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Tohoku University Annual Review 2012

Tohoku University
Annual Review 2012

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MISSION STATEMENT

Tohoku University has been committed to the “Research First” principle and “Open Door” policy since its foundation, and is internationally recognized for its outstanding standards in education and research.

The university contributes to world peace and equity by using the research results in solving societal problems, and educating human resources in leadership skills.

HISTORY

Tohoku University, formerly known as the Tohoku Imperial University, was founded in 1907. From its start, it displayed to the world an unswerving commitment to an “Open Door” policy. Departing from the norms of other imperial universities, it accepted graduates from technical schools and higher normal schools, and despite opposition from the government at that time, became Japan’s First University to admit female students in 1913 (admitting three in that year).

At the time of its founding, Tohoku University was able to attract a group of young and brilliant researchers who had trained around the world to serve on its faculty. For this reason, a “Research First” principle was established, calling upon scholars to not only pursue highly productive research but to also put their findings to work in the teaching of their students. In addition to this, Tohoku University has nurtured a tradition of “Practice Oriented Research and Education,” in which the results of cutting edge research are being put to use for the good of society and the improvement of living standards. Evidence of our pioneering practice includes the establishment of local venture businesses which have contributed to regional industry, and our status as the nation’s center for research on family law; the domestic branch of law which is closely associated with our daily lives.

Although Tohoku University was severely damaged in the wake of the Great East Japan Earthquake on March 11, 2011, great efforts have been made to restore the basic educational and research functions of our university, and with the traditions, the spirit of Tohoku University as its foundation, we will work toward the reconstruction of the Tohoku region and the revitalization of Japan.

Striving towards the Leap to World-Class and Leading the Way towards Reconstruction and Regeneration

Ever since Tohoku University was established in 1907, our philosophy has always been to put "Research-First," to maintain an "Open-Door" Policy, and to emphasize "Practice-Oriented Research and Education." With these three principles, the University has historically served its charter role as the premier research-oriented educational institution of higher learning. Tohoku University's Annual Review 2012 lists and notes the major achievements of the 2011 academic year.

Now, we are faced with difficult challenges, such as working up the experience of the Great East Japan Earthquake, the decline in industrial earning capacities, the dwindling birth rate, the intensification of international competition by globalization and also the environmental problems on global level. Faced with the present situation, during my six year tenure as President, Tohoku University will meet its responsibilities towards society and in order to fulfill its original mission on an even higher standard, we want to achieve the two goals "Leap to World-class" and "Leading the Way towards Reconstruction and Regeneration."

First, to fulfill the mission to leap for a World-class, the process and answers to the achievement of excellence in education and research are to be differentiated. Tohoku University will provide the liberal arts education curricula that will enable the students to acquire the leadership qualities necessary to meet the challenges posed by the present society. The University will provide the necessary language and communication skills to interact on an equal footing internationally with various people of the world, and enabling the students to play a leading role in the international community. In research, the roles of the University's graduate schools and research institutes will be enhanced by addressing the opportunities and issues associated with their current roles. We will devote all of our efforts to clarifying the issues for all mankind and addressing the challenges faced, from comprehensive and interdisciplinary perspectives.

Second, we will fulfill our leading role towards reconstruction and regeneration. Signs of reconstruction can be already observed in disaster affected areas, but a sharp vision for reconstruction has yet to be developed. Tohoku University is committed to leading the way by providing technological solutions and the development of local industries as a member of the affected communities, ushering the path to reconstruction and regeneration. We already promote various projects for reconstruction and regeneration at the "Institute for Disaster Reconstruction and Regeneration Research" which was established shortly after the great earthquake disaster, the "International Research Institute for Disaster Science" and the newly established Tohoku Medical Megabank Organization. In the future we will construct a cooperative network system not only stretching over Japan but the whole world.

In implementing the two key goals, Leap to World Class and Leading the Way towards Reconstruction and Regeneration effectively and efficiently, the University's management and operational structure will be held more accountable, and the high-level initiatives will be broken down into sets of more detailed action programs. Through your understanding of our mission and activities, and with the cooperation of many other people, I will continue my efforts to realize all this and contribute to the development of a just and peaceful human society.

Susumu Satomi
President of Tohoku University

Tohoku University News and Events April 2011 to July 2012

2011	
Apr. 25	University President announces Tohoku University Recommencement Declaration
Apr. 27	Tohoku University Institute for Disaster Reconstruction and Regeneration Research established
May. 6	Faculty entrance ceremony and orientation for new students
May. 7	All campus orientation and special seminar for new students
Jun. 30	2011 Revision to Inoue Plan 2007 (Tohoku University Action Plan) announced
Jul. 27 and 28	Tohoku University open campus
Sep. 27	Tohoku University commencement ceremony
Sep. 28	Opening ceremony for the Luxun Memorial Exhibit at the Tohoku University Archives
Oct. 8	Tohoku University Homecoming Day
Oct. 15	100th anniversary ceremony for the Tohoku University Library
Oct. 24	United Nations Day at Tohoku University
Nov. 3-5	Tohoku University Festival 2011
Dec. 7	Completion ceremony for the AIMR main building
Dec. 21	Powerful Positive Tohoku University Scholarship Program established
Dec. 31	New Year's Eve Concert 2011 "Repose and Gratitude" held in Tohoku University Kawauchi Hagi Hall

2012	
Feb. 1	Tohoku Medical Megabank Organization established
Feb. 25 and 26	2012 Tohoku University entrance examination: first examination for general admission
Mar. 11	Tohoku University session to mark the first anniversary of the Great East Japan Earthquake
Mar. 12	2012 Tohoku University entrance examination: second examination for general admission
Mar. 27	Tohoku University commencement ceremony
Apr. 1	Susumu Satomi becomes the 21st President of Tohoku University
Apr. 1	Tohoku University International Research Institute of Disaster Science established
Apr. 5	2012 Tohoku University entrance ceremony
Jul. 30 and 31	Tohoku University open campus

2012 Tohoku University entrance ceremony


Kawauchi-Kita Campus


2012 Tohoku University open campus

Post-Earthquake Relief Support and Reconstruction

The Great East Japan Earthquake, which struck at 2:46 p.m. on March 11, 2011 local time, and the subsequent tsunami of an unprecedented scale devastated communities in the Pacific Coast areas of the Tohoku region. Tohoku University has since been engaged in a wide range of reconstruction efforts.

Relief support in the aftermath of the earthquake

Tohoku University Hospital

Medical staffers from the Tohoku University Hospital rushed to affected communities to tend the injured. Critical patients were flown to the hospital by helicopter for treatment.

Radiation monitoring

We set up air-dose monitoring devices at four locations in the campus and at seven locations in Miyagi Prefecture, and kept students and local residents updated on the monitoring results. We also provided local governments with radiation data on vegetables, drinking water, air, soil, and seawater. Moreover, the University assisted Fukushima City in decontaminating soil within the fallout area.

Robot used to probe hazardous site

Quince, a robot that Tohoku University co-developed with the Chiba Institute of Technology to probe hazardous sites in disaster areas, was set to work at the Fukushima No.1 Nuclear Power Plant. The robot measured radiation dose rates inside the damaged reactor buildings and took photographs.

Student volunteers

Responding to a request from Miyagi Prefecture, teams of student volunteers helped local residents clean up their houses and sorted relief supplies from late March to June 2011. The Student Volunteer Support Center provided up-to-date information about volunteer opportunities; lent student volunteers equipment and tools; provided them with mental care; and organized volunteer tours to affected communities.

Keeping everyone informed

The University held four public forums and symposiums in which faculty members provided updates on the aftermath of the earthquake.

University hospital staffers loading medical supplies into a van

The Quince robot

Tour to an affected community, organized by the Student Volunteer Support Center

Tohoku University Recovery PR campaign

Tohoku University conducted a Recovery PR campaign under the slogan "Powerful Positive Tohoku University" to keep people in Japan and abroad updated on the progress that the University was making in recovering from the earthquake. We posted video clips and presentation materials on a special section of our website.

元気・前向き
Powerful Positive Tohoku University
東北大学

Official logo of the PR campaign

Donations received from around the world

Immediately after the earthquake, we started receiving an outpouring of messages of support and encouragement as well as donations from around the world.

As of March 31, 2012, the University had received 1,388 donations that amounted to 509.9 million yen from corporations, foundations, volunteer groups and individuals, and the University's alumni and faculty members.

With material and spiritual support and assistance from people in all walks of life, Tohoku University has been making a steady recovery from the earthquake and has been helping students in financial difficulties continue their education.

The money we received has helped repair or replace damaged laboratory equipment, and also finance a scholarship program named "Powerful Positive Tohoku University Scholarship," which assists financially struggling students in continuing their studies until graduation.

Financial assistance to students

Tohoku University extends the following financial assistance to high school seniors and graduates taking entrance examinations to the University and University students whose families were affected by the earthquake and are financially struggling.

Relief money

Financially struggling students received emergency relief money of up to 200,000 yen depending on the seriousness of their suffering.

Entrance examination fees, enrollment fees, and tuition waived

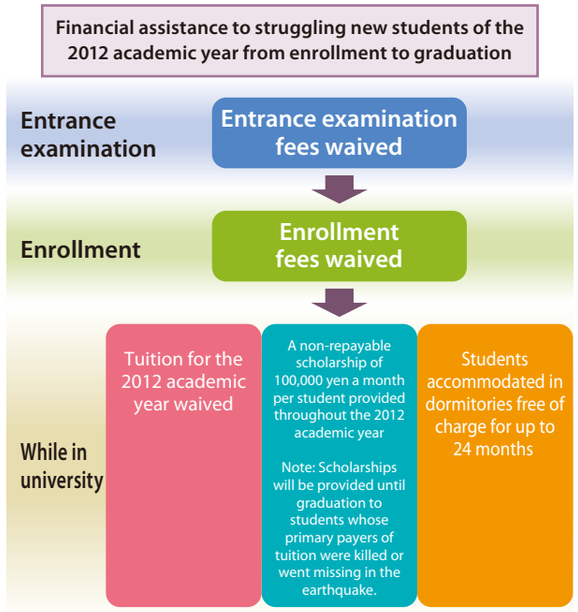
Depending on the seriousness of their financial suffering, students had their enrollment fees and tuition waived, and high school seniors and graduates who took entrance examinations to the University in February and March 2012 were exempted from examination fees.

Powerful Positive Tohoku University Scholarship

A scholarship program has been set up to provide each financially struggling student with a non-repayable scholarship of 100,000 yen a month for 12 months.

Temporary housing

We have built four temporary dormitories in Sendai to accommodate students free of charge.



Financial assistance to struggling new students of the 2012 academic year

Temporary dormitory on Kawauchi Campus

Shared living room space in the dormitory

A semi-furnished dorm room measuring 15 square meters

Leading efforts for regional reconstruction: Eight Projects and Reconstruction Action 100+

Tohoku University, as a member of the community affected by the Great East Japan Earthquake, has established the Institute for Disaster Reconstruction and Regeneration Research, which plays a leading role in helping bring affected communities back to normal by coordinating Eight Projects and supporting Reconstruction Action 100+.
(Disaster Reconstruction and Regeneration Research Website: http://www.bureau.tohoku.ac.jp/president/open/idrrr/)

<Eight Projects>

1. International Research Project on Disaster Science
2. Project for the Reconstruction of Community Health Care
3. Project for Environmental Energy
4. ICT Reconstruction Project
5. Tohoku Marine Science Project
6. Radioactive Decontamination Project
7. Regional Industries Restoration Support Project
8. Industry-University Collaboration Development Project for Reconstruction

1. International Research Project on Disaster Science

The International Research Institute of Disaster Science (IRIDeS) has been established to pursue an interdisciplinary and practical approach to enhancing disaster preparedness. The institute is tasked with reviewing and upgrading technology for reducing and managing disaster risks and with compiling and preserving records of the earthquake and tsunami for future generations.

Project to archive records of the damage caused by the earthquake and tsunami


IRIDeS Professor Fumihiko Imamura briefed the Emperor and Empress on a project to manage disaster risks on May 12, 2012 (photo provided by the PR Division of Miyagi Prefectural Government)

Posting an IRIDeS sign

2. Project for the Reconstruction of Community Health Care

- **The Comprehensive Training Center for Community Medicine** has been established to retrain medical staffers from the affected areas so that they can demonstrate better skills when they are back in community hospitals and clinics.
- **Tohoku Medical Megabank Organization** has been established to create a biobank that integrates medical and genome information; to build an information infrastructure for community medical services; and to develop highly skilled medical staffers.


Medical staffers learning how to use state-of-the-art medical equipment

3. Project for Environmental Energy

Meeting the energy needs of affected communities by researching and developing a disaster-resistant, clean energy system, as part of efforts to help reconstruct the Tohoku region.


Tohoku Medical Megabank Organization Session to discuss community health care

4. ICT Reconstruction Project

Researching and developing a disaster-resistant infrastructure for information and communication technology to address vulnerabilities of ICT exposed in the wake of the earthquake, such as the disruption of mobile phone services.

5. Tohoku Marine Science Project

Tracking and monitoring changes in the fishery environment along the Pacific Coast to ascertain the impact the earthquake and tsunami had on the marine ecosystem in the Tohoku region as a step toward restoring the region's fishery industry.

6. Radioactive Decontamination Project

- Researching effective ways to decontaminate radioactive soil and developing a technology to make use of radioactive substances extracted from such soil.
- Analyzing the organs of cattle and other farm animals exposed to radiation to ascertain the biological impact of radioactive substances through environmental media.


Decontamination of the playground of a nursery school in Fukushima

7. Regional Industries Restoration Support Project

The School of Regional Innovative Producers trains corporate executives and up-and-coming business leaders from local communities to lead efforts to restore industries in the Tohoku region.

8. Industry-University Collaboration Development Project for Reconstruction

Working with local businesses and leveraging the technological expertise that Tohoku University has amassed to pursue new business opportunities in a joint effort to innovate and enhance the region's industrial infrastructure that will provide a basis for economically revitalizing the affected communities.

<Reconstruction Action 100+>

Faculty members of Tohoku University's graduate schools and research institutes have initiated and been engaged in more than 100 voluntary projects of diverse scope to assist with the reconstruction of the affected communities in the region.

Food-Agriculture-Village Restoration Support Project coordinated by Graduate School of Agricultural Science

This project assists in securing safe, sustainable food resources; in restoring the region's agriculture, forestry, fishery, and livestock industries; and in revitalizing the region's farming and fishing communities. Two-thirds of the graduate school's faculty members are engaged in project activities, which include planting coles in farmlands damaged by seawater; helping restore the aquaculture business of oysters; and rounding up cattle left unattended within a 20-kilometer radius of the Fukushima No.1 Nuclear Power Plant.
(Website: http://www.agri.tohoku.ac.jp/agri-revival/)

Off-Site Open Class on Smart Aging conducted by the Institute of Development, Aging and Cancer (IDAC)

IDAC professors visit community centers in the affected areas to talk to local residents about healthy aging and give them tips on how to live long and happy lives. The professors help people who had gone through a lot from the earthquake and tsunami take good care of themselves and help them get physically and mentally strong enough to take up the challenge of reconstructing their communities.
(Website: http://www.idac.tohoku.ac.jp/demae/index)

Renewed commitment on the first anniversary

The start of the 2012 academic year coincided with the first anniversary of the Great East Japan Earthquake. To keep the affected communities on a firm track to full recovery, it is imperative to carry out reconstruction projects with a long-range vision for the future of the Tohoku region in particular and Japan as a whole. Tohoku University will continue to work closely with businesses and local and national governments to address opportunities and issues associated with the region's reconstruction efforts. We are also committed to becoming an educational and research institution that attracts the brightest minds from around the world and that contributes to society.

Tohoku University has been a part of the community and has been receiving community support throughout its history of more than 100 years. We have received an outpouring of sympathy and encouragement from many people after the earthquake. As a way to return the favor, Tohoku University strives to become a world-class university as its mission states, and will continue to play a leading role in reconstructing the Tohoku region and in revitalizing Japan.

"Going to Places Where Humans Cannot" Sending the Dream of Science on a Space Probe

JAXA's successful space probe Hayabusa was built to perform the first sample-return mission from an asteroid in human history. The probe experienced many problems after arriving at its target, Itokawa, and the resulting drama and anticipation of Hayabusa's return made it one of the most well-known space missions in Japanese history. The Space Robotics Lab at Tohoku University, led by Professor Kazuya Yoshida, contributed to the design and analysis of Hayabusa's sampling apparatus. The Space Robotics Lab focuses on technology, like Hayabusa, which allows exploration of environments where humans cannot survive. Hayabusa was designed for asteroid exploration, but robots for lunar and planetary exploration, satellites in orbit around Earth, and even rescue robots for use on Earth are being investigated in Professor Yoshida's lab.

For planetary exploration, such as on the Moon and Mars, rovers which travel on and carry scientific equipment across the surface of the planet are incredibly useful. The Space Robotics Lab has worked to improve various traveling methods which prevent wheels from spinning out of control in soft soil. They then conduct experiments by traveling to deserts and volcanoes where conditions are similar to barren planets.

The Space Robotics Lab is also developing a series of university-made microsatellites for Earth observing missions, known as "RISING". The first model is already in orbit around Earth and the RISING-2 is launching soon. In partnership with Hokkaido University, the satellites are being used to investigate the "sprites" upper atmosphere lightning phenomena. As projects like this lower the barrier to entry for space, hundreds of satellites can be placed in orbit for innumerable uses, such as rapid monitoring of natural disasters.

Space is not the only place where humans cannot go – disasters here on Earth of often complicated by environments too dangerous for human access. The Space Robotics Lab is involved in the "Quince" Project and worked on developing a model to be used in the nuclear accident in Fukushima. Radiation damage to electronic components of conventional robots was a significant concern, but they were able to find solutions by leveraging their experience with space systems.

[Photo 1] A computer graphic model of the Hayabusa asteroid probe. Professor Yoshida contributed to the technological development for sampling of the asteroid surface. [Photo 2] The earth observation microsatellite RISING. This satellite, created by students, is now flying in space. [Photo 3] The model rocket was launched in Nevada, U.S.A. Emphasis is placed on the educational aspects, such as practical training using robots.

[Photo 4] An exploration rover which has been repeatedly tested in the laboratory sand pit. It is important that the robot can traverse sandy slopes. [Photo 5] Rescue Robot "Quince," which can climb even steep stairs. Also used after the nuclear accident in Fukushima due to our know-how in the radiation field.

Department of Aerospace Engineering
Graduate School of Engineering
Professor **Kazuya Yoshida**

Born in 1960 in Tokyo. Awarded his doctoral degree in Mechanical Engineering Science from Tokyo Institute of Technology. After the experience as an assistant professor in Tokyo Institute of Technology, a visiting researcher at Massachusetts Institute of Technology, and an associate professor of the School of Engineering, Tohoku University, Dr. Yoshida has served at his current position since 2003. Since 1998 Dr. Yoshida has also engaged in international educational activities as an adjunct professor of the International Space University.

http://www.astro.mech.tohoku.ac.jp/e/index.html

Discovery of Novel Type of Pluripotent Stem Cell, "Muse Cells" Opening a New Stage of Regenerative Medicine

While medical treatment is evolving, diseases which are completely curable are the exception. Among treatment types, "regenerative medicine" aims to regenerate tissues by the replenishment of lost cells due to degeneration of demages.

Pluripotent cells, such as ES cells and iPS cells, are considered to be cell source for regenerative medicine. However, much attention has been given to problems such as tumorigenic property.

In response to the question, "Are there any safe and effective cells?" Professor Mari Dezawa began considering mesenchymal cells. "When culturing human bone marrow mesenchymal cells, cell masses similar to ES cells are formed at a low frequency. We could understand to a point that these cells consisted of tridermic elements."

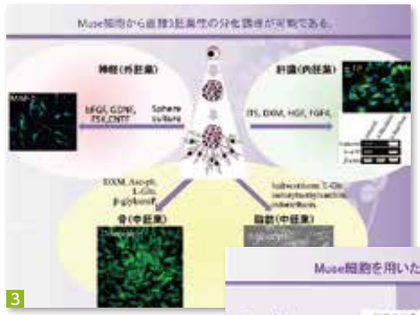
How to identify and isolate pluripotent cells then became the focal point of research. In 2007, clues to identify such cells were obtained at last. "During the experiment, mesenchymal cells were mistakenly incubated in a digestive enzyme for a prolonged period. It was a radical move, but, we were shocked to find an extremely small number of cells still remaining. With nothing to lose, we tried to culture them. And lo and behold, pluripotent stem cells we were searching for appeared!"

The discovered cells were named "Muse cells," and reported in April 2010. At the time, they were introduced by mass media as "The third type of pluripotent stem cells," and became very popular. Since then, direct separation from fresh bone marrow aspirate or the skin dermis using human embryonic stem cell marker SSEA-3 could be recognized.

"Since these cells already exist in vivo, no special procedures, such as gene transfer, are necessary. The danger of tumorigenic transformation is extremely low." When administered to a living body, Muse cells nome to damaged tissues, and differentiate into cells corresponding to the tissues. The possibility of autologous cell transplantation treatment is expected in the future.

"Progress in the research of Muse cells can be seen around the world. I think as efficacy increases, one path after another will be opened in regenerative medicine."

[Photo 1] Many young researchers, including foreign students, gather in the laboratory and actively carry out research. [Photo 2] A "Muse cell", the third type of pluripotent stem cell discovered by Professor Dezawa.



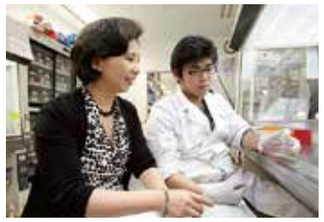
[Photo 3] Using a unique marker from Muse cells can directly lead to differentiation and induction to triderm without passing through iPS cells.

[Photo 4] A greater range of possibilities in regenerative medicine is expected by Muse cells allograft.

Department of Stem Cell Biology and Histology/Anatomy and Anthropology, Graduate School of Medicine
Professor **Mari Dezawa**

Born in Fukuoka Prefecture in 1963. She graduated from Chiba University Graduate School of Medicine and Pharmaceutical Sciences, specializing in regenerative medicine and stem cell biology. After serving as an assistant at Chiba University School of Medicine, lecturer of Yokohama City University School of Medicine, and Associate professor of Kyoto University Graduate School of Medicine and Faculty of Medicine, Dr. Dezawa has been at her present post since 2008.

http://www.stemcells.med.tohoku.ac.jp/english/index.html



Establishment of the Support Office for Children in the Aftermath of the 2011 Japan Earthquake

Support with developed community clinical practice know how

As a specialist of life-span developmental psychology and a view towards the mutual growth various generations in the family, workplace, and community, Professor Michiyo Kato engages in community clinical practice, including developmental consultation, counseling for parents and families, and specialized assistance for relief workers.

After the Great East Japan Earthquake, Professor Kato began support activities as the head of the Support Office for Children in the Aftermath of the 2011 Japan Earthquake, established by Graduate School of Education, Tohoku University. Long-term psychological support is provided by psychologists for 10 years, including support for single and foster parents. "It is a very difficult work. To be honest, when I was first heard about it, I was at a loss and didn' t know what to do. I thought that I would have to make full use of the support theory I had worked on up to now."

For children who were orphaned in the disaster, application to national facilities and searching for foster parents was recommended. However, it turned out that most children were taken in by relatives. "Usually, a person wants to contribute to social welfare and becomes a foster parent. But, in the case of this disaster, many people became foster parents totally unprepared. The reality of raising a child will catch up to the parents in the future." From telephone counseling, it was found that some children stop going to school from the second year, and that some parents are tired of the change in circumstances and are losing confidence in their relationship with children.

Currently the support office provides free telephone counseling, home-visiting counseling, a consultation room for foster parents, assistance for relief workers, etc. According to Professor Kato, the future vision of the support office is to work with relevant organizations and to promote support by a modest methodology called "filling in the gaps" that other organizations cannot. "I think that the important thing is, how the horizontal axis of local resources and the vertical axis of 10 years will line up. What will conditions be like 10 years after this unprecedented disaster? I would like to continue to provide support by using my imagination to the full."

[Photo 1] Establishment of the Support Office for Children in the Aftermath of the 2011 Japan Earthquake Commemoration Symposium – Mid/Long-term Support Outlook for Orphaned Children" was held in November 2011. Issues, such as the current situation of Miyagi Prefecture, issues facing foster parents, and the future direction of the support office, were discussed. [Photo 2] The Support Office for Children in the Aftermath of the 2011 Japan Earthquake was established in the Educational Network Center, Graduate School of Education. It will be the base of support for the next 10 years. [Photo 3] Caring for the mental health of children who have lost important persons and belongings is an important activity by the Support Office for Children in the Aftermath of the 2011 Japan Earthquake.

[Photo 4] A poster and flyer advertizing the support room. The picture of the grapes was drawn by an elementary school student living in Higashi-Matsushima City for the support room and is used as the Office mascot in advertisements. [Photo 5] Special cards with the counseling hotline number were printed. These cards were passed out to the local governments, schools, relevant organizations.

Department of Educational Science,
Graduate School of Education
Professor **Michiyo Kato**

Born in Miyagi Prefecture in 1956. She graduated from Tohoku University, Graduate School of Education, and obtained a doctoral degree (Pedagogy), specializing in life-span developmental psychology and clinical psychology. She is also a clinical psychotherapist. After serving as an assistant and associate professor of Tohoku University, Graduate School of Education, Dr. Kato has served in her present post since 2011.

■Support Office for Children in the Aftermath of the 2011 Japan Earthquake
http://www.sed.tohoku.ac.jp/~s-children/

Discovery of "dressed-cells" which inhibit delayed allergic reaction

What causes allergies? Allergic reactions occur when a person's immune system overreacts to a foreign antigen. Natural Killer cells (NK cells) are known to promote an immune response through interaction with antigen-presenting dendritic cells.

Professor Kouetsu Ogasawara discovered new cells which can control this function of NK cells.

"We discovered seven years ago that a molecular exchange between cells is possible." Professor Ogasawara says. "While carrying out a culture test on NK cells and cancer cells, we accidentally found out that NK cells had the same type of molecules as those on the surface of cancer cells."

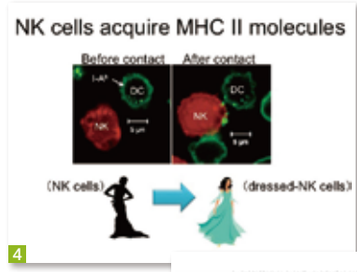
Further studies which focused on the interaction between NK cells and dendritic cells revealed that NK cells can acquire MHC II molecules from cancer cells, and transform into new type of cells.

The new cells were named "dressed cells" for their transformation which vividly reminds us of changing a dress. MHC II dressed-NK-cells were shown to regulate immune responses, and inhibit delayed allergic reaction.

"NK cells have long been recognized as immune-promoting cells, but they can function as immune-regulating cells through transformation into dressed-cells. In other words, their positive or negative immune responses can be adjusted by putting on or taking off their dresses." If we can control the acquisition pathway, it is suggested that new methods to treat delayed allergic reaction can be developed.

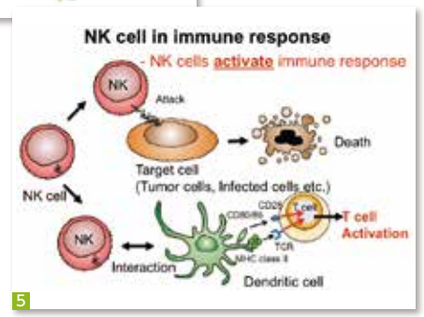
"This discovery is quite interesting, not only medically, but also for the scientific field. The expression of molecules has been strictly controlled by gene-expression regulation. However, we found that those molecules have the ability to change as a result of contact between cells. We believe that this discovery lays an important foundation for the further development of biological studies as well."

[Photo 1 2] Professor Ogasawara's laboratory. Research to develop new treatment for T-cell-related diseases, using newly discovered dressed-cells is now underway. [Photo 3] Discovery of new cells that inhibit delayed allergic reaction represented by contact dermatitis (such as allergy to metals, rash, drug hypersensitivity). In this picture, the moment where cells come in contact and are exchanging molecules is captured.



[Photo 4] NK cells (red) acquire MHC II-molecules (green) from dendritic cells. The cells were named "dressed-cells" for their action which bears a striking resemblance to changing a dress.

[Photo 5] We are beginning to understand the overall picture regarding the mechanism where NK cells, which have acquired MHC Class II molecules from dendritic cells, inhibit the activation of T-cells.



Department of Immunobiology,
Institute of Development, Aging and Cancer
Professor **Kouetsu Ogasawara**

Born in Akita Prefecture in 1967. He graduated from the Graduate School of Dentistry, Tohoku University, with a Ph.D degree in Dental Science. specializing in Immunology. He received the Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology, and other awards. Dr. Ogasawara has worked as Associate Professor at the Graduate School of Medicine and Faculty of Medicine, University of Tokyo, and the Director of General Research Institute, National Center for Global Health and Medicine, and has been in his current position since 2008.

http://www.med.tohoku.ac.jp/english/org/cooperate/115/

Bio-nano processing technology - Enhancing intelligent device development

Professor Seiji Samukawa says, “I want Japan to come back as the world’s leading semiconductor manufacturer”.

Currently, semiconductor devices are manufactured by plasma processing, with a maximum accuracy of 22 nanometers (nm). In order to make exceed the current limit, Professor Samukawa and his research group have developed ultra-high precise etching technology.

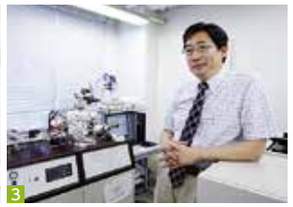
“With conventional plasma etching, material damage occurs due to electrical charges and ultraviolet rays. As an ultra-low damage process free from these factors, a new etching process using a “neutral beam” was developed. In this process, a neutral beam which maintains almost 100% kinetic energy can be produced as plasma passes through an aperture.

“We have further expanded this idea, and are developing a processing technology with accuracies of better than 10nm, by fusing neutral beam technology and biotechnology.”

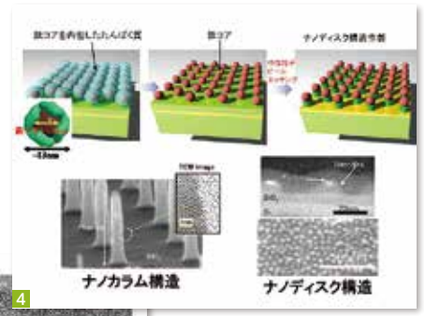
A mask, or a mold is necessary in top-down processing. However, in conventional lithography technology, developing a microscopic mask smaller than 22nm is not possible. To overcome this, the idea to utilize Ferritin, a protein containing iron particles in its core, was conceived. Ferritin can construct uniform structures to a measurement error of only 0.1nm. The iron particles, which remain after removing the protein shells, could be formed into lines at equal intervals. A micro-mask was developed using this alignment. Using neutral beam etching for this mask pattern, precisely-aligned quantum dots on a silicon substrate can now be created.

“A next-generation solar battery with energy conversion efficiency greater than 45% can be developed using this silicon as material. Since precise quantum dots can be created, power generation efficiency will be remarkably increased.”

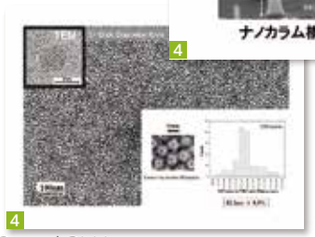
Establishment of an epoch-making processing technology has paved the way for further developments in the creation of solar batteries with high efficiency, laser devices, organic semiconductor devices, etc.

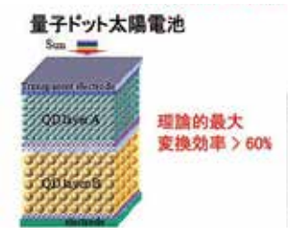


[Photo 1] Research on device-manufacturing using more precise plasma etching technology is now underway in the clean room. [Photo 2] Development of a generator for a highly efficient, low energy neutral beam which uses minus ions is now underway. [Photo 3] “I want Japan to come back as the world’s leading semiconductor manufacturer.” Professor Seiji Samukawa says.



[Photo 4] Research to create ultra-minute structures using bio-nano processing technology.





[Photo 5] The realization of a highly efficient solar battery is possible by using precisely-aligned quantum dots.

Intelligent Nano-Process Laboratory Targeted Research Division,
Transdisciplinary Fluid Integration Research Center, Institute of Fluid Science
Professor **Seiji Samukawa**

Born in Ishikawa Prefecture in 1959. He finished his doctoral course at the Faculty of Science and Technology, Keio University, specializing in Nano-Process Engineering. Dr. Samukawa has worked as a Chief Researcher at the Microelectronics Research Laboratory, NEC Corporation, and has served in his current post since 2000.

http://www.ifs.tohoku.ac.jp/samukawa/index.htm

Seeking business innovations which connect to regional resources with an entrepreneurial spirit

99% of all industrial and business entities in Japan are said to be small and medium-sized businesses. So how can innovation occur in such companies?

Professor Michi Fukushima says, “Through our studies, we have seen cases of innovation which are concentrated in specific areas.”

Take, for example, Austin, Texas. Prior to the mid 1980s, it was a sleepy town without any significant industries. However, since the arrival of George Kozmetsky, a key figure who focused on various resources found in the region, the town was dramatically transformed into a high-tech mecca only in 20 years. This transformation could be achieved by Kozmetsky’s vision, “Austin should be a large center of technology.”

Even in areas without abundant resources, regional innovation is still possible. Professor Fukushima presents following five points:

1) Entrepreneurs, 2) connection within the region, 3) not having a fixed view of resources, 4) diversity, and 5) a device to maximize potential.

From this standpoint, how does the situation in the Tohoku region look now?

“After the earthquake, people have become mobile, and more young people are returning to the stricken areas, creating a mixture of people who would like to do something about the area, and those ones who have found new business possibilities. I have great expectations for these regions.”

At the Regional Innovation Research Center where Professor Fukushima belongs to, various studies and research activities are carried out for local enterprises through two simultaneous approaches, the Local Industries Recovery Project and the Human Resources Development Project, with the goal of revitalizing local industries. For example, large-scale business surveys have been conducted, and attention has been focused on promising activities such as renewable energy, etc.

“The whole world is watching the Tohoku region. We have a chance to bring about big changes in the social order. No, we MUST change it.”

[Photo 1] A symposium hosted by the Local Industry Recovery Project. Proposals for the recovery of local industries from the Great East Japan Earthquake were discussed. [Photo 2] A policy workshop for business recovery. Through active discussions at the workshop, innovative ideas are created. [Photo 3] Although still underway, coastal regions hit by the earthquake and tsunami are being revitalized, thanks to the mobility of people and the entrepreneurial spirit of young ones moving into the region.

[Photo 4] Professor Fukushima, in her book “University Venture Companies and Cluster Strategies”, discusses whether the Austin model can be repeated in Japan.

[Photo 5] “Regional Innovation I – The Challenge from Tohoku” (jointly edited by the Tohoku Regional Advancement Center) introduces quiet innovations by undiscovered enterepreneurs in the Tohoku region, their efforts, and keys to success in making such innovations.

Business Administration Course, Regional Enterprises,
Graduate School of Economics and Management
Professor **Michi Fukushima**

Born in Shizuoka Prefecture in 1969. She graduated from the faculty of Economics, Tohoku University, with a master’s and doctoral course of the Graduate School of Commerce and Management, Hitotsubashi University, specializing in Business Administration. Professor Fukushima has worked as visiting scholar at the University of Texas at Austin, IC² Research Institute & Red McCombs School of Business, and has been in her current position since 2012.

http://www.econ.tohoku.ac.jp/~michi/newpage7.html

Contributing to Research in Superconductivity and Spintronics Using High-resolution Photoemission Spectroscopy

Superconductors have zero electric resistivity, and transfer energy without loss. In the past, superconductivity was realized by cooling down to -269 ℃ with expensive liquid helium. Recently, however, discovery of high-temperature superconductors can achieve the superconductivity with comparatively economical liquid nitrogen. Clarification of the mechanism of superconductivity is an important research subject for both basic science and practical application.

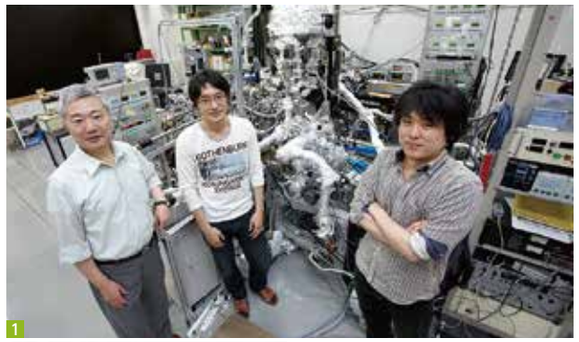
"The driving mechanism of novel properties in materials such as superconductivity is understood with the electronic structure. The most direct experimental method to measure the electron structure is photoemission spectroscopy based on the Einstein's light quanta (photon) hypothesis." states Professor Takashi Takahashi.

In photoemission spectroscopy, we inject photons onto the sample, so that electrons are emitted from the surface due to the external photoelectric effect. By measuring the energy and speed of emitted photoelectrons, we can experimentally determine the electronic structure of material. The photoemission spectrometer developed by Professor. Takahashi's group achieves a world-top-level resolution to survey the electronic state of materials with a very high precision. In fact, the spectrometer has been successfully used in the research of semiconductors and high-temperature superconductors.

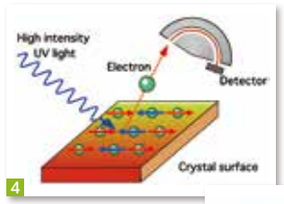
"Another important physical property of electrons is the spin. Recently we have constructed a spin-resolved photoemission spectrometer with the world-best resolution (8meV) at Tohoku University. This new machine would greatly contribute to the research of spintronics."

Currently, Professor Takahashi and his coworkers are carrying out active researches with this new machine on several novel functional materials such as topological insulators, graphene, iron-based high-temperature superconductors, and surface Rashba effect.

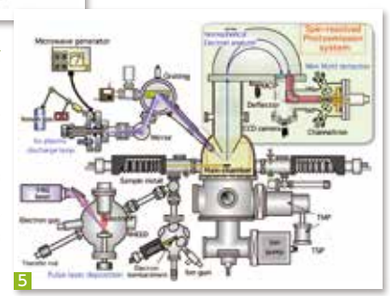
"Tohoku University is a center of materials science in the world. There are many active researchers and various interesting materials nearby. By taking this advantage, we would like to contribute to the research of new advanced materials."



[Photo 1 2 3] In Professor Takahashi's laboratory, the ultrahigh-resolution spin-resolved photoemission spectrometer was constructed to study the spin state of materials. The machine achieves the world-best resolution of 8meV.



[Photo 4] Schematic diagram of photoemission spectroscopy. We measure the energy, momentum, and spin of photoelectrons emitted by incident photons. Arrows show the direction of spin in the antiferromagnetic state.

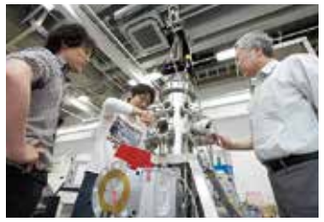


[Photo 5] Schematic view of the spin-resolved ultrahigh-resolution photoemission spectrometer constructed at Tohoku University. The energy and momentum of photoelectrons are analyzed by the hemispherical electron energy analyzer and then the spin is determined by the mini-Mott detector.

Advanced Institute for Materials Research
Department of Physics, Graduate School of Science
Professor **Takashi Takahashi**

Born in Niigata Prefecture in 1951. He graduated from Tokyo University School of Science, specializing in physics. After serving as an assistant professor of Tohoku University, School of Science, Department of Physics, Dr. Takahashi has served at his current post since 2007.

http://arpes.phys.tohoku.ac.jp/index-e.html



A gene-manipulated rat which sense light at its skin - Innovative informational transmission to the brain

How do we sense light and feel things? The answer is not as easy as it seems. Professor Hiromu Yawo and others at the Graduate School of Life Sciences, Tohoku University successfully developed the world's first rat with "Supersense", light-sensing skin. To develop this transgenic rat, the researchers focused on "Channelrhodopsin (ChR)", light-sensitive proteins obtained from single-celled green algae "Chlamydomonas".

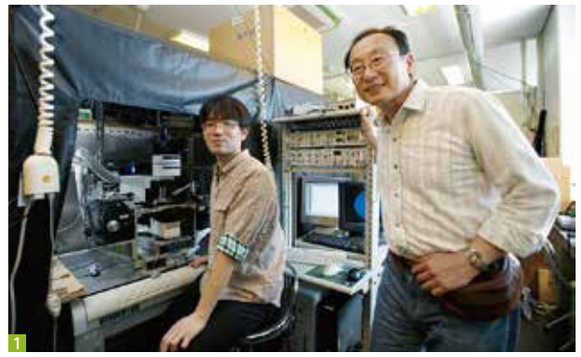
Professor Yawo says, "When light hits the rat's leg from under the cage, the rat moves as if physically touched."
In this experiment, if ChR can be expressed in living brain cells, neural manipulation by light is possible.

In the human brain, external stimuli are recognized through the links between neurons. However, methodologically explaining their function in detail is difficult, since those links are made up of multiple cells. Using light, it is possible to stimulate the targeted cells one by one, and as a result the relationship between these cells can be studied.

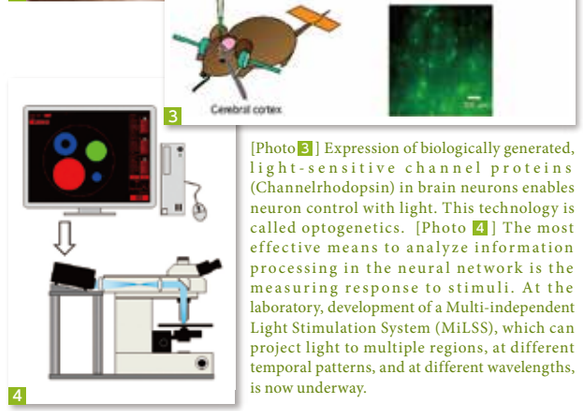
"How our brains recognize shape, size, movement, texture and other kinds of information provided through the sense of touch is still not well understood. We believe that the development of this rat will enhance studies in this area."

This technology allow us to directly send information to the brain by transmitting signals with specific meaning to the brain, through the irradiation of patterned light.
Professor Yawo says, "By connecting the brain to external devices such as a computer, brain-to-brain, and brain-to-machine communication using light may become a reality in the future."

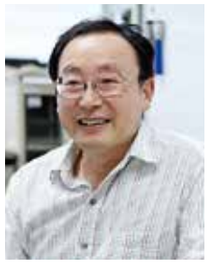
Professor Yawo's research group is now conducting research on a Brain-Machine Interface (BMI), a direct communication pathway to the brain through light, by applying technology obtained in this basic research .



[Photo 1 2] Methods to stimulate neurons with light, and to visualize the function of synapses, junctions where neurons are connected each other, using genetic engineering techniques, are now currently employed in the laboratory.



[Photo 3] Expression of biologically generated, light-sensitive channel proteins (Channelrhodopsin) in brain neurons enables neuron control with light. This technology is called optogenetics. [Photo 4] The most effective means to analyze information processing in the neural network is the measuring response to stimuli. At the laboratory, development of a Multi-independent Light Stimulation System (MiLSS), which can project light to multiple regions, at different temporal patterns, and at different wavelengths, is now underway.



Laboratory of Molecular and Cellular Neurosciences,
Graduate School of Life Sciences
Professor **Hiromu Yawo**

Born in Fukuoka Prefecture in 1952. He graduated from the Faculty of Medicine and the Graduate School of Medicine, Kyoto University, specializing in brain function analysis. Dr. Yawo has worked as Research Fellow for Japan Society for the Promotion of Science, and Assistant and Lecturer at Kyoto University. He has worked as Professor at Faculty of Medicine, Tohoku University since 1995, and has served in his current post since 2001.

http://neuro.med.tohoku.ac.jp/english/ENGLISH.htm

Faculty Awards and Honors

(August 2011-July 2012)

Grand Cordon of the Order of the Rising Sun Autumn 2011 (Awarded in November 2011)

Professor Emeritus Tokiyasu Fujita

From 1966 to 2002, Tokiyasu Fujita served as an assistant professor and professor of the School of Law at Tohoku University and then as a professor of its Graduate School of Law. He served as a Supreme Court justice from September 2002 to April 2010. He specializes in administrative jurisprudence and has been instrumental in evolving it in Japan. He also has an extensive knowledge of land laws and the Japanese Constitution. His opinions and decisions during his tenure on the Supreme Court bench were highly acclaimed for their practical and theoretical soundness. He has authored, among other writings, *Exercise of Public Power and Claim of Private Rights*, 1978; *Administrative Law I: Overview, First Edition* 1980, *Fourth Revised Edition* 2005; and *Basic Theory of Administrative Law*, two-volume set, 2005.

Grand Cordon of the Order of the Sacred Treasure Spring 2012 (Awarded in April 2012)

Professor Emeritus Hiroyuki Abe, a former president of Tohoku University

Hiroyuki Abe served as the president of Tohoku University from November 1996 to November 2002. He specializes in mechanical engineering (mechanical materials, material mechanics). He was an executive member of the Council for Science and Technology Policy from January 2003 to January 2007. He became an adviser to the Japan Science and Technology Agency (JST) in January 2007 and then the director of the JST Center for Intellectual Property Strategies in November 2009.

Medal with Purple Ribbon Autumn 2011 (Awarded in November 2011)

Professor Mitsumasa Koyanagi, New Industry Creation Hatchery Center

Mitsumasa Koyanagi developed a stacked capacitor memory cell—a basic device for dynamic random access memory—and has contributed to the growth of semiconductor industries in Japan and abroad. He designed three-dimensional ICs in 1989 and has since been a world leader in this field. He is also engaged in biodevice engineering, which combines semiconductor technology, nanotechnology, and biotechnology. He helps many researchers and engineers advance their academic excellence.

Medal with Purple Ribbon Spring 2012 (Awarded in April 2012)

Professor Masayuki Yamamoto, executive director of the Tohoku Medical Megabank Organization

Masayuki Yamamoto has been conducting pioneering research on oxidative stress response. He discovered that the Keap1 sensor molecule and the Nrf2 transcription factor control the environmental response system that a body has to maintain its biological activities under ever-changing environments; he ascertained how Keap1, upon detection of oxidative stress, activates Nrf2 and induces it to express detoxification enzymes.

Professor Shigenao Maruyama, Institute of Fluid Science

Shigenao Maruyama has evolved thermal engineering—a field of mechanical engineering—and has created a new research paradigm for it. His pioneering research achievements include an analysis of radiative heat transfer; the development of artificial heart muscles and cryoprobes by applying the active heat-transfer control using Peltier elements; and a project to draw up deep seawater using natural convection on a large scale.

Thomson Reuters Citation Laureate (Awarded in September 2011)

Professor Hideo Ohno, Center for Spintronics Integrated Systems, Research Institute of Electrical Communication

Hideo Ohno was selected as a 2011 Thomson Reuters Citation Laureate for his contribution to ferromagnetism in diluted magnetic semiconductors. Thomson Reuters Citation Laureates are selected as likely candidates for the Nobel Prize based on the citation impact of their published research findings using the Web of Science database.

L'ordre national de la legion d'honneur Chevalier (Awarded in October 2011)

Professor Yuko Harayama, Graduate School of Engineering

L'ordre national de la legion d'honneur was founded by Napoleon Bonaparte in 1802, and is awarded to private citizens who make outstanding achievements in culture, science, industry, and commerce. Chevalier designates a rank of the award. Yuko Harayama received the award for her studies in the field of science and technology policy; activities as an executive member of the Council for Science and Technology Policy; the promotion of cultural exchanges between Japan and France; contribution to French industries; and contribution to the development of young people in Japan and France.

25th IBM Japan Science Awards (Awarded in December 2011)

Professor Eiji Saitoh, Institute for Materials Research

Eiji Saitoh received an IBM Japan Science Award in Physics for his pioneering research on the spin Hall effect and the reverse spin Hall effect as well as his contribution to spin flow physics. The IBM Japan Science Award recognizes outstanding Japanese researchers 45 years of age or younger in the fields of physics, chemistry, computer science, and electronics, based on a review by a panel that includes Nobel Prize-winning scientists.

Associate Professor Eijiro Sumii, Graduate School of Information Sciences

Eijiro Sumii received an IBM Japan Science Award in Computer Science for developing a first proof method of program equivalence in a large class of high-level languages. His research findings were published in the Journal of the ACM, one of the most prestigious journals in computer science.

2012 Frederic Stanley Kipping Award (Awarded in March 2012)

Professor Emeritus Mitsuo Kira, Graduate School of Science

Mitsuo Kira received the 2012 Frederic Stanley Kipping Award for his achievement in the synthesis and characterization of the first trisilaallene. The award was established by the American Chemical Society in 1960 to recognize distinguished contributions to the field of silicon chemistry. Kira is the second recipient of the award in the Graduate School of Science of Tohoku University, after Professor Emeritus Hideki Sakurai in 1978.

Leading society in pursuing innovation

Organization and management that lay the groundwork for the future of society

Distinguished Professors 2011

Profiles of the University's professors to whom the title Distinguished Professor 2011 has been extended were posted on the University's website in March 2012.

The title of Distinguished Professor recognizes professors who play innovative roles in the fields of classroom teaching, research, and social contribution. Through this program, Tohoku University intends to show to the world its appreciation and support for talented professors, as well as enhance the University' s international standing and attract brilliant researchers and students from around the world.

Seventeen professors were named Distinguished Professors 2011 for having applied their extensive professional expertise in making remarkable academic achievements. Summaries of their research projects and their comments are posted at:
http://www.bureau.tohoku.ac.jp/koho/dp/english/index.html

Completion ceremony of the AIMR main building

The exterior walls of the building retain the old scratched-tile structure from the days of Tohoku Imperial University, while the glass walls and ceilings give its interior a modern look. A community space is provided to AIMR researchers to facilitate greater interaction and networking among them.

A ceremony to mark the completion of the main building of the Advanced Institute for Materials Research (AIMR) was held on December 7, 2011.

The construction of the main building was completed only four months behind schedule—despite the interruption caused by the Great East Japan Earthquake. The new building, which provides a unified location for all AIMR researchers on the Katahira Campus, is expected to facilitate, to a greater extent, integrated research across diverse fields of material sciences.

The completion ceremony, for which Center Director Yoshinori Yamamoto served as master of ceremonies, featured speeches by Dr. Akihisa Inoue, the president of Tohoku University; Dr. Hiroyuki Abe, a counselor to the President of the Japanese Science and Technology Agency and a former president of the University; Hayashi Towatari, deputy director general, Research Promotion Bureau of the Ministry of Education, Culture, Sports, Science and Technology (MEXT); and Dr. Toshio Kuroki, WPI program director. At the reception that followed, Dr. Junichi Nishizawa, an adviser to the Sophia School Corporation and a former president of the University, and Dr. Yoshihito Osada, WPI program officer, made speeches offering their congratulations on the completion of the building. (Attendees' titles are at the time of the event.)

Global Centers of Excellence Program

The Global COE Program is operated by MEXT to support centers of excellence in Japan as part of an initiative to make Japanese universities more competitive internationally and to nurture creative talents with global leadership potential. In the selection process, COE candidates are reviewed to determine their potential for growth as education and research centers capable of developing human resources using world-class, innovative, and groundbreaking research infrastructures.

At Tohoku University, 12 programs in eight research fields were designated as COEs in the 2007 and 2008 academic years.

- Basic & Translational Research Center for Global Brain Science
- International Center of Research & Education for Molecular Complex Chemistry
- Materials Integration International Center of Education and Research
- Center of Education and Research for Information Electronics Systems
- Global Nano-Biomedical Engineering Education and Research Network Center
- Global COE for Conquest of Signal Transduction Diseases with “Network Medicine”
- Weaving Science Web beyond Particle-Matter Hierarchy
- Global Education and Research Center for Earth and Planetary Dynamics
- World Center of Education and Research for Trans-disciplinary Flow Dynamics
- Center for the Study of Social Stratification and Inequality
- Gender Equality and Multicultural Conviviality in the Age of Globalization
- Center for Ecosystem Management Adapting to Global Change

100th anniversary of the University Library

June 14, 2011 marked the 100th anniversary of the Tohoku University Library, which was built on the current Katahira Campus in June 1911, four years after Tohoku Imperial University was founded.

Four branch libraries opened in the years that followed: the Medical Library in 1915, the Agricultural Library in 1974, the Engineering Library in 1978, and the Kita Aobayama Library in 1982.

The library boasts a broad collection of documents and books of historical values, including two national treasures; the Kano Library, which is an indispensable asset to scholars of the Edo period; and the Soseki Library, which includes a private book collection accumulated by Soseki Natsume—a prominent Japanese novelist (1867-1916)—and drafts and documents authored by him. The library's collection can be viewed electronically via the Internet.

Events celebrating the library's 100th anniversary

Birthday messages to the library (June 14, 2011):

People who visited the library on this day were asked to submit comments about and requests for the library, and were given 100th anniversary commemorative gifts.

Commemorative ceremony and speech (October 15, 2011):

During the commemorative ceremony, Professor Emeritus Hiroshi Okamoto donated to the library a copy of a first edition of *On the Origin of Species* by Charles Darwin, which he had bought at Bauman Rare Books in New York in 1997.
Dr. Hideaki Sena, a Tohoku University graduate and best-selling author of science fiction and fantasy, delivered a commemorative speech titled "The Future of Science and Humans and the Power of Story," which gave the audience something to think about regarding leveraging science to deal with post-earthquake challenges.

Commemorative exhibit titled "Collection of Brilliance: Gifts to the Future" (October 7 to November 5, 2011):

The library's collection of old books and documents that survived the Pacific War and the Great East Japan Earthquake was on display for public viewing.

Commemorative speech (October 30, 2011):

Professor Arata Hirakawa, the Center for Northeast Asian Studies, delivered a speech titled "Japan in the Edo Period was an Empire: Images of Japan Viewed Through the Eyes of Europeans."

First edition of *On the Origin of Species* (restored)

TOPICS

Tohoku University ranks third in the world in terms of academic paper citations in material science

Thomson Reuters, which is the world's leading source of academic information for researchers, released the rankings of Japanese research institutions based on citations in published academic papers. Tohoku University ranked third in the world (first in Japan) in material science and 12th in the world (second in Japan) in physics in 2012 as it did in 2011. These rankings indicate that the University is recognized worldwide as a research institution that has impressive academic achievements.

3rd in the world (1st in Japan) in material science

12th in the world (2nd in Japan) in physics

20th in the world (6th in Japan) in chemistry

109th in the world (9th in Japan) in biology/biochemistry

135th in the world (8th in Japan) in immunology

Compilation period: January 1, 2002 to April 30, 2012

Educational support tailored to meet diverse academic needs

Providing programs to assist education and research essential to a dynamic university

University Contribution Award in Education

This award recognizes University faculty members who make outstanding achievements in classroom teaching of liberal arts curriculums, refining education methods, providing study support to students, and taking a creative approach to teaching the curriculums.

Associate Professor Minoru Katsuyama,
Graduate School of International Cultural Studies

His class on literature took an ingenious approach to classroom teaching by engaging students' spontaneous motivation with good results, and was rated extremely highly by students.

Professor Tsuneyuki Abe,
Graduate School of Arts and Letters

Of all the social science classes offered in the liberal arts curriculums, his class was rated extremely highly by students in terms of student satisfaction and learning outcome; he contributed to keeping the quality level of the curriculums high.

Associate Professor Hironobu Higuchi,
Graduate School of Medicine

His physical education classes, especially tennis classes, were rated extremely highly by students in terms of student satisfaction.

Presidential Prize for Educational Excellence

This prize recognizes University faculty members who demonstrate outstanding dedication and excellence in teaching classes, assisting students in extracurricular activities, and supporting international exchange programs.

Associate Professor Minoru Katsuyama,
Graduate School of International Cultural Studies

In liberal arts curriculums, his humanities classes engaged students' spontaneous motivation with good results, and were rated highly by students.

Steering Committee of the Special Education Project for Advanced Mathematics and Physics, Graduate School of Science

This project, with the support of MEXT's Math and Science Students Support Project, helped improve students' math and science proficiency by facilitating an exchange-class program between departments, offering a short-term overseas study program, and having a dedicated assistant professor give a special exercise lesson.

Professor Hitoshi Tanaka and Professor Toshikuni Yonemoto, Graduate School of Engineering

They were the first at Tohoku University to develop and deploy a portfolio-based evaluation system to track each student's academic progress.

Professor Hitoshi Yonekura,
Graduate School of Agricultural Science

He made a significant contribution to promoting international exchanges between Tohoku University and an Indonesian university by helping conclude an agreement for exchanges between the two; developing a double-degree program; and teaching and helping Indonesian students at the University under the International Program in Liberal Arts.

Committee to Implement an Education Program for Professional Ecosystem Managers

The committee helped doctoral students achieve academic excellence in environmental studies through the Global Center of Excellence Program, bringing the University's doctoral programs to a new level.

Educational Development Core in International Cooperation

Tohoku University's Center for the Advancement of Higher Education was accredited as a joint educational development center by MEXT in March 2010 to support professional development of university faculty and staff at various higher education institutions in Tohoku area and across Japan.

The center's mission is to engage with organizational development and to develop and provide professional development programs that reflect career stages of university staff members including graduate students who wish to pursue an academic career path. Through these activities, we aim at contributing to create Japanese universities world-class.

Building on its previous achievements in promoting international collaboration in various fields, the center works with the University of California at Berkeley in the United States, the University of Melbourne in Australia, Queen's University in Canada, and other overseas institutions on research and program development.

Tohoku University Preparing Future Faculty Program abroad session in the University of Melbourne

Small-group seminars for first-year students

Most of first-year students attend small-group seminars of their choice during the first semester. They choose from among 150 seminars on diverse subjects given by more than 200 teachers, including faculty members of the University's undergraduate schools, graduate schools, institutes, research centers, and hospital as well as professors emeritus. Freshmen with any majors from any undergraduate schools may choose from any of these 150 seminars that interest them—even if a seminar's subject is not immediately relevant to their majors.

These seminars are intended to help freshmen make smooth transitions from the cramming style of learning they adopted when preparing for entrance examinations to a more academic style of learning by placing a greater emphasis on a hands-on approach to learning, which includes laboratory work and field trips, than on formal lectures. Each seminar accommodates an average of 15 freshmen, who research subject matters on their own and debate the findings with fellow students. This approach gives students an opportunity to acquire a self-driven style of learning. Students have an opportunity to give a formal presentation of their research findings, and those who make outstanding presentations receive recognition. This helps students improve their communication skills and broaden their academic perspectives.

Student giving a presentation of research findings

The project of Student Learning Advisers

SLA members

At Tohoku University, juniors, seniors, and graduate students staff to serve as Student Learning Advisers (SLAs) to assist freshmen and sophomores with their liberal arts studies under the slogan "TOGETHER we learn, TOGETHER we grow, TOMOSODACHI!" SLA provides their services out of the Kawauchi Learning Plaza, which is located on the first floor of the Multimedia Education and Research Complex.

SLA provides: (1) one-on-one tutoring; (2) class-specific academic assistance; (3) SLA-initiated academic assistance; and (4) assistance with student learning groups. First-year and second-year students learn from SLAs how to write a good report, how to learn in the university, and how to organize and manage a student learning groups.

The Kawauchi Learning Plaza accommodates the SLA Support Office, which handles inquires about the SLA program, and the Consultation Desk staffed by SLAs.

Students grow in their potential through studies and club activities

Campus life that helps students develop a greater sense of individuality

JASSO Students of the Year for 2011

To help nurture leaders of the next generation, the Japan Student Services Organization (JASSO) runs the Students of the Year program, which recognizes students who make outstanding achievements in academic studies, the arts and culture, sports, and social contributions, and awards them prizes paid out of donations.

The following three Tohoku University students were honored as JASSO Students of the Year for 2011.

Name	Faculty	Year	Prize	Field
Hideyuki Shimizu	School of Medicine, Medicine	Sixth year	Excellent Prize	Academic studies
Miki Hosaka	School of Pharmaceutical Sciences, Pharmacy	Sixth year	Student Encouragement Prize	Academic studies
Hiroki Sato	Faculty of Economics, Business Administration	Senior	Student Encouragement Prize	Social contributions

Orienteering Club wins 2011 Sendai City Sports Prize

The Tohoku University Orienteering Club, a member of the University's Students' Friendship Association, received a group encouragement award of the 2011 Sendai City Sports Prize, and one of its members Yoshitaka Fukazawa, a senior of the School of Engineering, received an individual encouragement award in an award ceremony on February 6, 2012. The Sendai Sports Prize recognizes groups and individuals who make outstanding achievements in amateur sports.

Individual Encouragement Award:
Yoshitaka Fukazawa, a senior of the School of Engineering, Orienteering Club
Group Encouragement Award: Orienteering Club

■Orienteering Club

Members of the Tohoku University Orienteering Club constantly hone their orienteering skills by training on weekdays, attending practice sessions in a Sendai suburb on weekends, and participating in orienteering meets held around the country.

The club is seen as a powerhouse at the national level, and its members have made the top six finalists at the Japan Collegiate Orienteering Championships every year. One of its members represented Japan at the 2011 Junior World Orienteering Championships.

2011 Ishida Cup and Umino Award for non-sports clubs

At an award ceremony on March 19, 2012, the Ishida Cup—which recognizes a non-sports club in the Students' Friendship Association for contributing to the development and promotion of the association's non-sports clubs—was presented to the Jugglery Club, and the Umino Award—which recognizes a non-sports club that achieves an excellent performance or contributes to the University and the community—to the Japanese Music Club.

■Jugglery Club

Members of the Tohoku University Jugglery Club practice their skills in magic, card tricks, juggling, ball tricks, and diabolo, and perform juggling and magic shows at the Cultural Festival, the Magic Festival in Sendai, and the Tohoku University Festival. In 2011, they held shows in communities affected by the March 2011 earthquake.

■Japanese Music Club

Club members play old and modern Japanese tunes on traditional Japanese instruments such as koto (harp), shamisen (banjo), and shakuhachi (flute) in concerts held twice a year. They also perform at the annual Jozenji Street Jazz Festival in Sendai.

2011 Students' Friendship Association Awards for sports clubs

At an award ceremony on February 21, 2012, the Tohoku University Students' Friendship Association presented awards to the University's Swimming Club and six other sports clubs and four individual club members for their outstanding performances during the 2011 academic year.

■Sports clubs and club members recognized by the Students' Friendship Association

	Award	Club/Club Member
Four Sports Awards	**Kurokawa Cup** Awarded to a sport club that achieves the best performance during the year	Swimming Club
	Shimura Cup Awarded to a sport club that makes the most outstanding achievement in competition during the year	Orienteering Club
	Suzuki Award Awarded to sophomores considered to be the most promising sports talents	• Kazumasa Susuda, sophomore of the School of Engineering, Triathlon Club • Jun Seki, sophomore of the School of Engineering, Orienteering Club • Shinichiro Fukawatari, sophomore of the Faculty of Arts and Letters, Track and Field Club
	Otani Award Awarded to a sports club that wins a championship at the annual Seven Universities Athletic Competition	Women's Japanese Archery Club, Women's Table Tennis Club, Men's Volleyball Club, Men's Soft Tennis Club, Women's Soft Tennis Club
Chairman's Award Awarded to a senior who has consistently achieved an outstanding performance in a sport club throughout the four years at university		Takuya Tanabe, senior of the Faculty of Agriculture, Orienteering Club

■Swimming Club

Club members compete at the annual Seven Universities Athletic Competition, Collegiate Swimming Championships in Hokkaido and Tohoku Regions, and other swim meets held around the country. They practice four days a week to improve their records.

Tohoku University Jazz Orchestra performs at National Cherry Blossom Festival in the United States

Celebrating the 100th anniversary of the gift of cherry trees sent from Japan to the city of Washington, D.C., a series of commemorative events were held in D.C. from March 20 to 27, 2012. During the National Cherry Blossom Festival, the Tohoku University Jazz Orchestra performed with a jazz orchestra from Howard University, and performed at a firework event and at the pre-opening ceremony.

Leveraging our world-class expertise in research and technology to revitalize regional industries

A body of knowledge that leads industry-university collaboration to a new level

Professor Kazuo Hokkirigawa received Grand Prize of JST Innovation Coordinator Award

The Japan Science and Technology Agency (JST) presented the 2011 Innovation Coordinator Award at the National Innovation Coordinators Forum in Sendai on November 1, 2011.

The Grand Prize was awarded to Professor Kazuo Hokkirigawa of the Graduate School of Engineering for his achievements in developing and implementing an effective industry-university collaboration model "Sendai-Hokkirigawa Model" in which a team of university professors and local officials visit small and midsize businesses to help them identify and solve problems in product development. He also facilitated personnel exchanges between universities and local governments, and drove the collaboration model to be adopted in the Tohoku region and the rest of the country.

Agreements to begin collaborative research projects signed

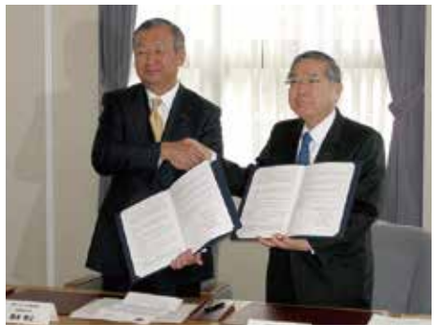
Working with Tokio Marine & Nichido in research on earthquake risk assessment

On July 26, 2011, Tohoku University and Tokio Marine & Nichido Fire Insurance Co., Ltd. (TMNF) signed an agreement to begin joint research on risk assessment of earthquakes and tsunami. Under the agreement, the University will furnish accumulated research data on earthquakes and tsunami, and TMNF will provide analyses and data on risks associated with earthquakes and tsunami. The collaborative research project is intended to advance research and technology in this field and to share research findings and data with society.

Working with IBM Japan in research on earthquake risk assessment and disaster-risk reduction

On November 22, 2011, Tohoku University and IBM Japan, Ltd. agreed to collaborate in research on risk assessment of earthquakes and tsunami and on technology to reduce the risks of disasters, with the goal of advancing academic research and technology in this field and contributing to the prosperity of society.

The University will bring to the collaborative project the fruits of the research it has amassed as well as its research teams in the field of disaster management and disaster-risk reduction. Combined with IBM Japan's expertise in IT solutions, the project is expected to help advance research on risk assessment of earthquakes and tsunami and help reduce the risks of disasters as well as develop expert researchers in this field.



Working with NICT to develop disaster-resistant information and communications technology

Tohoku University and the National Institute of Information and Communications Technology (NICT), a public institution tasked with promoting R&D in information and communications technology (ICT), signed a comprehensive agreement for collaboration and cooperation as well as an agreement to begin joint research on disaster-resistant ICT. The collaboration between the two parties is expected to drive R&D and innovation in ICT.

Raising public awareness of industry-university-government collaboration

Tohoku University Innovation Fair 2012 in Tokyo

Tohoku University held the Innovation Fair in Tokyo on March 15, 2012 to raise public awareness of its extensive expertise in research and of the fact that the University was working with businesses and communities in research projects to share the fruits of research with the public.

At the fair, Soichiro Okudaira, a managing officer of Toyota Motor Corporation, delivered a keynote speech about Toyota's way of making cars and developing its human resources, and a group of panelists shared what they expected from Tohoku University. In the pavilion area, the University showcased how it was assisting with reconstruction efforts in the Tohoku region, and highlighted research accomplishments in product development, life sciences, nanotechnologies and materials, environment and energy, and information and communications.

4th Tohoku University International Symposium "Aiming for World's Leading University"

Tohoku University held its 4th International Symposium on October 27, 2011, in which a University official talked about challenges that the University was tackling in recovering from the Great East Japan Earthquake and about the mission of the Institute for Disaster Reconstruction and Regeneration Research, established after the March 2011 earthquake.

At the symposium, the Tohoku University Office of Cooperative Research and Development presented the University's vision for international industry-university collaboration. Following a speech by a guest speaker from overseas, University professors provided updates on research projects in medicine and engineering.

Regional Industry Restoration Research Symposium

After the March 2011 earthquake, the Graduate School of Economics and Management established the Earthquake Recovery Research Center in April 2011. The center has since been working with other universities in the Tohoku region, local governments, and local businesses in the joint Regional Industry Restoration Research Project. The project is intended to develop policy initiatives that address long-term solutions to regional issues from a perspective different from those of public and private sectors.

The center held a symposium on October 1, 2011, in which highlights of the findings compiled from six months of research were presented, and policy issues relating to the restoration of regional industries were extensively debated.

2011 Regional Innovation Symposium "Secrets of Successful Regional Innovations"

The University's Regional Innovation Research Center joined forces with the Tohoku Regional Advancement Center to launch the Regional Innovation Research Project in 2011. This project is intended to shed light on low-profile but promising innovations and entrepreneurship in the Tohoku region, which has long been considered unproductive for business ventures, by interviewing local entrepreneurs to uncover the secrets of their successes.

At a symposium titled "Secrets of Successful Regional Innovations" on March 17, 2012, the center reported the results of the fact-finding interviews, and innovators from the region shared what it takes to be a successful innovator.

On the path to becoming a world-class university

Building a world-class education and research institution through international exchange

14th IACIS Conference in Sendai

The 14th conference of the International Association of Colloid and Interface Scientists (IACIS) was held in Sendai on May 13, 2012. The IACIS conference is one of the largest international conferences on colloid and interface science and is held every three years. The Science Council of Japan and the Chemical Society of Japan organized the Sendai conference, and Tohoku University provided assistance. The opening ceremony and reception were graced with the presence of the Emperor and Empress. About 1,000 researchers from around the world attended the conference to discuss the latest research results in the field of nanomaterials. Before and after the conference, several researchers visited Tohoku University and discussed with university officials industry-university and inter-university collaboration.

The Emperor and Empress at the opening ceremony (photo courtesy of the PR Division of Miyagi Prefectural Government)

Joining forces with international consortiums of universities

Tohoku University is actively involved with international consortiums of prominent universities as part of its continuing efforts to become a world-class education and research institution.

The University has been one of 17 members of the Association of East Asian Research Universities (AEARU) since 1998, and has been on its seven-member board since December 2011. Tohoku University President Susumu Satomi attended the 30th AEARU board meeting at Nanjing University in China on May 20, 2012, and discussed a wide range of issues with other university presidents.

30th AEARU board meeting

The University has also been a member of the Association of Pacific Rim Universities (APRU) since 2008. This association, which has 42 member universities from 16 countries and regions in the Pacific Rim, facilitates joint educational and research efforts to address key socioeconomic issues affecting the Pacific Rim. The University of Oregon in the United States hosted the 16th APRU Annual Presidents Meeting on June 28 and 29, 2012, in which 100 officials from 34 member institutions, including 23 university presidents, participated. At the meeting, President Satomi talked about how Tohoku University was assisting with the reconstruction efforts for communities and industries affected by the Great East Japan Earthquake.

16th APRU Annual Presidents Meeting

University presidents attending the meeting

President Satomi giving a presentation

Future Global Leadership Program offering bachelor's degree courses to international students

With a subsidy from MEXT's Project for Establishing Network for Internationalization, Tohoku University is running the Future Global Leadership (FGL) program to attract talented students from abroad by expanding the offerings of degree courses taught in English and providing international students with a comfortable environment for studying and living in Japan.

The University has been adding new degree courses in which faculty members teach classes in English and provide study support to international students. In the 2011 academic year, seven such courses were added, including undergraduate courses in engineering, science, and agriculture.

In the 2012 academic year, the University will be offering all the 16 courses originally planned for the FGL program. We will continue to enhance these courses and to improve accommodation for international students in an effort to become an education and research institution that embraces global perspective.

Students and tutors in an undergraduate course taught in English

Alumni associations in South Korea and China

Tohoku University has alumni associations in China, Indonesia, South Korea, and Taiwan. The South Korean alumni association held its general meeting in Seoul on November 5, 2011, and the Chinese association held its meeting in Beijing on January 8, 2012.

The then President Akihisa Inoue and faculty members attended both meetings to strengthen relationships between the University and South Korean and Chinese alumni by updating them on the University's reconstruction projects for communities and industries affected by the March 2011 earthquake and on the University's latest research projects.

Participants in the alumni association's meeting in China

The then President Inoue delivering a speech at the alumni meeting in China

3rd Japanese-Russian Forum of Rectors in Sendai

Tohoku University hosted the 3rd Japanese-Russian Forum of Rectors on March 19 and 20, 2012. This forum was organized by the executive committee chaired the then President Akihisa Inoue, the Japan-Russia Society, and Moscow State University. Thirty-three institutions participated in the forum from both countries.

The opening ceremony featured speeches by the then President Akihisa Inoue, Moscow State University President Victor Sadovnichy; Kunio Hatoyama, a member of the House of Representatives and chairman of the Japan-Russia Society (speech read by Yasuji Kaoru, executive member of the society, on his behalf); Yasuki Matsuo, director of the Student Support and Exchange Division of MEXT; and Konstantin Vinogradov, first secretary at the Russian Embassy. Presentations by university presidents were followed by a session to discuss the globalization of university education and the development of human resources with global perspectives.

At the conclusion of the forum, President Inoue and President Sadovnichy signed a communiqué on behalf of their respective countries. The communiqué stated that the forum participants agreed to: (1) collaborate to develop human resources capable of playing a role in a global arena; (2) address global issues facing higher education; (3) conduct joint research to pursue innovation; (4) conduct joint research on disaster science to reduce disaster risks; (5) share information about joint research projects between Japan and Russia; (6) hold a Japanese-Russian forum on medicine and human science at Moscow State University in autumn 2012; and (7) hold the 4th Japanese-Russian Forum of Rectors at Moscow State University in 2013.

3rd Japanese-Russian Forum of Rectors

The then President Inoue (right) and Moscow State University President Sadovnichy (left)

Short-Term Study Abroad Program

Three groups of Tohoku University students, 83 in total, studied at the University of California at Riverside in the United States and at the University of Sydney in Australia under the short-term Study Abroad Program in September 2011 and in February and March 2012. This program provides students with an opportunity during long vacations to take four- to five-week intensive English classes and audit classes in their majors at overseas universities with which Tohoku University has signed academic exchange agreements. UC Riverside offers classes that focus on improving students' English proficiency and multicultural awareness, and the University of Sydney focuses on improving students' English skills for academic purposes. Students participating in the program stay with host families to get a taste of daily life and culture of the host countries.

Tohoku University launched the Study Abroad Program in 2007, when the first group of students studied at the University of Sydney, and has since been upgrading the program to attract more students. Starting the 2011 academic year, students who complete the program earn credits for a liberal arts course.

Students on the Study Abroad Program

Stimulating the community's interest in science

New initiatives to promote social contribution and gender equality

Exploring-Germination-and-Growth program for young Scientist : EGGS science program

Tohoku University operates a program to help high school students pursue their interest in science by engaging them in science lectures, field studies, and laboratory experiments. This program is part of a project initiated by the Japan Science and Technology Agency to foster the next generation leaders in science and technology. The University recruits 100 local high school students every year, 70 of whom are assigned to a basic course and 30 to an advanced course. In both courses, professors of the University's graduate schools in sciences assist them in cultivating scientific minds—exploring the wonder around us, analyzing and summarizing their findings in reports and making presentations; and reading science materials in English.


High school students in the science program

Sendai high school students in the EGGS science program discover the antimicrobial activity of Ag_2O_3

Saaya Ando, Tomosato Hioki, and Takamichi Yamada—who are students of Sendai Daini High School and members of its chemistry club, and are in the Tohoku University's EGGS science program—discovered the strong antimicrobial activity of Ag_2O_3. Their discovery was reported online in the Journal of Materials Science.

When the three students were analyzing shiny black crystals that formed on a cathode while applying electrolysis to silver nitrate to produce pure silver dendrites, they discovered that the black crystals had the crystal structure of Ag_2O_3. They also found that the crystals were an Ag_2O_3 clathrate, which has stronger antimicrobial activity, higher oxidative activity, and higher conductivity than Ag_2O, and that releases 10 times more silver ions into water than Ag_2O does.

Science Café in Fukushima "What Does Smart Grid Mean to Us"

Professor Saito talking about the smart grid

Tohoku University holds a monthly Science Café event in Sendai, in which University researchers and local residents talk about topics in science casually. On November 19, 2012, the University and the Tohoku Regional Advancement Center hosted the Science Café in Fukushima City. In this event, Professor Hiroumi Saito of the Graduate School of Engineering, who is working on a system to monitor the stability of power systems and a system for the coordinated control of distributed power generators and power networks, shared the latest developments in the smart grid, which is considered the future of electric power distribution, and talked about how it will change people's lives.

Science Angel Project receives L'Oréal-UNESCO Award for Women in Science

Tohoku University Science Angel Project, in which female graduate students of natural sciences visit elementary, junior high, and high schools to stimulate students' interest in science, received a special award of the L'Oréal-UNESCO Award for Women in Science in Japan for 2011.

The day after project members received the award in a ceremony in Tokyo on July 12, 2011, they met with Atsuko Okajima, director-general of the Gender Equality Bureau of the Cabinet Office, and Kumiko Bando, director-general of the Lifelong Learning Policy Bureau of MEXT. The officials told the team that they hoped that the Science Angel Project would be extended to all over Japan to lay the groundwork for nurturing next-generation scientists.


Award ceremony

Developing a sense of community

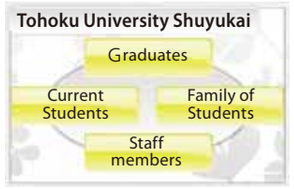
Tohoku University Shuyukai Association

When Tohoku University celebrated its 100th anniversary in 2007, the Tohoku University Shuyukai Association was established as a close-knit community for University alumni, current students and their families, and current and former faculty members and staffers. The organization is intended to facilitate friendship and communication among its members and foster a strong sense of togetherness.

Fostering a sense of community among Shuyukai members

Shuyukai members get together at an annual homecoming of the University and in regional networking meetings held around the country.

Class reunions are held every 10 years from the year of graduation, and secretaries selected from among alumni by year of graduation organize a reunion of that class. By the end of the 2011 academic year, secretaries of the alumni association have been chosen from among graduates of classes of 2006 through 2011.



Homecoming Day to celebrate the University's 104th anniversary

Tohoku University Homecoming Day events have been held in October since 2007 to give graduates an opportunity to reunite with old friends and teachers, and mingle with current students. Many events are lined up for the day—all under the theme "Welcome Back."

■Date: Saturday, October 8, 2011
■Venue: Centennial Hall (Kawauchi Hagi Hall), Kawauchi Gymnasium, Kawauchi Cafeteria
- ○General meeting of Shuyukai
- ○Get-together party for current and former students
- ○Seminar titled "Bridging Medicine and Engineering in the Face of the Coming Aging Society"
- ○Autumn Cultural Festival
- ○Lobby performance
- ○Concert celebrating Tohoku University's 104th anniversary

General meeting of Shuyukai


Anniversary concert


Get-together party for current and former students

Regional networking meetings

Shuyukai has been holding regional networking meetings for alumni and parents of current students since 2009 to update them on what is going on at the University, including an update on the latest research projects. This is part of Shuyukai's efforts to keep people informed of the latest developments at the University and Shuyukai and to foster a sense of community among members in each region.

- ○**Meeting in the Kanto region on July 20, 2011 (attended by 400 people)**
- ○**Meeting in Hokkaido on November 12, 2011 (attended by 120 people)**
- ○**Meeting in the Kansai region on February 11, 2012 (attended by 130 people)**


Lecture


Get-together party

Shuyukai premier members' retreat

Shuyukai held the second retreat for its premier members in the University's Kawauchi Hagi Hall on May 7, 2012.

The first part of the event featured a concert by Kazumasa Oda, a popular singer-songwriter and graduate of the University's Department of Architecture at the School of Engineering.

At the party that followed, Shuyukai President Susumu Satomi made a speech, and 150 participants sang the University's school song, led by members of the Tohoku University Cheering Club.


Concert by Kazumasa Oda

Transforming each campus into a more comfortable and inviting place

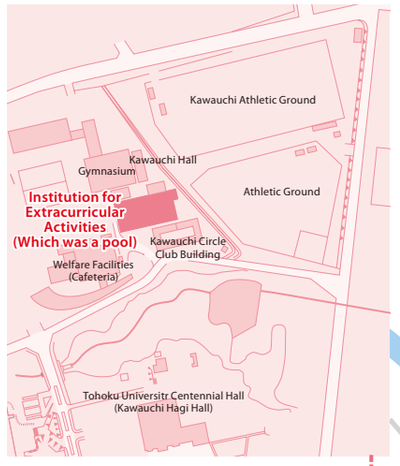
Tohoku University New Campus Plan

University facilities damaged as a result of the March 2011 earthquake are being repaired or renovated. In the autumn of 2012, reconstruction work will begin on the three most heavily damaged buildings of the School of Engineering on the Aobayama-Higashi Campus. All new research facilities, either being constructed or being planned, will be seismically isolated and equipped with their own power generators for added safety.

Kawauchi Campus

A new center for extracurricular activities

A new center for extracurricular activities will be built on the site of an old swimming pool. The new center will house facilities currently located all over the University's campuses: club rooms for non-sports clubs and a 150-seat auditorium on the first floor; club rooms for non-sports clubs on the second floor; club rooms for sports clubs and a fitness center on the third floor; and a 25-meter heated pool on the fourth floor. Some of these facilities will be open to both University alumni and the public. The building will have environmentally friendly features such as a retractable glass roof and solar thermal collectors. Construction will begin after an archaeological survey is conducted, and will be completed by March 2014.



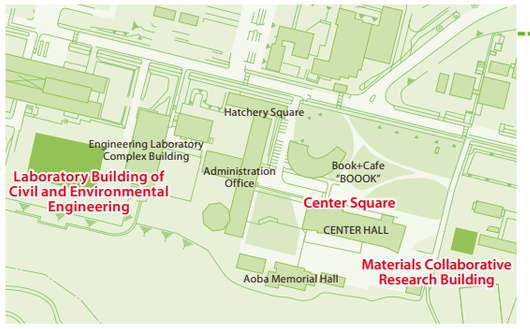
Aobayama-Higashi Campus

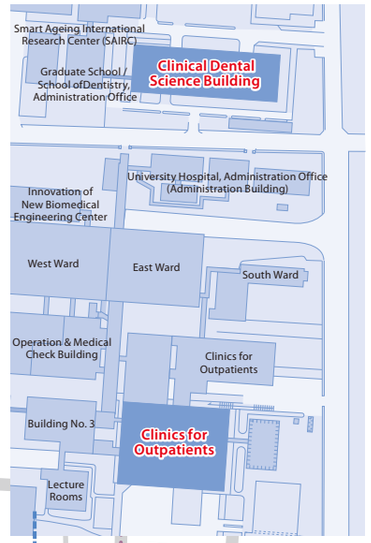
Civil Engineering and Architecture: Laboratory Building of Civil and Environmental Engineering and a rain garden completed

A new laboratory building has been built on the site of seven former laboratories. A rain garden, located in front of the building, is designed to collect rainwater from the roof of the building into a circulation pool that purifies the water naturally. This garden, which helps mitigate the heat-island effect on the campus and will provide a water source in the event of an emergency, serves as an experiment site for ecosystem engineering students, and will become a place for students and visitors to relax when the Campus Mall is completed.

Material Science and Engineering: Materials Collaborative Research Building completed

This building is intended to attract industry-university collaborative research projects in material science and engineering, and boasts facilities and equipment that meet a wide variety of needs. It is a landmark spot on the Aobayama-Higashi Campus, just like the Center Square.





Seiryo Campus

Clinic for Outpatients renovated and Clinical Dental Science Building opened

The renovation of the Clinic for Outpatients has completed the University Hospital's project to consolidate several clinics for outpatients into a single location. The renovated clinic has separated the flow of patient traffic from that of staffers and has optimized the locations of diagnosis and treatment departments to better serve patients.

The Dental Clinic Building has been transformed into the Clinical Dental Science Building following the relocation of the Dental Clinic to the Clinic for Outpatients. The building has been reinforced with steel beams to withstand earthquakes. Its new exterior, which is covered with warm-colored tiles, matches the surrounding buildings and blends in with the scenery. The first floor accommodates a café with a wood-deck seating area, which faces the Seiryo Campus Street being developed.

Katahira Campus

Redevelopment of the North Gate area completed

The North Gate area that leads to the Katahira Campus has been redeveloped with the old gate and fences removed to make it a wide open space that welcomes students and visitors, while retaining parts of the old buildings from the early days of the University and leaving trees standing to give the area a historical ambience.

When the Katahira Kitamon Commons is completed, the building and the adjoining North Gate area will become a vibrant space where University researchers and local residents mingle and interact with one another.

Main streets and sidewalks along the city roads that run through the campus have been widened to make them more pedestrian-friendly.

Construction begins on University House Sanjo II

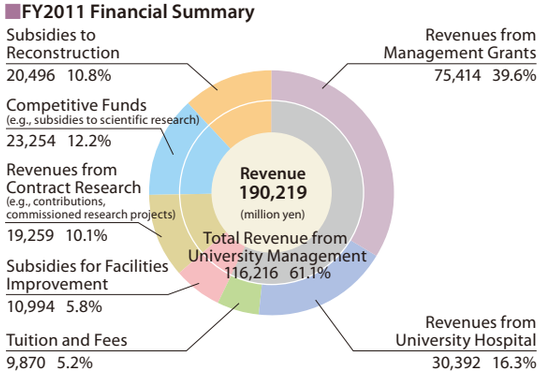
University House Sanjo II, a new dormitory for Japanese and international students, is being built on a site next to the current dormitory, to accommodate an increasing number of students from overseas. When completed, three residential buildings and a circular facility will surround a courtyard of trees and plants. In the new dormitory, as in the current one, students of diverse nationalities will have their own bedrooms and share a common living room space and a kitchen. This will give students opportunities to develop international perspectives, understand the diversity of cultures, and nurture social skills and a spirit of teamwork. The new dormitory is scheduled to open by the end of March 2013.

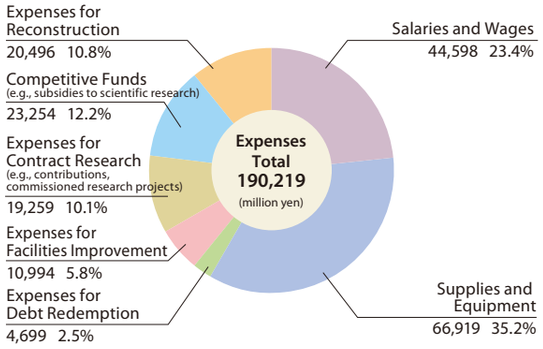
Data and Overview of Tohoku University

Number of Students (as of May 1, 2012)

	School enrollment	International students
Undergraduate students	10,970	138
Graduate students (Master's course, Professional Degree Program)	4,298	515
Graduate students (Doctoral Course)	2,735	549
Students at Affiliated Schools	42	0
Research students/Others	403	229
Total	**18,448**	**1,431**

FY2011 Financial Summary





Number of Faculty and Staff Members (as of May 1, 2012)

President		1
Board of Directors		7
Auditors		2
Faculty Members		2,992
Professors	837	
Associate Professors	711	
Senior Assistant Professors	160	
Assistant Professors	1,128	
Research Assistant	156	
Administrative/Technical staff/Others		3,016
Total		**6,018**

Agreements on Academic Exchange (as of May 1, 2012)

Agreements on the University Level	31 countries/regions	172 institutions
Agreements on the Department Level	43 countries/regions	335 institutions

Overseas Office (as of May 1, 2012)

Liaison offices	8 countries	11 centers
Overseas offices	3 countries	4 offices

Number of International Students (as of May 1, 2012)

	78 countries / regions	1,431

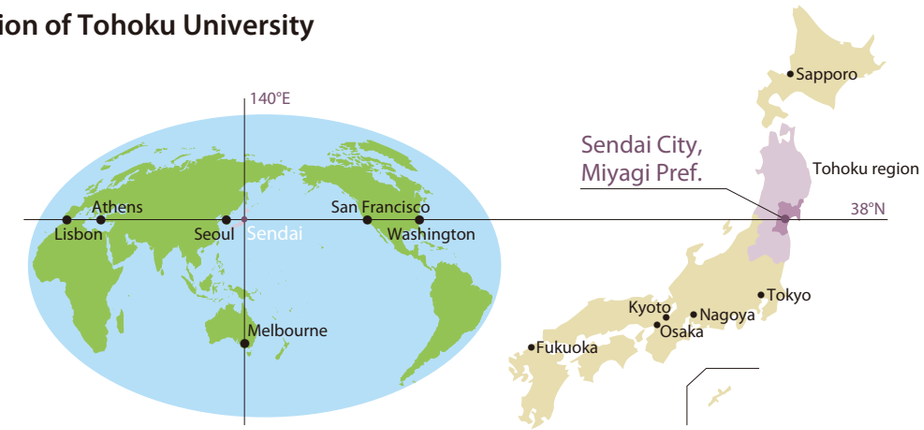
Number of Exchange Students Based on Academic Agreements (FY2012)

To Overseas	12 countries / regions	46
From Overseas	12 countries / regions	103

Endowed Chairs and Research Divisions (as of May 1, 2012)

Endowed Chairs	32
Endowed Research Divisions	12

Location of Tohoku University



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