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 devoting itself to research useful in solving societal problems, and educating human resources in leadership skills.

HISTORY

Tohoku University was founded in 1907 as the third Imperial University of Japan, following Tokyo Imperial University and Kyoto Imperial University. 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 also to 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 (before the Second World War) includes the establishment of local venture businesses which have contributed to regional industry, and our status as the nation’s center for research into law, the domestic branch of law which is closely associated with our daily lives.

This spirit, which continued strongly through World War II and the rapid economic growth of the post-war period, remains alive and can be seen in today’s new era of advanced globalization.

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*This Annual Review 2010 covers activities conducted from April 2009 to July 2010.
*Personal information of those who are in this Annual Review includingaffiliates, position, and age is not current.
Our Path Toward Becoming a World-Class University

Ever since Tohoku University was established in 1907, our philosophy has always been to put “Research First” while maintaining an “Open-Door” policy in order to emphasize “Practice-Oriented Research and Education.” We have conducted research and education at the world’s highest level. Tohoku University’s Annual Review 2010 describes our remarkable achievements and highlights of the previous year.

Humanity today is facing a variety of difficult and complex challenges which need to be addressed on a global basis. By applying the knowledge we have accumulated over the past century, and by continuing our efforts to achieve innovation in the fields of research and education, our university is determined to play a leading role as a “world-class university” in helping humanity overcome the challenges it faces today.

Tohoku University announced "Inoue Plan 2007" in March 2007, an action plan that consists of five pillars: education, research, social contribution, campus environment, and organization/management.

Three years have now passed since the plan was introduced, and during this period the University continues to make steady progress. In the field of education, for example, we are moving forward with the development of our new proprietary liberal arts curriculum and globalization, including the expansion of the overseas internship program, and the Global 30 Project for Establishing Core Universities for Internationalization. Further, we founded the "International Advanced Research and Education Organization" to raise researchers who will lead sciences in the 21st century with excellent, creative, and comprehensive knowledge, and inaugurated the Advanced Institute for Materials Research (WPI-AIMR) following the adoption of the World Premier International Research Center Initiative (WPI). Thus, we have created novel research frontiers that integrate different fields. We are also pursuing a number of highly original strategies: improving our global presence by participation in APRU (Association of Pacific Rim Universities), T.I.M.E. (Top Industrial Managers for Europe) and AEARU (the Association of East Asian Research Universities); developing our campus to meet international standards; introducing a personnel system to improve global competitiveness; establishing the Tohoku University Foundation; and implementing external evaluation by the European University Association (EUA). 2010—Even universities must question their raison d'être when faced with the tide of sudden changes on the unprecedented scale that we are facing. It is imperative that we clarify the path, carry out our mission and increase further the pace of reform. I believe that by helping all our stakeholders to understand our mission and the various activities carried out at Tohoku University, and by actively seeking the cooperation of a wide variety of peoples, we will become a university that is trusted, respected, and loved by society, and one which is truly capable of serving the needs of humanity.

Akihisa Inoue  
President of Tohoku University

Tohoku University News and Events (April 2009–July 2010)

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<tr>
<td>Apr 3</td>
<td>&quot;Inoue Plan 2007 (Tohoku University Action Plan, Revised for 2009)&quot; Announced</td>
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<td>Apr 7</td>
<td>2009 Tohoku University Entrance Ceremony</td>
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<td>Jul 30–31</td>
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<td>Sep 25</td>
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<td>Dec 31</td>
<td>Tohoku University Silvester Concert 2009–2010</td>
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2009

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<th>Date</th>
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<tr>
<td>Jan 6</td>
<td>Unveiling Ceremony of Kawauchi Welfare Facilities Bldg. New Cafeteria</td>
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<td>2010 Tohoku University Entrance Examination: First Examination for General Admission</td>
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<td>Mar 12</td>
<td>2010 Tohoku University Entrance Examination: Second Examination for General Admission</td>
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<td>Mar 25</td>
<td>Tohoku University Commencement Ceremony</td>
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<td>Apr 1</td>
<td>Trial Campus Bus Service Started</td>
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<td>Apr 2</td>
<td>&quot;Inoue Plan 2007 (Tohoku University Action Plan, Revised for 2010)&quot; Announced</td>
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<td>Apr 5</td>
<td>Opening of &quot;BOOOK&quot;</td>
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<td>Apr 6</td>
<td>2010 Tohoku University Entrance Ceremony</td>
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<td>May 13</td>
<td>Completion Ceremony for Fluctuation Free Facility for New Information Industry</td>
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<td>Jul 27</td>
<td>Completion Ceremony for Extended Education &amp; Research Building</td>
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<tr>
<td>Jul 28–29</td>
<td>Tohoku University Open Campus</td>
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2010
Fighting infectious diseases through field research across borders to save the children of the world

Professor Hitoshi Oshitani
Department of Virology, Graduate School of Medicine

Born in 1959. Ph.D. in medicine and master of public health. Graduated from the School of Medicine, Tohoku University. Served at the National Sendai Hospital, and dispatched to Zambian as an expert in virology by the Japan International Cooperation Agency (JICA). Was a regional advisor for infectious diseases to the Regional Office for the Western Pacific of WHO from 1995-2005. Has been in his current position since September 2005

http://www.virology.med.tohoku.ac.jp/index.html

Research work is a community on Leyte Island. (The leftmost person is the resident researcher from Tohoku University). Knowing the local conditions is a great help to establish more effective measures against infectious diseases.

Life on Leyte Island. Epidemiological research on respiratory infections and comprehensive research in identifying risk factors for dengue fever have been conducted as a project of the Science and Technology Research Partnership for Sustainable Development since 2010.

Professor Hitoshi Oshitani was at the forefront of the battle against severe acute respiratory syndrome (SARS) in 2003. Having engaged in various researches on rabies, Japanese encephalitis, influenza, etc., Professor Oshitani says that his research is based on field activities. It is most important for him to understand cultures, local characteristics and the living conditions in the field in order to take measures against infectious diseases.

About 8 million children have died less than 5 years die in the world every year, and respiratory infections such as pneumonia account for about 20% of the deaths of children in developing countries.

Professor Oshitani and his colleagues established the Tohoku-RTIM Collaborating Research Center for Emerging and Re-emerging Infectious Diseases in the Philippines in 2008. As a part of the Japan Initiative for Global Research Network on Infectious Diseases (J-GRID) of the Ministry of Education, Culture, Sports, Science and Technology of Japan, this project is being implemented jointly by the Graduate School of Medicine, Tohoku University, and the Research Institute for Tropical Medicine (RITM) of the Philippines.

The Eastern Visayas Regional Medical Center (EVRMC), a mid-sized government hospital in the Philippines with 250 beds located on Leyte Island, admits more than 800 children with severe pneumonia every year, resulting in 70-80 deaths. The most common cause of pneumonia deaths is respiratory syncytial (RS) virus. It is rare for RS infection to cause death in Japan; however, for financial reasons in developing countries many children infected with this virus do not come to hospitals until the condition becomes deteriorated, which is a main reason for its high mortality rate.

Professor Oshitani and his colleagues have engaged in comprehensive approach to not only identifying etiological pathogens for pneumonia in health care institutions, but also doing field studies on the virus transmission and central measures with the aim of preventing the spread of viral diseases in the community.

The system that they have been building will not only be used in the Philippines but applied to many other developing countries to save many children’s lives.

Reconstruction of social sciences from a gender perspective—To end “disadvantage from gender difference”

Professor Miyoko Tsujimura
Modern Civil Law, General Legal System, School of Law

Born in Tokyo in 1946. Graduated from the doctoral course, School of Law, Hitotsubashi University, and acquired a Ph.D. in Law. He served on the Science Council of Japan, President of Japan Association of Gender and Law, Director of the Japan Public Law Association, and as a member of committee of specialists, the Council for Gender Equality, Cabinet Office. Currently, Professor, School of Law, Tohoku University, also selected as a Distinguished Professor.

http://www.law.tohoku.ac.jp/gcoe

Gender issues have been discussed mainly in the field of sociology. On the other hand, Professor Miyoko Tsujimura has approached issues in the fields of constitutional law, and gender law, and brought to light gender issues in laws that have been ignored. She has addressed, for example, the constitutionality of the provision of the Civil Code that prohibits only women from getting remarried for six months after divorce, and theoretical relation between military service and gender. Thus, she has brought up different viewpoints for gender issues that reside in the Constitution, discussing them from a standpoint of elucidating the theories of human rights.

Professor Tsujimura is currently the Leader of the G-COE Program: Gender Equality and Multicultural Conviviality in the Age of Globalization, presiding over many international symposiums. Her work, “Constitutional Law and Gender,” published as a result of the G-COE, was recently awarded a Showa Women’s University Prize for Studies of Women’s Culture. It was highly regarded for many of its ideas, such as positive actions and a quota system, which could be incorporated into actual policies.

It was her encounter with La Declaration des droits de la femme et de la citoyenne (The Declaration of the Rights of Woman and of the Female Citizen) by Olympe de Gouges that guided her to the study of gender and law, when she was studying in Paris during her master’s course. As a woman she had a lot of problems in continuing to study law, which was considered a “men’s discipline,” and was extremely impressed with this work, which clearly says that The Declaration of the Rights of Man and of the Citizen ignores the rights of women. When she returned home, she translated this Declaration for the first time in Japan. It was the starting point of her activities.

“Gender issues in the Constitution should not be addressed as marginal at all, but as a main subject,” says Professor Tsujimura, who thinks it necessary to enlighten academic experts in law. She is planning to revise the textbooks on the Constitution and books on comparative constitutional law, published by the G-COE, which has so far published, and to publish “The Possibilities of Gender Research and Social Sciences” series, co-edited with Professor Man Oqwa, Ph.D. in economics.

Olympe de Gouges was a French writer and activist born in 1746. She was a major figure in the radical stage of the French Revolution. She was a supporter of women’s rights and equality before the law. Her book, “An Appeal to the Women of France,” was influential in shaping modern women’s rights movements. She later became a target of the Revolution, and was imprisoned and executed on charges of sedition.

Professor Tsujimura has produced brilliant achievements including her book titled “The Constitutional Principles of the French Revolution” awarded by the Shibusawa Club in 1996.

“I am not in the field of gender because I can’t be a woman, but I persist in looking into it from the perspective of a scholar in constitutional law,” she says.

A G-COE International Seminar titled “Gender Equality in Multicultural Society: Gender, Diversity, and Conviviality in the Age of Globalization” was held in August 3 and 4, 2009. Professor Francis O’Connor (O’Connor, University of New South Wales) was invited, there were lively discussions.

Her field of study are broadly divided into 4 groups, constitutional law, comparative constitutional law, “French Constitution,” and “gender and law.” She is eagerly working on 17 books in many areas.

The second Showa Women’s University Prize for Studies of Women’s Culture for “Constitutional law and Gender –Prospects for Gender Equality and Multicultural Community,” was published in 2009. The ceremony for the prize was held on May 21, 2010.

My favorite

Olympe de Gouges was great in France to Prof. Tsujimura. The Place Olympe de Gouges in the 3rd arrondissement of Paris was named after her in 2004. Prof. Tsujimura often travels to Paris because she has studied the French Revolution. She always visits this place, where she remind herself of the starting point for her study of gender and law and to refresh her results.

My favorite

A g-coe seminar at the University of Tokyo for 8 PNFOU

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Recent Research Topics
Policy issues on the social dimension of engineering and technologies

Professor Yuko Harayama
Chair of Management of Technology, Technology Policy, Department of Management Science & Technology, Graduate School of Engineering, Tohoku University

Professor Harayama is responsible for the chair of Technology Policy. Her teaching and research cover policy issues on science and technology, technology management, innovation, and regional clusters. Professor Harayama’s research focuses on technology policies, considering them as an interface between technologies and society, examining their economic effects and social contribution, and makes a systematic analysis of various related problems in modern society. Furthermore, it explores ideas and methods for producing solutions to them from a scientific point of view.

Professor Harayama points out the necessity of the science of science, technology, and innovation policy (Sci SIP). “What effects will science and technology policies decided by the government produce? Will they be really useful in society? If they do not produce the expected effects, what should be done to correct the results? It is essential for scientists to propose policies based on data and analysis, taking a step forward beyond armchair discussion,” she says. It is necessary to examine the outcome of, and issues in, policies, always in the pursuit of social values of such policies.

This is why, it is important to develop engineers and researchers who are able to not only develop new technologies but also take into consideration the effects on society and environment in designing and operating social systems. It is essential to look at things not only from a perspective of one’s own field but also to keep in mind a multi-disciplinary approach.

Professor Harayama thinks that it is extremely important to find and nurture torchbearers in the next generation to lead science and technology policies in the best direction. “We are now making arrangements to discover such torchbearers. We have set up some small networks across university and field boundaries, in cooperation with business enterprises,” she says.

The effect of a blood-flow shear stress on vascular endothelial cells may be a key to elucidating the mechanism of atherogenesis

Professor Masaaki Sato
Tissue Biomachinery, Department of Biomedical Engineering, Graduate School of Biomedical Engineering, Tohoku University

Cutting-edge medical examination technology can hardly identify “what part of the artery has what degree of atherosclerosis.” Professor Masaaki Sato and his colleagues are now performing research that may elucidate the mechanism of atherosclerosis, with the possibility of greatly improving its treatment and examination methods.

One of the research subjects on which Professor Sato, et al., are working is the workings of endothelial cells that cover the internal walls of a blood vessel. These endothelial cells have a unique sensor that senses the forces of flowing blood to help maintain the vessel wall, i.e. shear stress. They vary in their form and functions according to the shear stress, which expands or shrinks the blood vessel, which in turn controls the blood flow and pressure. The mechanism by which this occurs is still a mystery. Professor Sato, et al., are working on how endothelial cells change their shapes according to the magnitude of shear stress, where the sensor of these cells that sense the force is located in the cell, how that sensor functions, and on a quantitative basis to elucidate their working mechanism.

Actually, this deformation of endothelial cells is related to atherogenesis. The theory is that endothelial cells normally cover the internal walls without gaps, but there can be gaps in regions where the shear stress is low because such cells bend to one another weakly there, and LDL enters into the gaps. If this mechanism is elucidated, it may lead to not only preventing and treating atherosclerosis but also the possibility of in-blood monitoring and the identification of parts with atherosclerosis. In addition, their research is also expected to make a return contribution to the field of engineering and also robotics.

Endothelial cells that reside in the innermost layer of blood vessel walls are always exposed to force (shear stress) due to the blood flow and the deformation of the walls.

When force is applied via flow to a cultured endothelial cell, the cell changes its shape from a polygon on the left figure to a spindle shape on the right figure to adapt to the dynamic environment. The cytoskeletal structure (red) makes it change accordingly.

A blood cross-section of an endothelial cell when subjected to flow, and the deformation inside. In the uppermost figure, green indicates the nucleus, and red cytoplasm. In the middle and lowest figures, no boundaries of the nucleus are observed which means that both the nucleus and cytoplasm are deformed almost to the same degree.

Although Prof. Sato now uses a personal computer to create materials and papers, he still writes with a fountain pen. One of the reasons is that he says, “Fountain pens do not say much, like a smartphone, which is thought to have been invented more than 30 years ago. His collection consists of about ten fountain pens contained in a dedicated case.”
Elucidating the culture of human beings in the Ice Age from stone tools, products of the oldest manual technique

Professor Kaoru Akoshima
Archaeology, Japanese History, Historical Studies, Graduate School of Arts and Letters
Born in Shinshu City in 1955, graduated from the doctoral course of the Department of Anthropology, University of New Mexico. Studied archaeological and prehistoric studies. Has been researching the use of stone tools, etc., mainly in the Paleolithic Age, and comparative cultural anthropology. Appointed as Assistant Professor at the Faculty of Arts and Letters, Tohoku University before assuming current position. http://www.sal.tohoku.ac.jp/archa/home.htm

Two million years ago, in the Paleolithic Age, humankind had a technique for making stone tools, long before it was able to keep fire. One of Professor Akoshima’s research subjects is use-wear marks on stone tools made by striking stone or taking flakes off stone, which elucidate human activities and cultures in daily lives in that era.

The analysis of stone tools includes observing very small traces (use-wear marks) on stone tools through a microscopic lens and comparing them with those made in reproduction experiments to study how they were made. Stone tools left in the natural environment are compared with reproduced stone tools that were used to work animal bone or leather, or just flattened. The way a very small chip was made on a stone tool may be of great importance in reconstructing the ancient world. It is a wonder that there are identical use-wear marks on stone tools that have been excavated in countries that have had little historical relationship. It seems that stone tools with the same function look similar regardless of differences in age and place.

This “archaeology as anthropology” pursued by Professor Akoshima is based on the theory of Lewis Binford, the founder of processual archaeology. It is not only intended to reveal the history of the researcher’s own country but emphasizes comparative studies as a part of the study of humankind. It aims to reveal how human intelligence is in the same historical background and environment adapted to environmental changes, discover their universal experiences, and study them from a global perspective. This is the field that Tohoku University began to explore in the 1980s, earlier than any other. Use-wear analysis on stone tools is considered a way of comparing cultural remains on a global scale. A goal of this analysis is to join archaeology with anthropology for new development.

This work is like re-experiencing the memory of humankind of the far distant past. Archaeology is a long-range study that is synchronized with a remote past before time and space. Professor Akoshima says that hands-on and field-oriented approaches are important. They are also looking at the problem of reliably passing on archaeological findings to future generations in the form of theoretical anthropology.

Mysterious plants that do not travel but stay put
A world’s first! Supports Darwin’s hypothetical theory published in Nature

Professor Masao Watanabe
Laboratory of Plant Reproductive Genetics, Division of Genetic Ecology, Department of Environmental Life Sciences, Graduate School of Life Sciences
Born in Shizuoka Prefecture in 1955. Graduated from the Department of Agricultural Engineering, Faculty of Agriculture, Tohoku University. Completed the first half of the doctoral course of the Division of Agricultural Sciences, Graduate School of Agricultural Science, Tohoku University. Appointed a Ph.D. in Agricultural Studies. Appointed as Assistant Professor at the Faculty of Agriculture, Tohoku University, then Associate Professor at the Faculty of Agriculture, Tohoku University, then Professor. Chair of the 21st Century COE Program active in University. Has been in current position since 2005. http://www.igp.tohoku.ac.jp/jp/r/watanabe/

Plants do not speak, nor can they travel freely. However, they have their own ways of taking in outside information. In 1876, Charles Darwin, who put forward the theory of evolution, proposed the hypothetical theory that self-fertilization, i.e., being pollinated with their own pollen, was advantageous for plants in an environment with few breeding partners. This spring, research results that support this hypothetical theory were published in “Nature.”

For many plants, if the stigma surface is pollinated with the plant’s own pollen, this pollen is rejected. As a result, no seeds will be produced. This is because plants have the ability to distinguish their own pollen from other plants’ pollen, i.e., self-incompatibility (SI). This trait is to prevent inbreeding depression, which is observed in most animals and plants, including human beings. On the other hand, there are self-compatible (self-fertilized) plants, like rice and brassica plants. Why do these plants accept their own pollen? Professor Masao Watanabe and his collaborators elucidated the molecular mechanism of the evolution of SI.

Arabidopsis thaliana, known as a model plant, is self-compatible. Professor Watanabe, et al., surveyed several ecotypes of A. thaliana, and found one ecotype (Wei-1) having functional SIR (female S determinant) and non-functional SP1 (male S determinant). After modifying and repairing the non-functional SP1, the repaired (functional) SP1 was introduced into Wei-1 ecotype. The transgenic A. thaliana showed the SI phenotype. This is the first case of success in artificial SI in A. thaliana using modified gene introduction in the world. Since Darwin, researchers have discovered how finely plants have adapted to various environments in wonderfully sophisticated ways. The data from Professor Watanabe’s group is the first case of demonstration of the evolutionary process at the gene level.

Professor Watanabe has also done outreach activities at elementary and junior/senior high schools more than 100 times. In the future, he is looking forward to doing research with children. His ideas and ambition will be passed on to the next generation in this way. “A whole understanding of the molecular mechanism of plant activities should elucidate the problems of environments, food, and energy,” says Professor Watanabe.

My favorite

Use-wear polish on a stone tool called a “Shalako Stone” (Excavated from the Arapa site in Nigeria Prefecture, Upper Paleolithic Age). It has marks showing that it was used to make tools from animal bones or other animal parts, or process animal teeth.

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**Electronic Doctor’s Bag: A mobile communications system for home-visit medical services to overcome shortage of doctors and regional healthcare disparity**

**Professor Makoto Yoshizawa**

Research Division on Advanced Information Technology, Research and Development Divisions, CyberScience Center

Completed the last half of the doctoral course of the School of Engineering, Tohoku University in 1974. Ph.D. in engineering. Worked as a Research Associate and then Associate Professor at the Faculty of Engineering, Tohoku University. Then assumed the positions of Associate Professor at the Faculty of Engineering, Information Technology, and then, Associate Professor at the Graduate School of Information Science, Tohoku University. Appointed Associate Professor of the Information Science Center, Tohoku University in 2000, and then, as the CyberScience Center in 2008. Worked as a Visiting Researcher in the John Hopkins Medical Institute of Medicine, Baylor College of Medicine in 1990. Also a member of the Society of Information and Control Engineering, a member of the Japanese Society for Medical and Biological Engineering and a former committee member of 820 Engineering Medicine and Biology Society.

[http://www.yoshizawa.ecei.tohoku.ac.jp/](http://www.yoshizawa.ecei.tohoku.ac.jp/)

In Japan, regional health disparity is getting larger and larger. Many central hospitals in rural areas are short of doctors. Applications of information and communication technology (ICT) in the medical field are drawing attention as they may be effective for solving those problems.

Professor Makoto Yoshizawa and his colleagues set up the Consortium for Medical Information Communication Systems in the Mobile Environment, together with Professor Tomoyuki Yamabe of the Institute of Development, Aging and Cancer, and concerned business enterprises, in 2009. Then they undertook the development of a mobile health check system, called the “Electronic Doctor’s Bag,” that takes advantage of mobile communication systems to easily transmit not only sounds and high-quality video images but also biological information such as an electrocardiogram (ECG) and blood pressure data. Its features are broadly as follows:

1) With encrypted communication of high-quality video images, sounds and biological information, remote medical practice is made possible with almost the same security as face-to-face medical practice.

2) Available via mobile communication systems (PHS and mobile phone), in other words, in places without Internet lines (e.g., patients’ homes, ambulance car, site of disaster, etc.)

3) Makes it possible to combine bio-measurement terminals without restrictions, and thus, can be operated flexibly according to the purpose, e.g., home medicine, fast aid treatment, and health care.

4) Enables electronic control of patient data.

An Electronic Doctor’s Bag contains communication equipment including a PC, video camera and mobile phone, and medical equipment including an ultrasonography, blood pressure meter, and ECG, and can be easily carried. The intended usage scenario is that a nurse visits a patient’s home, carrying this Bag, and takes an ECG graph and measures blood pressure, communicating with a doctor at a hospital and transmitting the medical information to the doctor by means of ICT. Thus, it is designed to achieve a virtual environment for face-to-face medical practice through a video camera. This will make it possible for medical institutions to cover many more patients in areas with a scarce number of doctors. For emergency medical care, it will allow for emergency medical technicians to send measurement data on a patient to doctors, and thereby obtain an exact and quick diagnosis from them.

This system is expected to play a great role in medical practice in rural areas or on disaster sites once necessary legal arrangements and cooperation with medical institutions are put in place. This work was supported by the Sendai Area Knowledge Cluster Initiative founded by the Japanese Ministry of Education, Science, Sports and Culture.

**Revealing an “unknown interaction of molecules” using surface forces measurement**

**Professor Kazue Kurihara**


Born in Tokyo in 1955. Completed the doctoral course, Department of Industrial Chemistry, School of Engineering, University of Tokyo. Ph.D. in engineering. Worked as Technical Assistant at the University of Tokyo, then a post-doctoral fellow at the Department of Chemistry, Texas A&M University, a post-doctoral fellow at the Department of Chemistry, Clarkson University, a researcher at the Research Institute for Production Development, Visiting Researcher at the Institute for Surface Chemistry, Group Leader at the Research Development Corporation of Japan, Appointed Associate Professor of the Department of Applied Physics, School of Engineering, Nagoya University. Appointed Professor at the Institute for Chemical Reaction Science, Tohoku University in 1997, and at the Institute of Multidisciplinary Research for Advanced Materials, reorganized from the former Institute in April 2003. Has been in current position since 2015.

[http://www.tagen.tohoku.ac.jp/lab/kurihara/index.html](http://www.tagen.tohoku.ac.jp/lab/kurihara/index.html)

Interactions like attraction and repulsion between magnets also exist between molecules. These intermolecular interactions are an area of study for Professor Kurihara and the members of his laboratory. The measurement of intermolecular surface forces, among others, is the main thing that they are dealing with. In other words, they are measuring the distances and forces with which such interactions occur among various molecules. Revealing measured results can value means for understanding specific intermolecular interactions.

This area of measurement of surface forces deals with extremely small objects observed on the nanometer scale in research. Thus, the measurement requires extremely high precision, and this area of research is full of challenges, including maintenance and improvement of research facilities. Not many researchers have chosen this area for their work. Under these circumstances, Professor Kurihara and the members of his laboratory have developed new approaches and new apparatus by themselves. A lot of apparatus that they have developed are viewed with keen interest by other researchers in the same field.

Some interactions among molecules exist close to you. For example, the light or moist sensation of lotion, or a mechanism to increase the viscosity of a sealing material used in buildings, are attributed to a micellar aggregate of surfactant that easily deforms, or interactions that occur among liquid molecules. It is interesting that the process of elucidating an unknown world on the nano scale leads to discoveries and advances in areas of daily life. In fact, their laboratory has often received unanticipated inquiries from businesses.

One of their future research themes is interactions among liquid molecules, which are mostly unknown. Furthermore, they are considering developing a new apparatus that integrates electrochemistry and optical engineering to increase research possibilities.
Award Winners 2009
(August 2009–July 2010)

Order of Culture
(Awarded in November 2009)
Adjunct Professor Sumio Iijima Advanced Institute for Materials Research (WPI-AIMR)
Discovery of Carbon Nanotubes and the Development of High Resolution Electron Microscopy
Adjunct Prof. Sumio Iijima at WPI-AIMR was presented with the Order of Culture in an award ceremony at the Imperial Palace on November 3, 2009. He observed carbon electrodes using a high resolution electron microscope, and discovered that carbon nanotubes were formed on the cathode after discharge. This discovery triggered today’s flourish of nanotube research and has been internationally well recognized.

Order of Culture
(Awarded in November 2009)
Emeritus Professor Yorio Hinuma Tohoku University
Excellent Achievement through Research on EB Virus and ATL Virus
Emeritus Prof. Yorio Hinuma is highly recognized in Japan and worldwide for his great accomplishments in research on the Epstein-Barr virus and adult T-cell leukemia. He discovered a virus that causes T-cell leukemia in 1981, and was the first to show that human cancer is caused by a retrovirus. This pioneering work was achieved three years before the HIV retrovirus was discovered, thus, he was globally profiled with awards and honors such as the Person of Cultural Merits, Imperial Prize, and Japan Academy Prize, and in 2009, the Order of Culture. Many researchers who were encouraged and mentored by Emeritus Prof. Hinuma during his many years of medical and dental research are now actively conducting research endeavors in various fields.

Medal of Honor with Purple Ribbon
(Awarded in November 2009)
Professor Takakiyo Nakazawa Center for Atmospheric and Oceanic Studies, Graduate School of Science
Contribution to the Development of Geoenvironmental Sciences and Meteorology
About 30 years ago, when the global warming issue was yet to be widely acknowledged, Prof. Nakazawa launched research activities to elucidate the circulation of greenhouse gases on a global scale; his academic contribution is highly esteemed.

2010 Japan Prize
(Awarded in January 2010)
Emeritus Professor Shun-ichi Iwasaki Tohoku University
Creation of Large-capacity Hard Disk Drives
The Japan Prize, sometimes called “Japan’s Nobel Prize,” is presented by the Science and Technology Foundation of Japan to prominent researchers who have made significant innovative scientific achievements. During the 26th annual awards, Emeritus Prof. Iwasaki was honored as one of two (the other being Stanford University’s Peter M. Vitousek, Ph.D.) 2010 Japan Prize winners in the "Industrial production and production technology" field for his great contribution to high-density magnetic recording technology by developing the perpendicular magnetic recording method. He established the principles of the method, which differed from conventional approaches, back in 1977. The newly developed method significantly increased the capacity of hard disk drives (HDDs), and is now widely applied in HDDs for PCs, data servers and various consumer electronics.

Acta Materialia Gold Medal
(Awarded in March 2010)
Professor Akihisa Inoue President of Tohoku University
Contribution to the Development of Material Sciences on Bulk Metallic Glasses
President Prof. Inoue was awarded the Acta Materialia Gold Medal for his significant achievements in leading the development of materials science in the area of bulk metallic glasses. Acta Materialia, Inc. annually awards the Medal to researchers based upon their demonstration of great ability and leadership in materials research since 1974. Prof Inoue is the third winner from Japan, following distinguished laureates across the country and world. The award ceremony was held at the WPI-AIMR Annual Workshop on March 26, 2010, where President Inoue was presented with the Gold Medal by Ted B. Mascalaki, Professor at Carnegie Mellon University and Executive Secretary of Acta Materialia, Inc.

Medal of Honor with Purple Ribbon
(Awarded in April 2010)
Professor Masataka Nakazawa Director, Research Institute of Electrical Communication
Significant Contribution to Constructing a Global Information and Communication Network
Prof. Nakazawa developed key technologies that led to high-speed and large-capacity optical communication in the communication engineering field, including the invention of the EDFA, which is the world’s first compact optical fiber amplifier. His series of research projects revolutionized optical communication technologies and paved the way for a new era.

Japan Academy Prize
(Awarded in June 2010)
Emeritus Professor Hirosi Ooguri Tohoku University
Successful Creation of Innovative Biofunctional Substances
Emeritus Prof. Ooguri is highly esteemed for his outstanding contribution to the development of the life sciences through multidisciplinary accomplishments across fields such as organic chemistry, biochemical analysis and plant physiology. He shared the Prize with Takeshi Kitahara, a professor emeritus at the University of Tokyo, for research on the creation and application of novel biofunctional molecules.

Duke of Edinburgh Prize
(Awarded in June 2010)
Emeritus Professor Moritaka Nishihira Tohoku University
Research on Structuring and Conservation of Coral Reef Communities in Japan, Especially in Okinawa
Emeritus Prof. Nishihira presented basic data on coral reef studies and proposed the concept of inhabitation chains. He advocated for a groundwork on which local communities can readily work for coral reef conservation. He also introduced data that indicated increases in both fish species and total fish numbers as transplanted corals grew.
To go further in education and research
Environment, Organization, and Management for creation of new knowledge

Funding Program for World-Leading Innovative R&D on Science and Technology

Selections of the ‘Funding Program for World-Leading Innovative R&D on Science and Technology (FIRST Program)’ were made at a meeting of the Council for Science and Technology Policy on September 4, 2009. The FIRST program is an all-new system that places top priority on researchers as a part of government strategy that supports innovative R&D efforts to reach world-leading excellence within a 3-5 year period. It aims to reinforce Japan’s global competitiveness and lay a groundwork for industry, security control etc., and also to steadily distribute R&D results to people and our society. From Tohoku University, two research projects by Prof. Masayoshi Esaki and Prof. Hideo Othno were successfully designated amongst 551 applicants across the country. Furthermore, a research project by Nobuo Lauter Kouchi Tanaka at Shimazu Corporation was also designated. He is a visiting professor at Tohoku University and an initiator of the ‘Joint lectures for fusion research’ program at the university.

Research Project
Research and Development of Integrated Microsystems

Core-Researcher
Masayoshi Esaki

Outline
The project aims to introduce advanced design methodologies for high-performance integrated circuits, specifically focusing on the development of new materials and processes. This will enable the creation of circuits with superior performance and reduced power consumption, paving the way for future electronic devices. The project will also contribute to the advancement of research in related fields.

Research Project
Research and Development of Ultra-Low Power Spintronics-based Logic VLIS

Core-Researcher
Hideo Othno

Outline
The project aims to contribute to the realization of low-carbon and energy-saving society and to the strengthening of international competitiveness in the field of next generation VLIS, through the development of innovative energy-saving logic VLIS that fuse spintronics devices and logic-integrated circuits.

Micro System Integration Center (μSIC)

By integrating human resources, organizations and technologies across different fields and businesses, the Micro System Integration Center (μSIC) is engaged in Micosystems R&D activities for high added value, which requires a vast range of knowledge and technology. It will create an R&D center that can provide a platform, from basic research to design, prototyping, and packaging steps, with the best technology, people, information and opportunities/themes at the most appropriate time and cost.

Center for Spintronics Integrated Systems

Under the project “Research and Development of Ultra-Low Power Spintronics-based VLIS” (Prof. Hideo Othno), which started in March 2010 and is supported by JSPS’s “Funding Program for World-Leading Innovative R&D on Science and Technology” (FIRST), the Center for Spintronics Integrated Systems aims at assuming a leading role in achieving innovative change by the fusion of spintronics devices and logic integrated circuits. In this way, the center intends to play a pivotal role in the world-wide innovation cycle of logic VLIS.

The center concurrently promotes the research and development of spintronics materials, devices and circuits. In doing this, it aims to establish a unique technology structure for spintronics logic integrated circuits that includes research and development, processing and production technology and circuit design as well as a circuit integration prototyping environment. Furthermore, the center plans to demonstrate high performance of spintronics logic integrated circuits at ultra-low power far surpassing conventional levels as well as a high performance ultra-low power integrated computing system that combines processing and memory through logic-in-memory architecture using nonvolatile spintronics memories and CMOS. An open innovation center for spintronics logic integrated circuits will be established at the center, creating a standard for high performance ultra-low power systems. Through these dynamic processes, the center plans to play a critical role in the promotion of spintronics logic devices and engineers, giving hands on knowledge of all aspects of spintronics-based VLIS.

Global Centers of Excellence Program (Global COE Program)

The Global COE Program is an initiative by the Ministry of Education, Culture, Sports, Science and Technology in order to support internationally excellent centers for education and research in a concentrated manner to promote internationally competitive universities with the intention of developing creative human resources to lead the world.

Evaluation Team Visits: the Institutional Evaluation Programme (IEP) of the European University Association (EUA)

Tohoku University participated in the Institutional Evaluation Programme (IEP) of EU in FY2009, which is performed as an external evaluation with global viewpoints. This was the first time it was performed not only in Japan but also in Asia. After submitting self-evaluation reports in English, the university had two visits by an evaluation team of the IEP during the 27th–30th (4 days) of October 2009 and 13th–15th (3 days) of January 2010. The teams interviewed concerned people inside and outside the university. On the final visit day, they made an oral report with a Q&A session to the university executives and division directors, so the university as a whole shared their advice.

During the selection process, they are reviewed in terms of their possibility of growth as education and research centers with the function of human resource development on the precondition that they have world-leading, original and epoch-making research bases. At Tohoku University, 12 programs in eight research fields were designated in FY2007 and FY2008.

View the full article online: http://www3.tohoku.ac.jp/iep/
A wide variety of education/research support programs to vitalize the university

Contribution Award in Education

To enrich the university’s Common Subjects program, this award celebrates university staff members who have made great achievements in educational methods, study support and creative approaches for students toward the betterment of education.

Graduate School of International Cultural Studies and Center for the Advancement of Higher Education

Spanish Language Education Group, International Language Committee, Educational Review Board

Headed by: Mitsuhiro Shigaki, Professor, Graduate School of International Cultural Studies
Members: Shigeto Yoshida, Associate Professor, Graduate School of International Cultural Studies
Ceclia Noemi Silva, Lecturer, Center for the Advancement of Higher Education

The group introduced CALL digital technologies in various ways to provide a practical communicative approach, resulting in great learning effects.

Their attractive approach has increased the popularity of Spanish language classes year after year. Students learning Spanish are the third largest group among language classes for first learners, following German and Chinese. The Spanish classes were highly rated in an evaluation questionnaire survey by students.

Mutual Linkage of the Database for Academic Research Staff at Tohoku University and Tohoku University Repository (TOUR)

It is possible to directly refer to a paper registered in the Tohoku University Repository (TOUR) among the papers, reviews and explanatory articles stored in the Tohoku University Database, by the data link from the relevant paper in the researchers’ database.

This is a part of joint efforts for links made by Evaluation-Analysis Office of University Activities and the Library according to the Inuse Plan (Tohoku University Action Plan) to spread Tohoku University’s education and research results.

Now, about 2,500 academic papers are linked, and the number will increase.

Click here to open the Website of the Tohoku University Repository (TOUR): http://library.tohoku.ac.jp/ens/re/fiscal/en

Click here to access and download papers registered in TOUR:

Tohoku University Repository (TOUR) http://library.tohoku.ac.jp/re/fiscal/en

2009 Projects of Tohoku University adopted in “Support Program for Distinctive University Education” by the Ministry of Education, Culture, Sports, Science and Technology

http://www.tohoku.ac.jp/japanese/profile/about08/about0803/

Project for improving perinatal care environment

Project: support young women doctors to engage in perinatal medical care (Tohoku University Hospital)

http://www.4jy.med.tohoku.ac.jp/pw/

Designed to maintain and improve the educational environment for young doctors who will play a large part as medical service providers of the next generation, and support the continuation of, and return to work of women doctors, to reinforce the function of Tohoku University Hospital to nurture human resources, reduce the heavy work load of doctors, and construct a local medical system for perinatal care.

Nurse career system construction plan

Project: Development of a nurse career promotion support system (Tohoku University Hospital)

http://www.kango.hosp.tohoku.ac.jp/career/

This plan calls for the University Hospital and the School of Medicine to cooperate with each other in reviewing academic clinical training methods and systems to improve the educational levels in clinical and basic learning courses for nurses. It’s goal is to ensure that they can improve their expertise efficiently and continuously, and to construct a safe and secure nursing service system.
Productive days, leading a full life in academic and extracurricular activities
The campus life of our individualistic and diverse student body

Awards and Recognition

The Japan Student Services Organization (JASSO) awards excellent students with the Student of the Year award, funded with donations from many people, to commend students who have made great achievements in the categories of academic activities, culture/art, sports, and social contributions to help the development of promising youth who will be great human resources.

The subject of Nagamura’s research, for which the Grand-Prix was awarded, was a cohort study on the risk of colorectal, oral, pharynx or esophageal cancer related to coffee drinking, and a cohort study on the risk of malignant tumors as related to the drinking of green tea. His research report was published in an international medical journal. Mr. Nagamura was given the opportunity to study at the School of Public Health, at the University of Washington for one year.

The Japanese Archery Club of Tohoku University won both the men’s and women’s championships at the 48th Seven University Athletic Competition. The Seven University Athletic Competition is an annual athletic meet held by seven national universities: Hokkaido University, Tohoku University, the University of Tokyo, Nagoya University, Kyoto University, Osaka University, and Kyushu University. At the 48th Seven University Athletic Competition in 2009, the Japanese Archery Club of Tohoku University achieved the brilliant feat of winning the championships in both categories of men’s and women’s Japanese archery for the second year in a row. Particularly, the women have been the champions for three years running since 2007. In other sports, Tohoku University won the fencing and semi-hard baseball championships in the summer games. In the total results for the seven universities, Tohoku University was fourth overall.

Ceremony for the 2009 Ishida Cup and Umino Prize by the Cultural Association, University Union

The presentation ceremony for the Ishida Cup and Umino Prize was held in the Kawauchi-Kita Campus on March 10, 2010. The Ishida Cup is awarded to the club that has made the greatest contribution to the development and promotion of the Cultural Association for the year. For 2009, this was given to the Japanese Calligraphy Club, which actively held exhibitions of their calligraphic works and achieved great results in many competitive events. The newly established Umino Prize is awarded to the club that has achieved the greatest results or made the greatest contribution to the local community or the university. The first awarded Prize was won by the Rakugo Kenkyu-ku (rakugo or comic storytelling club) for visiting many diverse facilities to present their rakugo performances.

Three individuals and three groups that belong to the Student Union were awarded the Sendai City Sports Prize of 2009

The presentation ceremony for the Sendai City Sports Prize was held on February 9, 2009. This prize is given to individuals and groups that have made great achievements in the area of amateur sports. This prize was given to three individuals who belong to the Student Union and the following three clubs; Triathlon, Orienteering and Japanese Archery.

**Individual prize**

<table>
<thead>
<tr>
<th>Name</th>
<th>Sport</th>
<th>Results</th>
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<tbody>
<tr>
<td>Glory Prize</td>
<td>Masahiro Tomita</td>
<td>Triathlon</td>
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<tr>
<td>Prize for Excellence</td>
<td>Takahiro Fujiimoto</td>
<td>Triathlon</td>
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<tr>
<td>Encouragement Prize</td>
<td>Takahiro Ota</td>
<td>Orienteering</td>
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**Group prize**

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<tr>
<th>Name</th>
<th>Sport</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glory Prize</td>
<td>Triathlon</td>
<td>Japan Student Athlete Championships: First place</td>
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<td></td>
<td></td>
<td>The 14th Institutional University Triathlon Meet: First place</td>
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<tr>
<td>Prize for Excellence</td>
<td>Japanese Archery Club</td>
<td>The 57th All Japan Student Japanese Archery Championships: Second place</td>
</tr>
<tr>
<td>Encouragement Prize</td>
<td>Orienteering Club</td>
<td>2008 Japan Student Orienteering Championships: First place, Women’s Relay Championships: First place, Men’s Relay, Parallel Class: First place</td>
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<tr>
<td>Performance Prize</td>
<td>Orienteering Club</td>
<td>For sponsoring and holding 32 competitions in order to popularize orienteering</td>
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Award ceremony for the Four Prizes of the Student Union Sports Association and Student Union Chairman Prize

On March 6, 2010, the award ceremony for the “Four Prizes of the Student Union Sports Association” and the “Student Union Chairman Prize” was held at the Aoba Memorial Hall. The Kurokawa Cup, which is awarded to groups that perform most actively and obtain the most excellent results in that year, was given to the Men’s Volleyball Club, and the Shimura Cup, which is awarded to groups that held the most substantial events, was awarded to the Orienteering Club. Other prizes, including the Suzuki Prize and the Otani Prize, were awarded to outstanding groups and individuals who belong to the Sports Association of the Student Union.

**List of groups and individuals awarded the Four Prizes of the Student Union Sports Association and the Student Union Chairman Prize**

<table>
<thead>
<tr>
<th>Name</th>
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<tr>
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<tr>
<td>Kurokawa Cup</td>
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<td>Men’s Volleyball</td>
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<td>Shimura Cup</td>
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<td>Orienteering Club</td>
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<tr>
<td>Otani Prize</td>
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<td>Men’s Japanese Archery Club</td>
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<td>Japanese Archery Club (Otani Prize)</td>
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<td>Japanese Archery Club</td>
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<tr>
<td>Japanese Archery Club (Shimura Prize)</td>
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<td>Japanese Archery Club</td>
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<tr>
<td>Triathlon Club</td>
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<td>Men’s Volleyball</td>
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<td>Orienteering Club</td>
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<td>Orienteering Club</td>
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<tr>
<td>Track Club (Takahiro Sugimoto)</td>
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<td>Track Club</td>
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<td>Student Union Chairman Prize</td>
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<tr>
<td>Japanese Archery Club (Kurokawa Prize)</td>
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<td>Japanese Archery Club</td>
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<tr>
<td>Triathlon Club</td>
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<td>Swimming Club (Yasuda Daisuke)</td>
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<tr>
<td>Orienteering Club</td>
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<td>Swimming Club (Yasuda Daisuke)</td>
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<tr>
<td>Track Club (Takuma Inoue)</td>
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Creative research at the world’s highest level
Give our inherited and accumulated knowledge back to society

New “Fluctuation Free Facility for New Information Industry” research building of the New Industry Creation Hatchery Center completed

A new research building, the “Fluctuation Free Facility for New Information Industry” of the New Industry Creation Hatchery Center (NICHe) for industry-academia collaborative research, has been completed at the new Aobayama Campus. This new building was built with a fund from the Ministry of Economy, Trade and Industry. It is designed to provide facilities to develop human resources to support approaches to form and develop regional industrial clusters. It is also the first step toward the “approaches to realizing the Science Park Plant” of Tohoku University for further engagement in joint research with private enterprises.

In order that the most advanced research results can be assimilated into industry and rapidly put into practical applications, joint research activities linking to the university’s basic research will be facilitated among university researchers and researchers/engineers/skilled workers from major businesses/local small and medium sized businesses/Japanese small and medium sized businesses that are looking for global niches. This research building will be located next to the new Aobayama Station (tentative name) on the Sendai Tozai subway line, which will open in 2015 and increase accessibility.

Highly Ranked Achievements in Industry-University-Government Collaborations: two faculty members of Tohoku University received the award for Persons of Merit in Industry-University-Government Collaboration.

The Government has commended people who have made great accomplishments and taken leading approaches in industry-university-government collaborative activities among universities, public research institutions and the private sector, aiming at further development of collaboration in Japan since FY2003. Two faculty members of Tohoku University were honored with the Minister of Education, Culture, Sports, Science, and Technology Award in 2009.

Minister of Education, Culture, Sports, Science, and Technology Award
Development of Superhybrid Materials
Professor Tadafumi Adachi
Advanced Institute for Material Research (WPI-AIMR)

Prof. Adachi invented supercritical hydrothermal synthesis that enables continuous synthesis of organic-inorganic hybrid nanoparticles. Based on this technology, he jointly and successfully developed composite materials where contradictory properties are made compatible with each other in a new collaborative project by the Ministry of Economy, Trade and Industry and New Energy and Industrial Technology Development Organization (NEDO). The technology is expected to diffuse as a technological base for various industries.

Minister of Education, Culture, Sports, Science, and Technology Award
Development of a casting CAE system named ADSTEFAN
Professor Kazushi Anzai
Graduate School of Engineering

Prof. Anzai researched and developed a casting CAE system called “Stefan ID” for casting engineers. This technology was transferred to Hitachi Ltd., and further made into a software system product named “ADSTEFAN”. It is now widely used in Japan as well as other Asian countries. It has contributed to improved quality and cost performance of cast products, and has been upgraded every year since it was launched. It is an excellent case of meeting the needs of society through collaboration.

The 2nd Tohoku University International Industry-University Collaboration Symposium

The 2nd Tohoku University International Industry-University Collaboration Symposium was held in Tokyo, on February 22, 2010, as a part of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) “Project for the Strategic Development of Industry-University-Government (I-U-G) Collaboration.” The event featured lectures on the current state of industry-academia collaboration in Japan and other countries. It also included Tohoku University’s reports on world-leading collaborative activities, and case reports by its researchers who took principal roles in the development of international collaborations. Through the program, Tohoku University’s global competitiveness in various research fields was promoted to participants from Japanese and international businesses and other sectors.

The Symposium started with opening remarks by Akihisa Inoue, President of Tohoku University, and Takashi Yanagi, Director, Research Environment and Industrial Cooperation Division, Research Promotion Bureau of MEXT. Following the remarks, Mark M. Wall, Minister-Counselor for Economic Affairs, Embassy of the United States, made a keynote speech entitled “United States Perspectives on the Government’s Role in Fostering Private Sector -University Collaboration.”

The event closed with an enthusiastic gathering of about 128 participants, including many Industry-University relations representatives and experts from government, private sectors, academic institutions, and other foreign agencies.

Tohoku University will continue to promote its international industry-academia collaborative activities, and further contribute to the development of the country’s international collaborations as a whole.

2nd Prize of the German Innovation Award, “Gottfried Wagener Prize 2009” Won

The presentation ceremony of the German Innovation Award, “Gottfried Wagener Prize 2009” was held in Tokyo on February 8, 2010. At this ceremony, Takafumi Fukushima (Assistant Professor at Koyanagi Laboratory, Department of Bioinformatics, Graduate School of Engineering) was honored with the 2nd Prize for his research “Surface Tension-Powered Chip Self-Assembly Technology for Three-Dimensional IC Fabrication” and its innovative physical and chemical approaches.

Inspired by the work of Gottfried Wagener, a German scientist who had close links with Japan, this award has been initiated by twelve technology-focused German companies and the German Chamber of Commerce and Industry in Japan to promote cooperation between Germany and Japan in industry and academia.

This was the second time that a young researcher from Tohoku University has won this prize, following the previous year. There are great expectations that the university will continue to make great contributions to the promotion of industry-academia collaborative activities both for Germany and Japan.

Hints for Industry-Academia Collaborative Activities:
Tohoku University Research Profile Search—Now Available in Web Format (English/Japanese)

The Tohoku University Office of Cooperative Research and Development released the Tohoku University Research Profile Search, web version, to increase opportunities for using research results and resources of our researchers by people in industry and other sectors. It supports the collecting of information with useful facilities such as a list of research areas of life science, information communication, environment, nanotechnology, materials, energy, manufacturing technologies, infrastructure, frontier, and others; various navigation functions; and abundant links to related information. This Search can also be used to explore subjects related to joint research and development.

**International Exchange Programs**

**Becoming a World-leading University through the Construction of a Global Network Creating a World-class Research and Education Center through International Exchanges**

Hosted the 15th Annual General Meeting, the Association of East Asian Research Universities (AEARU)

Tohoku University hosted the 15th Annual General Meeting of the Association of East Asian Research Universities (AEARU) on December 2-4, 2009. AEARU is an international consortium of 17 research-oriented universities in East Asia, Tohoku University, University of Tsukuba, The University of Tokyo, Kyoto University and Osaka University from Japan, Tsinghua University, Peking University, Fudan University, The University of Science and Technology of China, Nanjing University and The Hong Kong University of Science and Technology from China, Korea Advanced Institute of Science, Seoul National University and Pohang University of Science and Technology from Korea; and National Tsing Hua University and National Taiwan University from Taiwan, and furthers workshops and student exchange programs. This Annual General Meeting chaired by President Matsumoto of Kyoto University reviewed its past activities and discussed plans for future activities.

Following the General Meeting, each of the member universities gave a presentation of its activities in a session led by President Inoue of Tohoku University, where attendees exchanged views about the improvement of undergraduate education and specialized education provided in English for universities to meet the globalization.

Selected as a core university in the "Global 30" program of the Ministry of Education, Culture, Sports, Science and Technology

In July 2009, Tohoku University was selected as a core university to implement the Project for Establishing Core Universities for Internationalization (Global 30) of the Ministry of Education, Culture, Sports, Science and Technology with the aim to provide an educational environment that is very attractive for international students.

"Future Global Leadership," a Global 30 program of Tohoku University, is designed to increase lectures and research guidance in English so that students can acquire a degree by taking such classes. Under this program, Tohoku University has established the Institute for International Education and the FlG Office as bases for the management of this program.

For the courses taught in English, our university is planning to increase to 16 courses until 2013, including the existing three courses. It is also planning to commence the International Program in Liberal Arts (IPLA) program in the autumn of 2010, based on its results in the Junior Year Program in English (JPE) program, a short period English education program for students in science and engineering.

Tohoku University has a plan to set up an overseas joint office with other universities for common use in Russia to support public relations there, and has established the Office of Japan-Russia Relations.

**Tohoku University Day (Shanghai Jiao Tong University, the Northeastern University of China and the Bandung Institute of Technology)**

In FY2009, we launched Tohoku University Day to promote the understanding of our university’s latest research results and educational activities to attract many more excellent international students/researchers, thereby making the university more internationally open.

Tohoku University Day was held at Shanghai Jiao Tong University in Shanghai on December 18, 2009, at Northeastern University in Shenyang, China on March 13, 2010, and at the Bandung Institute of Technology in Bandung on March 18, 2010.

The events included speeches delivered by the presidents of Tohoku University and each host university, presentations on the status and research results of Tohoku University, its divisions’ teachers giving counsel to individuals, and poster/panel exhibition.

**United Nations University Global School 8th Tohoku Session Increasing Poverty and Rich-Poor Gaps: From Glocal Perspectives**

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**United Nations University Global School 8th Tohoku Session Increasing Poverty and Rich-Poor Gaps: From Glocal Perspectives**


UNU Global Seminars are held annually to enhance awareness about contemporary global issues and the role of the United Nations in addressing them. They are designed to provide a place where students who will lead the next can interact with distinguished scholars and practitioners and explore issues at once globally and be familiar in depth through lectures and group discussions.

This year’s seminar was held as an event with two-night lodgings, with 83 attendees from across the country. They participated in lecture classes, group discussions, and presentation sessions.

**Study Abroad Program**

Had the Tohoku University Study Abroad Program (SAP) at the University of California, San Diego (UCSD), in the United States, and at the University of Sydney in Australia.

Started in 2008, the SAP was carried out for the first time at USCSD this year.

28 students participated in SAP at the University of Sydney, and 16 at USCSD, mostly from undergraduate classes. During the spring academic break, they stayed about four weeks at the University of Sydney or USCSD, where they received intensive English training and took lecture classes on special subjects together with local students. They also went on field trips or homestays to experience local culture and people’s lives.

**Tohoku University Study Abroad Fair**

Tohoku University Study Abroad Event was held by the Center for International Exchange on April 12, 2010.

This event is designed to encourage our students to go abroad for study or participate in international exchange activities.

This event included presentations about study abroad programs, short-period overseas training courses, language learning supports, etc., that our university carries out and about study abroad programs provided by overseas universities in partnership with our university, and from reports of students about their experiences as foreign exchange students or in short-term training programs. We invited universities in partnership with Tohoku University and domestic institutions to support studying abroad. The students who were interested in going abroad had an opportunity to consult with the universities and institutions.

**12 New Inter-university Academic Exchange Agreements Concluded. Total Agreements now at 144 (as of June 1, 2010)**

**Topics**

<table>
<thead>
<tr>
<th>Country</th>
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<th>Date of conclusion</th>
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*The 2009 version is based on information as of July 1, 2009. The 2008 version is based on information as of August 1, 2008.*
A Tradition of “Open-Door” Spirit
Active Approaches to Social Contribution and Gender Equality

Tohoku University “Exploring-Germination-and-Growth program for young Scientists (EGGS)” Held

Founded in June 2008, Tohoku University’s “Exploring-Germination-and-Growth program for young Scientists (EGGS)” (opened to 70 students in the Basic Course and 30 students in the Advanced Course) had its opening ceremony on June 12, 2010. These courses are provided annually for high school students across the country as a part of the Japan Science and Technology Agency (JST)’s Fostering Next-Generation Scientists project. The university submitted invitation letters to about 2,000 high schools, and received 278 applications in FY2008, and set the 100 students selected. They come to the university once a month to take two lecture classes. The selected young people are given the opportunity to experience cutting-edge research and tackle assignments in many scientific fields, including general sciences, engineering, biology, medicine, agriculture and environmental science. They also have opportunities to visit the university’s research facilities and learn about their prospects through career education. Students and their parents have great interest in these fruitful opportunities.

In FY2010, the Extended Course was launched; it allows FY 2009 Advanced Course students to explore research in-depth with particular faculty members for one year.

“Hirameki in Tokimeki Science”—Welcome to the University Lab-Science inspiring outreach science program for elementary and junior high school students

This program of the Japan Society for the Promotion of Science (JSPS) invites fifth and sixth year elementary school students, and junior high school students to university laboratories to have them see, hear and experience the results of research conducted at universities so that they can learn the relations between academic activities and daily life, and feel how interesting they are. Tohoku University held the following five events in FY2009.

July 10-11, 2009 (same event program on both days)
Professor Motoyuki Sato, Center for Northeast Asian Studies: Ground-penetrating radar to detect mines

Presentation to the children on how mines were removed in Afghanistan and Cambodia, and explained how the Advanced Landmine Imaging System (ALIS) detects mines by means of radar using electromagnetic waves. The children studied measuring instruments for electromagnetic waves and electricity, and experienced detection of a simulated mine by moving an ALIS around a large warn tank for the experiment.

August 8, 2009
Professor Shiochiro Kurata, Graduate School of Pharmaceutical Sciences: Feel the wonders of insect functions, together with Tohoku University Science Angels

Some veterans claim that more than 95% of the species on the earth are insects, and insects account for 95% of all the population on it. The children, guided by Science Angels, who are female students of graduate schools of natural sciences, explored the forming of insects’ shapes, which enables them to thrive, and their excellent protective functions against infectious diseases.

October 3, 2009
Professor Mamiko Sasa, Graduate School of Engineering: Let’s experience plasma—Energy around us

Lectures on the present state of plasma technology, and an introduction of the relevant laboratories, were conducted. The children also experienced what plasma around us is like through an experiment to generate and use it.

January 7, 2009
Professor Hitoshi Sogama, Graduate School of Engineering: Strengthening by stinking with bubbles

The children learned why metals are strengthened by applying an impact force produced when special bubbles called gas bubbles, are collapsed on it. They assembled bubble generators that they could take home for their own experiments. They also processed aluminum pieces with equipment actually used in research at the laboratory, and analyzed them with an X-ray diffractometer to learn about research activities at the site.

The 8th Tohoku University Gender Equality Symposium

Ten years have passed since the Basic Act for Gender Equal Society was enacted. Tohoku University, the first university to admit women in Japan under the “Open-door” policy, set up the Gender Equality Committee in 2001, and has since made active efforts to implement gender equality including establishing the Sawayana Prize (Tohoku University Prize for the Encouragement of Gender Equality) and the Support Program for Female Researchers. This symposium has been held annually since 2002. In FY2009, it took place at Katahira Sakura Hall at Tohoku University on November 28, 2009. It included the presentation ceremony for the Sawayana Prize, lectures, reports and panel discussions. The Sawayana Prize consists of three categories: Research, Activity, and Projects, to promote research and activities related to gender equality, with emphasis on active proposals or plans to realize a gender equal society. The 7th Sawayana Prize [Research] was awarded to Miyuki Shimbou, Associate Professor at the Graduate School of Arts and Letters, for her paper “Research on Policies of Child Support after Divorce and the Status of Women - Ambiguity in the Nation’s Intervention in Families.” It was praised as “research from a broad perspective that covers a wide range of family welfare policies, with a focus on changes in the child support system for fatherless households with divorced mothers, and depicts the status and problems of Japan in comparison with the United States and Britain.”

The second part of the symposium titled “The State of Gender Equality in Tohoku University – Issues and Prospects as Truly Discussed” was a comprehensive report by Miyoko Tsumura, Professor, Graduate School of Law, followed by a panel discussion on the state of gender equality and problems at Tohoku University with views and comments from the floor.

Some of the attendees’ comments were: “the perspectives of ‘broadening the range’ and ‘life-work balance‘ which will lead to the creation of an environment where individuals can give full play to their abilities regardless of gender” and “I would like the university to lead society theoretically and practically in implementing gender equality.”

Tohoku Women’s Hurdling Project—toward Next-step Actions

The Tohoku Women’s Hurdling Project has provided support to help female researchers overcome obstacles along their career paths and establish systems for such support for three years since 2006. This project has produced results including newly established systems and revised internal regulations to increase female academics and improved attitudes among academics toward gender issues in the university, and increase women’s involvement in the management system of the university. To further develop these results, the Tohoku Leading Women’s Jump Up Project for 2013 commenced in FY2009. It has set a target of having 30 female researchers in five years in the fields of physics, engineering and agricultural sciences, where the ratio of female researchers is low, with the aim of fostering “female researchers in Tohoku who are independent, helpful to each other, and who will shape the future.” The Tohoku Women’s Hurdling Project still continues to be implemented as a unique project of our university, to realize a gender equal society by providing further support. This project includes the following.

Child Rearing/Elderly Care Support Program

One of the highest hurdles that female researchers must step over along their career paths is the task of taking care of their children/elderly parents while engaging in research. The Child Rearing/Elderly Care Support Program has received extensions on a trial basis, and fully executed a fully supported system to enable female researchers to do both tasks, in collaboration with the Committee on Equal Opportunity for Women Physiologists. The system involves dispatching a technical assistant/secreetary solely set from among applicants to female researchers who are raising children, and providing financial support for the cost of hiring baby-sitters. Further developments of this program in collaboration with the Gender Equality Committee are a shortened work-time system and an improved system for extended terms of postponement for research, which creates an environment where female researchers are allowed to fully exhibit their abilities.

Environmental Improvement Program

To ensure that female researchers can continue their research activities, various appropriate environments need to be created. Child-care facilities for E-children in Tohoku University Hospital, which have operated since 2001 under space limitations, were granted an increase in staff members by this project in FY2006, so that they can now be used by the entire university. Now every graduate school of natural sciences/natural science laboratory has a lounge for women under this program.

The 8th Tohoku University Gender Equality Symposium
The State of Gender Equality - Issues and Prospects as Truly Discussed

Tohoku Women’s Hurdling Project activity

A Science Angels activity

Detecting a simulated mine with an ALIS

Lecture with an experiment by Hitoshi Sogama

Annual Review 2010

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Forming a Tohoku University community where the students, graduates and staff of Tohoku University join together

Tohoku University Shuyukai

The Tohoku University alumni association, called Shuyukai, was inaugurated in 2007, the centenary year of the foundation of the university. The Shuyukai is a Tohoku University community, having a membership of as many as 140,000 graduates, about 18,000 current students, a staff of about 6,000 people, and the families of the current students. The members interact with each other and promote friendship, and contribute the development of the university, with close communication between the members and the university. It aims to develop and strengthen the sense of solidarity among the members.

Shuyukai held Home Coming Day, an Exchange Meeting in Kantō, and an Exchange Meeting in Kansai as events where Tohoku University alumni and other concerned people could have friendly exchanges with one another. FY2009 graduate alumni secretaries were elected from among those graduates of each faculty who organize alumni meetings for graduates.

Tohoku University 102nd Anniversary Home Coming Day

■ (Saturday) October 10, 2009
Venue: Centennial Hall (Kawauschi Hagi Hall) and Kawauchi-Kita Campus (Kawauchi Gymnasium)
11:00–12:00 General Meeting of Shuyukai
13:00–15:30 Sendai Seminar “New Region Creation – Basic Strategies for Self-Supportive Development –”
12:00–19:00 Friendly Exchange between students and graduates

■ (Sunday) October 11, 2009
Venue: Centennial Hall (Kawauschi Hagi Hall)

● Performances
Time: 13:00–15:00
Place: Centennial Hall (Kawauschi Hagi Hall)
Performers: Mandolin Club, Jazz ORCHESTRA, Glee Club, Rakugo Study Club, Traditional Japanese Music Club, Cheering Squad, Brass Band, Broadcasting Association (MC)

● Exhibition
Time: 10:00–16:00
Place: Conference rooms in Centennial Commemoration Hall
Exhibitors: Movie Making Club, Photography Club, Japanese Calligraphy Club, Art Club, Mountain Climbing Club

Concert in commemoration of Tohoku University 102nd Anniversary Home Coming Day

● Performances
Time: 18:00–20:00
Place: Centennial Hall (Kawauschi Hagi Hall)

Tohoku University 102nd Anniversary Exchange Meeting in Kantō

■ (Sunday) August 2, 2009
Venue: Sapia Tower
15:00–17:30 Lecture
18:00–19:00 Networking Reception

Tohoku University Exchange Meeting in Kansai on the 103rd Anniversary

■ (Saturday) February 6, 2010
Venue: Creation Core Higashi-Osaka (3F, South Building)
13:00–14:20 Science Café
14:30–17:00 Lecture
17:30–19:30 Kansai Branch Alumni Meeting and Networking Reception

Alumni secretaries of the 103rd graduating class were elected by confidence vote

In FY2009, 26 members of the 103rd graduating class were elected as alumni secretaries by confidence vote on the occasion of the commencement ceremony on March 25, 2010.

Tohoku University Silvester Concert

The second Tohoku University Silvester Concert was held. This new year countdown event featured performances by Mr. Eijiro Kii, a soloist of the Vienna State Opera, Mr. Satoshi Nakawaga, a popular tenor singer, Ms. Kaori Nakazawa, a soprano singer as a representative of Sendai City, and Mr. Fumiaki Miyamoto, an orchestra director, who was familiar with this kind of event in Europe. Many guests fully enjoyed their gorgeous and splendid performances on New Year’s Eve.

■ (Thursday) December 31, 2009
○ Bizet: Prelude to the first act of Carmen
○ Stravinsky: Suite from The Firebird
○ Mozart: Overture and “Non piu andrai farfallone amoroso” from The Marriage of Figaro
○ J. Strauss: Czardas from Die Fledermaus
○ Verdi: “La donna è mobile” from Rigoletto
○ Verdi: “Libiamo ne’ lieti calici” and “Di provenza il mar, il suol” from La traviata
○ Rodgers & Hammerstein: from The Sound of Music
○ Khachaturian: "Waltz" from Masquerade Suite
○ Puccini: "Nessun dorma" from Turandot
Tohoku University New Campus Plan
Each Campus environment now being developed based on the master plan

Katahira Campus
Extended Education & Research Building completed

As a facility mainly for professional graduate schools, the Extended Education & Research Building was completed in August 2010 on the site of the old Administrative Building Annex.
Created in order to draw the eye when viewed from the Main Gate, the building is covered with tiles and features the Tohoku University Logo on the tower. This outstanding design has made it a new landmark on the Katahira Campus.

The Project Research Laboratory completed

The Project Research Laboratory, next to the University Archives near the Main Gate, was completed in December 2009. Following the design of a historic building on the Katahira Campus, this building faces the road leading to the Main Gate, and is decorated with tiles forming conspicuous vertical lines. Its wall is aligned with those of the adjoining buildings while the higher stories are recessed, to allow the landmark Archives building to stand out.

Construction started on Integrated Education & Research Building

Construction was started on the new Integrated Education & Research Building. The old building of the Department of Metallurgy of the School of Engineering in the former Tohoku Imperial University, adjoining the North Gate, which has been a familiar symbol of the Katahira Campus since 1925, will be renovated into the new building. Its outer tile walls will be preserved and reused, and some extensions of modern glass walls will be added to provide new functions. Thus, the old building will be revived, while preserving its historic design.

Kawauchi Campus
Remodeling and extension of the Welfare Facilities Building

The Welfare Facilities Building, which has a history of more than 40 years since it was built in 1969, has been completely renovated and extended with a new wooden cafeteria with a gentle arc shape facing the Kawauchi Campus Plaza, constructed in 2008.
This new cafeteria serves various meals from colorful kichenettes. As a new feature of the Kawauchi Campus, it also creates a busy place to talk and get together, or a great place to just relax.

Aobayama Campus
Book café, “BOOOK,” opened

As a part of the developments underway at the welfare facilities in the Aobayama East Campus, the BOOOK facility was opened. It contains a book café, the first of this kind in Tohoku University, store and travel counter. You can drink a cup of coffee brewed with a genuine espresso maker, surrounded by 25,000 academic books.

New Aobayama Campus
New campus under construction

The New Aobayama Campus is now under construction. It is designed to be a campus that maintains harmony with the rich natural environment that symbolizes the city of Sendai and is cherished by the people. The construction is progressing well.
The Fluctuation Free Facility for New Information Industry of the New Industry Creation Hatchery Center (NICHc) was opened in April 2010. This building is equipped with flexible laboratories that can accommodate diverse research, and bright spaces for resting.
The new campus will include the Aobayama Station (tentative name) of the Tozai Line of the Sendai City Subway, which is under construction and scheduled to open in 2013. The Tozai Line will run from near the Yagiyama Zoological Park in the southwest of the city to the East Interchange on the Sendai Tobu Road and on to Sendai Port via Aobayama Hill, Kawauchi, and JR Sendai Station. It will provide easy access to the campus from the center of the city.

Booklet on the Tohoku University Campus Master Plan created

A booklet titled “Tohoku University Campus Master Plan,” which has been sequentially reviewed and developed by the campus construction committees since 2001, was prepared in March 2010. Based on “Triangle Vision – Tohoku University New Campus Plan,” this Master Plan deals with open spaces, facilities and transportation. It reorganizes the campuses in view of the opening of the Tozai Line of the Sendai City Subway in 2013.
The Tohoku University New Campus Plan can be downloaded from the following web page.
http://campus.bureau.tohoku.ac.jp/tu_kouei.html (Japanese only)