

# Tohoku University

## Annual Review 2008

Tohoku University Annual Review 2008

### Tohoku University

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## MISSION STATEMENT

Since its foundation, Tohoku University has been committed to a "Research First" principle and an "Open-Door" policy, and the University is internationally recognized for its outstanding standards in education and research. The university contributes to world peace and equality by devoting itself to research useful in solutions to social problems and by developing leadership qualities in students.

## HISTORY

Tohoku University was founded in 1907 as the third Imperial University of Japan, following Tokyo Imperial University and Kyoto Imperial University. From the start, it displayed to the world an unswerving commitment to an "Open-Door" admissions policy. In contrast to the other Imperial Universities, it accepted graduates from Higher Technical Schools and Normal Schools and, despite opposition from the government at that time, it became Japan's first National University to admit female students in 1913.

At the time of its founding, Tohoku University was able to attract a group of young, brilliant researchers who had trained around the world to serve on its faculty. Partly as a result of this, a "Research First" principle came to develop, which calls upon our scholars not only to 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 their results of cutting-edge research are being put to use for the good of society and the improvement of ways of living. Evidence of our pioneering practice (before World War II) includes the establishment of local venture businesses which foster regional industry as well as our status as the national center for research into family 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 postwar period, still remains vibrant, and can be seen in today's new era of advanced globalization.

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Annual Review 2008 covers activities conducted at the University from April 2007 to August 2008.

[Picture] Planned site for the University's new Aobayama Campus

# Aiming to Be a World-Leading University



President of Tohoku University  
Akihisa INOUE, Ph.D.

Ever since Tohoku University was established in 1907, our Philosophy has always been "Research First" and to maintain an "Open-Door" policy for emphasizing "Practice-Oriented Research and Education." Over the years, this has enabled us to offer our students world-class education and for them to carry out world-class research. In Tohoku University's Annual Review 2008, we describe the remarkable achievements and highlights of the previous year at the University.

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 various challenges it faces today.

As we aim to become a "world-class university," Tohoku University has formulated practical strategies called the "Inoue Plan 2007 (March 2007)" which consists of 5 areas: education, research, community service, campus environment and organization/management.

Looking back to accomplishments in our first year since the plan started, we find ourselves with numerous projects which are steadily making progress. In the area of education, our university has reestablished a liberal arts curriculum which improves implementation structures indigenous to Tohoku University. In the area of research, Tohoku University has submitted a proposal on a basic concept presented through the international institute of advanced studies for materials research to the World Premier International Research Center Initiative which, as a result, enabled us to begin the "WPI Advanced Institute for Materials Research." Additionally, we have the following actions unique to Tohoku University in progress: to encourage entrepreneurs to conduct business through industry-academia collaboration, to upgrade our facilities to meet the international standards, and to recognize our human resource system and establish the Tohoku University Foundation.

Tohoku University has made an enormous step forward to create a new page in our 100-year-history in 2008. Our aim to be a "World-Leading University" is not a short-term goal. Therefore, we must make sure that our university's policy has a clear direction to follow, obtain a good understanding concerning our missions, and make definite progress towards our goal. Our intentions as a university are to contribute to the improvement of mankind and to be trusted, respected and loved by society.

## Inoue Plan 2007

(Revised 2008)

This is the latest edition of the Tohoku University Action Plan that the Office of the President, led by President Inoue, has implemented since the 2007 academic year. New strategies for the 5 areas which were formulated last year are continuously implemented in the plan, in addition to adjusting it thoroughly according to environmental changes and further evolutions.

## Tohoku University News and Events (April 2007 - August 2008)

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Apr 1	-International Advanced Research and Education Organization Established
Apr 5	- "Inoue Plan 2007 - Aiming to Be a Leading University" Announced
	-Tohoku University Entrance Ceremony
Apr 20	-Tohoku University China Office (Beijing, China) Opened
Jun 21	-Tohoku University Unveiling Ceremony for the Statue of Dr. Lu Xun and Dr. Fujino
Jun 22	-100 <sup>th</sup> Anniversary Event: Tohoku University's School Logo/Color Inaugural Ceremony
Jul 28, 29	-100 <sup>th</sup> Anniversary Event: Katahira Festival
Jul 30, 31	-Tohoku University Open Campus
Aug 25, 26	-Tohoku University's Centenary Anniversary Festival
Aug 27	-The Ceremony of Tohoku University Centenary Event
Sep 25	-Tohoku University Commencement Ceremony
Oct 1	-WPI Research Center: Advanced Institute for Materials Research established
Oct 6	-100 <sup>th</sup> Anniversary Project: Prize Ceremony - The 1 <sup>st</sup> Abe Jiro Memorial Prize for Essays by Young People
	-Tohoku University 100 <sup>th</sup> Anniversary Seminar (Sendai)
	"How to Get Along with China, a Superpower - New Phase of Sino-Japan Relationships and University Roles"
Oct 6, 7	-Tohoku University Homecoming Day
Dec 11	-Tohoku University 8 <sup>th</sup> , 100 <sup>th</sup> Anniversary Seminar
	"How to Educate Elite Engineers in this Globalizing and High-Tech Dominated Era" (Tokyo)
2 0 0 8	
Feb 1	-Innovation in New Biomedical Engineering Center established
Feb 5	-Award Ceremony - Tohoku University's Prof. Fujino Award (Lu Xun Award) 2007
Feb 25, 26	-2008 Tohoku University Entrance Examination: First Examination for General Admission
Mar 12	-2008 Tohoku University Entrance Examination: Second Examination for General Admission
Mar 25	-Tohoku University Commencement Ceremony
Apr 1	-Graduate School of Biomedical Engineering Established
	-25 Distinguished Professors Appointed
Apr 2	-Inoue Plan 2007 (Tohoku University Action Plan, Revised 2008) Announced
	-2008 Tohoku University Entrance Ceremony
Jul 30, 31	-Tohoku University Open Campus
Aug 1	-5 Distinguished Professors Appointed

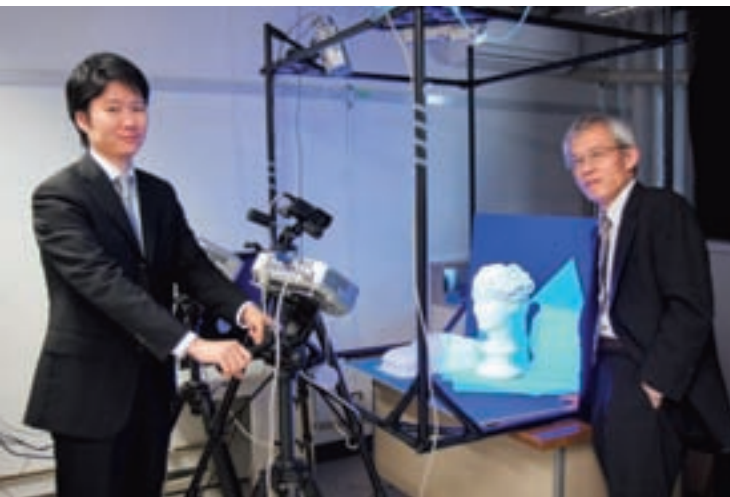
[http://www.bureau.tohoku.ac.jp/president/open/plan/Inoue\\_Plan\\_2007.pdf](http://www.bureau.tohoku.ac.jp/president/open/plan/Inoue_Plan_2007.pdf)



1	<b>E d u c a t i o n</b>	The Inoue Plan is designed to reform the university educational system. As a "Transmitter of Knowledge," the university will provide and disseminate the knowledge which it has accumulated through its history as a "Creator of Knowledge," nurturing students to become our future leaders. Those who will play key leadership roles must be provided with strong cultural backgrounds, specialized knowledge and an international outlook.
2	<b>R e s e a r c h</b>	Tohoku University, as a "Creator of Knowledge," has established a research system based upon originality, oriented towards strategies with a long term perspective. And in order to create the best in advanced, top-level achievements in world research, the University carries out research which is driven by fundamental needs and questions.
3	<b>S o c i a l C o n t r i b u t i o n</b>	As a "University Open to the World and the Local Community," Tohoku University returns its human and intellectual resources extensively to society to make a contribution to the development of the entire society.
4	<b>C a m p u s E n v i r o n m e n t</b>	As a "Creator of Knowledge," Tohoku University provides a global-standard campus environment. It maintains a high standard of support for various educational and research activities.
5	<b>O r g a n i z a t i o n a n d M a n a g e m e n t</b>	Tohoku University is reforming itself into an "Enterprise of Knowledge" to have a firm management base, including a financial base, and to deal with changes in the environmental surroundings and demands of the times.



## Expanding the Possibilities of Image Media by Computer Vision



Graduate School of Information Sciences  
[Image Analysis]

**Koichiro Deguchi**

Professor

Graduated from the MS course of the Faculty of Engineering, University of Tokyo. Worked at Yamagata University and the University of Tokyo. He has been in this position since 1998.

**Takayuki Okatani**

Associate Professor

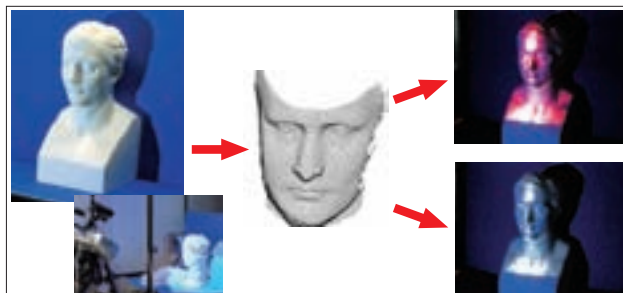
Graduated from the Ph.D. course of the Faculty of Engineering, University of Tokyo. He has been in this position since 2002.

The Deguchi and Okatani Laboratory has established a new area of "Active computer vision" where the dynamic changes of 3D object shapes and 3D space structures are analyzed from actively observed images. The Laboratory has been developing its wide applications in industrial and medical image measurements. The development includes a vision system for robots which recognizes the environment in order to control active movements. The visual function is an important key for robots and intelligent machines to support human works.

The Laboratory also engages in constructing basic theories of human image perception, pattern recognition, and shape description to extend the possibilities of image media. The development of next-generation image media based on these theories will help us to elucidate human visual functions, including 3-dimensional perception and motion information extraction.



Object image tracking: A person is continuously tracked in a sequence of images even in scattered backgrounds.



Construction of a virtual reflectance: Object 3D shape is reconstructed online from a camera image, and special patterns are projected onto it to make it look as if it was made of different materials.



New type of 3D stereo display: Measuring the viewing point of the viewer, sharpness and blur-level of the image displayed are controlled to enhance the 3D shapes of the objects.

[http://www.fractal.is.tohoku.ac.jp/index\\_en.html](http://www.fractal.is.tohoku.ac.jp/index_en.html)

## Multi-Aspect Study on the Problem of Social Stratification and Inequality Raising the Issue of Social Disparity

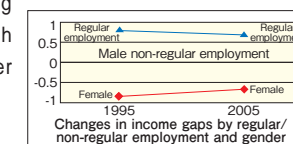


The Center for the Study of Social Stratification and Inequality formed in the 21<sup>st</sup> Century COE Program has elucidated social stratification and inequality, which is an important social problem of our times from four perspectives: the structure and change of social stratification and inequality, East Asia, minorities, and fairness. Concurrently with this program, the director of the Center, Professor Yoshimichi Sato, has conducted a "Comprehensive Study on Structure and Change of Social Stratification System in Contemporary Japan" as a Grant-in-Aid for Specially Promoted Research of the Ministry of Education, Culture, Sports, Science and Technology, where he conducted a countrywide Social Stratification and Mobility (SSM) survey. Through both programs, the professor has acquired knowledge of interesting facts.

One of the findings is an income disparity between regular employment and non-regular employment. Although this has been taken up as a big issue by mass media, no discussion had been held on precise statistical analysis. Professor Sato then conducted an SSM survey and analyzed the results after removing the effects of age, gender and job. The analysis results have revealed that regular employees earn 2.13 times higher income than non-regular employees. It is, however, not necessarily true that the "income gap is widening." The figure shows changes in the effects of regular/non-regular employment and gender on income.

As seen in the figure, gaps by employment form and gender have both become smaller. These results were published in Political Economy Quarterly and noted in a TV news program on NHK.

The study of social stratification and inequality has not only an academic meaning, but also a social meaning because it involves basic research being used to help make a better society.



Arrangements for research in the Center for the Study of Social Stratification and Inequality

Various education and research activities in the Center



Books in English to spread the research activities of the Center around the world (Published by Trans Pacific Press)



Professor Sato with Ms. Rumi Matsuzaki and Mr. Yusuke Hayashi, both COE graduate students

Graduate School of Arts and Letters  
[Behavioral Science and Sociology]



Professor

Born in 1957. Acquired credits in the Ph.D. program and left the Graduate School of Humanities and Sociology, Faculty of Letters, University of Tokyo. Appointed an assistant professor at the Faculty of Economics and Business Administration, Yokohama City University. Became a visiting scholar at the Department of Sociology, University of Chicago. Since 2002, he has been a professor at the Graduate School of Arts and Letters, Tohoku University.

<http://www.sal.tohoku.ac.jp/coe/index.html>



## A New Perspective on Human History from Old Indian Literature The Power of Language

Old Indo-Aryan language, commonly known as Sanskrit, is a descendent of Proto-Indo-European, from which also many European languages are derived. An intermediate stage is Proto-Indo-Iranian. The studies of Indo-Aryan and Indo-European provide the most important materials and methods for linguistics. Professor Goto is working on the origins of the Indian language culture, introducing a new wave into our Department of Indology and History of Indian Buddhism renowned for its tradition. His "I. Präsenksklasse" (Österreichische Akademie, 1987) and other leading activities were cited more than one thousand times in Etymologisches Wörterbuch des Altindischen by M. Mayrhofer. His life work is a grammar of Old-Indian verbs, one of the primary desiderata of the discipline in more than 130 years. Now, he is writing Morphology of Indic in Handbücher zur Sprach- und Kommunikationswissenschaft for Gruyter Publishing.

The first title of the new giant project "Verlag der Weltreligionen" (Germany) is a German translation of the Rigveda, the oldest collection of ritual poetry in India, which goes back to ca. 1200 BC, and which is one of the most important monuments of human history. Professor Goto translates, edits, and provides a commentary for it with Professor Witzel (Harvard University). The first volume of this new standard work in 80 years was published in September 2007, and has already obtained a great response.

He is also working on religious thought in Brahmanism, Buddhism, and Zoroastrian Avesta, and tries to elucidate with colleagues and students the theory of karman and samsara in their beginnings. Convinced of the necessity of popularizing the knowledge gained among specialists, he spoke and wrote in the past year on general surveys about old Indian rituals, Indian and European languages, and monotheism from the Indo-Iranian view.

In old Indian literature the thoughts and Weltanschauung at the time are condensed, providing basic materials for understanding the cultures of Indo-European peoples which were to expand ultimately to form a "global history." Professor Goto has cooperated also in the Indus-Project of the Research Institute for Humanity and Nature (Kyoto), endeavoring to reconsider the history of mankind as "not a clean or purified process", based on new archaeological findings in Europe and Asia.



At the press conference for the International Book Fair, Frankfurt, October 2007.

Graduate School of Arts and Letters  
[Department of Indology and History of Indian Buddhism]

**Toshifumi Goto**, Professor  
Born 1948, Dr.phil. (Indogermanistik, Erlangen). Assistant at the University of Erlangen, lecturer at the University of Freiburg, professor at Osaka University, guest professor at the University of Vienna, and since 1996 professor at Tohoku University. Beirat der Indogermanischen Gesellschaft, Mitglied des Münchener Sprachwissenschaftlichen Kreises.



Rig-Veda. Das heilige Wissen. Frankfurt 2007. 889pp.



A rock drawing from Ryland (Sweden). The Sun changes from a ship to a horse. On the right are Hesperus and Lucifer. A good counterpart illustrated the Asvins' myth in the Rigveda.



The sun-chariot from Trundholm, Denmark (from: H. Miller, Der geschmiedete Himmel, 2006), used to reconstruct Hesperus' myth in the Rigveda.

<http://www.sal.tohoku.ac.jp/indology/eng.htm>

## Development of an Aluminum Alloy to Generate Hydrogen in Room-Temperature Water

Determination of the composition by calculated phase diagrams of Al alloy systems



Special treatment

Through the simple contact of room-temperature water with developed alloys generates hydrogen gas



**Advantages**  
**Low cost and high safety**

Expected applications for batteries such as mobile phones, emergency generators, etc.

An Al alloy in water, generating hydrogen and floating

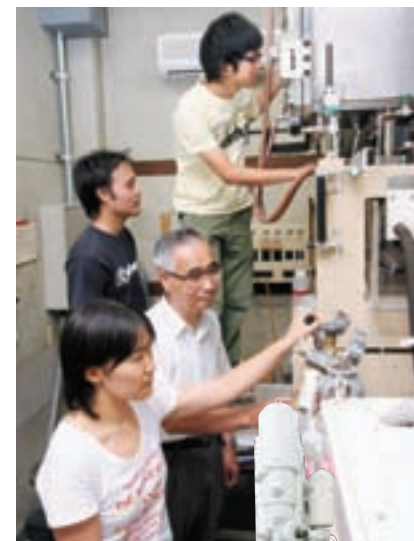
Kiyohito Ishida, Professor of Tohoku University Graduate School of Engineering, and Yoshikazu Takaku, research fellow (Ph.D.) at the Japan Science and Technology Agency (JST), et al., developed an aluminum alloy that generates hydrogen only with room-temperature water.

The research group has sought the method for hydrogen generation from inexpensive Alloys, by making full use of simulation with a computer aided phase diagram.

The newly developed Al alloy can be obtained through the same production process as that for conventional Al alloys; however, it has great advantages over the conventional production methods of hydrogen and in much more simple and inexpensive measures. Moreover, the new alloy has a unique feature; the proportional amounts of hydrogen, which are contained in the Al Alloy, are extractable in proportion to the content of Al. The new Al alloy can be produced anytime and anywhere through activation in different water conditions, including tap water. For this reason, the new alloy is expected to be applicable in many capacities such as portable batteries, emergency electric producing devices etc..

The research group has already applied a patent for the new Al alloy through JST and seeks collaborative research with companies which show interest in its practical application.

Professor Ishida has been honored with a number of awards, including a 2006 Commendation for Science and Technology by the Minister of Education, Culture, Sports, Science and Technology for Science and Technology, and has held many important positions including President of the Japan Institute of Metals.



Graduate School of Engineering  
[Computational Microstructure Design]



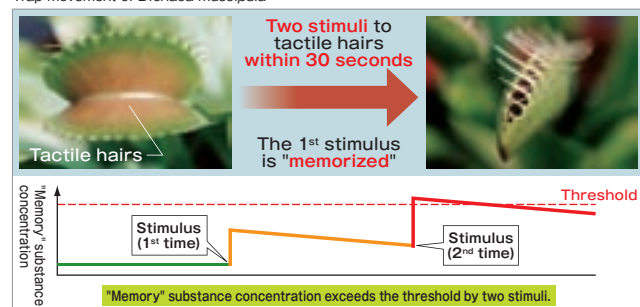
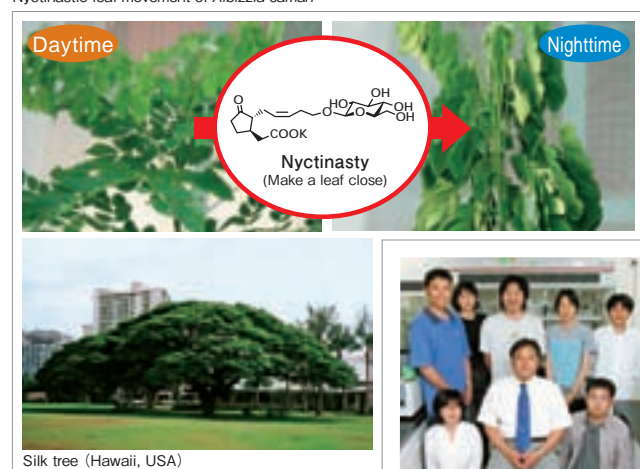
**Kiyohito Ishida**  
Professor

Born in 1946. Graduated from the Department of Materials Science, Faculty of Engineering, School of Engineering, Tohoku University in 1969. Finished the Ph.D. course in the Department of Materials Science, Graduate School of Engineering, Tohoku University 1974. Professor at the New Industry Creation Hatchery Center of Tohoku University in 1998. Since 2005, he has been a professor in the Department of Metallurgy, Materials Science, and Materials Processing, Graduate School of Engineering, Tohoku University.

<http://www.material.tohoku.ac.jp/~seigyolab.html>



# Chemical Approach to the Mystery of Plant Movement

Trap movement of *Dionaea muscipula*Nyctinastic leaf-movement of *Albizzia saman*

In general, plants are rooted and unable to move from place to place by themselves. However, some plants are known to be able to move in certain ways, such as the thigmonasty of *Mimosa* (sensitive plant), the trap movement of *Dionaea* (Venus's flytrap), and the nyctinasty of *Albizzia* (silk tree), etc.

A research group led by Professor Ueda found that these movements are controlled by endogenous bioactive small molecules. The circadian rhythmic leaf closing movement can be explained by the circadian rhythmic changes in balance between a leaf-opening molecule and leaf-closing molecule within the plant body. Stepwise accumulation of "memory" substances" accounts for the "memory" of *Dionaea*, which is observed in their trap movement. These biologically intriguing phenomena are controlled by a small molecule of subnanometer size. Only chemists can reveal these mysteries which lie between chemistry and biology.

## Graduate School of Science [Department of Chemistry]

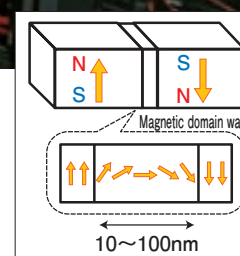


**Minoru Ueda**  
Professor

Born in October, 1965. Finished the doctoral course of the Graduate School of Bioagricultural Sciences and the School of Agricultural Sciences, Nagoya University. Became a research associate, assistant professor, and associate professor in the Department of Chemistry, Faculty of Science and Technology, Keio University, and took up his present position.

<http://www.org1.sakura.ne.jp/>

# Forefront of Spin Electronics – For a Highly Information-Oriented Society



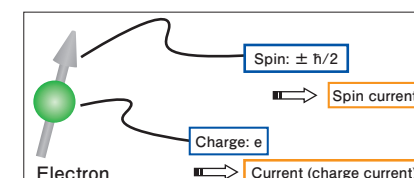
Ferromagnets have structures called magnetic domain walls in each of which N-S directions change on a nanometer scale. A magnetic domain wall can be controlled with a current or a magnetic field.

Electrons have a spin property that is the basis of magnetism. Spin electronics is making an innovative development from conventional electronics by use of the spin. Professor Sadamichi Maekawa has been a world leader in this field.

Since the mid-1990s, nanotechnology has been a high-profile research area in the world. It has made it possible to control devices on a scale far smaller than  $1\ \mu\text{m}$ . Professor Maekawa has elucidated the phenomena that occur in a nanoscale world by means of theoretical physics and computational physics, and constructed new ideas of matter based on quantum phenomena caused by electrons in a substance. In recently conducted joint research with Hideo Ohno, professor at the Research Institute of Electrical Communication, Tohoku University, Professor Maekawa illuminated the difference between a current and a magnetic field acting on a magnetic nanostructure called a magnetic domain wall. The research result was published in *Science* (Vol. 317, September 21, 2007).

Professor Maekawa was honored with The Humboldt Prize (Germany) in 2001 and The Magnetism Society of Japan Award in 2003 for his achievement in building the foundation for spin electronics, and was selected as a Fellow of the Institute of Physics of the United Kingdom, in 1999, a Fellow of the American Physical Society in 2007, and a Distinguished Professor at Tohoku University in 2008.

[http://www.maekawa-lab.imr.tohoku.ac.jp/index\\_e.html](http://www.maekawa-lab.imr.tohoku.ac.jp/index_e.html)



An electron has a charge and a spin. A current of charges is an electric current, and a current of spins is a spin current.



Research discussion with a visiting professor.

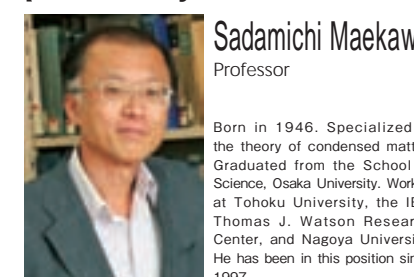


Posters describing research results put up in the corridor in front of Professor Maekawa's Laboratory.



Internationally published books written by Professor Maekawa.

## Institute for Materials Research [Theory Division]



**Sadamichi Maekawa**  
Professor

Born in 1946. Specialized in the theory of condensed matter. Graduated from the School of Science, Osaka University. Worked at Tohoku University, the IBM Thomas J. Watson Research Center, and Nagoya University. He has been in this position since 1997.



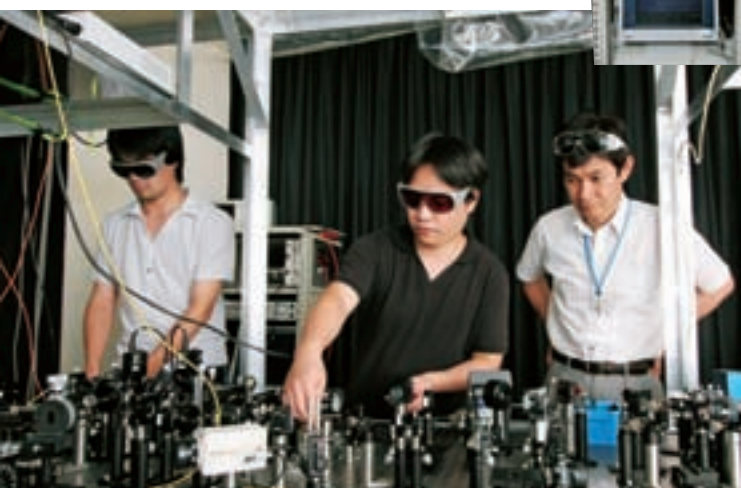
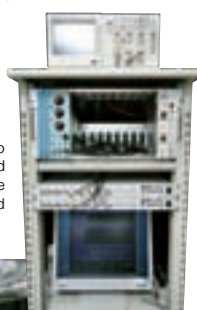
# Frontiers of Quantum Information and Communication Technology Using Photons and Semiconductors

Quantum information and communication (QIC) technology, which goes beyond the limits of existing information and communications technologies using quantum mechanical properties of the electron and photon, has recently attracted a great deal of attention. One of the fundamental technologies for QIC technology is the method of generating and controlling the state of "quantum entanglement," in which a pair of particles has a quantum mechanical correlation. The quantum entanglement is essential to future QIC devices, such as a "quantum computer," "quantum teleportation," and "quantum repeater."

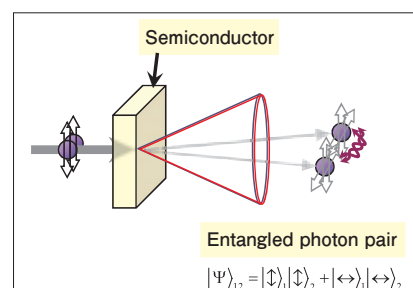
A research group led by Professor Keiichi Edamatsu succeeded in demonstrating the world's first generation of high purity entangled photons from semiconductor material. The research findings were published in Nature in 2004. The team demonstrated a generation of entangled photons with much higher purity in 2007. In 2008, they also demonstrated the proof-of-principle experiment of quantum state transfer from a photon to an electron spin. The research achievement has opened up a new way to produce QIC devices using photons and semiconductor materials.

Professor Edamatsu has communed with starlit skies from his childhood, yearning to know about the beauty and marvels of lights. He was also captivated by the mystery of "quantum mechanics" when he studied it at the Physics School, Tohoku University. He said, "My current research activities have been triggered by these experiences."

System to detect and analyze entangled photons



An experiment using entangled photons.



Entangled photon pair generation using a semiconductor.



All members of the research team examine the experimental results and exchange their views, which may produce great ideas.



Adjustment of optical devices, such as laser, is delicate and strict.



The research team on entangled photons. Every team member has his/her own research theme and is striving for research night and day.

## Research Institute of Electrical Communication [Quantum-Optical Information Technology]

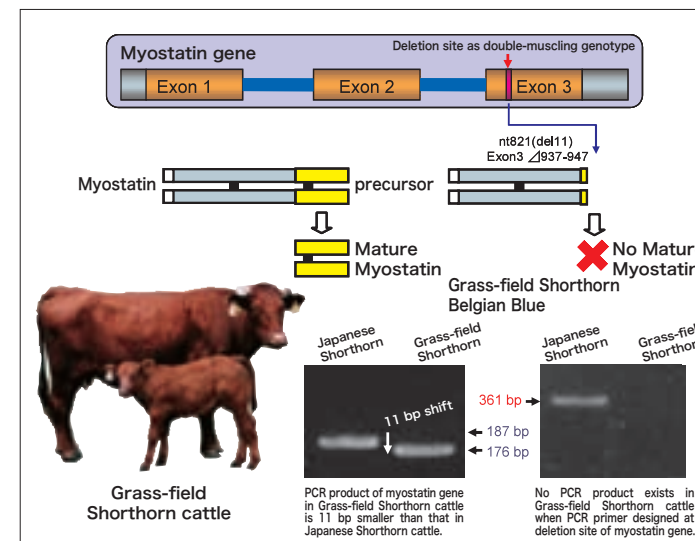


**Keiichi Edamatsu**  
Professor

Born in 1959. Received B.S., M.S., and D.S. degrees in Physics from Tohoku University. Worked at Tohoku University, California Institute of Technology, and Osaka University. In 2003, he assumed his current position as a professor at the Research Institute of Electrical Communication, Tohoku University.

<http://www.quantum.riec.tohoku.ac.jp>

# Elucidating the Mechanisms of Grass-field Shorthorn Cattle to Improve Lean Beef Production



Double-muscling phenotype in Grass-field Shorthorn cattle

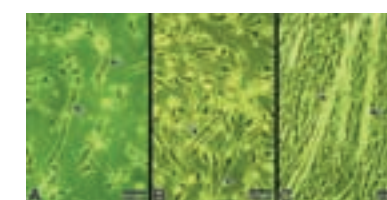
The research team led by Professor Takahiro Yamaguchi makes full use of the latest cellular and molecular biology technologies to carry out studies on bio-mechanisms in ruminants and the associated applied science. The representative research achievements in this laboratory are the elucidation of myogenesis in cattle to improve meat production. The research team developed Grass-field Shorthorn cattle that are naturally deficient in myostatin, a negative regulator of muscle development and growth, from the family of Japanese Shorthorn cattle. Grass-field Shorthorn cattle have the same double-muscling (DM) phenotype as Belgian blue cattle, producing a carcass that is classified as a superior beef grade in Europe. The healthier lean beef production in Grass-field Shorthorn cattle is about 1.5 times more than that of Japanese Shorthorn cattle. The cattle strain is promising as a beef cattle resource to increase beef production in our country.

The research team also first established cloned DM-derived myoblasts and succeeded in forming myotubes in vitro. This culture system gave us new myostatin information concerning the mechanisms of myogenesis and the endocrine effects. The discoveries anticipate great research advances in the myology and also open up a new field for myostatin research not only in agricultural science but also in medical science. An assessment of consumers on beef of Grass-field Shorthorn cattle has been significantly judged as "low calorie tender lean beef". This research project is funded by the Bio-oriented Technology Research Advancement Institution (BRAIN) and is proceeding with practical applications.

<http://www.agri.tohoku.ac.jp/keitai/index.html>



Increased production of healthier lean beef in Grass-field Shorthorn cattle. Arrowheads show fat deposition in beef.



**Myogenesis of bovine myoblasts in vitro.**  
A: Myoblasts in growth medium (arrows). B: Immature myotubes formed by myoblasts (arrows). C: Developed myotubes (arrows)



Grass-field Shorthorn cattle have approximately 1.5 times higher beef productivity than Japanese Shorthorn cattle.

## Graduate School of Agricultural Science [Functional Morphology]



**Takahiro Yamaguchi**  
Professor

Born in 1946, he completed his doctoral course at the Graduate School of Agricultural Science, Tohoku University. He worked at the Medical School of Tohoku University and then the Medical School of Texas University. In 2000, he assumed a position as a professor at the Faculty of Graduate School of Agricultural Science, Tohoku University.



## Continuous Advances in Innovative Research are Highly Valued inside and outside Japan

# Prize Winners for 2007

(April 2007 - August 2008)

### Order of Culture

Awarded in November 2007

## For Great Contribution in Bio-organic Chemistry and Natural Products Chemistry with Structure Determination of Ginkgolide

**Koji Nakanishi**, Professor Emeritus, Graduate School of Science

Professor Emeritus Koji Nakanishi, was awarded the Order of Cultural Merit of 2007 for his achievements in determining the structures of ginkgolide and brevetoxin, and in developing the nuclear Overhauser effect (NOE) method and exciton chirality method, which made a great impact on bio-organic chemistry and natural products chemistry. Professor Nakanishi is a world-renowned authority in organic chemistry, and has achieved many great things, including his elucidation of the mode of action of physiologically active substances at molecular structure level and his discovery of causal substances for ocular fundus degeneration. He has been honored domestically and internationally with the Japan Academy Prize in 1990, the U.S. Science Academy Prize for Chemistry in 1994, the Robert Welch Award for Chemistry in 1996, and the King Faisal International Prize in 2002.

He is now conducting research in the structures of functional natural organic compounds and in vivo functional expression.



### Person of Cultural Merits

Elected in November 2007

Achievement in Study of International Laws  
Contribution as a Judge of the International Court of Justice

**Shigeru Oda**, Professor Emeritus, Faculty of Law



Professor Emeritus ODA, who taught international law was known already in the 1960's and 1970's as a pioneer in the Law of the Sea among international lawyers. In 1976, he was elected by the United Nations as Judge of the International Court of Justice, and served three nine-year terms until 2003.

### Person of Cultural Merits

Elected in November 2007

Opened a New Phase for Organosilicon Chemistry  
Highly Evaluated for Achievements to Lead the World

**Hideki Sakurai**, Professor Emeritus, Faculty of Science



Professor Emeritus Sakurai, who established organosilicon chemistry as an academic system having an important extent, was elected as a Person of Cultural Merit in November 2007. He was highly evaluated carrying out research in organosilicon chemistry playing a leading role at the world level.

### Japan Academy Prize

June 2007  
March 2008

Awarded the Japan Academy Prize  
Honored with the Tribology Gold Medal

Highly Evaluated in Domestic and International Academic Communities, and by Industry for Study on Tribology

**Koji Kato**, Professor Emeritus, Graduate School of Engineering

Koji Kato, Professor Emeritus, was awarded the Japan Academy Prize in 2007 for his joint "Studies on Tribology" with Yukio Hori, Professor Emeritus, the University of Tokyo.

Professor Kato elucidated the mechanism of generating static friction coefficient by means of visualization methods, and the microscopic mechanisms of friction and wear. He succeeded in creating wear maps for the first time by integrating those elucidations. The map has made it possible to diagnose and predict wear condition, which is a great contribution to the development of anti-wear design. Tribo-coating lubrication that he invented was subjected to exposure tests in the international space station, and is under development for long-term practical use in space.

Professor Kato was also honored with the Tribology Gold Medal of 2007. It is considered to be a great honor in the field of tribology, equivalent to the Nobel Prize.



### Medal of Honor with Purple Ribbon

Awarded in April 2007

Invention of Flash Memory that Changed the Semiconductor Field in the World

Research Institute of Electrical Communication

**Fujio Masuoka**, Professor Emeritus



Professor Emeritus Masuoka was awarded with a Medal of Honor with Purple Ribbon in the spring of 2007 for his great invention of flash memory. Flash

memory has spread worldwide as a data storage medium in mobile phones, digital cameras, personal computers, etc.

### Medal of Honor with Purple Ribbon

Awarded in November 2007

Created and Elucidated Silicon Compounds of with New Structures

Graduate School of Science

**Mitsuo Kira**, Professor Emeritus



Professor Emeritus Kira was awarded with a Medal of Honor with Purple Ribbon in the autumn of 2007 for his achievements in researching and elucidating the properties

of silicon compounds with new structures. Professor Kira has created stable divalent silicon compounds and various silicon "double bonds."

### Medal of Honor with Purple Ribbon

Awarded in April 2008

Great Contribution to the Academic Community and Industry with Research in Fluid Engineering

Institute of Fluid Science

**Kenichi Nanbu**, Professor Emeritus



In recognition of his achievement in fluid engineering research, Professor Emeritus Kenichi Nanbu was awarded with a Medal of Honor with Purple Ribbon in the spring of 2008. His achievement

is not only important in academic terms, but also a great contribution to the industry, e.g., in space and aeronautics, semiconductor plasma process, and vacuum machinery.

### Topics

Successively Selected as the "No. 1 University," from Overall Ranking, by Japanese High School Teachers

In the "University Ranking 2008" published by the Asahi Shimbun Company, Tohoku University was ranked top for four consecutive years, from an overall rating of responses to questionnaires. The newspaper conducted a questionnaire survey of high school teachers in charge of educational guidance from across Japan and compiled the results. Tohoku University was first favorite for "In which university did the students show improvements in performance after entering?" and third favorite for "Which university do you recommend to your students?"

No. 1 | Tohoku University

No. 2 | The University of Tokyo

No. 3 | Keio University

No. 4 | Ritsumeikan University

No. 5 | Tsukuba University

### Topics

"Materials Science" Ranked Third in the ESI's List of Most Cited Papers in the World.

As of May 2008, the Institution Rankings based upon Essential Science Indicators (ESI) which provides data of citation frequencies, published by Thomson Scientific, USA, indicated Tohoku University's publications in the field of "Materials Science" ranked 3rd in the world. It is ranked 1st in Japan, while that in the field of "Physics" ranked 2nd in Japan.

3rd in the world (1st in Japan) | Materials Science

9th in the world (2nd in Japan) | Physics

15th in the world (4th in Japan) | Chemistry

40th in the world (3rd in Japan) | Engineering



## Brilliant Talent Illuminates the World, and Guides Researchers of the Future

# Distinguished Professor System



The Distinguished Professor System is designed to support professors who are leading in the fields of education, research and social contribution. Tohoku University intends to show its appreciation of these distinguished professors to the world, and to increase the university's international profile, and to ensure world-class human resources.

Appointed as Distinguished Professors for the first time in this system are 30 professors (25 on April 1, 2008 and 5 on August 1, 2008) who have made great achievements based on the highest expertise. All

of them have a research mentality of "Challenge," "Creation," and "Innovation," which are three keywords developed in Tohoku University.

The activities of the Distinguished Professors are expected to stimulate other teaching staff and be a model for students, and to encourage them to make a contribution to human society.

During a term of three years beginning in the academic year of 2008, when Tohoku University starts another 100 years of its history, they will spread various activities of the university throughout society.

Name	Organization	Reason for appointment
Appointed on April 1, 2008		
Teruo Asakawa	Center for the Advancement of Higher Education	He has contributed to the promotion of English teaching at the university by playing a leading role in innovation, associated with constructing course contents and curricula of English teaching.
Tatsuo Uchida	Graduate School of Engineering	He has followed an untrodden path in the research of liquid crystal display, and has achieved outstanding results through a great contribution to the practical application of high performance liquid crystal displays.
Noriko Osumi	Graduate School of Medicine	She has played an active role in the most advanced research field as the representative for the center of the global COE in the field of life science, as well as taking a leading role in social contribution.
Eiji Ohtani	Graduate School of Science	He has contributed to both education and research through publishing a number of world-class articles, and played a role as the representative for the center of the 21 <sup>st</sup> century COE program.
Hideo Ohno	Research Institute of Electrical Communication	He has achieved excellent results in the new research area of fused semiconductor physics with magnetism, and has been developing world-leading research in the new field of semiconductor spin-electronics.
Yoshitomo Oka	Graduate School of Medicine	He has been greatly appreciated in the field of internal medicine, especially regarding his research into diabetes and life-style related disease, and has played a leading role in internal medicine in Japan.
Ryuta Kawashima	Institute of Development, Aging and Cancer	He has conducted groundbreaking research in brain function imaging and achieved the most advanced research results in the world, as well as enthusiastically making a great contribution to society with his achievements in research.
Takashi Kobayashi	Graduate School of Arts and Letters	He has achieved outstanding results in the research of dialectology and has conducted remarkable research as the top dialectology researcher, receiving awards including the "Kyosuke Kindaichi Prize" and the "Isuru Niimura Prize".
Mitsumasa Koyanagi	Graduate School of Engineering	He has contributed to the improvement of research in semiconductors through his advanced research, leading the field associated with large integration / high-capacity semiconductor memory, both in Japan and worldwide.
Eimei Sato	Graduate School of Agricultural Science	He has been highly praised for his outstanding research in agricultural science, especially in animal reproduction, and has also been highly acclaimed among educationists both inside and outside the university.

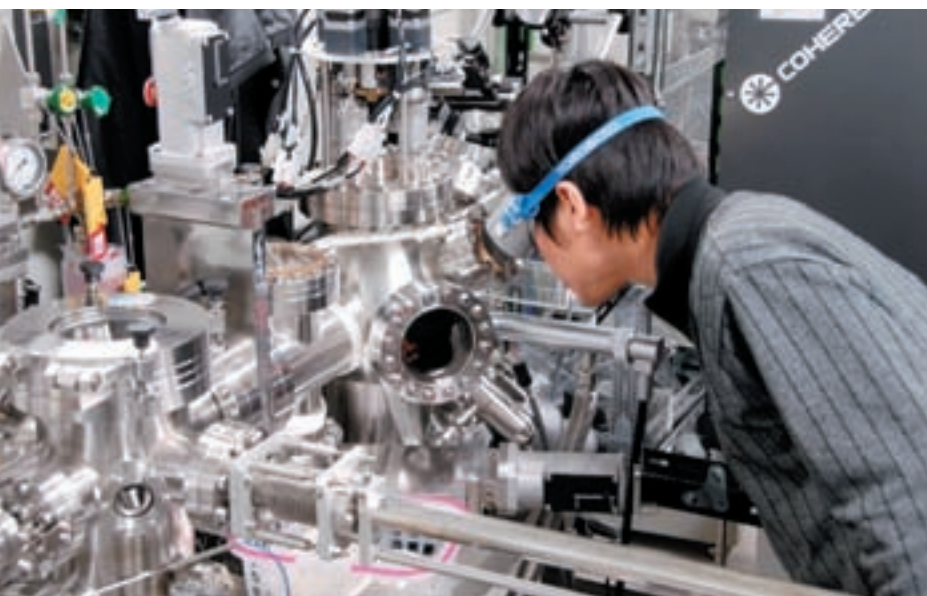
Name	Organization	Reason for appointment
Shigeru Sato	Graduate School of International Cultural Studies	He has contributed advanced research into the neuroscience of language associated with the multi-lingual brain, and has also contributed to practical education related to foreign languages.
Motoyuki Sato	Center for Northeast Asian Studies	He has developed next-generation landmine detectors in the field of demining detection / development of demining technology, and has contributed to international demining activities indispensable for reconstruction and development in the conflict-affected regions in the world.
Seiji Samukawa	Institute of Fluid Science	He has achieved world-leading research concerning plasma process in the field of semiconductors, and has greatly contributed to society by realizing the practical application of technologies such as pulse-time-modulated plasma.
Tetsuo Shoji	Graduate School of Engineering	He has achieved outstanding research results associated with the breakthrough in aging degradation of energy conversion in plants, and methodology for plant life-time prediction and management. He has also contributed to society in the practical aspect of degradation diagnosis.
Miyoko Tsujimura	Graduate School of Law	She has played an important role as a top constitutional scholar in Japan, and at the same time, she was the program leader of the center for the 21 <sup>st</sup> century COE. She has contributed research into the world view of laws and policy for a gender-equal society.
Tetsuya Terasaki	Graduate School of Pharmaceutical Sciences	He has achieved outstanding results in his research for pharmacy and pharmaceutical studies on a world basis, especially in his research into blood-brain barriers, and has been actively promoting research in leading pharmaceutical studies nationally and internationally.
Nobuhiko Terui	Graduate School of Economics and Management	He has achieved world-class research in theoretical econometrics, and has been developing leading research activities as one of the international front-runners in this field.
Masataka Nakazawa	Research Institute of Electrical Communication	He has succeeded in achieving a number of the world's first research projects in the field of optical communication technology, and has contributed significantly to innovational research and development, leading the world in electrical communication.
Masahiro Hirama	Graduate School of Science	He has developed leading research in the field of organic chemistry / synthetic organic chemistry, and has achieved outstanding research which has received great attention worldwide.
Sadamichi Maekawa	Institute for Materials Research	He has been leading the world in the research field associated with magnetic conductors, including the effect of tunnel magnetoresistance, and he has achieved world-leading results in the research of electric property centered in the property of magnetism and the phenomenon of conductors.
Kensaku Mizuno	Graduate School of Life Science	He has published a number of research articles in the world's leading journals in the field of cell biology, and in life science he has been recognized as one of the leading researchers in the world.
Katsutoshi Mizuhara	Graduate School of Education	As a consequence of the implementation of educational reforms changing the curriculum to students' participatory education, he has received the 1 <sup>st</sup> Tohoku University chancellor award, and has widely contributed to society and the education administration among local regions, such as Miyagi prefecture and Sendai city.
Tokuji Miyashita	Institute of Multidisciplinary Research for Advanced Materials	He has succeeded in being the first in the world to develop a polymer ultra thin nano-film, and he has achieved conducting outstanding research in polymer nano-material chemistry, especially in the field of new polymer nano-sheets materials, on an international basis.
Akira Miyamoto	New Industry Creation Hatchery Center	He has succeeded in developing chemistry software based on original mathematical logic, and he has contributed socially to the realization of innovational material design and process design through university-industrial cooperation.
Hiroshi Yoshino	Graduate School of Engineering	He has achieved great results in building environmental engineering, particularly concerning issues of thermal environment, indoor air quality and energy conservation in residential buildings, and he has made a remarkable contribution to society in various fields.
Appointed on August 8, 2008		
Kunio Inoue	Graduate School of Science	He has revealed the solution of the solar neutrino problems as a result of measurement of reactor anti-neutrinos with Kamland, and developed the research field in neutrino geophysics and astrophysics. He has propelled world-leading research into neutrinos as a director of RCNS and a leader of the global COE program.
Motoko Kotani	Graduate School of Science	She received the 25 <sup>th</sup> Saruhashi Prize for her contribution to "Discrete geometric analysis on a crystal lattice", achieving discrete geometric analysis which connects Geometry and Probability Theory, and she has been recognized as a mathematician of worldwide standing. At the same time, she has been playing a leading role in social contribution and the project for a gender equal society.
Yoshimichi Sato	Graduate School of Arts and Letters	He has achieved outstanding research associated with the analysis of social stratification and social changes. He has been contributing to research achievement through propelling worldwide research leads to Japan as a leader of the 21 <sup>st</sup> Century COE program and the global COE program.
Tohru Nakashizuka	Graduate School of Life Science	He has achieved research of international reputation in the field of forest ecology and received the Midori Scientific Award. He has also propelled global research associated with global environmental problems, ecosystem management and ecosystem integrity as a leader of a global COE in the area of interdisciplinary Composition, New Field.
Shigenao Maruyama	Institute of Fluid Science	He has achieved a number of outstanding research results in wide areas relating to thermal engineering and thermodynamics. As a leader of the 21 <sup>st</sup> Century COE program and a leader of the global COE program, he has been promoting the expansion of research to fuse interdisciplinary areas. He has played a remarkable leadership role in conducting world-leading research.



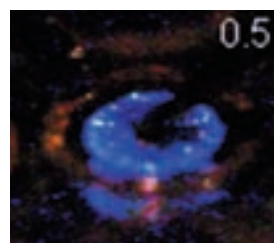
# International Center where Knowledge of the Highest Level Gathers and the Most Advanced Knowledge is Created Environment and System for Developing World - Leading Research

## "World Premier International Research Center: Advanced Institute for Material Research (WPI-AIMR)" Opens

<http://www.wpi-aimr.tohoku.ac.jp/>



New Zr-based bulk metallic glass (a maximum diameter of 30 mm)



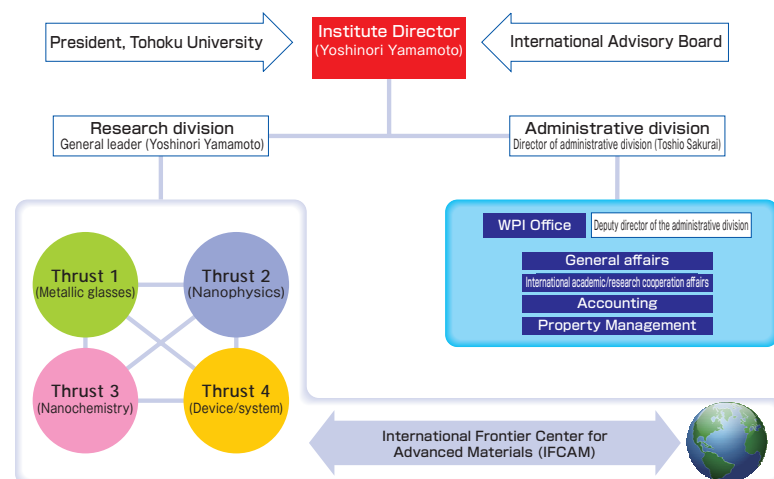
Ultraviolet light-emitting device of an ecotype light-emitting material, first in the world

The Advanced Institute for Materials Research (AIMR) of Tohoku University was selected as one of the five centers around the country in the World Premier International Research Center (WPI) Initiative of the Ministry of Education, Culture, Sports, Science and Technology. The WPI Research Center: Advanced Institute for Materials Research (WPI-AIMR) was inaugurated in October 2007.

WPI-AIMR will be an international base to open new areas of materials science where forefront

researchers gather from the world and engage in research and development by fusing five fields: physics, chemistry,

materials science, electronic engineering/information engineering, and precision/mechanical engineering.



**Field of metallic glasses**  
Control of composing clusters makes metallic glasses sheets large, very strong and high-functional. Unique advanced non-equilibrium phase materials that exist nowhere in the world are being developed.

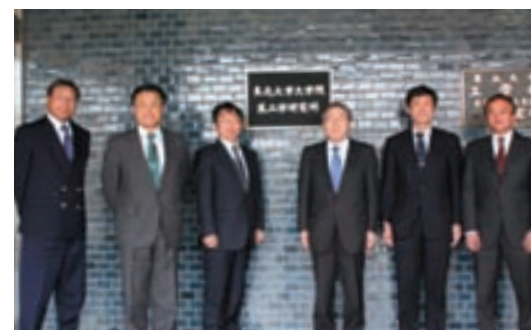
**Field of nanochemistry**  
The field of soft materials, an unexplored field of materials science, is being opened, such as the development of organic and inorganic hybrid materials with self-assembled molecules.

**Field of nanophysics**  
The most advanced measuring instruments in the world are being developed, and the physical properties of nanomaterials are being elucidated. A group of new nano-materials is being developed.

**Field of devices/systems**  
Materials, new magnetic substances, advanced optical communication, and ultra high-performance LSI that provide various functions in micro electromechanical systems to support the information-oriented society of the 21<sup>st</sup> century are being developed.

## Graduate School of Biomedical Engineering, an Academic Field First Created in Japan

<http://www.bme.tohoku.ac.jp/>

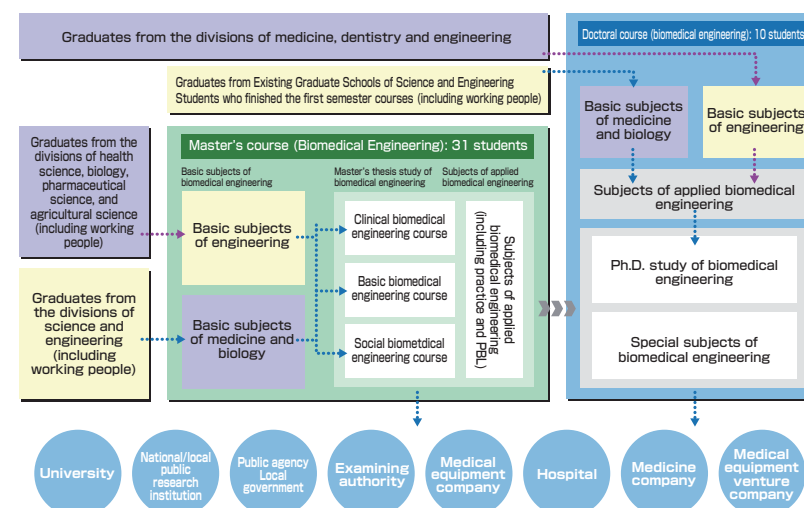


The first Graduate School of Biomedical Engineering in Japan was created at Tohoku University in April 2008. Biomedical Engineering is a new academic field that is based on physics, chemistry and biology, and also, a fusion of those sciences.

The mission of this fusion field is to approach the wonder of life by fully using engineering knowledge and technologies to elucidate the functions of life, to result in reforms of medicine and medical care to make a contribution to social welfare.

At Tohoku University, there was already joint research between engineering and medicine leading to the development of an

electric stethoscope in 1925, and since then, there has been much research and development that pioneers biomedical engineering. Such a progressive spirit in the collaboration of different fields is the basis for the creation of the Graduate School of Biomedical Engineering. The university is going to inherit the knowledge of preceding generations and develop students so that the students of the first generation of this Graduate School can become human resources to open the field of biometric engineering in the world.



Dean	
Deputy Dean	
Biomedical measurements and diagnostics	6 fields
Biomedical engineering for diagnostic and treatment	4 fields
Biomechanical engineering	4 fields
Regenerative and biomedical engineering	5 fields
Biomedical engineering for health and welfare	4 fields
Biofluids control system	2 fields
Artificial organs	1 field
Medical materials	1 field
Biomedical system control engineering	1 field
Biomedical information system	3 fields

## "Innovation of New Biomedical Engineering Center" for TR

[http://www.hosp.tohoku.ac.jp/tr\\_center/index.html](http://www.hosp.tohoku.ac.jp/tr_center/index.html)

Nowadays, basic research results in the field of life sciences in Japan are highly evaluated internationally. It is, however, pointed out that a lack of a base support system for translational research (TR) to clinically apply such results allows little reflection of them in practical medicine. Tohoku University, therefore, created the Innovation of New Biomedical Engineering Center at the Tohoku University Hospital to carry out TR as one of the university-wide initiatives in February 2008. This makes it possible for all the clinical departments to gather all of their capacity to drive next-generation medical practice systematically. In addition, for clinical applications of the results, a review system by an organization of the Center comprising external members is being set up to strictly analyze and evaluate the applications, with the aim of spreading sophisticated and advanced medical care in society.



## Seven Projects Accepted in the Global COE Program of 2008

The Global COE Program is a successor to the 21<sup>st</sup> Century COE Program that the Ministry of Education, Culture, Sports, Science and Technology has implemented since financial year 2002 mainly to form globally excellent education and research programs in order to develop creative human resources to lead the world. Seven of the 12 programs that Tohoku University submitted as applications for this Program were accepted.

In the selection for the Global COE Program, applications are reviewed in terms of the

potential development of the planned centers for education and research that function to develop human resources, on the precondition that the centers have excellent research bases of the world-highest level and also such bases for academic fields with some significant features. This year, 315 applications from 130 national, public, and private universities were reviewed, and 68 applications from 29 universities were selected.

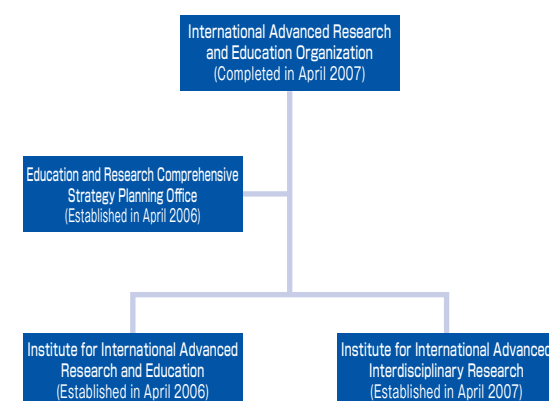
Year	Research Fields	Program Leader	Organization	Program Title
Financial Year 2007	Life Sciences	Noriko Osumi	Graduate School of Medicine	Basic & Translational Research Center for Global Brain Science <a href="http://www.sendaibrain.org/">http://www.sendaibrain.org/</a>
	Chemistry, Material Sciences	Masahiko Yamaguchi	Graduate School of Pharmaceutical Sciences	International Center of Research & Education for Molecular Complex Chemistry <a href="http://iremc.pharm.tohoku.ac.jp/index_en.html">http://iremc.pharm.tohoku.ac.jp/index_en.html</a>
	Chemistry, Material Sciences	Takashi Goto	Institute for Materials Research	Materials Integration International Center of Education and Research <a href="http://www.gcoe.imr.edu/en/index.html">http://www.gcoe.imr.edu/en/index.html</a>
	Information, Electrical and Electronic Sciences	Fumiyuki Adachi	Graduate School of Engineering	Center of Education and Research for Information Electronics Systems <a href="http://www.ecei.tohoku.ac.jp/gcoe/">http://www.ecei.tohoku.ac.jp/gcoe/</a>
	Interdisciplinary, Combined Fields, New Disciplines	Takami Yamaguchi	Graduate School of Biomedical Engineering	Global Nano-Biomedical Engineering Education and Research Network Centre <a href="http://www.nanobme.org/en/index.html">http://www.nanobme.org/en/index.html</a>
Financial Year 2008	Medicine	Yoshitomo Oka	Graduate School of Medicine	Global COE for Conquest of Signal Transduction Diseases with "Network Medicine" <a href="http://www.nm-gcoe.med.tohoku.ac.jp/english/index.html">http://www.nm-gcoe.med.tohoku.ac.jp/english/index.html</a>
	Mathematics, Physics, and Earth Sciences	Kunio Inoue	Graduate School of Science	Weaving Science Web beyond Particle-Matter Hierarchy <a href="http://www.scienceweb.tohoku.ac.jp/english/index.html">http://www.scienceweb.tohoku.ac.jp/english/index.html</a>
	Mathematics, Physics, and Earth Sciences	Eiji Ohtani	Graduate School of Science	Global Education and Research Center for Earth and Planetary Dynamics <a href="http://www.gcoe.geophys.tohoku.ac.jp/index-e.htm">http://www.gcoe.geophys.tohoku.ac.jp/index-e.htm</a>
	Mechanics, civil engineering, architecture, and other engineering	Shigenao Maruyama	Institute of Fluid Science	World Center of Education and Research for Transdisciplinary Flow Dynamics <a href="http://www.ifs.tohoku.ac.jp/gcoe/index-e.html">http://www.ifs.tohoku.ac.jp/gcoe/index-e.html</a>
	Social Sciences	Yoshimichi Sato	Graduate School of Arts and Letters	Center for the Study of Social Stratification and Inequality <a href="http://www.sal.tohoku.ac.jp/coe/index.html">http://www.sal.tohoku.ac.jp/coe/index.html</a>
	Social Sciences	Miyoko Tsujimura	School of Law	Gender Equality and Multicultural Conviviality in the Age of Globalization <a href="http://www.law.tohoku.ac.jp/gcoe/english/index.html">http://www.law.tohoku.ac.jp/gcoe/english/index.html</a>
	Interdisciplinary, combined fields, new disciplines	Tohru Nakashizuka	Graduate School of Life Sciences	Center for Ecosystem Management Adapting to Global Change <a href="http://memo.biology.tohoku.ac.jp/gcoe/index_english.html">http://memo.biology.tohoku.ac.jp/gcoe/index_english.html</a>

## International Advanced Research and Education Organization - an across-the University Education Support System

<http://www.iiare.tohoku.ac.jp>

In April 2007, Tohoku University established the International Advanced Research and Education Organization as a new education support system to train world-class young researchers. This Organization has a role of coordinating on a centralized basis measures to deal with the issue of post-doctoral positions for young researchers and measures to enhance graduate school education in

research in interdisciplinary fields that are taken by the Institute for International Advanced Interdisciplinary Research established in April 2007 and by the Institute for International Advanced Research and Education established in 2006.



## Institute of Liberal Arts and Sciences, a New Organization to be a Foundation for University Education

Liberal arts education is absolutely essential for students to improve their human awareness, acquire a broad view of the world, and establish a solid foundation for further specialized education. It is also important for them to create research fusing different fields in graduate schools. On those ideas, after it abolished the College of General Education, Tohoku University created original curricula including basic seminars and established the Institute of Liberal Arts and Sciences in April 2008. For the teaching staff of the Institute, three retired professors who can provide a wide range of general education, including education for international communication ability, have been appointed as Special Professors by Presidential Appointment.



Masao Akiba, Professor Emeritus    Michio Umino, Professor Emeritus    Hiromichi Ebisawa, Professor Emeritus

## Topics

### Number of projects approved as a Global COE Program

The Global COE Program of the Ministry of Education, Culture, Sports, Science and Technology help create centers of education and research excellence of the world's highest order. Five programs proposed by Tohoku University in 2007 and seven in 2008 were selected. As a result, Tohoku University is in second place among the universities in terms of the number of programs under the Global COE Program.

1   The University of Tokyo	16
2   Tohoku University	12
2   Kyoto University	12
4   Osaka University	11
5   Tokyo Institute of Technology	8

## Topics

### Two Distant Cities Bonded over the Teacher-student Relationship of Dr. Fujino and Dr. Xun

Awara City, Fukui Prefecture and the Lu Xun Museum in Beijing exchanged the busts of Dr. Genkuro Fujino and Dr. Lu Xun in the year 2006. Dr. Xun studied at Sendai Medical College (present School of Medicine at Tohoku University), and 2006 was the year when it marked the 100<sup>th</sup> year after he left Sendai. Awara City is the hometown of Dr. Fujino, who was a good teacher to Dr. Xun. The two busts were later donated to Tohoku University in 2007 in commemoration of the 100<sup>th</sup> anniversary of the university. As Tohoku University celebrated the 100<sup>th</sup> year anniversary,



Tohoku University Library



# Bringing Immeasurable Opportunities to the University Education in order to Cultivate Broad Vision and Creativity

## Education Program under Continuous Innovation

### Practical English Course to Improve Practical and Applicable Skills



Tohoku University has provided the Practical English Course for undergraduate and graduate school students as an extra-curricula course since 2005. The university aims to develop the practical English ability of students that will make it possible for them to spread research results over the world and exchange with researchers in the world. The classes are mainly composed of such as discussions and short presentations, and are highly valued by students. This course is provided free of tuition and fees. This course is managed with an innovative approach, where the curriculum and the teaching sta are outsourced.

### Presidential Education Prize to Commend Education Results

For teaching sta s who have made excellent achievements in instruction, education and support in class teaching, extra-curricula activities, international exchange, etc., Tohoku University highly appraises and commends them.

Graduate School of Information Sciences

Masanori Hariyama, Associate Professor

Professor Hariyama has provided prominent class teaching in an across-the University subject in order to stimulate the intellectual curiosity of students in information science and technology, and has continuously been highly evaluated by them.



Cyclotron and Radioisotope Center

Mamoru Baba, Professor

Professor Baba has educated and trained the teaching sta , and graduate and undergraduate students of the entire university on the basics of how to handle radiation and RI, and how to handle X-rays and synchrotron orbital radiation (SOR), and made a large contribution to the training in safe radiation control.



Programs Accepted in the "Support Program for Distinctive University Education" by the Ministry of Education, Culture, Sports, Science and Technology (FY 2007 and 2008) ( ) indicates the department implementing the program

<http://www.tohoku.ac.jp/japanese/studentinfo/studentinfo3-1.htm>

#### Support Program for Improving Graduate School Education

- Program for cultivating practice-oriented education professionals (Graduate School of Education)
- Cultivation of advanced scientists aiming at the practice and application of science (Graduate School of Science)
- Substantiality of graduate school of medicine education with multiple layers and bidirectionality - Renaissance plan for cultivating physician-scientists who play leading roles (Graduate School of Medicine)
- Creation of frontier technology in mechanical engineering - Innovation for system integration based on flight, robotics and nano-technology (Graduate School of Engineering)
- Education program for Biomedical and Nano-Electronics, Tohoku University (Graduate School of Engineering)
- Graduate Program for Frontier Environmental Studies-Develop basic skills and research capabilities by striking a good balance between multi-disciplinary subjects such as science, engineering, human and social studies (Graduate School of Environmental Studies)

Result of Graduate School Education Reform Support Program (1) (Graduate School of Education)

#### Program for Cultivating Practice-Oriented Education Professionals Overseas Internship

The aim of "Overseas Internship" is for graduate students to study and research approaches to educational reforms in overseas countries that are actively implementing such reforms by experiencing them directly, so that they can have an opportunity to understand issues in, and prospects for, educational reforms in Japan. The "Overseas Internship" was implemented in five countries: Singapore, Mongolia, New Zealand, Canada and Taiwan in financial year 2007.



#### Support Program for Professional Graduate School Formation

- Construction of a psychological and practical legal education program (School of Law)

#### Cancer Professional Training Plan

- Tohoku Cancer Professional Cultivation Plan (Graduate School of Medicine)

Program for Innovation and Productivity Improvement in Service Industries at the Graduate School of Economics and Management

- Develop managers who administer service innovations and keep a high performance (School of Economics and Management)

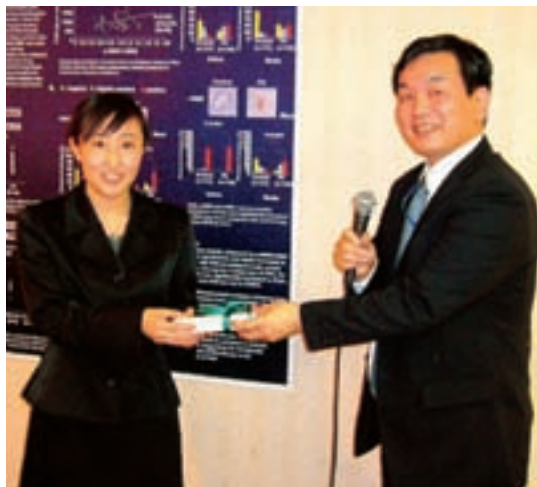
#### Science and Mathematics Students Support Project

- Advanced mathematics and physics for special education project (Faculty of Science)

Result of Graduate School Education Reform Support Program (2) (Graduate School of Medicine)

#### Substantiality of Graduate School of Medicine Education with Multiple Layers and Bidirectionality The 1<sup>st</sup> International Workshop on Pulmonary Hypertension at Tohoku University

The 1st International Workshop on Pulmonary Hypertension in Tohoku University was held in support of the Graduate School Education Reform Support Program, entitled "Renaissance Plan", of the Graduate School of Medicine, in March 2008 in Sendai. More than half of the 40 participants were graduate school student, and young researchers had active discussion. In this workshop, Ms. Doe Zhulanqigige, who is a second-year foreign student of the Graduate School of Medicine, won thd Best Abstract Award.



### Topics

#### "The New Century of Tohoku University" On Air

Tohoku University and Higashinihon Broadcasting began broadcasting a program titled "The New Century of Tohoku University" in July 2007 in a joint project. Taking advantage of the characteristics of digital broadcasting, this program combines terrestrial television, satellite television, and a website to present researchers and research results of Tohoku University to the world. It lets the charms of Tohoku University be known widely for the further development for another 100 years of history.



<http://www.tohoku100-tv.jp/>  
Broadcasted on KHB on Mondays 23:10-23:15



## A Life Irreplaceable in Time and in Splendour A Bright and Active Campus Life

### Triathlon Club Won the Championship for the Second Year Running



At the 22<sup>nd</sup> Itako Triathlon, Japan held in May 2008, the Tohoku University Triathlon Club won the Championships in the category of Individuals (Male) and Group (Male). For the Group category, it was the second Championship in a two-year winning streak.

The Triathlon Club won the Championship in the Japan University Triathlon Championship (Inter College Championship) in the categories of Group (Male) and Individuals (Female) with glory in 2005. The winner of the Championship in the category of Individuals (Female) then became a U-23 participant in the World Championship sent by Japan.

### Contract Bridge Club Full of Elite Players

Contract bridge is an intellectual card game that requires knowledge of probability theories and mathematical thinking. The Tohoku University Contract Bridge Club participated in the Pacific Asia Bridge Federation Championship 2007 in the third of three consecutive years of participation. Japanese participants are selected by the Japan Contract Bridge League through camp training and two series of selection matches. In 2007, this club made a great achievement : three players were selected as participants.



### A member of the Competition Dance Club Won the Championship in the Category of Individuals



A male member of the Tohoku University Competition Dance Club partnered by a member of the Competition Dance Club of Miyagi Gakuin Women's University participated in the All-Japan University Competition Dance Championship held in December 2007, and won the Championship in the category of Individuals in the division of Latin rumba. The pair competed with about 50 other pairs in that division.

### The Student Go Grand Master was born from the Go Club

In the Final Three Match Series for Meijin (Grand Master) in the 25<sup>th</sup> All-Japan Student Go Meijin-Sen Games held in the Nihon Ki-in Ichigaya O ce in February 2008, Shogo Ota of the Tohoku University Go Club won the Series to obtain the title of the Student Meijin. The All-Japan Student Go Meijin Games were contested through three periods: the first and second periods by Internet and the third period where a series of three matches are contested head-to-head on the board.



### The Annual Mock Trial Wins Popularity

The Mock Trial Executive Committee of the School of Law at Tohoku University holds a mock trial on a relevant theme every year. A mock trial is composed of a court scene and conversations to explain the background theme. The history of this activity is long, beginning with the first mock trial at the University Festival of 1952, and now the 57<sup>th</sup> show in 2008. Nowadays, this mock trial is popular with about 1,000 spectators every year. The theme of the mock trial in October 2007 was the "Japanese jury system," and one which dealt with "Death with dignity" was held at the Tohoku University Centennial Hall in the following year.



### Japan SHOCK! Fair to Consider the Crisis Food



The food security team in the seminar for economy, trade and industry of the school of law, held the "Japan SHOCK! Fair" in cooperation with Tohoku University CO-OP. in January 2008. The theme of the event was "What would our daily meals be like if the import of agricultural products were disrupted completely?" In this event the team provided students with meals from domestic production alone at university cafeteria and it enlightened them about the Japan's critically low food self-sufficiency ratio which has declined to 39% (on the calorie basis) in financial year 2006. On the team's own initiatives, the event succeeded in giving participants warnings of several issues concerning the food crisis.

### The Japan Student Services Organization (JASSO) presented the JASSO's Student of the Year Award to Four Students

JASSO, an independent administrative institution, encourages and supports students with outstanding achievements in academia, culture and art, sports, and social contribution activities.

Four students from Tohoku University were commended in this program.

#### Academic Study



#### Excellent prize

4<sup>th</sup> year student, Faculty of Engineering  
**Naoki Inomata**

Research in a nano-device made of carbon nanotubes and its biological application. Presented at a meeting of the academic society.

#### Academic Study



#### Excellent prize

4<sup>th</sup> year student, Faculty of Engineering  
**Ken Obara**

Research in fusion of control engineering and biology. Developed a new microscope device. Presented in the domestic academic society.

#### Academic Study



#### Excellent prize

6<sup>th</sup> year student, School of Medicine  
**Yui Mano**

Medical studies on a case of visceral inversion of all organs. Presented in the domestic academic society, and published in domestic academic journals.

#### Culture and Art



#### Grand prize

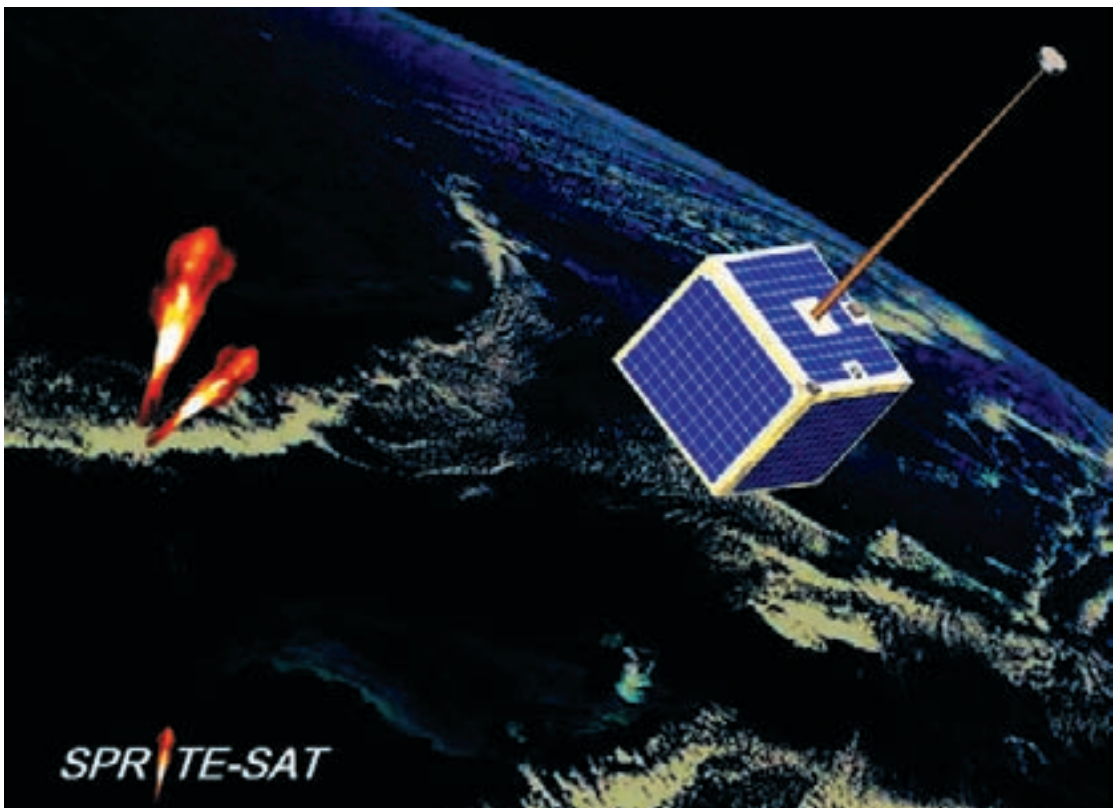
3<sup>rd</sup> year student, Faculty of Economics  
**Hiroaki Tsuchiya**

Calculation on the abacus: the 16<sup>th</sup> Grand Master, won the Grand Championship in the category of Individuals in All-Japan Abacus Contest, and the Grand Championship in the category of Individuals in the All-Japan Abacus Calculation Championship



# The Beginning of the Future for Mankind from Ideal Collaboration Providing Intellectual Resources to the World through University-Industry Cooperation

## SPRITE-SAT: A Low-cost Short-period Project Made Possible By Academia-Industry Collaboration



The Department of Geophysics, Graduate School of Science, and the Department of Aerospace Engineering, Graduate School of Engineering have cooperated with each other to carry out the SPRITE-SAT project for an ultra-compact scientific satellite with a total weight in the order of 50 kg. It is planned to be launched as a piggyback satellite of the large satellite of the Japan Aerospace Exploration Agency (JAXA), GOSAT, at the Tanegashima Space Center in January 2009.

Manufacturing an ordinary space satellite costs billions to tens of billions yen, and sometimes takes more than 10 years from planning to launch. With SPRITE-SAT project, however, the costs of the development, making and installing

the satellite and the ground-based facilities have been covered mainly with a grant-in-aid for Specially Promoted Research (about ¥350 million/4 years). It has taken only about four years from the planning to the launch, and only one year from the start of assembly to the completion of the satellite. Such a rapid development, enabling us to lead in the international scientific research field, was achieved by the joint work of highly motivated students / professors in university and staff from private companies. The project would not be feasible without the cooperation of flexible companies with sophisticated technologies including system design, communication equipment, extension mechanisms, and on-board observation equipment of the satellite.

### Systematic Collaboration with Private Sectors (Active Academia-Industry Collaboration with Collaboration Agreements)

Date of conclusion	Name of organization	Purpose of Collaboration
August 3, 2007	Japan Aerospace Exploring Agency (JAXA)	To further joint research, exchange researchers, cultivate young researchers through collaboration courses at graduate schools, etc., and use mutual research facilities/equipment.
July 25, 2008	Central Institute for Experimental Animals	To promote joint research, exchange researchers, cultivate young researchers, and use mutual research facilities/equipment.
July 28, 2008	Nippon Telegraph and Telephone Corporation (NTT)	To promote joint research, exchange researchers, cultivate young researchers, and use mutual research facilities/equipment.



## Initiation of a Graduate Course titled "Local Economic and Financial Theory" sponsored by The 77 Bank.

The 77 Bank and Tohoku University initiated a sponsored course titled "Local Economic and Financial Theory" at the Graduate School of Economics. Both sides concluded an Academia-Industry Collaboration agreement in January 2007, to cooperate in contribution with the communities and revitalize the local economy. This course was begun under the agreement. It will begin with two subjects of "Local Economic Theory" and "Local Financial Theory" as in the graduate courses this October.



## New Research Facilities for "Brain Training" were Opened

Professor Ryuta Kawashima at the Institute of Development, Aging and Cancer, who supervised the creation of "DS Training for Grown-ups to Train the Brain," a big-hit game software product for mobile phones, showed new facilities equipped with measuring equipment to observe changes in blood current in the brain, and so on, opened to the public in April 2008. This is the second case of a result of academia-industry collaboration led by Professor Kawashima, following the first case where animal experimental faculties were constructed in 2007.



## Achievements Reported at the Conference for the Promotion of Collaboration among Business, Academia, and Government

The Conference for the Promotion of Collaboration among Business, Academia, and Government, hosted by the Office of Cabinet of Ministers, etc., commends those who have shown great achievements and contributed in taking a leading role for industry-academia-government collaboration. Two professors at Tohoku University were commended with a People of Merit Award in 2007. Professor Hiroshi Takahashi, who was commended in the following year, was evaluated highly and was presented with the Minister of Land, Infrastructure, Transport and Tourism Award.

### Minister of Science and Technology Policy Award

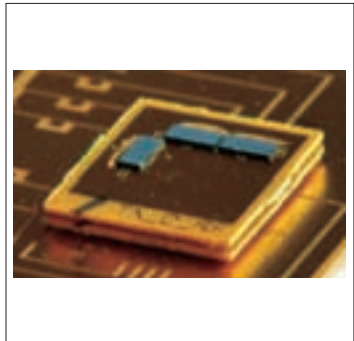
Kazuo Hokkirigawa, Professor, Graduate School of Engineering, Tohoku University  
Sanwa Oil & Fat Co., Ltd.  
Prefact Co., Ltd.



Development and applications of multi-functional carbon materials RB ceramics made from rice bran

### Minister of Education, Culture, Sports, Science and Technology Award

Kazuo Tsubouchi, Professor, Research Institute of Electrical Communication, Tohoku University  
NEC Corporation  
Mitsubishi Electric Corporation



Development of a next-generation mobile Internet terminal through academia-industry collaboration

### Minister of Land, Infrastructure, Transport and Tourism Award

Hiroshi Takahashi, Professor, Graduate School of Environmental Studies, Tohoku University  
Mori Institute for Environmental Technology Co., Ltd.  
Bon Terrain Research Committee



Recycling technology for high water content sludge using Fiber-Cement-Stabilized Soil Method called "Bon Terrain Method"



## Knowledge Has No Border; Learning Means Encountering New Knowledge; Further Expansion and Enrichment of International Exchanges

### Silicon Valley Internship Program

The Silicon Valley Internship Program was conducted in the San Francisco Bay Area from April 26 to May 3, 2007. The program was coordinated in cooperation with the Tohoku University US Office in Los Altos, California. The objectives of the program were to foster students' competence as researchers, such as in their spirit of challenge, creativity, and innovative power, and to develop character among participants. Eighteen students were selected from 160 applicants and participated in the Program.



### Short-Term Study Abroad Program in Sydney

The Short-Term Study Abroad Program was held for the first time in the University of Sydney, one of our university level academic exchange partner universities, in March 2008 and 20 undergraduate students participated in this 4-week program. In the Short-Term Study Abroad Program, students attended a 3-week Intensive English Course at the Centre for English Teaching, listened to some regular University of Sydney lectures, and visited various sites in Sydney and its surrounding areas.



11 more universities have signed agreements for Inter-university Academic Exchange Agreements (IAEA), which makes a total of 129 universities (as of August 1, 2008).

Country/Area	Name of University	Date of conclusion	Country/Area	Name of University	Date of conclusion
China	Lanzhou University	April 17, 2007	Venezuela	Simón Bolívar University	January 8, 2008
Korea	Yonsei University	May 29, 2007	Korea	Chung-Ang University	March 27, 2008
China	Tianjin University	June 8, 2007	Indonesia	Institut Teknologi Bandung	June 4, 2008
China	Dalian University of Technology	June 16, 2007	France	Institut d'Etudes Politiques de Lyon	June 6, 2008
Korea	Pusan National University	July 26, 2007	China	Yangzhou University	June 20, 2008
Korea	Kongju National University	July 29, 2007			

### Topics

#### Contributed to "The Year of Rennes, France in Sendai in 2007"

In 2007, the Sister City 40<sup>th</sup> Anniversary between Rennes, France, and Sendai, the Graduate School of International Cultural Studies of Tohoku University made a contribution to more exchanges with Rennes as an administrative office for an inter-university agreement with Université Rennes 2, and joined "The Year of Rennes, France in Sendai in 2007" as a member organization of the Executive Committee for "The Year 2007."



### Established Tohoku University China Office

Tohoku University established the China Office in Beijing in April 2007. This office is designed to evolve the results and potential of research and education of the university, and put various projects into effect as a creative and structured "base for sending out knowledge." Tohoku University China Office is the second overseas office of the university following the Tohoku University US Office established in May 2006. It will play an important role as a base for future international exchange.



### The Fourth Lyon-Tohoku Engineering and Science Forum



The Fourth Lyon-Tohoku Engineering and Science Forum - Toward the Joint Laboratory - was held by Tohoku University, Ecole Centrale de Lyon, and INSA de Lyon at Sakura Hall and the Auditorium of the Institute of Fluid Science, Tohoku University on December 13 and 14, 2007.

Approximately 100 participants attended the parallel sessions of specialized fields where they had discussions and exchanged information to establish substantial collaboration in creating a joint laboratory. Before this Forum, the three institutions signed a memorandum of agreement to establish a joint laboratory on December 11.

### Four Party Joint Communiqué for International Exchange Signed

On November 1, 2007, the four parties of Tohoku University, the University of California at Riverside (UCR), the City of Sendai and the City of Riverside signed a Joint Communiqué. The President of Tohoku University, the Dean of Bourns College of Engineering at UCR (on behalf of the President of UCR), the Mayor of Sendai City, and the Mayor of Riverside City attended the signing ceremony.

Tohoku University will promote academic exchange and industry-academia collaboration with UCR in cooperation with Sendai City and Riverside City based on the Joint Declaration. This aims to contribute to developing the relationship between Sendai and Riverside by reflecting academic results back into society.





## Inheriting the "Open Door" Principle; Academia for Social Development Contributing to Society and Promoting Gender Equal Society

### "Tohoku Women's Hurdling Project" to Support Women Researchers

<http://www.morihome.tohoku.ac.jp/index.html>

In 1913, Tohoku University first opened its door to women in Japan. In 2001 it established the Gender Equal Commitment Committee, to improve gender gaps, and research and labor environments for women, and to enhance the work and life balance support system. The Tohoku Women's Hurdling Project was selected as a support model in the Project for Developing Women Researchers Support Models in the Special Coordination Funds for Promoting Science and Technology of the Ministry of Education, Culture, Sports, Science and Technology.

The Tohoku Women's Hurdling Project aims to have systems to help women researchers, hurdle various barriers to their career paths, and was implemented by the Support and Promotion Office for the Tohoku Women's Hurdling Project in three Programs: Support for Care of Children and Aged Families, Environmental Improvement, and Development of Next-generation Women Researchers.



#### Cultivating Next-generation Female Researchers through "Alma Mater Visiting Seminar"

Under the Program for Development of Next-generation Women Researchers in the Tohoku Women's Hurdling Project, the science angel (SA) system was created where SAs are women students of the graduate schools of natural sciences. SAs visit their alma maters and provide seminars to be role models for those students at their alma maters who wish to be researchers.



### "Tohoku University Science Café Special" Gained Popularity

<http://cafe.tohoku.ac.jp/>



Science Café, which was begun in the United Kingdom in 1998, has been spreading through many countries. In Japan, Tohoku University opened the first of its kind in Japan in August 2005, as the place where the citizens and researchers have chats about science. This event is held on a monthly basis. In 2007, Science Café Special was held at the Katahira Sakura Hall of Tohoku University as the 100<sup>th</sup> anniversary commemoration project, and was very popular. It is planned that Science Café will be held in areas outside Sendai in the second half year of FY 2008 onward.

### Contribution to Revitalize the Region in a Project-based Education and Research Program

The Graduate School of Economics and Management of Tohoku University established the Regional Innovation Research Center to enhance the innovation capabilities of the Tohoku region in July 2005. The Center started its "Project-based Education and Research Program" in 2006. This program is designed to organize projects to solve regional issues where university professors,

graduate students, and practitioners collaborate to conduct research activities and make action plans for regional innovation. The program not only contributes to the solution of regional issues by promoting research activities, but also provides graduate students and practitioners opportunities for training and career development.



### Inauguration of the Abe Jiro Memorial Prize for Senior High School Students

<http://www.sal.tohoku.ac.jp/abe2008/index.html>

On the occasion of the 100<sup>th</sup> anniversary of the university, the Faculty of Arts and Letters created the Abe Jiro Memorial Prize for Essays by Young People. Professor Jiro Abe (1883-1959) was one of the foremost thinkers of the university, and Santaro's Diary, his collection of essays, has been regarded as essential reading for the youth since it was first published in 1914. Tohoku University founded the Abe Jiro Memorial Museum in 1999. The Prize, intended to commemorate Abe's quest for the self and the quintessence of Japanese culture, is awarded to essays submitted by senior high school students from throughout Japan.





# The End of an Era is the Beginning of Another Journey The 100th Anniversary Projects

## Celebrating its 100<sup>th</sup> Anniversary in the Summer of 2007

Commemoration Ceremony at the Sendai International Center on August 27, 2007 with guests from 20 overseas countries present.

On August 25 and 26, the university held the Tohoku University 100<sup>th</sup> Anniversary Commemoration Festival, where about 27,000 citizens were entertained at Katahira Campus with concerts and various lectures. There were different zones for introducing research, for

international exchange, and for exchange with local people. Thus the 100th anniversary was celebrated by many people.

Tohoku University held other events to commemorate its 100<sup>th</sup> anniversary, such as the 100<sup>th</sup> Anniversary Commemoration Exhibitions at the Edo-Tokyo Museum and the Sendai City Museum, and the Citizens' Concert.



100<sup>th</sup> Anniversary Commemoration Ceremony



100<sup>th</sup> Anniversary Celebration



100<sup>th</sup> Anniversary Commemoration Festival



Establishment ceremony for the school emblem and school color



Citizens' Concert



100<sup>th</sup> Commemoration Special Exhibition, 'Great Author Soseki Natsume' (Edo-Tokyo Museum)



100<sup>th</sup> Anniversary Commemoration Exhibition (Sendai City Museum)

## First "Homecoming Day"

Tohoku University invites its graduates to the university regularly so that its current status can be presented to them. They have reunions with their teachers and classmates, or participate in exchanges with students. The day is called Homecoming Day.

The first Homecoming Day was held on October 6 and 7,



Presentation ceremony of the first Abe Jiro Commemoration Prize for Essays of Youth

2007, when various events, such as the 100<sup>th</sup> Anniversary Sendai Seminar, the presentation ceremony for the first Abe Jiro Memorial Prize for Essays by Young People, and social parties for graduates and students, and campus tours, took place.



Social party for current students and graduates: Listen to senior people

## Tohoku University Alumni Association Inaugurated

At the General Alumni Meeting of Tohoku University held in October 2007, the establishment of the Tohoku University Alumni Association was recognized.

On the occasion of the 100<sup>th</sup> anniversary, this Association was organized as a development of the university-wide alumni association of Tohoku University to include current students and their parents, current and former teaching staff, as well as old boys and girls.



Tohoku University Alumni General Meeting

## "Tohoku University Fund" Created

Tohoku University created the Tohoku University Fund in April 2008 as a 100<sup>th</sup> Anniversary Commemoration Project, funded with a part of the donations collected through the fund-raising campaign for the Project mainly by the Foundation Support Research & Education & Project. This Fund will be used to improve the environment for research and education, and support for students including scholarships.

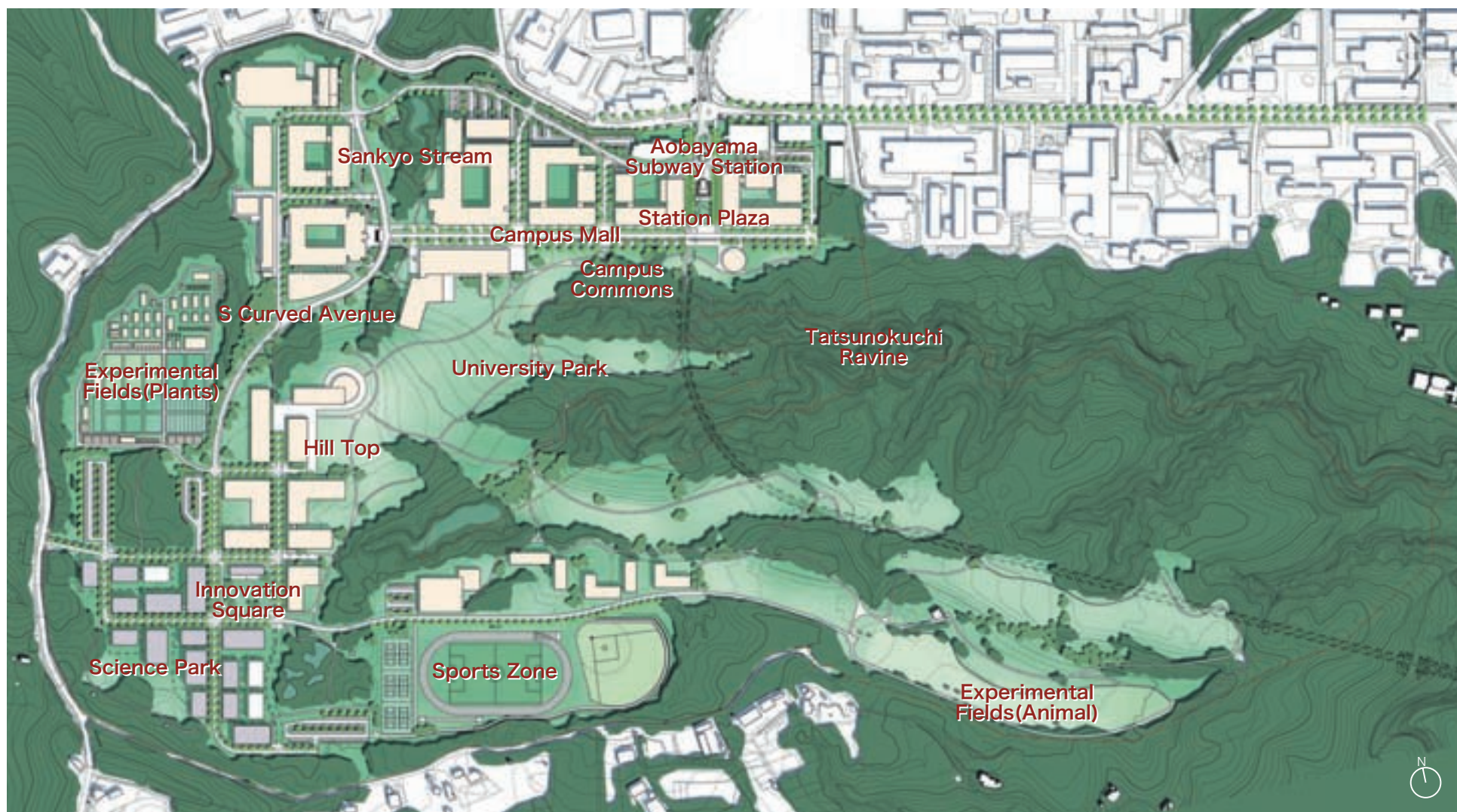


Presentation of Letters of Appreciation for donations to create the fund



# To Realize an Environment for Education and Research in Harmony with Abundant Nature

## New Campus Development Plan



This is a prospective image and does not define details of any particular facilities, i.e., positions, shapes or designs.



### Campus Mall

This is the center of campus life with greenery and crowds that define pedestrian lines in the new campus. This will be constructed as an open space to be integrated with research/education facilities, a library, lecture halls, and restaurants along the campus mall.



### Hill Top

This open space is positioned on a hill facing the University Park, overlooking the campus. This is an important point viewed from almost everywhere in the new campus, and is planned together with a building to be a landmark for the entire campus.



Birds-eye Image of the Campus Mall

## Topics

### Zelkova Trees Transplanted from Aoba-dori Avenue to the New Aobayama Campus

The Executive Committee to Transplant Zelkova Trees to the New Aobayama Campus that is composed of Tohoku University, the Gofudaimachi Town Development Committee, and Sun Mall Shopping District Promotional Association transplanted nine zelkova trees from Aoba-dori Avenue to the campus, and held an unveiling ceremony on April 3, 2008. This area is planned to be open to the public when the new campus is inaugurated.



## New Campus Development Plan

Tohoku University is aiming to make an education and research environment to help create new academic fields, and new technologies or industries, and realize an environment-harmonious campus using the abundant natural environment of Aobayama, a symbol of "City of Trees, Sendai", with which people of the city can commune. Progress in the pre-development procedure for environmental assessment completed by the end of March 2008, and permission for the development will be granted by Sendai City and the land preparation construction will begin in the middle of FY 2008. In parallel with the construction, the university will hold hearings with concerned organizations (Graduate School of Agricultural Science, Faculty of Agriculture, and Research Institute of Electrical Communication) to determine the execution of designs.

### Station Plaza

A place representative of the entire Aobayama Campus where outside visitors first feel they are in an academic environment. It is designed to be united with Aobayama Station of the Tozai Subway Line so that visitors can have a scenic view of the Campus Commons and the gigantic University Park when they come out of the Station. Commercial facilities and the all university-shared facilities will be laid out to make the Plaza full of life.



### Innovation Square

An open space facing the central research building in the Science Park to be constructed as a place where students and teachers can have industry-academia exchanges. A cafeteria will be constructed in the Innovation Square to be used integrally with outdoor spaces, where people can enjoy an abundant natural environment.





## Divisional Major Achievements (Academic Year 2007)

Divisions	Achievements
Graduate School / Faculty of Arts and Letters	The Abe Jiro Memorial Prize for Essays by a Young People was inaugurated for the Centenary Anniversary of Tohoku University. Associate Professor Kyoko Haga was awarded the Herend Prize 2007 by Collegium Mediterrainistraum. Four International COE Symposiums on "Social Stratification and Inequality" were held.
Graduate School / Faculty of Education	'Toward Improving Academic Competencies in Asian High Schools :Japan, Korea, Taiwan, Singapore and Mongolia' in the International Symposium.
Graduate School / School of Law	7 <sup>th</sup> World Congress of IACL (Athens) by Science Council of Japan COE International Symposium of Gender Equality and Social Diversity Rapport aux 7emes Journées Franco-Japonaises (Paris) Conclusion on the Yokohama Round Table of IACL.
Graduate School of Economics and Management / Faculty of Economics	We started a program "Promoting Human Resources on Innovation in Service Industries (sponsored by JSPS)". "Graduate Program on Environmental Frontiers (sponsored by JSPS)" started by cooperating with Graduate School of Environmental Studies.
Graduate School / Faculty of Science	Prof. Eiji Ohtani was awarded N.L.Bower Award 2007, for his pioneering work on the physical and chemical properties of earth materials, under deep earth conditions. Prof. Mitsuo Kira was awarded the Purple Ribbon Medal for his research in organosilicon chemistry. Prof. Takakiyo Nakazawa was awarded the Miyake Award and the Shimadzu Award, for his excellent achievement in greenhouse gas research. Associate Professor Tateo Moroi was awarded the Nishinomiya-Yukawa Memorial Award, for his research on the effects of gravitino on the evolution of the universe. Assistant Professor Yoshikata Kida was awarded the Inoue Research Award for Young Scientist for his study of the mapping class group from the viewpoint of measure equivalence theory.
Graduate School / School of Medicine	Identification of translational suppressor 4E-BP1 as a factor promoting pancreatic $\beta$ cell survival. Symposium on Local Medical System #4 Building up the doctors' career design. Train the doctors in community. Tohoku Foster Plan for Cancer Specialists was established. Prof. Masayuki Yamamoto received the 18 <sup>th</sup> Tsukuba Prize.
Graduate School / School of Dentistry	MEXT Research and Education Funding "Highly-functional Interface Science: Innovation of Biomaterials." Prof. Fukumoto received Minister of MEXT Award 2007 (Science and Technology, Young Scientist). Development of the Regional Oral Health Promotion Office with Miyagi Pref. and Sendai City. Publication of "Interface Oral Health Science 2007"
Graduate School of Pharmaceutical Sciences / Faculty of Pharmacy and Pharmaceutical Sciences	Prof. Tetsuya Terasaki received "'The Academy of Pharmaceutical Sceince and Technology, Japan Award" and "The Japanese Society for the Study of Xenobiotics Award." Prof. Hidetoshi Tokuyama received "The Commendation for Science and Technology by MEXT (Young Scientist's Prize)." Prof. Sumio Otsuki received "The Gold Medal Award" from Tokyo Techno Forum 21."
Graduate School / School of Engineering	Prof. Kazuo Hokkirigawa was awarded the prize of Minister of science and technology policy. Analysis of traction mechanics and development of a slip compensation control for lunar/ planetary rovers (Prof. Kazuya Yoshida G). Realization of Stable Quadruped Gait Transition By Changing Body Stiffness (Prof Akio Ishiguro G). Towards establishing a venture company with non-destructive analyzing systems (Prof Keisuke Asai G). Al Alloys for Hydrogen Generation Successfully Developed.(Prof Kiyohito Ishida G). Cu-Mn alloys can drastically improve the performance and reliability of LCD panels (Prof Junichi Koike G). Application of earthquake early warning system in schools (Prof. Masato Motosaka G).
Graduate School of Agricultural Science / Faculty of Agriculture	Prof. Ikuo Ikeda was awarded the Japanese Society of Nutrition and Food Science Prize 2008 for "Physiological functions of food components preventing atherosclerosis." Associate Prof. Hideki Takahashi was awarded the JPS Prize 2008 for "Study on the molecular interaction between CMV and host plants". Involvement of the Arp-Ino80 complex in DNA replication and genome stability (Assoc. Prof. Harata G).
Graduate School of International Cultural Studies	Joint Workshop on "Japanese Culture" by Graduate Students of Chung-Ang-University (Korea) and Tohoku University (GSICS). Lecture Forum on "the European Union" by Christophe PENOT, Minister-Counsellor, French Embassy.
Graduate School of Information Sciences	Cooperative Support for Asian IT Student Career Route by MEXT-METI ASIST program. Symposium on "Research Activity and Morality" was held for development of all faculty members. OB and incumbent faculty cooperative seminar on "Science Integration" was held.
Graduate School of Life Sciences	Established the "Basic & Translational Research Center for Global Brain Science" as a global center of excellence (GCOE) for life science fields. (Cooperated with the Graduate School of Medicine) Shedding blue light on algal gene expression. -AUREOCHROME, the new blue light receptor of Stramenopiles-

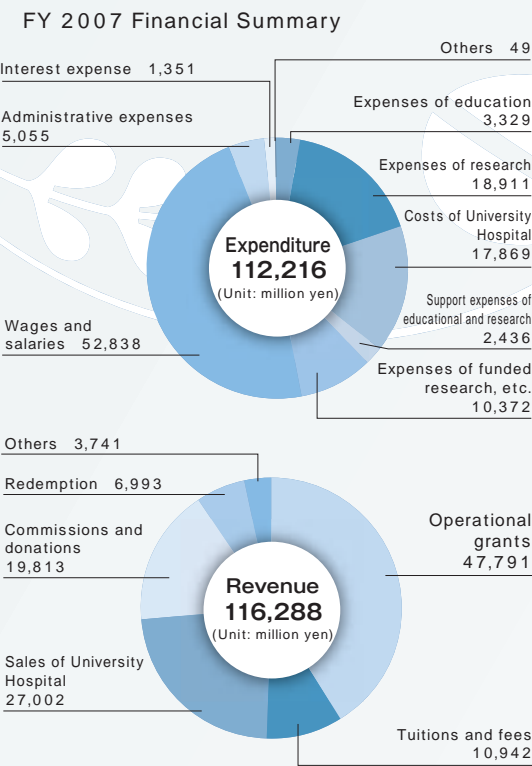
Divisions	Achievements
Graduate School of Environmental Studies	Environmental Forum (13 <sup>th</sup> ~ 15 <sup>th</sup> ) "Global warming and sustainable manufacturing" etc. 5 <sup>th</sup> Environmental Technology Symposium "Global warming — Life Style and Industry."
Institute for Materials Research	Giant spin Hall effect in perpendicularly spin-polarized FePt/Au devices. Li superionic conductivity in hydride. Different drive mechanisms of domain wall motion -Step toward MRAM- Formation mechanism of dendrite crystals with parallel twins and its implementation to the crystal growth method to realize high-quality Si multicrystals for solar cell applications.
Institute of Development, Aging and Cancer	Identification of a novel cell-surface receptor regulating allergic responses. We found IL-10 gene transfer reduces acute allograft rejection in a rat lung transplant model.
Institute of Fluid Science	7 <sup>th</sup> International Symposium on Advanced Fluid Information and 4 <sup>th</sup> International Symposium on Transdisciplinary Fluid Integration. Development of damage-free nano-process using neutral beam.
Research Institute of Electrical Communication	Emeritus Professor Fujio Masuoka was awarded the Purple Ribbon Medal in spring 2007. Prof. Kazuo Tsubouchi received the "Minister of Education, Culture, Sports, Science and Technology Award" in the Award for Persons of Merit in Industry-Academia-Government Collaboration in FY2007. Associate Professor Yuzo Ohno received the "Marubun Science Award" in FY2007 from the Marubun Research Promotion Foundation.
Institute of Multidisciplinary Research for Advanced Materials	Post-Silicon Materials and Devices Research Alliance was started under 4 different institutes in different universities. Center for Advanced Microscopy and Spectroscopy and Center for Advanced Nitride Technology were reorganized. Res. Prof. T. Fukuda was awarded The Czochralski Gold Medal and The 57 <sup>th</sup> Kahoku Bunka Prize. Big project, Development of Ultra-Hybrid Materials, was started, and also concentrated research laboratory was founded.
Center for Northeast Asian Studies	Demining sensor ALIS and its deployment in mine fields in Croatia.
Center for the Advancement of Higher Education	CAHE developed and held a laboratory subject entitled "Introductory Science Experiments for Humanities" for first-year students in humanities course (Faculty of Arts and Literature, Education, Law, and Economics). CAHE established "Advanced Mathematics Course" which stresses mathematics seminar in order to implement small and high-level extracurricular class.
The Center for Academic Resources and Archives	Interchange program on facilitating museum education runs with the Smithsonian National Museum. A long term monitoring of Aobayama was started under a co-operation with Ministry of the Environment.
International Advanced Research and Education Organization	Start of nurturing for excellence young researchers in interdisciplinary areas by selection of "Master's course students of the Institute", employment of "Research Fellows" and etc.
Cyclotron and Radioisotope Center	Successful development of a semi-conductor animal PET scanner of ultra high resolution "Fine PET".
New Industry Creation Hatchery Center (NICHe)	Prof. Migaku Takahashi received prize from Minister of MEXT. The Tohoku University Business Incubator (T-Biz) sponsored by Small & Medium Enterprises and Regional Innovation - JAPAN(SMRJ) was inaugurated.
Center for Interdisciplinary Research	Success in the fabrication of vertical blue-light-emitting diodes by chemical lift-off technique
Cyberscience Center	Reference of sample policies for information security measure for universities.
Tohoku University Library	Special exhibition, "Tohoku University Treasures" and "A Great Novelist Natsume Soseki" held to commemorate the Centenary Anniversary of the University. TOUR (Tohoku University Repository) providing more than 20000 items.
Tohoku University Hospital	Building up a foothold of translational research based on cooperation with medical science and engineering-Tohoku University Innovation of New Biomedical Engineering Center - has been established. DMAT (Disaster Medical Assistance Team) had been dispatched to the Niigata Chuetsu Offshore Earthquake. Regional emergency medical treatment system promotion project had been reinforced by Emergency Center. (Miyagi Prefecture and Sendai City). Opinion exchange meeting for the promotion of equality in cancer treatment was held. Regional medical treatment cooperation conference was held. Emergency Center public lecture for citizens was held. Training for "Cancer Medicinal Treatment", cancer expert pharmacist and nurse was held.
WPI Advanced Institute for Materials Research	Professor Inoue was elected as a foreign member of National Academy of Engineering. Professor Miyazaki was awarded the Asahi Prize.
Biomedical Engineering Research Organization (TUBERO)	Symposium commemorating completion of TUBERO project was held. A venture company originating from TUBERO "Clino" was established.



Data and Overview of Tohoku University

Number of Students (as of May 1, 2008)		
	School enrollment	Number of international students included
Undergraduate students	10,953	122
Graduate students (Master course,Master's Program, Profession Degree Program)	4,146	334
Graduate students (Doctoral Program)	2,748	440
Attached school	40	0
Research students, etc.	553	322
Total	18,440	1,218

Number of Personnel (as of May 1, 2008)	
President	1
Executive Vice Presidents	7
Auditors	2
Teaching sta .	2,743
Professors	840
Associate professors	654
Senior assistant professors	147
Assistant professors	1,006
Research associates	96
Administrative/Technical sta .	2,803
Total	5,556



Agreements on Academic Exchange (as of June 30, 2008)		
Agreements on the University Level	26 countries & regions	129 institutions
Agreements on the Department Level	40 countries & regions	289 institutions

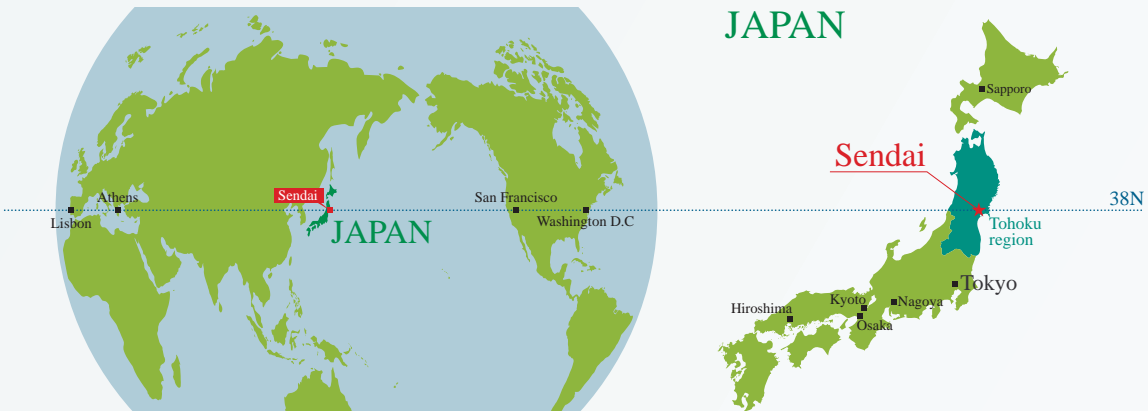
Overseas Offices (as of June 30, 2008)		
Liaison offices	8 countries	11 centers
Overseas offices	2 countries	3 offices

Number of International Students (as of May 1, 2008)	
75 countries & regions	1,218

Number of Exchange Students Based on Academic Exchange Agreements (FY 2007)		
To Overseas	11 countries	37
From Overseas	16 countries & region	137

Endowed Chairs and Research Divisions (as of May 1, 2008)	
Endowed Chairs	23
Endowed Research Divisions	13

Location of Tohoku University



CONTACTS

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**Graduate School of Economics and Management / Faculty of Economics**  
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**Graduate School / School of Medicine**  
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**Graduate School / School of Dentistry**  
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[http://www.dhntohoku.jp/index\\_e.html](http://www.dhntohoku.jp/index_e.html)

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<http://www.intcul.tohoku.ac.jp/?lang=en>

**Graduate School of Information Sciences**  
General Affairs Section  
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<http://www.is.tohoku.ac.jp/index-e.html>

**Graduate School of Life Sciences**  
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**Graduate School of Biomedical Engineering**  
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**Graduate School of Educational Informatics Research Division, Education Division**  
Education Affairs Division  
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**Institute for Materials Research**  
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**Institute of Development, Aging and Cancer**  
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**Institute of Fluid Science**  
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<http://www.ifs.tohoku.ac.jp/eng/index.html>

**Research Institute of Electrical Communication**  
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**Institute of Multidisciplinary Research for Advanced Materials**  
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<http://www.tagen.tohoku.ac.jp/index2.html>

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[http://www.cneas.tohoku.ac.jp/index\\_e.html](http://www.cneas.tohoku.ac.jp/index_e.html)

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**The Center for Academic Resources and Archives**  
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University Archives Tel.+81-22-217-5040  
<http://www.archives.tohoku.ac.jp/>  
Botanical Gardens Tel.+81-22-795-6760  
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**International Advanced Research and Education Organization**  
Education and Research Comprehensive Strategy Planning Office  
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**New Industry Creation Hatchery Center (NICHe)**  
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**Center for Interdisciplinary Research**  
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**Tohoku University Library**  
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