
**Graduate School of
Agricultural and Life Sciences/
Faculty of Agriculture
The University of Tokyo**

2013 ▶ 2014



Index

Contents	
Message from the Dean	1
Chronology	2
Number of Personnel in Various Categories	4
Faculty Staff	4
Center Staff	4
Required Units and Years for Degree	4
Enrollment of Students	5
Undergraduate Courses	5
Graduate Courses	6
Enrollment of International Students	7
Overseas Research Activities	8
Region of Overseas Research Activities	8
Foreign Visiting Researchers	9
Region of Foreign Visiting Researchers	9
International Academic Exchange Agreements	10
Departments	11
Department of Agricultural and Environmental Biology	11
Department of Applied Biological Chemistry	12
Department of Biotechnology	13
Department of Forest Science	14
Department of Aquatic Bioscience	15
Department of Agricultural and Resource Economics	16
Department of Biological and Environmental Engineering	17
Department of Biomaterial Sciences	18
Department of Global Agricultural Sciences	19
Department of Ecosystem Studies	20
Department of Animal Resource Sciences	21
Department of Veterinary Medical Sciences	22
Agricultural Bioinformatics Unit	24
AGRI-COCOON	25
Affiliated Institutions	26
Institute for Sustainable Agro-ecosystem Services	26
The University of Tokyo Forests	27
Animal Resource Science Center	28
Veterinary Medical Center	29
Fisheries Laboratory (Aquatic Bioscience Research Center)	30
Radioisotope Center	31
Technology Advancement Center	32
Research Center for Food Safety	33
University Library for Agricultural and Life Sciences	34
Overseas Research Units	35
Related Research Centers	36
Biotechnology Research Center	36
Asian Natural Environmental Science Center	37
MAP OF THE YAYOI CAMPUS	38

Message from the Dean



In the long history of biological evolution, life has produced a diversity of biological species and created an abundance of nature. Agricultural science is a discipline aimed at elucidating the wide variety of functions of organisms and developing applications that are conducive to human society with a main focus on food. Currently, our research and educational activities at the Graduate School of Agricultural and Life Sciences, the University of Tokyo, cover a wide range of fields aimed at understanding life and dealing with a wide variety of organisms, from microorganisms such as viruses and bacteria to higher plants and animals, with a focus on a broad spectrum of biological phenomena from the molecular level to the cellular, individual, and ecosystem levels. Our activities also include the humanities and social sciences such as economics to analyze associations between food and society. At our graduate school, these fields constitute a comprehensive academic system based on an organic linkage between basics and applications.

In recent years, the roles to be played by agricultural science as an integrated discipline have become increasingly important year by year. Now our world is facing many serious problems, including food and energy supply issues and concerns over food safety and security as well as deterioration of the global environment and the loss of biodiversity. A common feature of these problems is that it is too late to take countermeasures after understanding the problems scientifically because a great many fields are involved. Agricultural scientists are required to make constant efforts to find the best measures based on comprehensive knowledge in many relevant fields and to create new scientific value and contribute to society at large. The Graduate School of Agricultural and Life Sciences comprises 12 departments, including two multidisciplinary ones. This research and educational system for agricultural science as an integrated discipline is strengthened by an agricultural bioinformatics research unit based on biological information science, the AGRI-COCOON project (Agricultural Research Incubator Community for Cooperative Network of Public, Administrative, Business, and Academic Sectors), and multi-departmental programs such as for food safety.

These research and educational activities at the Graduate School of Agricultural and Life Sciences cannot emerge and evolve without the aid of affiliated institutions. We are going to launch a new technical unit at our graduate school from academic year 2013 to organize our technical staff members who now belong to their own respective institutions. To date, skilled technical workers with high levels of expertise have worked to support research and educational programs at their own affiliations; however, there has not always been adequate exchange or cooperation among these institutions. The new technical unit will be an organization that integrates existing institutions and technical staff as warp and woof, with the aim of enhancing their abilities and capacity through schematic and efficient training programs and skill-sharing to allow them to conduct cooperative activities with academic and administrative workers in equitable positions. This is expected to facilitate further improvements in the current organizational system to ensure world-class research and education in agricultural sciences.

We will continue to provide support for restoration from the Great East Japan Earthquake disaster. Our academic staff and students have so far been actively involved in supportive activities for relevant investigations, academic societies, and other associations, including projects for a volunteer registry at the University of Tokyo's Headquarters for Disaster Countermeasures. Additionally, we will institute the Practical Educational Program for Radiation Research Focusing on the Agricultural Environment and Food Safety and Security for five years from fiscal 2013. The radiological contamination resulting from the accident at Tokyo Electric Power Company's Fukushima No. 1 nuclear power plant has reminded us of the fact that water, soil, forests, and the sea are all indispensable for our survival. This program will lead initiatives for radiological decontamination at the Graduate School of Agricultural and Life Sciences to a new stage.

In addition to cultivating human resources, internationalizing research and educational activities, and carrying out the other essential missions of a university, at the Graduate School of Agricultural and Life Sciences we are endeavoring to help advance agricultural science as an integrated discipline in a unified way.

A handwritten signature in black ink that reads "Ken Furuya". The signature is written in a cursive, flowing style.

KEN FURUYA

Dean

Graduate School of Agricultural and Life Sciences
The University of Tokyo

Chronology

- 1874 : The Agricultural Training School established.
- 1878 : University Farm opened.
- 1880 : Veterinary Hospital opened.
- 1882 : Became The Komaba School of Agriculture.
- 1886 : The Tokyo School of Agriculture and Forestry formed.
- 1890 : Became The College of Agriculture of The Imperial University consisting of three Departments: Agriculture, Forestry, and Veterinary Science.
- 1893 : Department of Agricultural Chemistry added.
- 1894 : The University of Tokyo Chiba Forest opened.
- 1897 : Renamed The College of Agriculture of The Tokyo Imperial University.
- 1909 : Botanical Research Nursery opened.
- 1910 : Department of Fisheries established in The College of Agriculture.
- 1919 : Renamed Faculty of Agriculture of The Imperial University of Tokyo.
- 1925 : Department of Agricultural Economics and Agricultural Civil Engineering added.
- 1935 : Faculty moved from Komaba-cho, Meguro-ku, to its present location at 1-chome, Yayoi, Bunkyo-ku, Tokyo.
- 1936 : Fisheries Laboratory established.
- 1946 : Part of Department of Agriculture merged with Department of Veterinary Science to form Department of Zootechnics.
- 1947 : Renamed Faculty of Agriculture of The University of Tokyo.
- 1948 : Department of Agricultural Civil Engineering renamed Department of Agricultural Engineering.
- 1949 : Animal Resource Science Center opened.
- 1950 : Department of Veterinary Science became independent from Department of Zootechnics. Experimental Station for Landscape Plants opened.
- 1955 : Radioisotope (RI) Center opened.
- 1956 : Department of Forest Products became independent from Department of Forestry.
- 1957 : Biotron opened.
- 1964 : Department of Agriculture renamed Department of Agrobiolgy.
Department of Veterinary Science and Zootechnics reunited to form Department of Veterinary Medicine and Animal Sciences.
- 1965 : Agricultural Library opened. Research Facility for Radiation Breeding opened.
- 1984 : Biotechnology Research Facilities established.
- 1987 : Course in Biotechnology established.
- 1988 : Department of Veterinary Medical Science reorganized.
- 1991 : Course in Animal Resource Sciences established.
- 1993 : Biotechnology Research Center established.
- 1994 : Graduate School of Agriculture renamed Graduate School of Agricultural and Life Sciences.
- 1995 : Asian Natural Environmental Science Center established.
- 1997 : Department of Global Agricultural Sciences established.
- 1998 : Endowed Chair in Food-induced Bio-Signaling (Meiji Milk Products Co.) established. (1998–2008)
- 2000 : The 125th anniversary of founding celebrated.
Yayoi Auditorium completed.
Department of Ecosystem Studies established.
- 2001 : Agricultural Library renamed University Library for Agricultural Life Sciences.
- 2002 : Ebara-Donated Research Unit on Biomass Refinery established.
- 2003 : ILSI JAPAN-Endowed Chair of Functional Food Science and Nutrigenomics established. (2003–2013)
- 2004 : All National Universities transformed into National University Corporations, and The University of Tokyo incorporated.
Koishikawa Arboretum opened (former Botanical Research Nursery).

- 2004 : Agricultural Bioinformatics Unit established.
- 2005 : AGRI-COCOON (Agricultural Research Incubator Community for Cooperative Network of Public, Administrative, Business, and Academic Sectors) established.
- 2006 : Endowed Chair in Clinical Plant Science (Ikeda Scientific Co.) established. (2006–2011)
Technology Advancement Center opened.
Research Center for Food Safety opened.
- 2007 : Veterinary Hospital renamed Veterinary Medical Center.
Endowed Chair in Governance-oriented Civil Engineering for Sustainable National Land Management (Maeda Co. and Kumagai Gumi Co.) established. (2007–2009)
- 2007 : Endowed Chair in Taste Science (Nissin Food Products Co.) established. (2007–2017)
- 2008 : Ninomiya branch of University Farm closed.
Yayoi Auditorium Annex completed.
- 2008 : International Program in Agricultural Development Studies (IPADS) established.
- 2009 : University Library for Agricultural Life Sciences reopened.
- 2010 : Institute for Sustainable Agro-ecosystem Services established.
- 2010 : Food Science Building completed.
- 2011 : Ecohydrology Research Institute established.
Forest Therapy Research Institute established.
- 2012 : Food Science Building B completed.
Experimental Station for Landscape Plants closed.
Endowed Chair in Microbial Metabolic Potential (Institute for Fermentation, Osaka [IFO]) established.

Number of Personnel in Various Categories

Dean	1
Vice Dean	4
Professors	94
Associate Professors	88
Lecturers (full-time)	10
Assistant Professors	81
Administrative Personnel	87
Technical Staff	96

Faculty Staff

(As of April 1, 2013)

	Professor	Associate Professor	Lecturer	Assistant Professor	Administrative Personnel	Technical Staff	Total
Graduate School (Faculty)	86	80	5	67	66		304
Institute for Sustainable Agro-ecosystem Services	2	3		4	3	13	25
The University of Tokyo Forests	4	4	5	10	13	60	96
Animal Resource Science Center	1				2	9	12
Veterinary Medical Center	1				2		3
Fisheries Laboratory		1			1	3	5
Technology Advancement Center						11	11
Total	94	88	10	81	87	96	456

Center Staff

(As of April 1, 2013)

	Professor	Associate Professor	Lecturer	Assistant Professor	Total
Biotechnology Research Center	3	2		3	8
Asian Natural Environmental Science Center	4	3		1	8
Total	7	5		4	16

Required Units and Years for Degree

(As of May 1, 2013)

	Bachelor Degree	Bachelor Degree of Veterinary Medical Sciences	Master's Degree	Doctoral Degree	Doctoral Degree of Veterinary Medical Sciences
Units	154 or 160*	228.5 or 234.5*	30	20	32
Years	4	6	2	3	4

*Depends on the course of the Junior Division students are admitted.

Enrollment of Students

Undergraduates (International students in parentheses)

(As of May 1, 2013)

	3rd Year	4th Year	5th Year	6th Year	Research Students	Total
Applied Life Sciences	143 (2)	149 (4)			2 (0)	294 (6)
Environmental Resources Sciences	107 (0)	124 (0)			4 (1)	235 (1)
Veterinary Medical Sciences	32 (0)	32 (0)	33 (0)	34 (0)	0	131 (0)
Total	282 (2)	305 (4)	33 (0)	34 (0)	6 (1)	660 (7)

Graduates (International students in parentheses)

(As of May 1, 2013)

	Master's Program	Doctoral Program	Research Students	Total
Agricultural and Environmental Biology	42 (4)	36 (18)	0 (0)	78 (22)
Applied Biological Chemistry	133 (11)	69 (22)	3 (2)	205 (35)
Biotechnology	84 (11)	61 (24)	3 (3)	148 (38)
Forest Science	36 (4)	33 (17)	1 (0)	70 (21)
Aquatic Bioscience	53 (4)	65 (20)	6 (6)	124 (30)
Agricultural and Resource Economics	18 (1)	21 (14)	1 (1)	40 (16)
Biological and Environmental Engineering	23 (1)	18 (4)	0 (0)	41 (5)
Biomaterial Sciences	49 (5)	36 (5)	3 (2)	88 (12)
Global Agricultural Sciences	63 (13)	50 (18)	5 (3)	118 (34)
Ecosystem Studies	43 (1)	18 (3)	0 (0)	61 (4)
Animal Resource Sciences	29 (3)	13 (2)	2 (2)	44 (7)
Veterinary Medical Sciences		72 (14)	8 (1)	80 (15)
Total	573 (58)	492 (161)	32 (20)	1,097 (239)

Undergraduate Courses

Courses

Major

Applied Life Sciences

Biological Chemistry and Biotechnology

Applied Biology

Forest Life Science

Aquatic Life Science

Animal Life Sciences

Biobased Materials Chemistry

Environmental Resources Sciences

Landscape Ecology and Planning

Forest Environmental and Resource Science

Aquatic Production and Environmental Science

Wood Science and Timber Engineering

Biological and Environmental Engineering

Agricultural and Resource Economics

Field Science

International Sustainable Agriculture Development

Veterinary Medical Sciences

Veterinary Medical Sciences

For 3rd and 4th year (3rd–6th year in case of Veterinary Medical Sciences) undergraduate courses.

Graduate Courses

Departments

Courses

<i>Agricultural and Environmental Biology</i>	Bioresource Development Applied Agrobiology Basic Agrobiology Asian Biological Resources Field Production Science Associated Courses
<i>Applied Biological Chemistry</i>	Biofunctional Chemistry Agricultural Chemistry Food Science Associated Courses
<i>Biotechnology</i>	Biomolecular Research Biofunctional Research Biotechnology Research Molecular and Cellular Biosciences Associated Courses
<i>Forest Science</i>	Forest Life and Environmental Science Forest Resources and Environmental Science Asian Environmental Science Forest Ecosystem Science and Management Associated Courses
<i>Aquatic Bioscience</i>	Aquatic Molecular Biology and Biotechnology Aquatic Production and Environmental Science Aquatic Life Science Applied Marine Biology Marine Bioscience Associated Courses
<i>Agricultural and Resource Economics</i>	Agricultural Structure and Farm Business Management Development Policies and Economics Rural Development Finance Pan-Asia Associated Courses
<i>Biological and Environmental Engineering</i>	Rural Environment Engineering Biological Systems Engineering Biological and Environmental Information Engineering Ecological Safety Studies Associated Courses
<i>Biomaterial Sciences</i>	Structural Biomaterials Science Material and Housing Sciences Biomass Chemistry Associated Courses
<i>Global Agricultural Sciences</i>	Global Animal Production Sciences Global Plant Production Sciences Global Biological and Environmental Sciences International Development and Agro-Environmental Sciences Associated Courses
<i>Ecosystem Studies</i>	Biological Conservation Ecosystem Management Bioresources Management Associated Courses Bioresources and Eco-Environmental Studies
<i>Animal Resource Sciences</i>	Bio-regulatory Systems Functional Bioscience Bio-animal Science Associated Courses
<i>Veterinary Medical Sciences</i>	Basic Veterinary Medicine Clinical Veterinary Medicine Bio-animal Science Food Safety and Science Experimental Medicine Associated Courses

Enrollment of International Students

(As of May 1, 2013)

Country/Region	Male	Female	Total
Bangladesh	3	2	5
Bolivia	1	0	1
Brazil	0	1	1
China	58	51	109
Denmark	0	1	1
Ecuador	1	0	1
Germany	1	1	2
India	2	2	4
Indonesia	8	3	11
Laos	1	0	1
Malaysia	3	3	6
Mongolia	2	0	2
Myanmar	0	3	3
Nepal	1	1	2
Pakistan	1	0	1
Peru	1	0	1
Philippines	3	7	10
Singapore	0	1	1
South Korea	16	8	24
Spain	0	1	1
Sri Lanka	4	3	7
Taiwan	7	13	20
Thailand	6	16	22
USA	0	1	1
Vietnam	2	6	8
Zimbabwe	1	0	1
Total	122	124	246

U.S.		R.S.		M.S.		D.S.	
M	F	M	F	M	F	M	F
0	0	17	19	30	22	75	83
0		36		52		158	

U.S. = Undergraduate students
 R.S. = Research students
 M.S. = Master's students
 D.S. = Doctoral students



Study Trip 2012: Nagatoro, Saitama Prefecture



Study Trip 2012: Hakone, Kanagawa Prefecture

Monbukagakusho Scholarship Students: 80
 Self-supporting students: 166



Yayoi International Day-2012

The Office for International Cooperation & Exchange (OICE)
<http://www.a.u-tokyo.ac.jp/english/oicelp-e/index.html>

Overseas Research Activities

	2010	2011	2012
(1) Financed by Ministry of Education, Culture, Sport, Science and Technology			
Sub-total	0	0	0
(2) Financed by Grants-in-Aid for Scientific Research 〈KAKENHI〉 (Ministry of Education, Culture, Sports, Science and Technology/ Japan Society for the Promotion of Science)			
Sub-total	156	135	156
(3) Financed by other ministries or governmental organizations			
Japan Society for the Promotion of Science (JSPS)	5	8	21
Japan International Cooperation Agency (JICA)	1	5	7
Others	20	9	57
Sub-total	26	22	85
(4) Financed by other Japanese organizations			
Sub-total	231	229	126
(5) Financed by foreign governments or organizations			
Sub-total	49	35	27
(6) Private			
Sub-total	4	17	17
Total	466	438	411

Region of Overseas Research Activities

	2010	2011	2012
China	49	57	30
South Korea	43	39	37
Other Asia	121	157	136
Oceania	20	17	7
Middle East	3	4	1
Europe	125	79	109
North America	94	72	70
Latin America	4	3	6
Africa	7	10	15
Total	466	438	411

Foreign Visiting Researchers

	2010	2011	2012
(1) Financed by Ministry of Education, Culture, Sports, Science and Technology			
Sub-total	0	0	0
(2) Financed by Grants-in-Aid for Scientific Research <KAKENHI> (Ministry of Education, Culture, Sports, Science and Technology/ Japan Society for the Promotion of Science)			
Sub-total	14	27	17
(3) Financed by other ministries or governmental organizations			
Japan Society for the Promotion of Science (JSPS)	33	34	47
Japan International Cooperation Agency (JICA)	0	0	0
Others	3	4	1
Sub-total	36	38	48
(4) Financed by other Japanese organizations			
Sub-total	54	73	99
(5) Financed by foreign governments or organizations			
Sub-total	3	3	9
(6) Private			
Sub-total	0	32	32
Total	107	173	205

Region of Foreign Visiting Researchers

	2010	2011	2012
China	32	56	60
South Korea	4	17	19
Other Asia	44	60	74
Oceania	0	2	6
Middle East	1	1	2
Europe	18	13	16
North America	6	23	25
Latin America	0	0	0
Africa	2	1	3
Total	107	173	205

International Academic Exchange Agreements

(As of August 1, 2013)

Countries and Regions	Universities / Institutes	Started on
Bangladesh	University of Chittagong	Aug. 7, 2010
Cambodia	Cambodian Agricultural Research and Development Institute	Jul. 6, 2009
China	Beijing Forestry University	Feb. 25, 1984
	Northeast Forestry University	Dec. 23, 1996
	China Agricultural University	Sep. 17, 1997
	Nanjing Forestry University	Mar. 9, 2002
	Institute of Soil Science, Chinese Academy of Sciences	Jan. 5, 2007
	Nanjing Agricultural University	Mar. 21, 2007
	Sichuan Agricultural University	Mar. 29, 2007
	Tianjin Agricultural University	Aug. 9, 2010
	Northeast Agricultural University	Aug. 25, 2010
	Nankai University*	Dec. 6, 2010
India	Tamil Nadu Agricultural University	May. 27, 2013
Indonesia	Bogor Agricultural University	Oct. 21, 1988
	Gadjah Mada University*	Nov. 22, 2010
	Padjadjaran University*	Mar. 4, 2002
	Mulawarman University	Jan. 27, 2006
Laos	National University of Laos (Planning and International Cooperation Office)	Jul. 21, 2010
Malaysia	Sabah University of Malaysia (School of International Tropical Forestry)	Oct. 18, 2012
Mongolia	Mongolian State University of Agriculture	Oct. 13, 2003
South Korea	Seoul National University (College of Agriculture and Life Sciences)	Sep. 9, 2006
	Pukyong National University (College of Fisheries Sciences)	Jan. 24, 2007
	Pukyong National University (College of Environmental and Marine Science and Technology)	Jan. 24, 2007
	Kangwon National University (College of Forest & Environmental Sciences)	Jan. 31, 2013
Sri Lanka	University of Ruhuna	Jun. 7, 2011
Taiwan	National Taiwan Ocean University	Apr. 27, 2006
	National Chung Hsing University (College of Veterinary Medicine)	Mar. 26, 2008
	Taipei Medical University (College of Public Health and Nutrition)	Jan. 28, 2013
Thailand	Kasetsart University (Faculty of Veterinary Medicine and Faculty of Agriculture)	Jun. 8, 1998
	Khon Kaen University (Faculty of Agriculture)	Feb. 3, 2009
	Agricultural Research Development Agency	Jul. 12, 2011
Vietnam	Hanoi University of Agriculture	Dec. 25, 1995
	Nong Lam University	Dec. 25, 2008
	Can Tho University	Jul. 19, 2010
Argentina	National University of La Plata	Dec. 6, 1990
Colombia	International Center for Tropical Agriculture (CIAT)	Feb. 19, 2010
New Zealand	Massey University	Jul. 24, 1995
Finland	Aalto University	Aug. 18, 2010
France	AgroParisTech (Institute National Agronomique Paris-Grignon)	Jan. 30, 1996
	IBEB, Commissariat à l'énergie atomique et aux énergies alternatives	Sep. 7, 2010
Germany	Karlsruhe Institute of Technology	Dec. 2, 2010
Poland	University of Agriculture in Krakow	Dec. 5, 2012
	University of Warmia and Mazury in Olsztyn	Dec. 6, 2012
Sweden	Swedish University of Agricultural Sciences	Aug. 23, 2004
	Royal Institute of Technology (Kungliga Tekniska högskolan)	Nov. 30, 2010
UK	The University of Edinburgh (The Royal (Dick) School of Veterinary Studies)	Mar. 9, 2009

*University-wide Agreement

Departments

Department of Agricultural and Environmental Biology

Researches conducted in the Department of Agricultural and Environmental Biology aim to obtain better understanding of genetic, biotic, and abiotic factors that affect the growth, development, and yield of agricultural and horticultural crops. Understanding of the mechanisms that give rise to phenotypic variations in plants will help us to develop strategies for efficiently improving the quality and yield of crops under diverse environmental conditions and/or reducing the loss of products by diseases and insect pests. Researches conducted in our department also include development of insects useful for production of biological materials and development of statistical models and procedures for efficiently analyzing diverse life phenomena ranging from genome evolution to human preference.

<http://www.ab.a.u-tokyo.ac.jp/aeb/index-e.html>

Bioresource Development

Plant Breeding and Genetics

Genetic and molecular studies on the regulatory mechanisms of important traits in crops

Insect Genetics and Bioscience

Genetics, genomics, developmental biology, virology, and molecular pathology of the silkworm and insects

Applied Agrobiology

Crop Science

Carbon and nitrogen metabolism in relation to yield performance of various crop species, mechanism of environmental stress tolerance in crop plants

Horticultural Science

Physiological and genetic studies on improvements in the quality of horticultural products

Applied Entomology

Physiological, ecological, and genetic studies on reproduction, dormancy, and speciation in insects

Basic Agrobiology

Plant Ecology and Morphology

Ecological and morphogenetic basis for improving productivity and sustainability of plant production systems

Plant Molecular Genetics

Structure, function, and evolution of genomes in higher plants

Plant Pathology

Molecular plant pathology of plant pathogens and host-parasite interaction

Biometrics and Statistical Genetics

Biometric studies on DNA polymorphism, inheritance of quantitative traits, population genetic structure, and plant morphology

Aeon and Aeon 1% Club Endowed Chair

Clinical Plant Science

Development of technologies for diagnosing and controlling plant diseases to establish a plant clinic network

Asian Biological Resources *1

RNA Virology and Resistance Mechanisms

Replication, transmission, and pathogenesis of RNA viruses and resistance mechanisms

Environmental Stress Tolerance Mechanisms

Tolerance mechanisms of plants to environmental stresses and development of tolerant plants

Regional Resource Reassessment

Sustainable land use and agricultural production under fragile regional conditions

Field Production Science *2

Advanced Environmental and Plant Sciences *

Studies on sustainable crop production system for high productivity/quality and low environmental impact



Greenhouses of our department



Our experimental materials include crops, insects, microorganisms, and organelles



Experiment room for molecular biology

*1 Cooperative course. The laboratories and their staff belong to the Asian Natural Environmental Science Center.
*2 Cooperative course. The laboratory and its staff belong to the institute for Sustainable Agro-ecosystem Services.

Department of Applied Biological Chemistry

Wide-ranging research and education in biological chemistry are carried out in the Department of Applied Biological Chemistry. In addition to basic research methodologies in biological chemistry, which consists of biochemistry, organic chemistry, and cellular biochemistry, this department is actively introducing new research methodologies and techniques, such as genetic engineering, protein engineering, and cellular engineering. By applying these techniques to research in plants and animals for food production, cellular functions of food-producing organisms and food immunology, discovering new bioactive compounds, and maintaining the environment for the coexistence of human beings and living organisms, this department seeks to further advance research methodologies in biological chemistry and the development of a new era of coexistence between human beings and all living organisms. This department is also striving to form a global network for the development of techniques in bioproduction and biological chemistry.

<http://www.bt.a.u-tokyo.ac.jp/english/introduction/>

Biofunctional Chemistry

Plant Molecular Physiology

Molecular and cellular biology of plant response and tolerance to environmental stress

Biological Function and Developmental Chemistry

Molecular cell biology, neurology of taste signaling, and biochemistry of food proteins

Agricultural Chemistry

Plant Nutrition and Fertilizer

Plant nutrient transport, metabolism, response to nutritional conditions, and nutrient stress-tolerance

Biological Chemistry

Chemistry, molecular biology, and neuroscience of chemosensory signals and receptors in mammal, insect, plant, and microorganism

Organic Chemistry

Organic synthesis of bioactive natural products and their derivatives for elucidation of bioactive function or practical use

Development of new reactions for efficient synthesis of optically active substances

Bioorganic Chemistry

Chemistry, biochemistry, and molecular biology of bioactive compounds such as microbial secondary metabolites and compounds regulating biomineralization

Soil Science

Soil microbiology for sustainable agriculture and environmental conservation

Chemical Biology

Chemistry, physiology, and molecular biology for plant growth regulation

Food Science

Nutritional Biochemistry

Nutrient regulation of gene expression

Differentiation of mammalian cells

Food Chemistry

Chemical, biochemical, and molecular biological studies on intestinal function-modulating food substances

Food Biochemistry

Molecular and cellular biological studies on lifestyle-related diseases

Search for food factors that prevent lifestyle-related diseases

Analytical Chemistry

Bioinorganic chemistry of biological and environmental systems

Structural and Food Biotechnology

Molecular biology of aging and search for anti-aging food materials

ILSI Japan-Endowed Chair

Functional Food Science and Nutrigenomics

Functional genomics to investigate food-induced physiological responses

Nissin Food Products-Endowed Chair

Taste Science

Investigation of the molecular logic of sensory events for application to food quality design

Nestlé-Endowed Chair

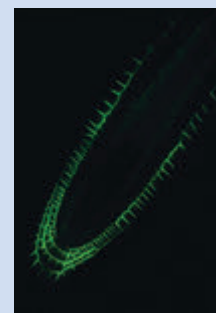
Food for Life

Molecular nutrition and functional genomics for the betterment of quality of life



Morphology of the *kobito* (*kbt*) mutant of morning glory.

The *kbt* mutant has a defect in biosynthesis of brassinosteroids, a class of plant hormones, and shows conspicuous dwarf phenotype, demonstrating the importance of this hormone function. (left) Two-month old *kbt*. (right) Seven-week-old *kbt* and wild-type plants.



A confocal microscope image of *Arabidopsis* root expressing GFP-tagged BOR1 borate transporter carrying mutation at Lys-590 (K590A). The mutant BOR1-GFP localizes in the plasma membrane and shows inward (stele-facing) polarity similar to the wild type, although high boron-induced endocytic degradation of BOR1 is completely blocked by this mutation.



A structural view of the positive regulatory mechanism of abscisic acid (ABA) signaling. ABA receptor PYL1 interacts with type 2C protein phosphatase ABI1 using two loops closed by ABA binding. In the resulting (PYL1-ABA-ABI1) complex, loop 1 of PYL1 seals the active site of ABI1 to inhibit its phosphatase activity, which confers tolerance to environmental stresses such as drought and high salinity in plants.

Department of Biotechnology

The Department of Biotechnology has maintained a high standard of education and research in wide areas of biotechnology. Employing DNA technology, protein engineering, and cell/tissue culturing techniques in combination with recent advances in biomolecular structure determination, genomic information, and bioinformatics, the department is revealing basic mechanisms of a variety of biological functions. Furthermore, we are making efforts to apply these findings to contribute to the prosperity and welfare of human beings.

<http://www.bt.a.u-tokyo.ac.jp/english/introduction/>

Biomolecular Research

Molecular and Cellular Breeding

Analysis and improvement of useful genes in microorganisms

Bioinformation Engineering

Computational biology, computational chemistry, and bioinformatics

Molecular Biotechnology

Structure, function, and localization of biological molecules

Biofunctional Research

Fermentation and Microbiology

Genetic and protein engineering, bioactive substances

Applied Microbiology

Application of diverse microbiological metabolisms

Enzymology

Structure-function relationship of enzymes and proteins

Microbiology

Protein secretion in filamentous fungi

Cellular Genetics

Regulation of macromolecular biosynthesis in microorganisms

Biotechnology Research *1

Environmental Biochemistry

Biotechnology of microorganisms and plant cells

Cell Biotechnology

Biosynthetic studies using biochemistry and structural biology

Plant Functional Biotechnology

Plant nutrient acquisition, nodulation, and plant growth improvement

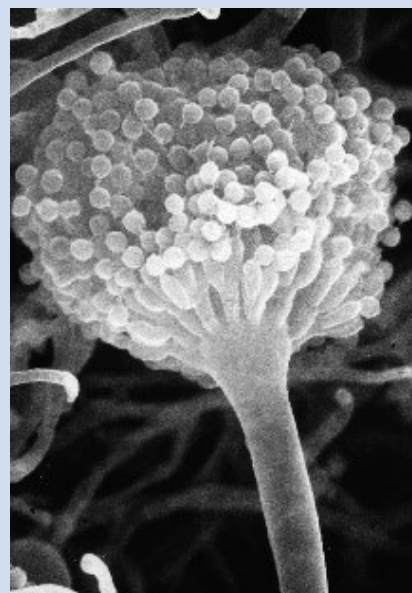
Molecular and Cellular Biosciences *2

Chromosome Dynamics

Molecular and Genetic Information

Membrane Proteins

Genome Structure and Function



Scanning electron microscopic image of a conidiophore of filamentous fungus *Aspergillus nidulans*



Production site for traditional rice vinegar (kome-kurozu). Microorganisms play an essential role in the making of kome-kurozu

*1 Cooperative course. The laboratory and its staff belong to the Biotechnology Research Center.

*2 Cooperative course. The laboratory and its staff belong to the Institute of Molecular and Cellular Biosciences.

Department of Forest Science

Our comfortable life is dependent on advanced science and technology and creates large environmental load. Environmental problems on a global scale, such as extreme weather and extinction of species, have become apparent. Degradation of the environment is a serious problem for human beings. Forests are the biggest terrestrial ecosystems on earth, accounting for about 80% of plant production. They play a major role in hydrological and carbon cycles on a global scale and help conserve the global environment. Extensive human activity leading to deforestation and forest degradation is a cause of deterioration of the global environment. Moreover, forests bring various benefits such as wood resources, pure water, and a comfortable environment, and the use of forests is indispensable to our life. Forest science is a discipline that helps us to sustainably enjoy the benefits of forests by harmonizing forest ecosystems with human activities. <http://www.fr.a.u-tokyo.ac.jp/english.html>

Forest Life and Environmental Science

Forest Botany

Ecology and physiology of trees
Symbiology and pathology in forests

Forest Zoology

Ecological studies of animals in forest ecosystems
Studies on management of animal populations in forests

Silviculture

Biology for forestation
Physiology and ecology of forest trees
Pedology and edaphology in forests

Forest Resources and Environmental Science

Forest Management

Research on integrated management and utilization of forest areas
Research on forest inventory and monitoring techniques using remotely sensed data

Forest Policy

Studies on policies to manage and utilize forests
Social scientific studies on relationship between human beings and forests

Forest Utilization

Planning and design of forest-road networks
Forestry mechanization and operational efficiency

Forest Hydrology and Erosion Control Engineering

Hydrological research on the relationship between forests and the environment
Soil conservation, landslide and mud flow, and disaster-prevention science

Forest Landscape Planning and Design

Planning methods for conservation and creation of living environments
Planning, design, and management of forest landscape

Asian Environmental Science ^{*1}

Regional Resources Planning

Evaluation of regional resources for nature conservation planning
Methodological studies on sustainable tourism

Tree Physiology and Tropical Silviculture

Tolerance mechanism of trees to environmental stress
Development of reforestation methods for deteriorated lands in the Asian tropics

Forest Molecular Ecology

Population genetics and reproduction ecology of forest tree species
Ecology and physiology of ectomycorrhizal fungi

Forest Ecosystem Science and Management ^{*2}

Forest Ecosystem

Long-term monitoring of forest ecosystems
Wildlife management

Forest Functional Biology

Utilization of biological functions of woody plants

Forest and Human Society Relationship

Monitoring and management of forest information

Forest and Water Resources Management

Long-term monitoring of hydrological cycle with forest development
Sustainable forest-resource management



Practical student exercise in a mountain village



Collecting botanical specimens in a practical course



An 80-m-tall canopy crane with a 75-m-long rotating jib in a tropical rainforest, Sarawak, Malaysia

^{*1} Cooperative course. The laboratories and their staff belong to the Asian Natural Environmental Science Center.

^{*2} Cooperative course. The laboratories and their staff belong to the University of Tokyo Forests.

Department of Aquatic Bioscience

The Department of Aquatic Bioscience has the following major aims. First, given the global scale of the havoc wreaked on the environment by humankind, we must find ways to preserve aquatic ecosystems. Second, we must strive to develop self-sustaining fisheries. And third, using knowledge and expertise from other research fields such as biotechnology, we must investigate ways to contribute to the welfare of the human race including food production. Our laboratories, including the Fisheries Laboratory on Lake Hamanako and those in the Atmosphere and Ocean Research Institute, are striving to tackle these problems and have achieved many encouraging results. However, the ocean, which has spawned and nursed life since the Earth's formation, is vast and as yet only partially understood. There is a real need to once again observe biological phenomena in the oceans from a fresh viewpoint and with an open mind.

<http://www.a.u-tokyo.ac.jp/english/departments/D-AB.html>

Aquatic Molecular Biology and Biotechnology

Aquatic Molecular Biology and Biotechnology

Development and function of aquatic animal muscles
Molecular response to environmental stress
Protein engineering

Aquatic Production and Environmental Science

Fisheries Biology

Management of coastal fish stocks and ecosystems
Ecology and life-history studies of fish

Fish Disease Research

Pathology of infectious diseases of fish and shellfish
Biology and ecology of pathogens
Host defense mechanisms

Aquatic Biology and Environmental Science

Ecology of marine organisms and related environmental changes

Aquatic Life Science

Aquatic Animal Physiology

Mechanisms of reproduction and environmental adaptation in aquatic animals

Aquatic Natural Products Chemistry

Search for biologically active substances from marine invertebrates
Characterization of biosynthetic pathways of aquatic natural products

Marine Biochemistry

Functional diversity in metabolic pathways for aquatic organisms

Applied Marine Biology *1

Applied Marine Biology

Molecular genetics, immunology, and comparative genomics
Structure and function of coastal ecosystems

Marine Bioscience *2

Marine Planktology

Phylogeny, life history, and production ecology of plankton and micronekton
Marine food web, interactions between shallow and deep-sea ecosystems

Marine Microbiology

Ecology, phylogeny, and physiology of marine bacteria
Bacterial contribution to microbial loop and material cycles

Fish Population Dynamics

Assessment of exploited fish stocks, establishment of reasonable fishery management systems, and conservation of marine organisms

Biology of Fisheries Resources

Ecology and physiology of living marine resources, underlying mechanisms of their reproductive fluctuations

Fisheries Environmental Oceanography

Studies on coastal and open ocean environments for living resources and related physical oceanography

Behavior, Ecology and Observation Systems

Fish migration: physio-ecological mechanisms, development of behavior, and evolutionary aspects

Ecology and development of measuring systems: remote sensing and GIS, sampling gear and methods, and seagrass and seaweed ecology

International Coastal Research Center

The center is concerned with basic marine sciences including marine ecology, marine pollution, marine biology, physiology, taxonomy, and physical oceanography



School of sardines



Plankton sampling



Kuruma prawn

*1 Cooperative course. The laboratory and its staff belong to the Fisheries Laboratory.

*2 Cooperative course. The laboratory and its staff belong to the Atmosphere and Ocean Research Institute.

Department of Agricultural and Resource Economics

How can we meet the global need for foodstuffs and agricultural materials under the growing constraints of natural resources and the environment as well as imperfect food distribution, such as coexistence of hunger and satiation? This challenging issue should be addressed in consideration of fundamental socio-economic elements, e.g., unsustainable development and resource depletion, enlargement of poverty and social inequality, and economic and institutional conflicts among developed and developing countries.

Our department embodies the following two key principles of graduate education and academic research for the new age of agricultural and resource economics.

- (1) Global perspective: Our research concerns have become broader and more internationalized beyond traditional agricultural economics to include intergenerational resource conservation, multifunctionality of agriculture, the global food system, harmonization of international trade systems, and rural development and communities, while encompassing new disciplines of other applied economics such as development economics, environmental economics, and institutional economics.
- (2) Local perspective: We pay attention to the reality of rural communities and individuals. Our fieldwork approach, through which we have accumulated academic knowledge and established research networks, is one effective method to achieve our aim of comparing Japanese and overseas agricultural economies.

We continue to offer intensive seminars and classes for graduate students, which deepen their professional insight and enhance their communication abilities. In addition, we intend to strengthen intellectual collaboration with other natural science disciplines. One of the keys to solving the aforementioned complex problems is technological progress owing to developments in bioscience and information technology. As a department of Graduate School of Agricultural and Life Sciences, we have an excellent opportunity and favorable position from which to engage in academic dialogue and scientific discussion for the future.

<http://www.a.u-tokyo.ac.jp/english/departments/D-ARE.html>



The food supply is the basis of our lives.

Agricultural Structure and Farm Business Management

Farm Business Management and Rural Development

Management and analysis of farm business
Management for regional and environmental resources

Agricultural Structure and Policy

Comparative studies on agricultural structure
Agricultural policy

Agricultural History

Comparative studies on agricultural development
History of agricultural sciences

Development Policies and Economics

Agricultural and Development Economics

Political economy of agriculture
Development economics
Agricultural trade

Food and Resource Economics

Food system economics
Resource and environmental economics

Rural Development Finance

Rural Development Finance

Finance for agricultural and rural development
Microfinance in Asia (Vietnam, India, China, and Mongolia)
Challenges of agricultural cooperatives
Estimation of capital stock in Japanese agriculture

Pan-Asia*

Economic Development in Asia

Economic development in Asia
Social and cultural changes in Asia



Economic theories and field researches are essential in our department



We seek consistency between efficient agricultural production and favorable rural environments

* Cooperative course. The laboratory and its staff belong to the Institute of Oriental Culture.

Department of Biological and Environmental Engineering

The Department of Biological and Environmental Engineering (BEE) deals with the creation and preparation of favorable environments in rural areas and production control of living things. Technologies in this field are essential for appropriate management of natural and biological resources sustaining human beings on the Earth. This department contains the four branches of Rural Environmental Engineering (REE), Biological Systems Engineering (BSE), Biological and Environmental Information Engineering (BEIE), and Ecological Safety Studies (ESS). REE seeks to achieve advances in modern technologies associated with the engineering of land foundations, water resources, soil conditions, plants, and air resources. It aims to encourage efficient production of food and to conserve the Earth's environment, especially in rural areas, by harmonizing production with natural ecological systems. BSE aims to develop advanced techniques and research in bioengineering, biological process control, biosensing and robotics, bioenergy production, and bio-farming in outer space by making greater use of life functions themselves. BEIE applies the latest information technology to strive for the harmonious coexistence of life and the environment as well as optimized food production. Information on the effects of changes in the conditions of both the geosphere and food materials is covered. ESS is an associated branch of the Department of BEE in the National Institute for Agro-Environmental Sciences (NIAES), which is located in the science-hub city of Tsukuba. NIAES is the leading institute on environmental sciences in agriculture. ESS conducts interdisciplinary studies on atmosphere and soil environments, the material cycle in agro-ecosystems, and ecological statistics as the basis for such studies.

<http://www.a.u-tokyo.ac.jp/english/departments/D-BEE.html>

Rural Environmental Engineering

Land Environmental Engineering

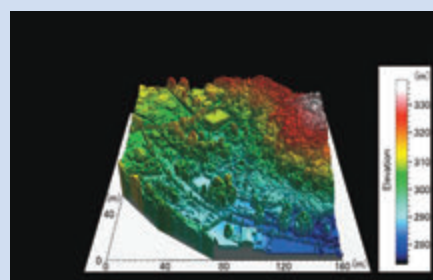
Nitrogen circulation in watershed areas with agricultural activity
Monitoring and analysis of flood mitigation function of paddy fields and upland fields
Water and material circulation in Soil-Plant-Atmosphere Continuum
Soil conservation in arid regions by controlling salt accumulation

Water Environment Engineering

Development and application of hydraulic and hydrological models on large-scale irrigation systems for improved water management
Quantitative valuation and demand-oriented provision of irrigation service
Control of greenhouse gas emissions from paddy fields by on-farm water management
Survey and analysis of water resources and environment problems in the Asian monsoon regions

Soil Physics and Soil Hydrology

Unsaturated water and solute transport in soils
Migration and remediation of metals in soils
Carbon dynamics in soil and transport phenomena
Climate change and soil physical conditions
Erosion and conservation of low-pH soils
Colloid-facilitated transport of chemicals in soils



3D image of forest measured by helicopter-borne scanning LIDAR

Biological Systems Engineering

Bioenvironmental Engineering

Analyses of plant responses to light, gas, and water environments
Control and analysis of plant environment in greenhouses and plant factories
Development of advanced plant production technologies and experimental devices for plant-response research
Advanced technology utilization for plant production and plant-response research
Ecophysiology and biotechnology in advanced greenhouse horticulture

Biological and Mechanical Engineering

High-speed autonomous vehicle for forage production
Three-dimensional measurement in identification of plants
Vehicle control using omnidirectional machine vision
Energy production from marine biomass by hybrid treatment
System analysis of bioenergy production and utilization

Bioprocess Engineering

Storage of foods and agricultural products by application of both gas-hydrate formation and freezing
Non-destructive and real-time monitoring for food safety and quality
Evaluation of dynamic properties of micro-/nano-bubble water for application to biosystems
Prediction of dynamic change in agricultural product quality
Studies on accumulation of functional compounds in fruits and vegetables during storage



Lettuce production under artificial lighting

Biological and Environmental Information Engineering

Biological and Environmental Information Engineering

Remote sensing of biosphere functioning
Analysis and modeling of ecosystems
Analysis of global change effects on ecosystems
Image instrumentation for bio-monitoring
Information engineering for biological and environmental systems

Ecological Safety Studies

Ecological Safety Studies

Detailed mechanisms of trace-gas dynamic exchange
Modeling of GM-rice pollen flow
Microbial interaction in soil ecosystems
Evaluation of soil function in terms of life-cycle assessment of agricultural activities
Prediction of nitrogen load due to future food production in East Asia
Potential productivity of biofuel in East Asia and its environmental effects
Theoretical and empirical study of methods for phylogenetic estimation from DNA and amino-acid sequence data
Geometric morphometrics of biological shapes and statistical analysis of shape variation



Tone Oozeki barrage for irrigation and municipal water supply

Department of Biomaterial Sciences

To better our quality of life, we consume various kinds of raw materials. At present, many of these materials are produced from fossil resources, but excessive consumption is cause for concern because it may significantly influence the environment. The development and introduction of biomaterials more in harmony with the environment is desirable to facilitate replacement of fossil resources. Wood, the most important biomaterial, is both renewable and clean. Promoting its appropriate utilization will help to preserve the environment and is essential for the continued existence of human beings far into the future. In order to constructively promote utilization of biomaterials, we must strive for efficient and complete use of wood and apply acquired knowledge and refined research methods from material sciences to biomaterials other than wood. We are striving to advance science and technology in order to make progress toward this goal.
<http://www.fp.a.u-tokyo.ac.jp/graduate/english/>

Structural Biomaterials Science

Structural Biomaterials Science

Ultrastructure and physicochemical properties of cellulose and chitin
Correlation between structure and biogenetic mechanisms of polysaccharides
Development of nanomaterials from polysaccharides

Material and Housing Sciences

Physics of Biomaterials

Physical and mechanical properties of structural biomaterials
Fracturing mechanism of wood and wooden structures
Degradation simulation of wood
Properties of wood for musical instruments
Timber drying and wood/water relationships
Evaluation of wooden dwelling environments for human comfort
Analysis of strength decreases of wood by biodegradation

Wood-based Materials and Timber Engineering

Dynamic analysis and structural performance of timber construction
Development of new wood-based materials and processing
Environmental impact of wooden housing and recycling of wood resources
Evaluation of wooden dwelling environments for human comfort

Cellulose, Pulp, and Paper Science

Preparation of new bio-based nanomaterials from cellulose and chitin through environmentally friendly processes including TEMPO-mediated oxidation
Efficient surface modification of TEMPO-oxidized cellulose nanofibrils for application in high-tech fields
Self-assembly behavior of bio-nanofibers and their structural characterization in nanocomposite materials

Biomass Chemistry

Forest Chemistry

Total genome and transcriptome analysis of wood-decay fungi
Functional and structural analysis of enzymes related to biomass conversion
Biotechnology for production of fuel and chemical feedstock from cellulosic biomass
Biochemical and genetic analysis of plant cell-wall components and secondary metabolites

Wood Chemistry

Chemical structure, reactivity, and function of plant cell-wall components
Pollution-free pulping and bleaching technology
Biomass utilization by chemical modification of lignin and carbohydrates

Science of Polymeric Materials

Chemical and microbial syntheses of new bio-based polymers
Development of biodegradable polymeric materials
Structure and properties of fibers, films, and nanocomposites
Improvement of adhesives and adhesive performance

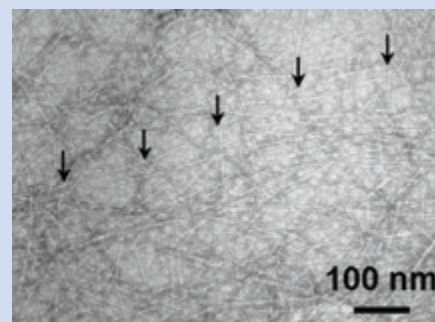
Asian Natural Environmental Science Center*

Sustainable Material Design

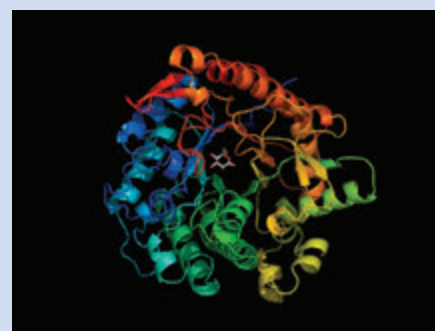
Design of high-performance wood-based materials and timber engineering
Wood biomass flow and the life-cycle analysis of wood biomass products
Influence of habitat environment on tree growth and material quality



Penrose Dome for May Festival using new construction system with wood-based materials



Cellulose nanofibers prepared by TEMPO-mediated oxidation



Three-dimensional structure of β -glucosidase

* Cooperative course. The laboratories and their staff belong to Asian Natural Environmental Science Center.

Department of Global Agricultural Sciences

At the Department of Global Agricultural Sciences (GAS), we are committed to serving the global society with education and research for sustainable ecosystem services such as foods, fibers, and other bioresources. Our programs are issue-oriented rather than technology-oriented and are based on a strong combination of expertise across disciplinary and national boundaries. The associated programs offered by professors from institutions outside the university give further breadth to our education and research.

Students are advised to join an overseas training course organized by GAS in collaboration with universities and institutes in the country. Master's course students are encouraged to take minors in another department to strengthen their expertise in the pertinent discipline. Students will thus become well prepared to navigate the globalizing and ever-changing world. <http://english.ga.a.u-tokyo.ac.jp/>

Global Animal Production Sciences

Global Fishery Science

Biological studies for sustainable fisheries and aquaculture
Economics and social aspects of community-based fisheries
Consumer markets, value chains, and international trade in fishery products

Global Animal Resource Science

The study of human-animal relations
Virus-based recombinant vaccines for animal diseases
Molecular pathology of malaria and leishmaniasis
Host immunity to protozoan parasites
Development of edible vaccines and other mucosal vaccines

Global Plant Production Sciences

Plant Science for Sustainable Agriculture

Impact of atmospheric changes on agriculture and ecosystems
Adaptation of agriculture to changes in climate
Root-system development of cereal plants
Soil conservation in cereal fields

Global Plant Material Science

Techniques for utilization of unused biologically active plant resources
Study on function of plant components in ecosystems
Development of techniques for material performance evaluations for lesser-utilized biomass resources
Development of techniques for effective utilization of biomass resources as wood-based building materials and components

Global Biological and Environmental Sciences

Global Forest Environmental Studies

Policy options for collaborative forest governance based on field realities and CPRs management theory
International comparative analysis on participatory forest-management policy
Forest monitoring using satellite remote sensing
Development of forest environment assessment methods by remote sensing and GIS

Plant Biotechnology

Cellular and molecular analysis of iron-acquisition mechanism in plants
Studies on transporters in plants
Analysis of stress response and molecular genetic breeding of stress-tolerant plants
Genetic improvement of plants for production of valuable chemical substances

International Development and Agro-Environmental Sciences

International Environmental Economics

Effect of global warming on world agriculture and forestry
Food supply and demand in the world interpreted by system modeling
Economic development and environmental problems in developing countries
Historical studies on climate change, agriculture, and population growth in the world

International Agro-Informatics

Development of biodiesel fuel (BDF) production
Monitoring system for agricultural and soil information using IT technology
Engineering developments in the conservation of soil and water
Optimized project scheme and evaluation methods in international development and cooperation
Optimal distribution model for fresh produce in rural Java, Indonesia
Appropriate technology in agricultural and socio-economic development
Conservation and rehabilitation of land and soil in tropical and arid conditions



Boys collecting fish from set net on a coast in Thailand



Rice plants are grown in a free-air ozone exposure facility in eastern China. Surface ozone concentration is rising rapidly and could cause large crop losses across Asia in the near future



Field survey of land conversion to fruit cultivation in Java, Indonesia

Department of Ecosystem Studies

The Department of Ecosystem Studies aims to develop sustainable global management schemes that value ecosystem mechanisms and allow human society and nature to live in harmony. An important feature of this department is a focus on fieldwork, which is conducted in different ecosystems located in forests through to coastal environments. Based on an understanding of the mechanisms and existing problems of focal ecosystems, we aim to both integrate agricultural and life-science-related academic achievements and develop related principles and techniques while educating skilled personnel.

The department has two main divisions, Biological Conservation and Ecosystem Management, and the two associated divisions of Bioresources Management and Bioresources and Eco-Environmental Studies. The Bioresources Management associated division cooperates with the former two divisions in research and education and is composed of six establishments within the Graduate School of Agricultural and Life Sciences.

<http://www.es.a.u-tokyo.ac.jp/english/>

Biological Conservation

Biodiversity Science

Studies on various aspects of biological diversity, both from pure and applied views

- 1) Mechanisms maintaining biodiversity
- 2) Conservation and management of biodiversity

Conservation Ecology

Ecological studies for conservation and restoration of biodiversity and integrated ecosystems
Evolutionary and ecophysiological studies on plant life-histories including vegetative responses to physical environments and floral and seed strategies such as heterostyly and soil seed banks

Ecosystem Management

Landscape Ecology and Planning

Landscape ecological studies on global and regional environments, monitoring of natural environmental changes caused by human impact, and ecological land evaluation and its application to landscape and environmental planning

Forest Ecosystem Studies

Genetic and ecological studies for conservation of forests and surrounding ecosystems
Planning sustainable use of forest resources
Analysis and conservation of tree diversity, forest species interactions, population dynamics of animals and plants, and endangered species conservation

Aquatic Conservation

Effects of environmental changes in coastal habitats on fishes and invertebrates, and coastal habitat conservation
Assessing restored and natural intertidal flats in a damaged embayed system
Production mechanisms in coastal ecosystems analyzed by stable isotope techniques
Life cycle of coastal fishes and invertebrates

Bioresources Management

Agricultural Field Ecology

Ecological Environmental Studies

Aquatic Bioscience

The University of Tokyo Forests

Forest Ecosystem

Forest Functional Biology

Forest and Human Society Relationship

Forest and Water Resources Management

Bioresources and Eco-Environmental Studies

Bioresources and Eco-Environmental Studies

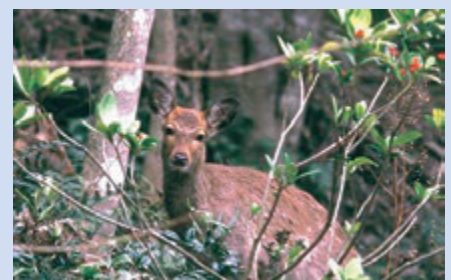
Rural Landscape Ecology



Satoyama, a traditional rural landscape of Japan



Participatory monitoring activity for invasive bumblebee in Hokkaido



Sika deer in a forest on the Boso peninsula

Department of Animal Resource Sciences

The primary aim of our research and education is to maximize the utility of various functions of animals, mainly mammals, by revealing mechanisms underlying diverse and complex life phenomena. To this end, we are attempting to elucidate life phenomena from a variety of perspectives, ranging from molecular biology to ethology. We also aim to improve the productive capability of animals and seek effective ways to preserve valuable genetic resources by applying state-of-the-art biotechnologies that enable elicitation of the potentiality of animals and animal cells. At the same time, we have always placed high priority on fostering the enriched human nature of our students. Graduates from our department now occupy important positions not only in the field of animal resource sciences but also in other fields such as medical and pharmacological sciences. We welcome ambitious students.

http://www.ar.a.u-tokyo.ac.jp/pages/English/E_top.html

Bio-regulatory Systems

Molecular Immunology

Studies on molecular mechanisms in immunity against protozoan infection
Development of diagnostic, therapeutic, and prophylactic technologies for protozoan diseases
Epidemiological studies on visceral leishmaniasis in the Old World

Applied Genetics

Reverse-genetic analyses of mechanisms in mammalian oocyte growth, oocyte maturation, fertilization, and early embryo development
Molecular mechanisms of bi-directional communication between oocytes and surrounding somatic granulosa cells

Cell Regulation

Signal transduction in cell proliferation, differentiation, and carcinogenesis
Molecular mechanisms in regulation of hormone action



DNA microinjection into mouse zygote

Functional Bioscience

Cellular Biochemistry

Studies on molecular mechanisms underlying growth and differentiation of trophoblast lineage
Elucidation of the role of genomic DNA methylation in the epigenetic control of cellular differentiation and mammalian development
Investigation of molecular mechanisms for the maintenance of totipotency and pluripotency
Epigenetic risk assessment of hyperglycemia

Veterinary Ethology

Chemical communication via pheromones in mammalian species
Nature-or-nurture questions for personality formation
Clinical studies in veterinary behavioral medicine

Animal Radiology

Studies on pathophysiological effects of low radiation
Studies on lipid signaling in inflammation (tumor, allergy, and tissue regeneration)



Chimeric mouse placenta produced by injection of GFP-positive TS cells

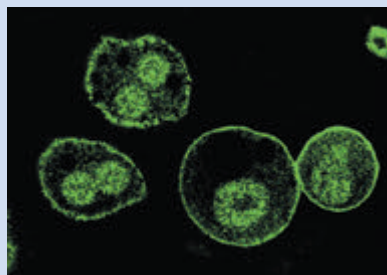
Bio-animal Science *

Animal Life Science and Biotechnology

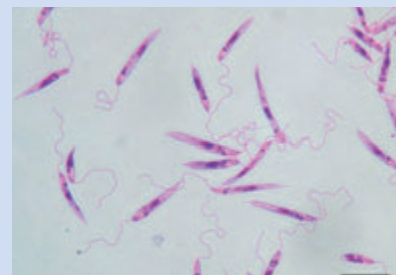
Studies on the molecular mechanism of oocyte selection in mammalian ovaries
Artificial rescue of potential oocytes in the ovaries
Safety and risk assessment of feeds and animal-derived foods
Studies on nutritional effects of amino acids in farm animals



Clinical research on problem behaviors in companion animals



Insulin-dependent activation of Akt associated with plasma membrane



Promastigotes of *Leishmania* parasites (Giemsa stain)

* Cooperative course. The laboratory and its staff belong to the Animal Resource Science Center.

Department of Veterinary Medical Sciences

Veterinary medicine covers wide areas of life sciences, not only medicine for animals but also biology of mammals and higher vertebrates. In the Department of Veterinary Medical Sciences, the most advanced research is being carried out at molecular, cellular, and in vivo levels in order to fully understand vital processes of normal and diseased animals. Veterinary medicine encompasses two aspects of science: basic science to understand the mechanisms underlying biological phenomena, and applied science to satisfy the social demands for maintenance and improvement of human welfare and productivity of domestic animals. This department collaborates with the veterinary medical center located on the Yayoi campus. The center is equipped with the latest and most advanced medical instruments and plays an important role as an advanced veterinary hospital in this area.

<http://www.vm.a.u-tokyo.ac.jp/eng/>

Basic Veterinary Medicine

Animal Breeding

Neuroendocrine mechanisms regulating ovulation and follicular development in female mammals
Pathophysiological mechanisms mediating suppressed gonadal activities under malnutrition
Remodeling of mechanisms associated with pregnancy establishment
Changes in placental structures through mammalian evolution
Development of systems effective in improving reproductive efficiency

Veterinary Anatomy

Molecular and cellular analyses of mammalian gonadogenesis, testiculogenesis, and spermatogenesis
Roles of SOX (Sry-related HMG box) genes in mammalian embryogenesis and organogenesis

Veterinary Physiology

Regulation of reproductive function by the neuroendocrine-immune system
Molecular mechanisms underlying sexual differentiation of the brain
Neuroendocrine control of body growth and metabolism
Regulatory mechanisms involved in growth and regeneration of skeletal muscle

Veterinary Pharmacology

Signal transduction in cells and its modification by drugs
Pharmacological effects of bioactive natural products

Veterinary Microbiology

Studies on mechanisms of persistent infection and reactivation of animal viruses and protozoa
Development of recombinant vaccines for animals

Veterinary Public Health

Control of zoonotic bacterial and viral pathogens in humans, livestock, and foods
Ecology and role of bacteria-harboring in the intestines of humans and animals

Cellular Biochemistry *1

Studies on molecular mechanisms underlying growth and differentiation of cell lineages
Elucidation of the role of genomic DNA methylation in the epigenetic control of cellular differentiation and development
Investigation of molecular mechanisms for the maintenance of totipotency and pluripotency in stem cells, including ES, TS, and EG cells
Risk assessment of endocrine chemical disruptors for mammalian development

Veterinary Ethology *1

Chemical communication via pheromones in mammalian species
Nature-or-nurture questions for personality formation
Clinical studies in veterinary behavior medicine

Molecular Immunology *1

Immunopathological understanding of host-parasite relationship during protozoan diseases
Development of drugs, vaccines, and diagnostics for parasitic diseases
Ecology and biology of sandflies as the vector for Leishmania

Applied Genetics *1

Reverse-genetic analyses of mechanisms in mammalian oocyte growth, oocyte maturation, fertilization, and early embryo development
Molecular mechanisms of bi-directional communication between oocytes and surrounding somatic granulosa cells

Animal Radiology *1

Studies on pathophysiological effects of low radiation
Studies on lipid signaling in inflammation (tumors, allergies, and tissue regeneration)



Scene from a veterinary histological training class

Clinical Veterinary Medicine

Comparative Pathophysiology

Pathophysiology of circulation, respiration, and autonomic nervous system

Veterinary Pathology

Comparative neuropathology
Comparative oncology
Experimental and toxicologic pathology

Veterinary Internal Medicine

Molecular diagnostics of lymphoid and hematopoietic malignancies
Pathogenesis of inflammatory gastrointestinal (GI) and liver diseases
Clinical application of acute phase proteins (APPs)

Veterinary Surgery

Biological and translational research of tumors in small animals
Regenerative therapy in veterinary medicine
Anesthetic, analgesic, and perioperative management in small animals

Biomedical Science

Studies on infectious viral diseases in experimental animals
Establishment and analysis of animal model of diseases

Veterinary Clinical Pathobiology

Diagnosis and pathophysiology of central nervous system disorders
Diagnostic and therapeutic studies on diabetes
Molecular basis of genetic disorders

Infection Control and Disease Prevention

Studies on pathogenesis of slow infection including viral cancer
Studies on pathogen detection methods
Studies on vaccines for controlling infectious diseases

Veterinary Emergency Medicine

Regeneration of bone tissue using artificial bone implants
Development of new treatments for osteoporosis
Biological effects of trehalose

Global Animal Resource Science *2

Veterinary epidemiology, import risk assessment of animals and animal products, and food-safety risk assessment
Vaccinology including mucosal delivery system, edible vaccines, immunogen formulation, and host immunity



Scene of surgery at the Veterinary Medical Center

Bio-Animal Science *3

Animal Life Science and Biotechnology

Safety and risk assessment of animal-derived foods including evaluation of radioactive contamination of livestock and livestock products due to the Fukushima Daiichi nuclear power plant accident
Studies on regulation of microbial infection by sterilization of compost using ultra-high-temperature aerobic bacterial fermentation
Studies on physiological characteristics of ovaries including research on molecular mechanism of oocyte selection in mammalian ovaries
Studies on nutritional effect of amino acids on infantile growth in farm animals

Food Safety and Science *4

Laboratory of Food-borne Pathogenic Microbiology

Genome-wide screening for virulence markers of *Streptococcus suis*
Surveillance of virulent *Streptococcus suis* strains among healthy pigs and retail pork meat in Japan
Functional analysis of genetic regions associated with fimbriation in *Streptococcus suis*
Studies on the virulence mechanisms of *Streptococcus gallolyticus* of avian origin
Development of a rapid detection system for bacterial pathogens associated with food poisoning



Students hearing the disease history from the staff of an elephant farm in Thailand in a practical collaboration with Kasetsart University

Experimental Medicine *5

Laboratory Animal Research Center

Analysis of pathogenicity and species specificity of RNA viruses
Analysis of mechanisms of RNA-virus persistent infection
Development of novel treatments for emerging lethal virus infections
Development of new recombinant vaccines
Development of recombinant viruses as oncolytic virotherapy agents

*1 Cooperative course. The laboratory and its staff belong to the Department of Animal Resource Sciences.
*2 Cooperative course. The laboratory and its staff belong to the Department of Global Agricultural Sciences.
*3 Cooperative course. The laboratory and its staff belong to the Animal Resource Science Center.
*4 Cooperative course. The laboratory and its staff belong to the Research Center for Food Safety.
*5 Cooperative course. The laboratory and its staff belong to the Institute of Medical Science.

Agricultural Bioinformatics Unit

The Agricultural Bioinformatics Unit was established in 2004 with support from MEXT (Ministry of Education, Culture, Sports, Science and Technology) to conduct education and research on bioinformatics for graduate students who are studying agricultural and life sciences. The Unit's educational program includes lectures, practical education, and seminars in foundations, methodologies, and advanced topics of bioinformatics and their agricultural applications. It also supports the research of master's and doctoral students and presents practical education linked directly to each research topic. The unit aims to become a base of cooperation for experimental and computational studies as well as industry–university cooperation. The Agricultural Bioinformatics Unit was renewed in 2009 in order to enhance our activities by building upon past experience and to promote university–industry cooperation and international cooperation. So far (2004–2012 academic years), a total of 854 students have completed the lectures and a total of 150 students have completed this program.

Educational Program

Fundamentals

- Introduction to Biological Sequence Analysis
- Introduction to Genome Informatics
- Introduction to Biostatistics
- Introduction to Structural Bioinformatics

Methodology

- Knowledge Information Processing
- Sequence Statistics and Mathematical Biology
- Molecular Modeling and Simulation
- Omics Analysis
- Functional Genomics
- Introduction to Systems Biology

Advanced Topics

- Special Lectures on Agricultural Bioinformatics I (Bioinformatics Methods)
 - Special Lectures on Agricultural Bioinformatics II (Agri-/Bio-Sensing and Spatial Informatics)
 - Special Lectures on Agricultural Bioinformatics III (Agro-ecosystem and Bioresource Informatics)
 - Special Lectures on Agricultural Bioinformatics IV (Structural Bioinformatics)
- Other special lectures being prepared include Environmental Informatics and Landscape Informatics
- Research Exercises on Agricultural Bioinformatics

Graduate students can obtain credits by attending these lectures and practical education toward professional certification. Besides these lectures and practices, several seminars and a symposium are held every year.



Scene during a lecture at the Unit



Educational computer system
(high-performance cluster server)



Certification graduation ceremony

AGRI-COCOON

AGRI-COCOON (**AG**ricultural **R**esearch **I**ncubator **CO**mmunity for **CO**operative **N**etwork of Public, Administrative, Business, and Academic Sectors) is a research and educational community established in 2005 at the Graduate School of Agricultural and Life Sciences, the University of Tokyo. The principal mission of AGRI-COCOON is to develop and implement multidisciplinary programs for graduate students. The programs are designed to enable them to conduct original, highly creative, and self-directed research projects by enhancing their skills in:

- Information collection
- Problem assessment
- Academic communication
- Knowledge building
- Knowledge integration

AGRI-COCOON also contributes to further advancement and enrichment of the Graduate School through collaborative interactions among academia, business, government, and private institutions. We welcome graduate students of all majors and departments to our unique multidisciplinary workshops and seminars and have partly opened up academic courses to undergraduate students since 2011.

By building agro-science knowledge and developing a new agricultural research–education protocol, AGRI-COCOON aims at systemization of mutual understanding and communications among academics, industries, government, and private individuals/organizations related to agricultural sciences.

Throughout the academic year, AGRI-COCOON hosts many international symposiums and seminars that are open to all students and the general public off campus. International students are especially welcomed to the unique Agro-Science Circle of Friends event series.

Academic Curriculum

Food Safety Seminar Series I (for graduate students)

Advanced Studies of Food Safety (for undergraduate students)

Multidisciplinary lectures on food safety with leading topics in economics, veterinary science, and chemistry

Food Safety Seminar Series II (for graduate students)

Seminar on Food Safety System (for undergraduate students)

Discussions with guest lecturers, one-day study trips to factories, testing centers, and/or research institutes

Food Safety Seminar Series III

Internship programs on food safety policy at government organizations

Seminar for Global Agriculture and Culture

Intensive lectures on natural and socio-economic environments in developing countries

Practices in Global Agriculture and Culture

Practical training at Japanese farming sites and field trips to developing countries

Topics in Biomass Utilization Research I/II

Monthly seminars of UT Faculty members with guest lecturers on leading topics in biomass utilization

Biomass Utilization Research Seminar I/II

Fieldwork at biomass utilization sites in Japan

Biodiversity and Agriculture

Discussions and fieldwork toward biodiversity of agricultural sites with local citizens, organizations, and researchers

Training in Nature-Restoration Operational Monitoring

Monitoring research of nature-restoration project sites in Japan

Agro-Informatics Seminar

Field trips to food production, distribution, processing, and consumption sites and dialogue with people in the field

Influence of Radioactive Substances in Agriculture (for graduate students)

Influence of Radioactive Substances in Agriculture and the Environment (for undergraduate students)

Multidisciplinary lectures on the problems of radioactive substances attributable to the nuclear accident in Fukushima

Influence of Radioactive Substances in Forest Ecosystems (for graduate students)

Practical training to monitor and analyze radioactive substances in forest ecosystems



International symposium



Practices in Global Agriculture and Culture Seminar: field trip to Laos



Food Safety Seminar: field training at an independent research institute



Agro-Science Circle of Friends

Affiliated Institutions

Institute for Sustainable Agro-ecosystem Services

The Institute for Sustainable Agro-ecosystem Services (ISAS) was founded on April 1, 2010, by integrating the University's Field Production Science Center (University Farm) and the Experimental Station for Landscape Plants. The Institute is also affiliated with the University of Tokyo Tanashi Forest for education and research in forest sciences.

With the integration of these research facilities, the Institute aims to conduct research for sustainable provision of foods, forest products, and other ecosystem services. Our scope also entails robustness and resilience of ecosystem services against natural disasters and human perturbations. The research toward these goals is done by three groups: the Information and Social Science Group, the Agricultural and Forest Ecology Group, and the Agricultural Biology and Biogeochemistry Group. The members of the research groups have diverse academic backgrounds but work together across disciplines toward common aims. They also collaborate with scientists outside ISAS, especially those at the Graduate School of Agricultural and Life Sciences, the University of Tokyo, to utilize their expertise to achieve the research aims.

The ISAS campus is located in Nishitokyo City and has a total area of 31 ha covering upland fields, rice paddies, forests, greenhouses, and other research and education facilities. For more details, you may visit our website (<http://www.isas.a.u-tokyo.ac.jp/index-e.html>) or even better, visit our campus personally!



Transplanting rice seedlings by hand in a field class for undergraduate students



Learning how to transplant tomato seedlings in a field class



A lotus flower in bloom in the early morning



Trees make shade in a university forest

The University of Tokyo Forests

The University of Tokyo Forests (UTF) was established for research and educational purposes in the field of forestry and forest science. The UTF has seven branches in a wide variety of vegetation localities. The total forest area is approximately 32,300 ha.

Executive Office (EO): The Executive Office located on the Yayoi campus was established to coordinate the various activities of the seven branch forests and the Education and Research Center. The role of the office is to coordinate educational, research, public, personnel, financial, and international affairs as well as to promote cooperation between the branches and other organizations.

The University of Tokyo Chiba Forest (UTCBF): The University of Tokyo Chiba Forest was established in the southern corner of the Boso Peninsula in 1894 as the first university forest in Japan. The forest has an area of 2,226 ha and is located in the warm-temperate forest zone. The area is covered with various types of trees, which include *Cryptomeria*, *Chamaecyparis*, *Abies*, *Tsuga*, and broad-leaved evergreen trees.

The University of Tokyo Hokkaido Forest (UTHF): The University of Tokyo Hokkaido Forest, which has an area of 22,715 ha and is located in central Hokkaido, is dominated by boreal coniferous trees mixed with broad-leaved deciduous trees.

The University of Tokyo Chichibu Forest (UTCF): The University of Tokyo Chichibu Forest has an area of 5,812 ha and is located in Chichibu-Tama-Kai National Park. It is in the cool-temperate zone with mountainous terrain. The vast majority of the UTCF (>85% of the total area) is covered with natural forest. The major tree species are *Abies firma*, *Tsuga sieboldii*, *Fagus japonica*, and *Fagus crenata*. Of the 26 *Acer* species in Japan, 19 are found in the UTCF.

The University of Tokyo Tanashi Forest (UTTFF): The University of Tokyo Tanashi Forest is the nearest university forest to the University of Tokyo campus and is approximately 9 ha in area.

Ecohydrology Research Institute (ERI): Ecohydrology is an interdisciplinary field studying the interactions between forest and water, and their ecosystem services. The ERI manages the Akazu Research Forest (ARF, 745 ha), the Inuyama Research Forest (IRF, 443 ha), and the Ananomiya Experimental Forest (AEF, 77 ha) for various field researches and educations.

Forest Therapy Research Institute (FTRI): The Forest Therapy Research Institute is 41 ha in area and located on the eastern slope of Mt. Fuji. The area lies between the cool-temperate and sub-frigid forest zones.

Arboriculture Research Institute (ARI): The Arboriculture Research Institute is 247 ha in area and located at the southern tip of the Izu Peninsula. It is a typical warm-temperate forest covered with evergreen tree species. We have conducted field adaptation tests over several decades to select locally adaptable *Eucalyptus* species. Further screening of candidate species is planned to identify better species in terms of tree growth.

Education and Research Center (ERC): The Education and Research Center is located on the Yayoi campus of the Graduate School of Agricultural and Life Sciences, the University of Tokyo. Students who belong to the UTF study and conduct research at ERC.



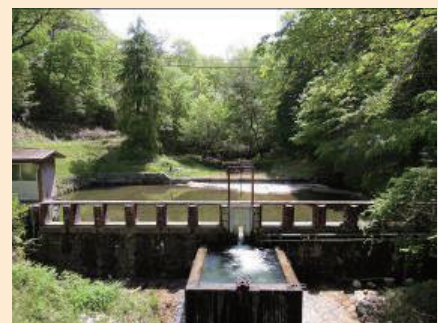
Seasonal transitions of forest scenery, the University of Tokyo Chichibu Forest



Field education for students, the University of Tokyo Hokkaido Forest



Forest classroom, the University of Tokyo Tanashi Forest



Shirasaka experimental watershed, Ecohydrology Research Institute

Animal Resource Science Center

The Center, which was established in 1949 as a livestock farm for teaching undergraduate and graduate students, is located in Kasama, 90 km north of the main campus. Three professors (of veterinary physiology, animal breeding, and animal resource sciences), two assistant professors (of animal nutrition and veterinary public health), nine technical assistants including two veterinarians and staff with doctoral and master's degrees, two management staff, and four part-time assistants support teaching and research for veterinary medicine, animal life sciences, and animal biotechnology. Some graduate students, who belong to the research unit of animal resource sciences, investigate frontline topics in animal biotechnology.

The Center provides education in the form of nine practical trainings, four seminars, and eight courses for undergraduate students and two practical trainings, two seminars, and seven courses for graduate students. In addition, many practical seminars on animal life sciences are offered for pupils of kindergartens, elementary schools, and junior high schools, and for the general public. The Center also serves as a social educational center for assessing animal food safety.

There are more than 50 pigs and 20 horses including Criollo horses, a gift from La Plata University, Argentina, which are employed in animal therapy. Dairy cattle, beef cattle, and native Japanese Shiba goats bred at the Center are used as experimental animals for studies on ruminants. These farm animals are supplied to many research institutes as experimental animals for veterinary medicine, animal sciences, and medical fields.

Recent research areas of the Center are as follows: (1) evaluation of radioactive contamination of livestock and livestock products due to the Fukushima Daiichi nuclear power plant accident and developmental research for animal husbandry reconstruction; (2) fundamental physiology of mammalian embryos and reproductive organs; molecular studies on the mechanism of programmed cell death and apoptosis in mammalian ovaries, follicular granulosa cells, oocytes, and luteal cells; (3) studies on the nutritional effect of amino acids on infantile growth and prevention of mastitis gastric ulcer in farm animals; (4) physiological properties of prion gene homo-knockout cattle, which were produced by genetic manipulation and reproductive biotechnological techniques; (5) studies on ultra-high temperature (more than 110°C) fermentation for sterilizing disposal of livestock excretion using aerobic bacterial flora.



Radioactive contamination of livestock (piglets) and livestock products (cow's milk) due to the Fukushima Daiichi nuclear power plant accident were assessed



Practical exercises for animal resource science performed

Veterinary Medical Center

The Veterinary Medical Center (VMC: formerly the Veterinary Hospital) was established in 1880 and engages in education and research on clinical veterinary medicine. VMC is a 4-story, 3,000-m² building and is equipped with advanced diagnostic imaging systems, such as those for color Doppler ultrasonography, endoscopy/arthroscopy, computed tomography (CT), and magnetic resonance imaging (MRI). Approximately 12,000 animal patients are referred to VMC every year to receive advanced and high-level clinical services.

VMC plays an important role in educating undergraduate students. They receive practical clinical education via the academic staff of VMC as well as bedside education through clinical rotations. In addition, graduate students carry out researches at the clinical laboratories they belong to, utilizing information on diseases specialized to their fields. Current research projects at VMC include neoplastic diseases, various immune-mediated diseases, neurological diseases, hereditary diseases, anesthesia/analgesia, and orthopedic diseases. Recently, collaborative researches with medical schools/medical hospitals, companies, and/or other institutions have been conducted, which may lead to novel techniques and drugs useful for both human and veterinary medicine. These translational researches should be one of the important roles of VMC.

Furthermore, VMC accepts 10 to 15 newly licensed veterinarians for clinical training every year. They work as residents/hospital staff in the clinical services of VMC to obtain advanced knowledge and techniques in small animal practices.

These activities of VMC are designed to satisfy the social demands for maintenance and improvement of human welfare and fulfill requirements for education and research in veterinary medicine.



The Veterinary Medical Center building



Students and residents observing a surgery



MRI is used mainly for diagnosis of neurological diseases

Fisheries Laboratory (Aquatic Bioscience Research Center)

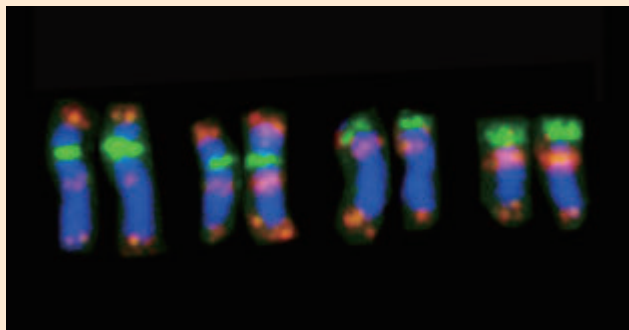
The Fisheries Laboratory lies on the shore of Hamana Bay, which is an example of a Japanese coastal lagoon system. The Laboratory is well situated for research and education regarding the genetics, physiology, development, and ecology of marine organisms. The facility can supply seawater as well as fresh water to more than 100 tanks and ponds of various sizes, ranging from 1 to 100 m³. Moreover, state-of-the-art instruments for use in genomics, genetics, imaging, cell biology, and biochemistry enable researchers to study marine organisms at the molecular level. Currently, as part of our main research focus, we are investigating the genetic basis of phenotypic evolution of aquatic animals in order to help make fisheries and aquaculture sustainable. In the past few years, we have been making a strong effort to understand the genetic and immunological aspects of the fugu or pufferfish, the genome of which was the second vertebrate genome to be sequenced. The Fisheries Laboratory accepts both undergraduate and postgraduate students, including those from overseas.



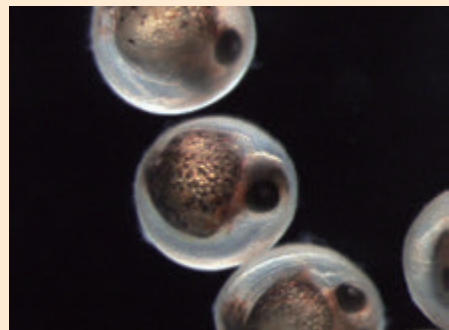
Practical training for undergraduate students



Fieldwork in Lake Hamana on the *Seriola*



Fugu chromosomes



Fugu embryos

Radioisotope Center

The Radioisotope (RI) Center in the Graduate School of Agricultural and Life Sciences was established in 2004. The use of isotope tracers in agricultural study started as early as the 1950s, mainly in the fields of plant nutrition and fisheries. With recent and rapid developments in genetic engineering, most isotope experiments are now focused on labeling of DNA or RNA. Besides genetic engineering, isotope labeling of chemicals or cells are also performed. Since there are many advantages to using radioisotopes for researches, the laboratories using isotopes are widespread among almost all of the departments in the Graduate School. About 300 people register to use isotopes each year and most of them are graduate students, senior researchers, and academic staff.

The Center houses an administrative office. Following strict regulations in Japan, the administrative office provides a radiation safety program for each user, and everyone using an isotope must be registered. All users are required to attend two kinds of lectures, which are provided by the University of Tokyo and the Graduate School of Agricultural and Life Sciences. Health checks and radiation exposure monitoring are also performed for each user. Every user must have an ID to enter the facility, and administrative records are kept. There are two members of the academic staff at the Center who, through their research and training, can advise researchers on how to use radioisotopes and provide new information about the application of radiation and radioisotopes.



Entrance to the Radioisotope Center



Radioactivity measuring room



Radioactivity inspection room



Experimental room

Technology Advancement Center

The Technology Advancement Center was established to retain talented technical staff and promote their skills to support research and education.

Main facilities

Biotron

As environmental conditions in agricultural field experiments are frequently affected by natural climate conditions, the accuracy and reproducibility of experimental data are occasionally limited. Such problems can be resolved to a certain extent by the use of the Biotron facility, where environmental conditions are kept constant and controlled year-round and different conditions can be set at the same time for comparative experiments. Laboratory animals, insects, and aquatic organisms as well as plants can be bred in our Biotron. The conditions of each room of the Biotron facility are as follows:

Bldg. No. 6
Chamber (for insects) 20-35°C
Rooms G1-G4 (natural light) 20-30°C
M (machine room)

Bldg. No. 7 (A) rooftop
Room G1 (natural light) D30-N25°C
G2 (natural light) 20°C (constant)
G3 (natural light) D25-N20°C
M1 (machine room)
M2 (for managing)

Bldg. No. 7 (B) rooftop
Rooms G1-G3 (natural light) 20-35°C
M1 (machine room)
M2 (for managing)

Life Sciences Research Bldg.
Rooms G1-G3 (natural light) 20-35°C



Panoramic view of the Biotron

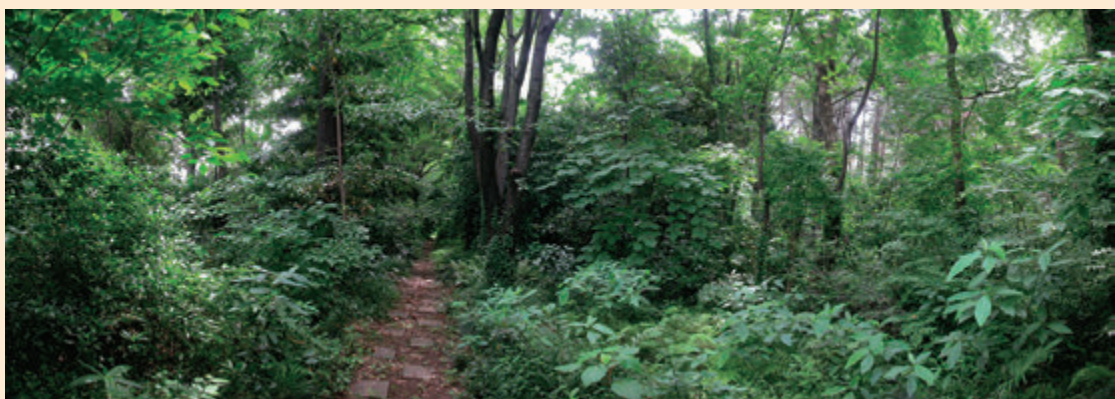


Phytotron

Koishikawa Arboretum

Koishikawa Arboretum occupies about 0.6 ha of the northwest part of the Koishikawa Botanical Gardens, which belongs to the Graduate School of Science, the University of Tokyo. As an experimental nursery, since 1909 the Arboretum has provided plant materials for research on physiology, pathology, genetics, and breeding of plants.

A rhizotron constructed in 2003 has provided valuable facilities for researchers and students studying symbiotic relationships between trees and fungi.



View of Koishikawa Arboretum

Research Center for Food Safety

The Research Center for Food Safety was established in November 2006 to meet the expectations and desire for the development of science and technology for food safety. The Center aims to conduct comprehensive research on food safety and dissemination of scientific information through close collaboration with national and international organizations. The Center is devoted not only to research activities but also to the provision of scientific information to the public, government, and private sectors. The Center also aims to develop leaders with high levels of knowledge and skills by training students, researchers, and government officials from Asian and other countries.

The Center is composed of four divisions, and representative research activities are as follows:

Division of Radiological Sciences:

- Analysis of radioactive substances in foods
- Biological effects of radioactivity, including those on the genome and epigenome

Division of Risk Assessment Science:

- Risk assessment and control of *Streptococcus* spp.
- Risk assessment and control of BSE and other prion diseases threatening food safety
- Behavior and control of pathogenic bacteria in foods
- Prevention of health problems caused by food contaminants
- Pathological, toxicological, and pathophysiological studies of the mechanisms of health problems caused by food contaminants
- Development of experimental animals and cellular systems useful for risk assessment of food contaminants and animal-derived pathogens
- Development of analytical methods for food contaminants

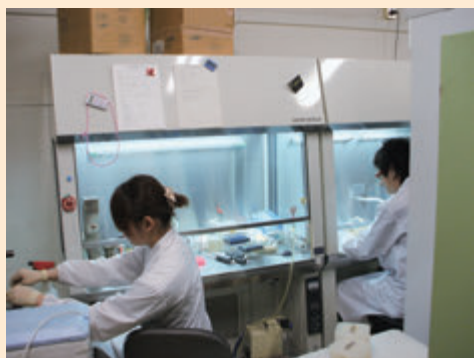
Division of Risk Control Science:

- Control of intestinal immune response and food allergies
- Maintenance and improvement of healthy livestock to provide safe foods
- Development of functional foods and low-risk foods

Division of Information Science and Economics:

- Policy decisions and economics relating to food safety
- Risk perception and risk communication relating to food safety
- Training and education of researchers, administrators, and other professionals in the field of food safety

These research activities of the Center are expected to promote the development of innovative science and technology for the advancement of food safety and contribute to the growth of experts capable of dealing with food safety issues based on the most current knowledge in these fields.



Experiments using cultured cells at the Laboratory of Immune Regulation



Training course for risk assessment of agricultural chemicals in foods



Analytical experiments at the Laboratory of Food Functionality Science

University Library for Agricultural and Life Sciences

The Faculty has its own library, which was established in 1965 with donations from alumni and the aid of the Rockefeller Foundation. Former libraries of the various departments were then consolidated into one library. The Library contains 400,000 volumes of books and periodicals dealing with agricultural and other natural sciences. Currently, the Library subscribes to about 2,900 titles of periodicals.

In 1977, the Library was designated by the Ministry of Education, Science and Culture (currently the Ministry of Education, Culture, Sports, Science and Technology) as the central library for foreign agricultural periodicals and functions as such by collecting foreign periodicals that are difficult to find in Japan and providing services to affiliates of other institutions.

In July 2009, the main building was reopened after seismic retrofitting.



Browsing Corner (2nd floor)



Main building



PC Room (3rd floor)



Reference Corner (1st floor)

Overseas Research Units

Center for Biodiversity and Ecosystem Restoration in Mongolia

In response to threats posed by declining biodiversity from climate change and desertification, the Center for Biodiversity and Ecosystem Restoration in Mongolia was established at the Mongolian State University of Agriculture in 2003 as part of the Biodiversity and Ecosystem Restoration Research Project, a 21st Century COE Program headed by Professor Izumi Washitani of the Graduate School of Agricultural and Life Sciences, the University of Tokyo. Our collaborative research has continued even after the five-year program finished, and it was handed over to the Asian Conservation Ecology as a Basis of Symbiotic Society, a Global COE Program, in 2008.

Mongolia has a harsh continental climate with high annual and diurnal temperature fluctuations and low intermittent rainfall, which makes the ecosystem in the region very sensitive to climate change and anthropogenic disturbances. Moreover, political transition at the beginning of the 1990s in Mongolia, followed by livestock privatization and declines in infrastructure, caused a rapid increase in and concentration of livestock, which has resulted in land degradation. The missions of the Center are to understand such vulnerable arid ecosystems in relation to human activities, to effectively conserve grassland ecosystems, and to provide appropriate pasture management strategies to sustain ecosystem functions for future generations by taking the initiative in international and interdisciplinary research through exchanges of researchers, lecturers, and students, collaborative researches, and holding lectures and symposiums.



Mongolian and Japanese students attending to a joint field campaign in semi-desert grassland



Local professors, researchers, and staff in the Center

Asian Natural Environmental Science Center

Established in 1995, the Asian Natural Environmental Science Center (ANESC) is a research center open to University of Tokyo scholars. The major aim of the ANESC is to establish sustainable management systems for bioresources through conservation of regional and global environments. This aim is achieved by assessment of land use and biomass production in the environment, encompassing land and coast, and by development of cultivation processes for biomass adapted to natural conditions. In addition, effective utilization of unused biomass, sustainable tourism making full use of the natural environment, and methods for energy-efficient cultivation of biomass using symbiotic fungi and plant varieties tolerant to environmental stress and disease are investigated at the ANESC.

In addition to basic laboratory studies, members of the ANESC engage in international cooperative researches with scientists of academic and/or governmental institutes in Asian countries, such as Cambodia, China, India, Indonesia, Malaysia, the Philippines, Thailand, and Vietnam. The research sites are set in tropical forests, desertified areas, tropical peatlands, degraded lands, and coastal areas in these countries.

The environment and living organisms maintain a close relationship with the earth. Biological production depends on the environment, which in turn is conserved by living organisms. This relationship should be studied to prevent further deterioration of the regional and global environments and to achieve sustainable production of biomass.

We investigate existing relationships and work toward restoration of the environments to provide sound ecosystems and sustainable biomass production. Basic and practical knowledge and techniques developed in our projects are aimed at contributing not only to conservation and restoration of the global environment, but also to improvement of our quality of life and the economies of local communities.

The ANESC has two research divisions with the following aims:

Division of Bio-Environmental Assessment aims:

- (1) Establishment of management systems for sustainable bioresources with conservation of regional and global environments based on investigation of land use and soil fertility of the region
- (2) Evaluation of regional resources for nature conservation and agricultural productivity, and development of sustainable regional systems using these resources

Division of Biological Resources Development aims:

- (1) Development of low-input technologies for environmental reforestation and sustainable forest management using the physiological activity of trees and symbiotic functions
- (2) Investigation of tolerance mechanisms of plants to extreme environments and disease, and development of plant varieties tolerant to environmental stress and disease



Planting trial for environmental reforestation in acid sulfate soils (Thailand)

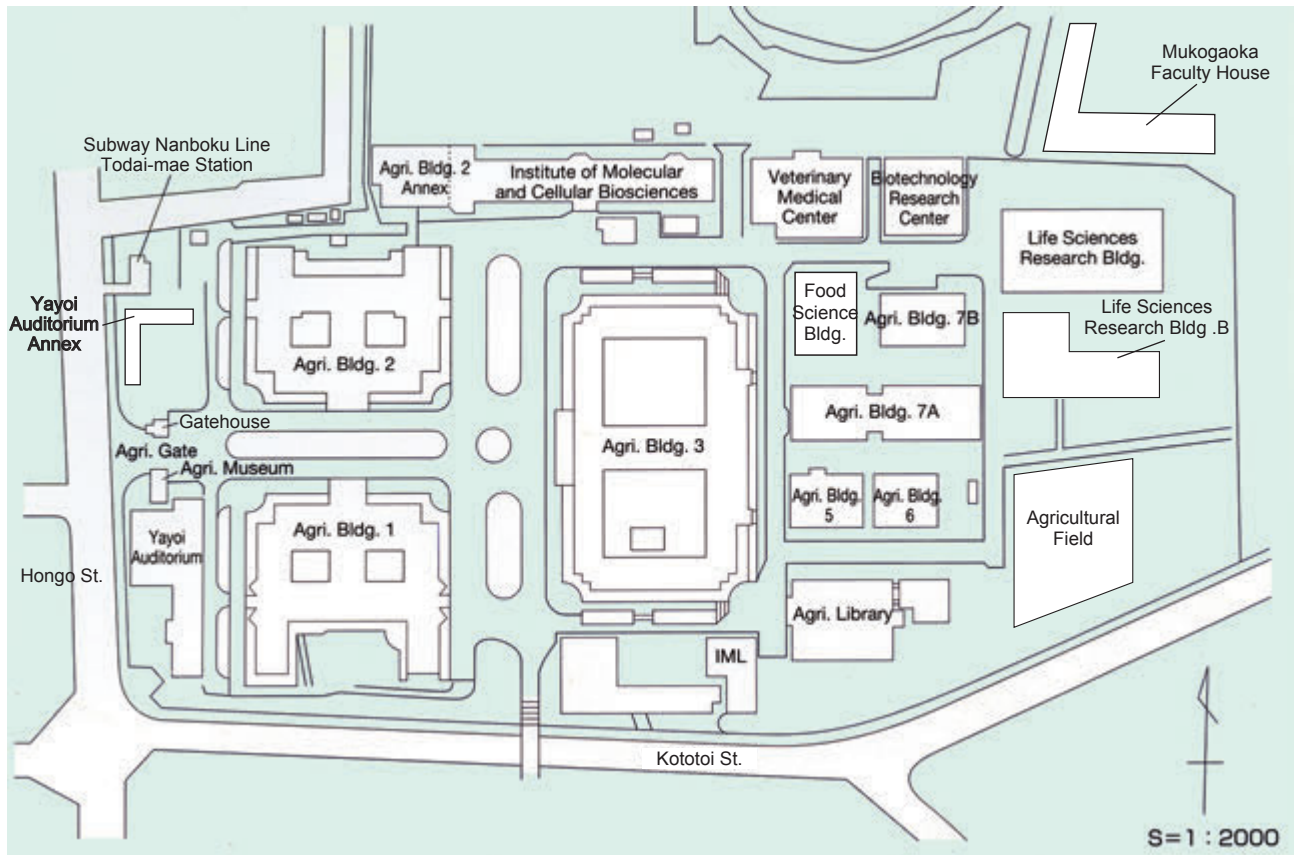


Transplanting of traditional and improved rice varieties for a participatory experiment in Cambodia



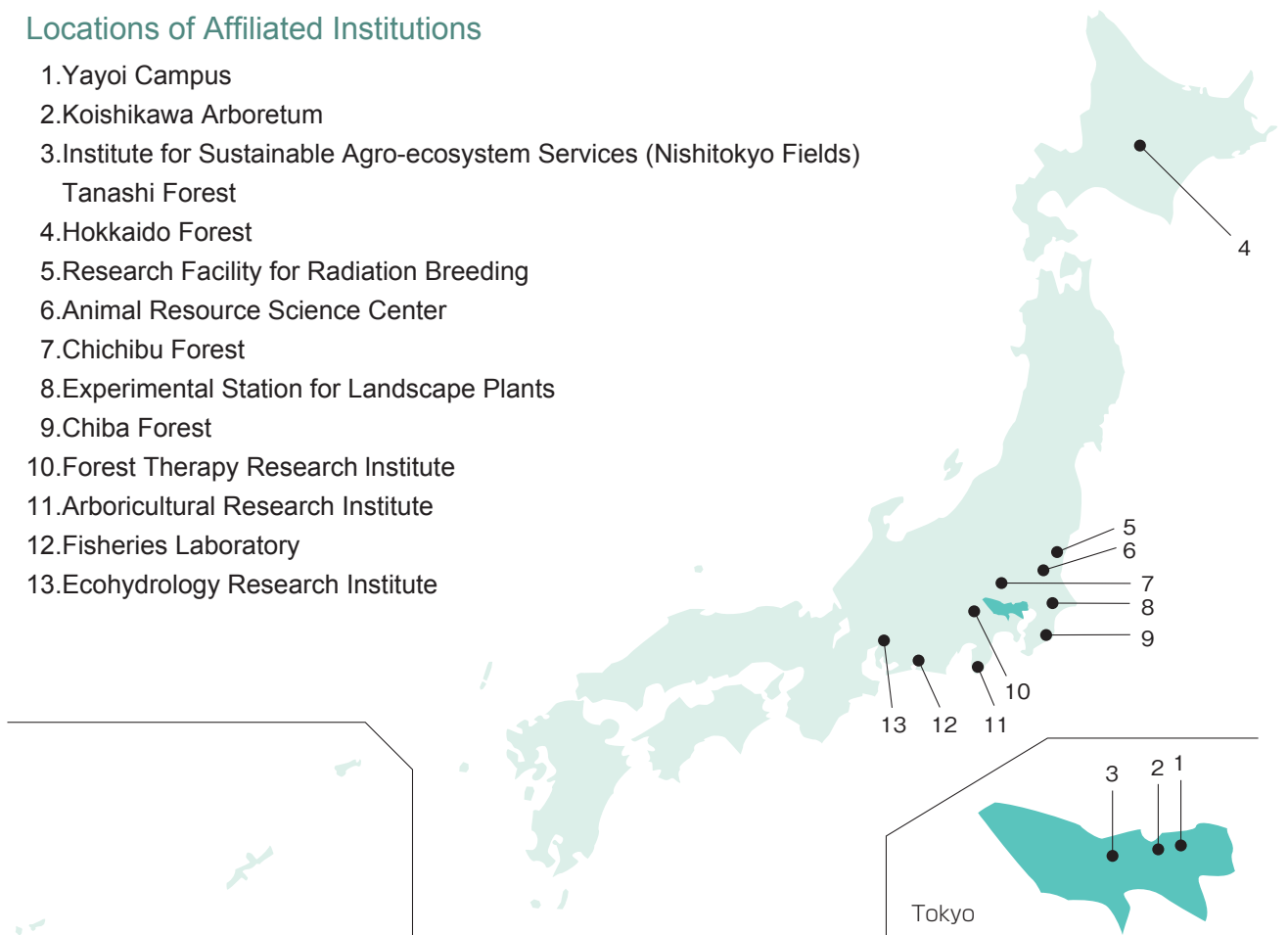
Alkaline soil area in northeast China, where desertification is in progress

MAP OF THE YAYOI CAMPUS



Locations of Affiliated Institutions

1. Yayoi Campus
2. Koishikawa Arboretum
3. Institute for Sustainable Agro-ecosystem Services (Nishitokyo Fields)
Tanashi Forest
4. Hokkaido Forest
5. Research Facility for Radiation Breeding
6. Animal Resource Science Center
7. Chichibu Forest
8. Experimental Station for Landscape Plants
9. Chiba Forest
10. Forest Therapy Research Institute
11. Arboricultural Research Institute
12. Fisheries Laboratory
13. Ecohydrology Research Institute





1-1-1 Yayoi, Bunkyo-ku, Tokyo 113-8657
phone +81-3-5841-5485
HP <http://www.a.u-tokyo.ac.jp/english/index.html>