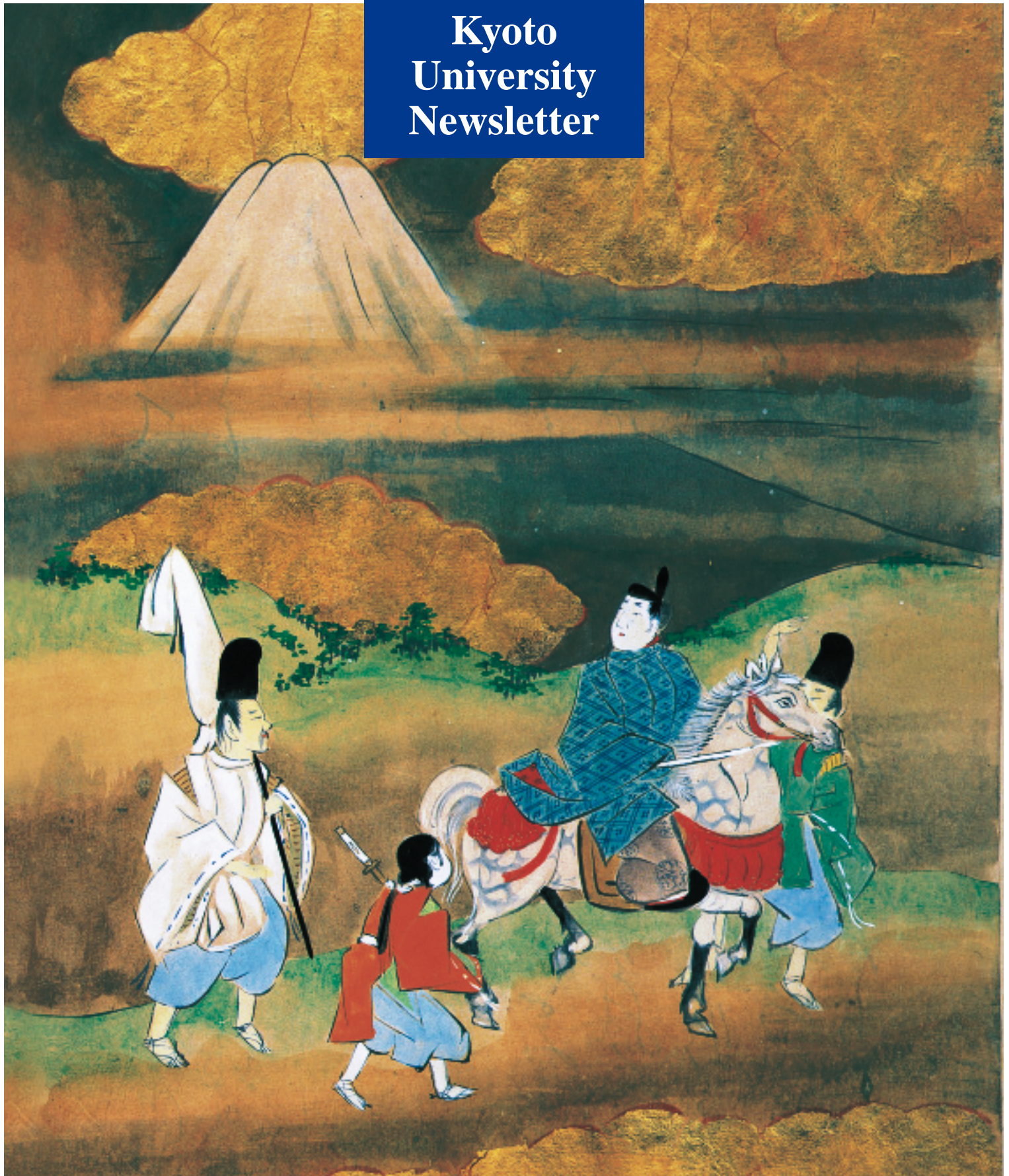


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楽友
Raku-Yu

Kyoto
University
Newsletter



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Editor's notes

At Kyoto University, we promote creative research and self-education in an academic culture supportive of academic freedom and an open and stimulating atmosphere. While a mentality that prizes freedom fosters creative and independent-minded talent, it also creates an aspect of permissiveness and therefore demands a university's involvement in order to fulfill its educational responsibilities. The incorporation of Japan's national universities in April 2004 was accompanied by significant changes to the research and educational system. Prior to that, Kyoto University established our basic policy for the 21st century that emphasizes harmony and dialogue with local communities. We are also engaged in the establishment of a new research and educational system while simultaneously maintaining our "free academic culture". In this issue, we will try to reflect on the current state of our research and educational activities from various perspectives while taking note of these changes.

Jyuichi Itani, Senior Editor, The Editorial Committee of *Raku-Yu*

Illustrated Books: *Ise Monogatari (Tales of Ise)*

Paper with illustrations in color, manuscript, 2 volumes, author and publisher unknown, 28.0 × 23.3cm

The *Ise Monogatari*, completed in the early Heian Period (the first part of the 10th century), is one of the most beloved works of Japanese classical literature and a cornerstone of Japanese culture, one that is repeatedly quoted as a motif in a wide range of genres besides literature, such as art and theater. It consists of 125 *Utamonogatari* (poetic tales), a small collection of *waka* (traditional Japanese short poems) and their related episodes, which are said to have been modeled on the life of Narihira Ariwara (825-880), a nobleman celebrated as the greatest male poet in his age. Most of the *Utamonogatari* deal with romances between young men and women, but section 9, entitled *Azuma Kudari* (Eastward Bound) and featured on this issue's cover, has been famous since the classical period for its depiction of the heart of someone traveling away from home.

The painting on the cover is a scene of Narihira's party, having left Kyoto with heavy hearts in search of safe refuge in the East, as they looked upon the majestic Mt. Fuji in Suruga (modern-day Shizuoka prefecture). Narihira looked up at the mountain from his horse and set his deep feelings down in a *waka*: "Fuji, the mountain that forgets its seasons. What time does it think it is? Though summer, snow covers the ground in spots." He describes Mt. Fuji, with its piled-up snow even in summer, in a somewhat critical tone as "the mountain that forgets its seasons". These words are suffused with a distinct feeling of homesickness for the gentle turning of the seasons in Kyoto's mountains which Narihira had grown to love. As a symbol of Japan, Mt. Fuji's shape and size is known to us all. In this poem, however, its dignity is expressed as "twenty Mt. Hieis stacked on top of one another". Twelve hundred years ago when Kyoto was the capital, Mt. Hiei guarded the city and might have embodied the image of the "sacred mountain" more so than Mt. Fuji. (Please refer to the picture of Mt. Hiei on the back cover of this issue.)

The image of the sacred mountain represented by Mt. Fuji and Mt. Hiei transcends space and time as one of the scenes of the Japanese people's collective imagination. The sense of faith that pulls us to sacred mountains certainly lives on today in a deep place in our everyday lives.



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A Note on Order of Names

As a general rule, names appearing in *Raku-Yu* are written in given name/family name order.



This name was taken from the assembly hall called "Raku-Yu Kaikan" that commemorated the 25th anniversary of the founding of Kyoto University.

Hirohisa Higashiyama Born in Osaka in 1942. Prof. Higashiyama graduated from the Kyoto University Faculty of Education in 1965. He earned his master's degree in 1967, and his Ph.D in 1973 both at Kyoto University. In 1975 he became an associate professor at Osaka Kyoiku University, and a full professor in 1987. In 1997 he became a professor at the Kyoto University Graduate School of Education. In December 2003, he was appointed Vice-President of Kyoto University, and Director of Education and Student Affairs in April 2004.

A specialist in clinical psychology, Prof. Higashiyama knows from extensive experience in patient counseling just how hard it is to make analyses and evaluations. Counseling, being the use of one psyche to treat another, demands maintaining an ongoing dialogue with the patient, while also remaining constantly aware that the therapist and the patient are not the same. In these times when Kyoto University has become a National University Corporation, and evaluation, whether internal or external, has increasingly come to mean "numerical value," the fact that Prof. Higashiyama puts the utmost faith in "the power of the human spirit" both puts people at ease and gives them courage.



What Characterizes a Kyoto University Education?

As Vice-President and Director in Charge of Education and Student Affairs, my work encompasses all aspects of academic life at Kyoto University, insofar as students are concerned. This role includes, but is not limited to, partnerships with high schools, open campus days, entrance exams, admission and orientation, guidance—especially regarding waiving tuition fees, scholarships, dormitories, off-campus housing, and student insurance-curricula, counseling, employment assistance, graduation, and awarding of degrees. And the important thing in all of this is that our educational programs are focused on our students.

In the writings of Mencius, there is the following: "君子有三樂。父母俱存、兄弟無故、一樂也。仰不愧於天、俯不忤於人、二樂也。得天下英才、而教育之、三樂也" An English translation of which is : "The superior man has three things in which he delights, and to be ruler over the Kingdom is not one of them. That his father and mother are both alive, and that the condition of his brothers affords no cause for anxiety; - this is one delight. That, when looking up, he has no occasion for shame before Heaven, and, below, he has no occasion to blush before men; - this is a second delight. That he can get from the whole kingdom the most talented individuals, and teach and nourish them; - this is the third delight" (Reproduced from "The Chinese Classics - Volume II The works of Mencius", James Legge, Hong Kong University Press, 1960) Great minds from all over are gathered together at Kyoto University, and it is the great pleasure of our faculty to educate them.

Han Yu wrote, "千里馬常有、而伯樂不常有". Persons of talent may abound, but one is hard-pressed to find persons capable of teaching them. Though one may attract persons of talent, the hard part is being a sufficiently good judge of character to be able to educate them.

And if there is one thing that the faculty of Kyoto University have learned from experience about being a good judge of character, it is this: do not teach.

Now, I know it sounds drastic to say, do not teach at a place of education. Rest assured, however, that this is not an attempt to abdicate responsibility.

You are probably wondering, why, then, do Kyoto University faculty not teach? Do they focus solely on research, because they don't like to teach? And yes, there may well be some faculty

members who feel that way, now that you mention it. We humans have this habit, however, of wanting to tell people what we know. Can you keep from telling people things that only you know? Do you not feel the temptation to pass your knowledge on? Such feelings are especially strong for educators, given that telling people things is considered the heart of what they do.

That being the case, why, then, do we say that Kyoto University's professors do not teach? Because teaching someone more talented than oneself ruins that very talent. Professors cannot teach students what they themselves do not know. They can only teach at their own level. Therefore, students cannot rise beyond the level of their professors. Top students frequently quarrel with their mentors, postulating ideas at odds with their mentors' theories, who throw them out as a consequence. The reason being that the student is superior to his mentor.

Advances in scholarship, however, are born of unprecedented ideas that supersede established wisdom. Persons of talent chafe at conventional ways of living and doing things, because conventional thinking confines one to operating within the bounds of such established wisdom. Those of Sigmund Freud's disciples who later founded their own schools of thought all fell out with their mentor, while those who remained faithful to their mentor's teachings have gone unremembered. And the reason for this is that, if we want to read Freud's ideas and teachings, we need only study Freud's own writings, rather than those of his warmed-over disciples. It is precisely those who went beyond what Freud taught that we should learn from, in fact. Technique is learned by imitation, whereas ideas represent innovation.

The members of the faculty of Kyoto University are characterized by taking on successors whose ability exceeds their own. In this way, they perpetuate this very tradition. It is not so very difficult to respect an instructor, supervisor, or upperclassman whose ability exceeds one's own. The reverse, however, is not true: it is no simple thing to respect a pupil or underclassman whose ability exceeds one's own. Better to make such a person one's successor, which is what we do at Kyoto University. And we will continue to make advances in research and scholarship so long as we maintain this particular tradition.

Hirohisa Higashiyama
Vice-President of Kyoto University

東山 弘久

Liberal Arts Education, The Kyoto University Way

Keys to a Liberal Arts Education: Academic Well-Roundedness, Sensitivity to the Cultural Aspects of Language, and an Intellectual Foundation

The fundamental principle of Kyoto University can be stated as follows: "to educate top scientists and persons with advanced degrees of specialized abilities, who are well-rounded and deeply humanitarian, who place great store in responsibility, and who contribute to harmonious coexistence within global society as a whole." That is to say that, together with conducting academic research on the leading edge of all fields of scholastic endeavor, the university considers its duty to be to educate persons capable of fulfilling these obligations and assuming leadership roles in society. There is a need for people with knowledge both broad and deep, rather than specializing in some narrow discipline, because we must, as individuals, assume leadership roles in academia and research on the one hand, and all segments of society on the other. Add to this the fact that all of these are expanding into the global realm, transcending national borders, and becoming both more diverse and more complex in the process, and such needs become all the more acute. With this guiding philosophy of training and education, Kyoto University's undergraduate educational program has elements of advanced study in specialized subjects on the one hand, and a general, liberal arts curriculum on the other, at its core.

Seen from this standpoint, the liberal arts program at Kyoto University must not aim to provide ordinary culture or self-improvement for the masses. Rather, it must ask what meaning we can derive from scholarship, that is, what scholarship means to us as human beings. Confronting academia in such a way should enable students to become highly independent, cultivating strong values and a broad sense of humanism. Therefore, the goal is to connect the liberal arts to the most advanced work being done in relevant fields of scholarship, thus bringing students and scholars in those fields to places of academic study. In other words, the goal is to apply academic rigor to the liberal arts, which is itself brought

about by profound consideration and the extensive communication that underpins it.

These latter traits depend on good linguistic ability, which itself must be sufficiently strong and culturally sensitive to facilitate communication in common tongues, transcending national borders, drawing on a platform of understanding of the properties of different regions and indigenous cultures to do so. Such understanding is especially important now, when academe and society alike are operating on a global basis in all respects. Thus, another of the keys to education in the liberal arts at Kyoto University is striving for improvement in culturally sensitive linguistic ability.

Before one can study in specialized subjects, one must first build an intellectual foundation by learning the basic subjects. Another aspect to the "intellectual foundation" concept is creating a common base of knowledge that allows communication between different sectors, as best exemplified by the instilling of basic knowledge and criteria for judgment of the humanities and social sciences on the part of natural sciences students, and vice versa.

General Education and the Institute for the Promotion of Excellence in Higher Education: Implementing and Conducting the Well-Rounded Liberal Arts Education

The Kyoto University General Education Program is primarily charged with the university's Liberal Arts/Foundational Education work, the goal of which is instilling the academic well-roundedness, sensitivity to the cultural aspects of language, and intellectual foundation described above. The Faculty of Integrated Humanities Studies was the managing board of the General Education Program, and as such, it both provided the majority of the subjects, and contributed to the planning and implementation of the program, under the auspices of the Special Curriculum Committee. In 2003, the Faculty of Integrated Humanities



Yoshida South Campus Academic Center Bldg.

Studies and Graduate School of Human and Environmental Studies were merged into a single program, and came to share the management of the General Education Program with the Graduate School of Science. The university, in turn, founded the Institute for the Promotion of Excellence in Higher Education to plan, implement, and evaluate the General Education Program, which forms committees to deliberate on problems facing the program objectives, draft specific courses, call on various departments and boards to provide course materials, and audit the content of materials so provided. These consist of the Committee on Liberal Arts Education, the Committee on Core Curricula, the Committee on Language Studies, and the Committee on Information Education. These committees, which all operate under the auspices of the General Education System Committee, which oversees the Program's overall planning, give instructions to subcommittees representing the various boards of liberal arts, sciences, seminars, health and physical education, mathematics, physics, chemistry, geography, biology, English language, and other beginning or remedial foreign language programs. These subcommittees, in turn, work to resolve the issues specific to these various boards, in accordance with the instructions they are given. The Institute's Executive Council deliberates on matters pertaining to the operation and administration of the Institute itself, with the Secretariat being its actual administrative body. The Center for the Promotion of Excellence in Higher Education is the research arm of the Institute. As such, the research it conducts forms the basis for its plans, development, and implementation of

the General Education Program. The Center also provides operating support for the General Education System Committee.

Revitalizing the Yoshida-South Campus: Building the Liberal Arts Education Framework

As of this writing, the university's liberal arts education is being held primarily at the Yoshida-South Campus. Facilities are being established here for the General Education Program, including the construction of Building No. 1, the restoration of the North Wing of the campus's Academic Center, and the surrounding framework of buildings that will accompany it. More teaching assistants are being assigned to the program, and the Computer Assisted Language Learning Education COE is also being adopted. Both of these measures, aimed at improving the education being provided, are already showing solid results.

Another essential part of the program's equipment is sending and receiving information in a trouble-free manner between the faculty and the more than 8000 students enrolled in it. The Institute is aggressively pursuing development of the KULASIS System to deal with this issue.

All incoming first year students receive guidance in April, when the school year starts, regarding both liberal arts and basic education. Information is also regularly posted to the Institute's website, including coaching on coursework, syllabus additions, classroom and schedule changes, and lecture cancellations, in a bulletin board, which can also be viewed at any time on display screens in the Institute. In the not too distant future, all students enrolled in the General Education Program will have their own webpages on this site, which will have personalized class schedules, lecture cancellation

notices, and appointments with instructors, among other customized information. The Institute is further developing a system that will allow online course registration, whether from personal computers or cellular phones.

Issues Facing Liberal Arts Education: The Road Ahead

The Kyoto University General Education Program runs between 2000 and 3000 classes, each running 15 weeks at 90 minutes per week. The Program is one of the finest in Japan in terms of extent, diversity, and sophistication of content.

The question remains, however: to what degree has the philosophy cited at the outset of this article been fulfilled? The results necessarily look encouraging. Some of the issues that need to be dealt with in the near term include:

- 1) Developing and implementing course evaluation procedures for understanding what students in the course want and need, and meeting those requirements;
- 2) Studying the role of Faculty Development in improving courses in accordance with guiding principles, as well as improving the teaching ability of course instructors;
- 3) Using fewer visiting lecturers; and
- 4) Extending the educational environment-maintaining and enlarging lecture halls, laboratories, and equipment is a critical problem; need for a General Education Program Library is particularly urgent.

KUINEP* courses will begin in Fall 2004, in the Yoshida-South Campus's General Education Program Facilities. These courses will bring together foreign students and Japanese undergraduates, especially first and second year students, in a livelier atmosphere than before, thus helping to facilitate the creation of a more global outlook.

*Kyoto University International Education Program



Masaki Maruyama

- Born in 1944.
- Specialized Research Field: Mathematics, Algebraic Geometry
- Graduate of the master's program, Graduate School of Science, Kyoto University
- D. Sci., Kyoto University
- Professor, Graduate School of Science, Kyoto University
- Director, Institute for the Promotion of Excellence in Higher Education, Kyoto University
- Vice-President of Kyoto University
- URL <http://www.z.k.kyoto-u.ac.jp/greeting.html> (Japanese only)

Everyone who comes in contact with Prof. Maruyama is amazed by the force of personality that seems to radiate from his small frame. His personal presence and penetrating logic lead him to resolve accumulated problems quickly and clearly. Being a highly vital person and a strategic thinker, the Professor undoubtedly considers his involvement with higher learning at Kyoto University to be worthwhile. Whereas it has not been possible to formulate a clear and unique higher learning policy due to complex intertwining campus interests, Prof. Maruyama has turned this situation back on itself, creating an attractive curriculum rich in diversity through participation by various departments. He uses both the refreshing logical viewpoint of his mathematician's background together with his personal charm in the cause of educating the next generation of world leaders.



The study room at the Yoshida-South Campus.

Small Group Seminars: Initial Opportunities for First-hand Experience of Learning, the Kyoto University Way

Designed for incoming students, Small Group Seminars take place in the instructor's laboratory, for the purpose of exposing these students to the atmosphere of university research facilities. Kyoto University will hold 151 such Small Group Seminars in the 2004 school year. Students will be able to attend Small Group Seminars in subjects of interest that may have no connection to their board of study, and in the process, may come face-to-face with both faculty and graduate students, which assists in another objective, that of intra-campus networking. One popular Small Group Seminar is "Opening the Black Box," conducted by Prof. Masao Kitano of the Graduate School of Engineering. As its name suggests, the objective of the course is to dismantle, examine, and record the inner workings of black boxes in our everyday lives, that is, devices that work simply with the touch of a button, such as personal computers, video machines, and cellular phones. In the process of such examination, students naturally find themselves drawn to trying to put things together with their own hands, says Prof. Kitano, adding that the course also inspires free debate, which continues outside of course hours, both on mailing lists and online bulletin boards.



Class is in session. The students are hard at work opening up various black boxes.

Kyoto University's Regional Education Program

Kyoto University defines the basic policy of its "relationship to society" as being "to be an open campus, so as to strengthen its ties to both Japanese society and the societies of its various regions, and communicate knowledge to these societies in an atmosphere of freedom and accord."

In accordance with this policy, the university has sponsored public and community lectures across Japan, starting with the series that was launched in 1997 as part of the commemoration of its centennial, and continuing through the ceremony commemorating the completion of Centennial Hall, in December 2003, which in turn has led to such additional events as its series of Forums

on the Future, and musical concerts. All the university's departments and research groups, starting with the University Museum, hold frequent lectures, public addresses, symposia, and seminars, in order to give the results of research at Kyoto University back to the public. The university is also working to enlarge its on-campus amenities. Kyoto University is taking such measures in this regard as expanding its information center, building a new coffee shop, the Camphora, opening the Centennial Hall, and putting the Media Commons in the Kyoto University Library. The university hopes to make itself a more open campus by making these facilities available to the public.



Media Commons, on the third floor of the Kyoto University Library, has 32 booths with DVD, CD, audio and videocassette equipment. The area is open to the public as well as students and faculty. With a 50-inch plasma display, the room is used for listening to music, watching movies, and language studies, among other activities.

The 4th Forum on the Future of Kyoto University



The view from the Centennial Hall auditorium

The 4th Forum on the Future of Kyoto University took place on 9th July 2004, in the Centennial Hall. The theme of this year's forum was "The Buddhist View of Our Chaotic Times." The speaker, Somon Horisawa, is a high priest of Buddhism, who studied in India and at Mt. Hiei, the sacred site in Japanese Buddhism, after leaving the Faculty of Economics at Kyoto University. In his lecture, he said that modern society is near to "dying" with its unending confrontations and repeated massacres, and that the

cause of, and solution to, this state of affairs lies with four truths about life, as expounded by Buddhism. He went on to describe the concept of "kuu (emptiness)", a worldview unique to Mahayana Buddhism, in terms of its potential to overcome all conflict and prejudice. Despite the complex subject matter, he nonetheless held audience of some 250 listeners, comprised of students and the general public alike, spellbound. The question and answer session ran considerably longer than planned due to the great

number of questions asked by the audience as well.

When asked their opinions, many of the attendees stated that they frequently attended such functions as these that the University made open to the public, and that they looked forward to further such program offerings. The hall itself also received acclaim for the glass wall behind the rostrum, which afforded a changing view of the campus, as well as a relaxed atmosphere, making it easy for the attendees to concentrate on what was being said.



Students enthusiastically ask a speaker questions.



Attendees listen intently to a speaker.

Information for International Students

Kyoto University accepts students from all over the world for International Doctoral Programs as well as general Graduate and Undergraduate Programs. Shown below are two examples of the scholarships available for international students: Japanese Government (Monbukagakusho: MEXT) Scholarship and Honors Scholarship by Japan Student Service Organization (JASSO).

For further information, please contact:
 Foreign Student Division, Kyoto University
 ryugak78@mail.adm.kyoto-u.ac.jp

International Doctoral Program

Kyoto University offers the following four International Doctoral Programs mainly for a graduate of a university that has the faculty-level Agreement of International Academic Exchange with Kyoto University: International Doctoral Program in Economics, Energy Science, Engineering, and Informatics. Strong command of English is a prerequisite for participation, though Japanese language ability is not required. Students selected by Kyoto University will be recommended to Japanese Government (Monbukagakusho) as candidates for a scholarship.

Please visit the following three URLs for application details currently available.

- International Doctoral Program in Engineering
<http://interex.kuee.kyoto-u.ac.jp/IntC/ic-doctor.html>
- International Doctoral Program in Energy Science
<http://www.energy.kyoto-u.ac.jp/doctoral/>
- International Doctoral Program in Informatics
<http://www.i.kyoto-u.ac.jp/English/index.html>

Graduate and Undergraduate Programs

Please check the following URL for general Graduate and Undergraduate Programs.
<http://www.kyoto-u.ac.jp/english/etop2/e09-top.htm>

Japanese Government (Monbukagakusho: MEXT) Scholarships

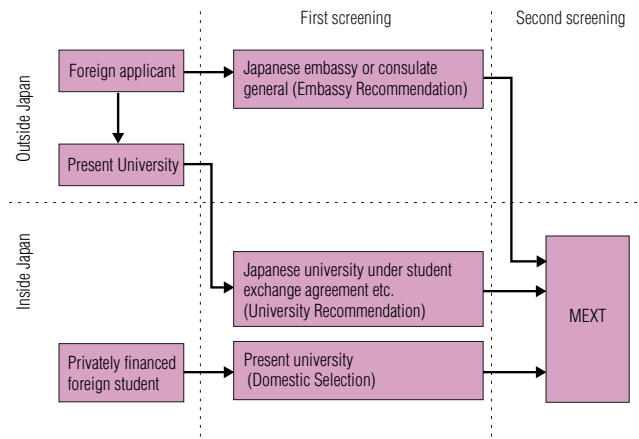
There are seven types in Japanese Government Scholarships. Kyoto University accepts students of the following status.

Type of Scholarship	Age	Monthly Allowance	Duration	Number of Grantees
Research Student*	under 35	175,000yen	2 years	4,000
Undergraduate Student	under 22	135,000yen	5 years**	560
Japanese Studies Student	under 30	135,000yen	1 school year	340

* Graduate School Student & Research Student

** 7 years : Medicine, Dentistry, Veterinary Medicine

The general flow of an application



Honors Scholarship for Privately Financed International Students

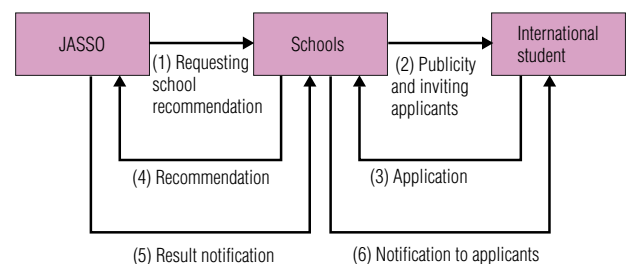
Japan Student Services Organization (JASSO) provides scholarships for privately financed international students to help them with their academic work and research in Japan. Details are shown on the JASSO website at <http://www2.jasso.go.jp>

Academic Level	Monthly Stipend	Payment Period	Application Period	Number of Scholarships
Undergraduate Student	52,000yen	One year (Apr-Mar)	Late March-early May*	7,450 students**
Research Student	73,000yen			3,550 students
Master's Course Student				
Doctor's Course Student				

* Period varies from school to school

** The No. of Japanese language institute student, Specialized training college student, College of technology student, University Japanese program student, Junior college student are included.

Notification of result



Robotics Research: Can Robots Have Human-level Manipulation Skill?

Manipulation by hands and walking on feet are the two most significant kinetic skills of humans.

Robots appeared for the first time as technological products called industrial robots in 1962, and since then they have been numerous used in factories. Industrial robots are essentially mechanical arms and their manipulation skill is based on various special purpose grippers and tools for each specific task. Recently, advancement of non-industrial robots, especially humanoid robots with two legs, is taking place especially in Japan. People were surprised by the very natural walking skill of these humanoid robots. They made people feel the approach of an era where humans and robots coexist at home and in social spaces. One key technology among others for this expectation to happen is manipulation skill by multi-fingered human-like mechanical hands, since grasping and manipulation of various objects is a fundamental function for these robots to be useful.

We have been studying basic technologies for grasping and manipulation of robotic mechanisms. Some results in our laboratory in this area will be introduced in the following.

(1) Control of Redundant Robot Manipulators.

A human arm can be regarded as a link mechanism with seven degrees of freedom. Since the task of holding an object and keeping it at an arbitrary position and orientation in three-dimen-

sional space needs just six degrees of freedom, for this basic task the human arm has one more degree of freedom than necessary, which is hence called the redundant degree of freedom. A human utilizes this redundancy, often unconsciously, for taking a comfortable arm configuration for a given task, performing a manipulation task of an object behind an obstacle, and so on. Many robot arms are also designed to have redundant degrees of freedom to make it possible to perform a larger array of tasks. However, to make this arm work possible, it is of course necessary for an engineer to clearly recognize the purpose of redundancy utilization and to select an appropriate arm trajectory. For this problem we have proposed the task-decomposition approach in which the whole task is decomposed into several subtasks with an order of priority and each subtask with higher order is realized first by utilizing a general kinematic solution of the arm motion. Since the degrees of redundancy of humanoid robots are generally far larger than conventional industrial robots, much more study on redundancy utilization will be necessary.

(2) Manipulability

In designing the mechanism of a robot arm or in planning the arm posture for performing a task, one important factor that should be taken into account is the ease of arbitrarily changing the position and orientation of the end effector at the tip of the arm. To give a quantitative index of this ability, the concept of manipulability was proposed. This is based on the idea that, when we consider the set of all end-effector velocities that are realizable by joint velocities under a magnitude constraint (i.e., the Euclidean norm is not larger than one), it is desirable that this set is large and Spherical as

much as possible. For example, consider a very simple case of a two-joint arm moving in a plane, then this set becomes an ellipse (called manipulability ellipsoid). Regarding the area of this ellipse as a measure of manipulation ability of the arm (called manipulability measure), we can show that this measure takes its maximum when the elbow angle is a right angle, and when the lengths of upper arm and forearm are the same if the total arm length is constant. These results are intuitively natural when we consider our arm moving on a table.

(3) Analysis and Control of Grasping and Manipulation by Robot Hands

In grasping and manipulating an object by a multi-fingered robot hand, many contact points and contact forces between the hand and the object are generally involved. This causes the arbitrariness of the internal force, which can be utilized for securing the grasp against various external disturbance forces. In order to make the determination of the internal forces more systematic, we proposed a physically reasonable definition of grasping and manipulating forces for multi-fingered robot hands. We also proposed the concept of active closure and passive closure to classify robotic mechanisms from the viewpoint of how the mechanism constrains the grasped object. Active closure means a grasp that needs a feedback control based on the object's position and force, and passive closure means a grasp that does not. These concepts will make the planning of grasping and manipulation procedure for robots much more reasonable.

(4) Understanding Human Skill Using Haptic Virtual Reality Technology

Automation of assembly tasks by robots is still very hard, despite the fact that a human operator can perform the task without much difficulty. If we understand this human skill better, it will be easier to automate assembly

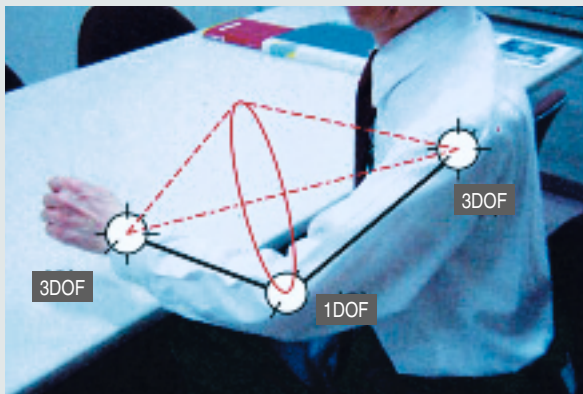


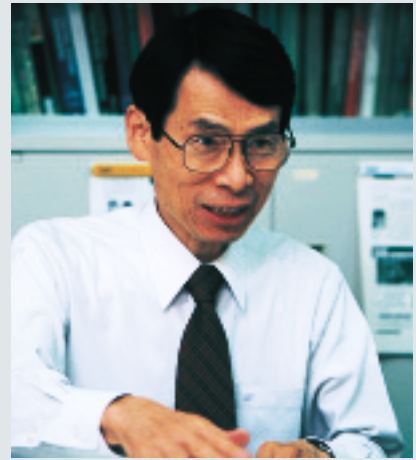
Figure 1: Locations of the seven degrees of freedom (DOF) in the human arm. Even after fixing the hand position and orientation, the elbow can move along a part of the circle shown in the figure, implying that the arm has one redundant degree of freedom.

tasks. But it is often the case that the operator cannot describe his/her skill explicitly. It is also rather difficult to measure motion, force, contact state, and so on during the execution of the real task. To overcome this difficulty, we developed a virtual task environment using haptic virtual reality technology. A peg-in-hole task in virtual space was provided using this system. By a comparison study, we saw that although the virtual task needs twice as much time as the real task, the order of the three motions required to perform the task using three assembly strategies is almost the same in the real and virtual tasks, implying that the virtual task environment could be valid for qualitative study of human skill. We

are also working on improving the performance of haptic display devices from several aspects.

In our laboratory, we are also working on other robotics-related research topics such as modeling and control of flexible manipulators, analysis and control of master-slave manipulator systems, mixed reality, development of rescue systems, and legged robots.

I believe that there is a strong possibility that diffusion of intelligent mechanical systems like robots will change our lifestyles drastically in the near future. I hope that many young people will become interested in robotics and contribute to the research and development of robots that will be useful for mankind.



Tsuneo Yoshikawa

- Born in 1941
- Specialized Research Field: Robotics, Mechanical Control Engineering
- Graduate of the doctoral program, Graduate School of Engineering, Kyoto University
- D.Eng., Kyoto University
- Professor, Graduate School of Engineering, Kyoto University
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"Can you imagine what the world might be like if robots were to come into possession of psyches? One important aspect of the work being done by us who research robotics is defining the future of robots, or a vision of that future."

The most interesting recent development in robotics concerns humanoid robots. Prof. Yoshikawa's research, on the other hand, involves manipulatory systems, of which perhaps the best known example is the human hand. While this field has traditionally focused on industrial applications, the professor's work in this regard is now considered to be a key element in determining the future outlook for humanoid robots. For acquiring the ability to "work with objects", that is, to grab and manipulate them, is essential if robots are to become truly useful in human society.

Unlike many roboticists, Prof. Yoshikawa, whose original specialty is control theory, did not enter the field out of any childhood fascination with children's robot superhero programs. Accordingly, he is not optimistic about the relationship between humans and robots, instead ceaselessly emphasizing the need for constant examination of the policies of robotics research and development. The professor's awareness of the tremendous impact of science and technology gives him an equally tremendous sense of responsibility vis-à-vis society, in his capacity as a scientist.

Prof. Yoshikawa's voice is lively and his eyes alight when he speaks of his robotics research, much like an innocent little boy's would be under similar circumstances. That very enthusiasm may give us all hope for peaceful coexistence on the part of humans and robots.

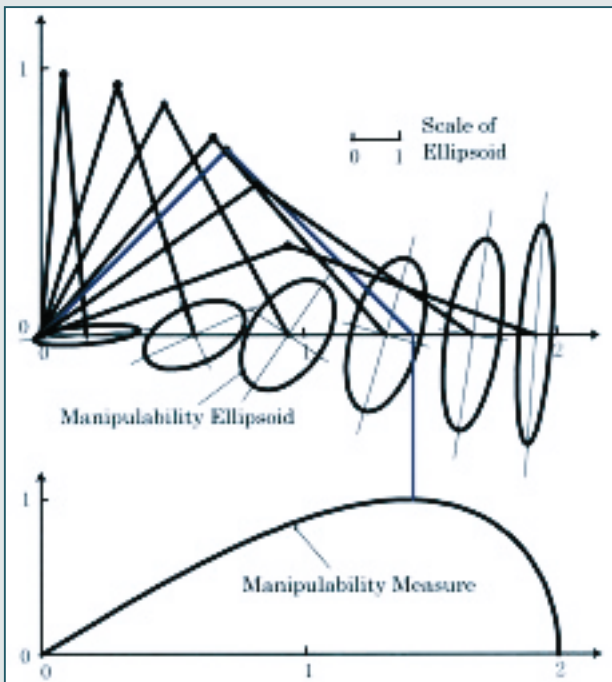


Figure 2: Manipulability ellipsoid and manipulability measure of a two-joint arm. The blue arm configuration with a right elbow angle attains the maximum manipulability measure.



Figure 3: Human skill observation using haptic virtual reality technology. The operator can perform a virtual peg-in-hole task getting the feel of touch through his fingers.



Prof. Yoshikawa advises students regarding their experiments. The Yoshikawa Lab adopts a one research topic per person approach, wherein students choose their own research topics for their theses, an approach that places much store by the originality of students' ideas.

Exploring minds of nonhuman relatives

Our interfaculty group of psychologists in Kyoto University was selected as one of the 21st Century Center-of-Excellence Programs in 2002. This group, named Kyoto University Psychology Union, aims at comprehensive understanding of mental functions by integrating experimental, field, and clinical approaches to the mind.

We are working on the four major questions regarding the mind: namely, what are the nature and functions of mental images and representations, how do the body and the mind interrelate, how does the mind interact with social and cultural milieu, and how does the mind change in time? I myself have studied cognitive processes of nonhuman animals to answer the last question from an evolutionary point of view.

Drawing a picture of how the mind has evolved is not an easy task. Because minds do not leave their shape as fossils, a direct sketch is of course impossible without a time machine, except in such lucky cases where the mental functions of our ancestors left outcomes like tools and painting. However, we are able to infer the evolutionary process of the mind by exploring the minds of our current nonhuman relatives. This academic field is called comparative cognitive science or

comparative cognition.

The specific question my colleagues and I ask is how nonhuman animals recognize objects and events that are not directly detected by sensory organs. It is a good idea to compare recognition of such invisible objects and events across species because the characteristics of a perceptual system should be most evident when the system receives incomplete and ambiguous information.

One such case in point is referred to as perceptual completion. For example, we recognize the complete clock tower when we look up at it through the camphor tree, though what we actually sense is a collection of visual fragments through the leaves and twigs. Humans routinely complete hidden portions of partly occluded objects.

A laboratory version of perceptual completion is shown in Figure 1a. When human infants see the two rods moving in concert behind the occluding belt, they recognize the rods as unitary. The infants are in fact surprised if they are shown two separate rods without the occluding belt after they become bored seeing the rods behind the occluder many times.

Using a computer display we trained nonhuman animals to match a unitary rod and a pair of broken rods; they were trained to choose the same comparison

stimuli as the sample. Then we tested which type of stimuli they choose as a matching comparison when they are presented the non-distinguishable sample having its critical central portion occluded by a surface.

A language-trained chimpanzee and three tufted capuchin monkeys overwhelmingly chose the unitary rod when the non-distinguishable sample was presented. Thus they clearly complete the occluded portion like humans. In later experiments the capuchin monkeys were shown to share most of the rules of how to complete the hidden parts with humans (Figures 2b and 2c).

However, pigeons tested in the same procedure chose the pair of broken rods. This choice was maintained when we modified the shape of the occluding surface to an undulated one so that the top and the bottom portion of the rod changed in shape and size as the rod moved along the surface. Pigeons do not seem to complete occluded contours. Actually the data were consistently negative although we have tried many other situations including photos of food as stimuli.

Pigeons are known to perform extraordinarily well in a variety of cognitive tasks such as concept-formation, memory, image processing, and insightful problem solving. They are highly cognitive but seem to perceive the environment very differently from humans. We humans are apt to think that the way we perceive the world is the single ultimate solution to recognize the environment. This notion is simply wrong. Perceptual systems seem to have evolved diversely even among species having well-developed central nervous systems, probably to fit the way the species live.

The second topic we tackled was how nonhuman animals recognize others' mental states. Mental states are another set of events not detectible by the sensory organs. This social intelligence to "read" others' minds has been suggested as a clue to understanding how physical intelligence such as tool use and logical thinking has evolved.

We tested whether capuchin monkeys

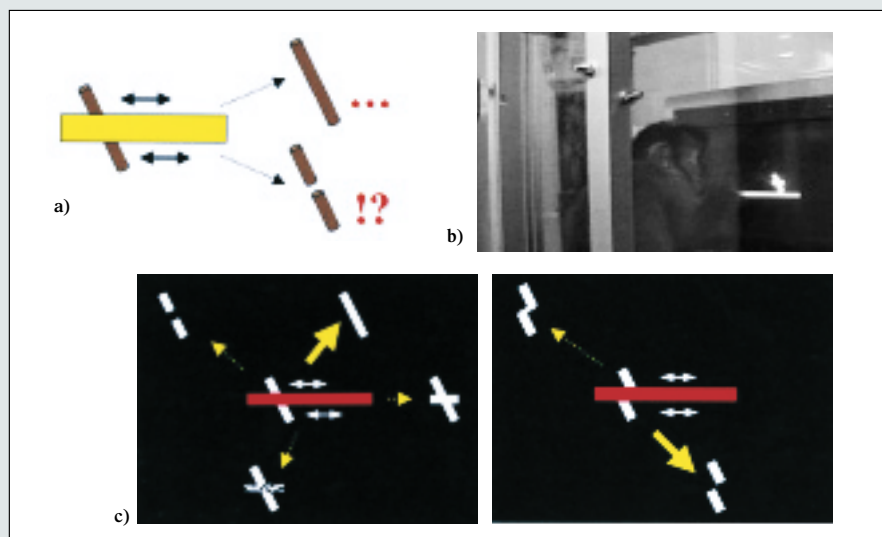


Figure 1. a) An example of perceptual completion. Human infants are surprised at the broken rods after being habituated to the rods moving behind the occluder. b) A tufted capuchin monkey working on the matching task on the computer screen. c) Capuchin monkeys tend to match the straight rod to the sample on the left and broken rods to that on the right. How the monkeys complete occluded portion is like humans.

spontaneously deceive conspecific opponents. Two food boxes were placed between a dominant monkey and a subordinate monkey. Only one of the boxes contained food. The subordinate monkey was able to see the contents of the boxes and to open them. The dominant monkey was unable to do either, but was able to usurp the food once the box was opened.

Two of the four subordinate monkeys started to open the empty box first in more than 10% of the trials. It is hard to conclude whether this behavior incorporated deceptive intention or not. However, it is evident that capuchin monkeys have the intelligence to adjust their behavior in response to social situation in which misleading others could benefit themselves.

We also discovered that this species spontaneously cooperate by dividing labor between two monkeys. We first trained each individual monkey to perform a two-action sequence to obtain two rewards in a tandem cage (Figure 2a). Then we separated the cage into two areas and two monkeys were simultaneously put into each area (Figure 2b). Now the two monkeys had to divide the action sequence between themselves.

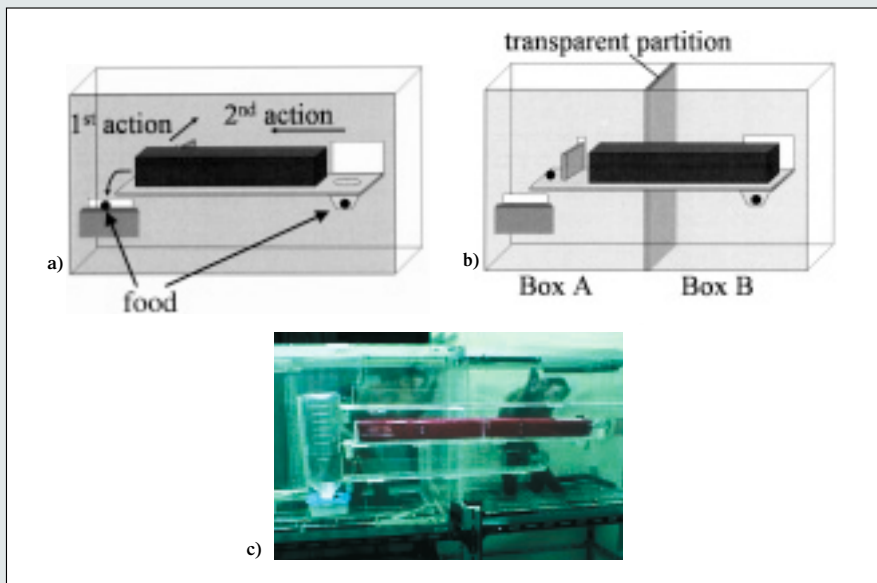
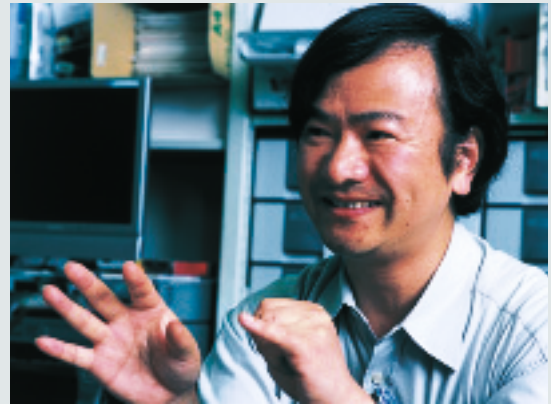


Figure 2. a) A tandem test box in which individual capuchin monkeys learned the whole two-action sequence to obtain rewards. b) The separated tandem box used to test whether the monkeys in Box A and Box B spontaneously cooperate by dividing the action sequence between the two. c) Two capuchin monkeys performing the cooperation task. The monkey in Box A is waiting for the second action by the monkey in Box B.

All of the three pairs started to cooperate without explicit training (Figure 2c). In one of the tests that followed we placed only one reward at a time so that one of the workers never obtained the food. When the placement of the monkey was switched every one or three trials, the monkeys maintained this cooperative behavior. Thus they not only solved a cooperative task spontaneously but also showed reciprocal altruism.

These results led us to think that a variety of social intelligence humans exhibit in both competitive and cooperative situations may have their roots in the common ancestor of humans and New World monkeys that lived about 30 million years ago.

A brief look at nonhuman animal studies such as the above tells us that human perception and cognition are both evolutionarily continuous to and ecologically different from those of our relatives. Such diversity among relatives must be the most important thing for the symbiotic ecosystem the earth has fostered. All the lives share the same evolutionary time of nearly 4 billion years.



Kazuo Fujita

- Born in 1953.
- Specialized Research Field: Psychology, Comparative Cognition
- Graduate of doctoral program, Graduate School of Science, Kyoto University
- D.Sci., Kyoto University
- Professor, Graduate School of Letters, Kyoto University
- URL <http://www.psy.bun.kyoto-u.ac.jp/fujita/> (Japanese only)

"Being with nonhuman animals makes me happy. Take chimpanzees. They're closely related to humans, which makes it fairly easy to understand what they're thinking. I can also empathize with them to some extent."

Prof. Fujita has kept a wide variety of nonhuman animals in his life, ever since he was a small child. Hence, it seemed only natural that he should go into science, specifically, animal ecology. What is surprising is that he went on to become a professor at the graduate school of letters. Yet, his unraveling of the "behavior" of animals, including human beings, progressed dramatically, spreading into all manner of disciplines. Kyoto University is an ideal research environment for this, with scientists all over the place, studying all kinds of subjects.

Prof. Fujita believes that psychology needs to expand the scope of its research subjects to encompass the diversity of psyches. He describes one such direction as "evolutionary diversity," saying that the human psyche does not exist in isolation; rather, that it has evolved, as the human body has evolved, and thus, ought to have some links to the psyches of nonhuman animals. He derived this idea from his own extensive empathic experiences with nonhuman animals. "My field of research is peering into the psyches of animals," the professor says with enthusiasm. The accompanying twinkle in his eye is that of a little boy who grew up with nonhuman animals all around. Now a grown man, he runs the only animal laboratory in the Faculty of Letters, where his search for the wellspring of empathy continues.



Prof. Fujita works with his students in preparing for experiments with animals, placing some monkey food in the experimental apparatus.

Beginning Japanese daily life in Kyoto

Engelbert Jorissen



Engelbert Jorissen

- Born in Germany in 1956
- Specialized Research Field: Comparative Studies of Culture and Literature
- Graduate of the Faculty of Arts and Humanities, University of Cologne
- Dr. phil., University of Cologne
- Associate Professor, Graduate School of Human and Environmental Studies, Kyoto University
- URL http://www.h.kyoto-u.ac.jp/jimu/staff/223_jorissen_e_0_e.html

When different cultures overlap, they do not do so in friendly ways; rather, they collide, violently, in any and all aspects. This is the view of Dr. Jorissen, an associate professor at Kyoto University, and when he speaks of it in his calm, rational way, listeners cannot help but be struck to the core by the impact of his words. Yet, seeing the constant half-smile on his face, it would be difficult, if not impossible, to imagine him as struggling in the three decades since his own collision with what, to him, is an alien culture, to wit, that of Japan. Nonetheless, man is not inclined to be broad-minded with regard to differences in lifestyles, and the importance and difficulty of multicultural coexistence is a subject not merely to be found in historical records or on faraway battlefields. Rather, as Dr. Jorissen's warmth and hospitality informs us, it is a problem that confronts us on a daily basis, here on campus.

The courtyard of the Yoshida-South Main Bldg. Dr. Jorissen says he preferred the disorderly atmosphere of the old Yoshida-South Facility. The courtyard maintains this traditional atmosphere as the building itself is renovated.

At the end of the 1970s I visited Japan for the first time. I spent about two months, February to April, in Kyoto. To a certain degree I had been 'prepared' for my stay. My principal subject as a student was Italian language and literature, but I had begun to study Japanology, and I had Japanese friends. I should perhaps add that my only professor at the institute of Japanology was interested in authors of the Edo period, like Matsuo Basho, Kobayashi Issa, and in classical Japanese literature. One of the first texts of Japanese literature I was introduced to was the "The young lady who loved insects" from *Tsutsumi Chunagon Monogatari* (Tale of the Tsutsumi Middle Counselor) from the 11th century.

In Kyoto, I had experiences, which I remember, but not exactly. For example, I ate some tasty pickled vegetables, *tsukemono*, but I could not remember where. I also ate, but did not appreciate sufficiently, *udon* noodles, which for me at that time had a somewhat "weak" taste. Of course, many experiences I kept vividly in mind, such as the plum blossoms at the Kitano Tenmangu Shrine, which I knew before coming to Japan, because I had heard about the god of literature Sugawara no Michizane (845-903). The visit to the shrine on the occasion of the *baikasai* plum blossom festival was impressive because of the large crowds strolling through the long line of *yatai* stalls vending delicacies. At that time, I was worried how introduction of the western calendar in 19th century would affect what I had learned about seasonal flowers in traditional Japanese culture.

I soon learned that Kyoto could be rather

chilly. Theoretically I had put the geographical position of Kyoto into one context with that of the island of Crete, which I had visited exactly in March the year before, and it had been very warm. At once I began to like the subtleties of Japanese architecture, like the *horikotatsu* heater. And I understood much better a passage from a letter written by a south-western European of the 16th century who reported that, on a winter journey from Kyushu to Miyako (Kyoto), he had covered himself with *tatami* mats because of the cold.

But I had begun to like Japanese everyday life and, while having become critical towards certain aspects of Japan and its lifestyle, I still like and enjoy it. I became so sad when I boarded the plane to take me back to Europe. It was dark weather with heavy rain clouds, but an acquaintance had brought some of the first cherry blossoms to the airport.

Repeatedly I visited Japan and, then, began to live there. Looking at my daily life now, and my liking for delicate seasoning in cooking, too, I sometimes ask myself how much I have changed or not in behavior and feeling. Cultural relations between Europe and Japan have become one of my main objects of research. A fascinating question for me is, how did Europeans coming to Japan in the 16th century, settle into Japanese life, sometimes for decades. There are impressive documents that clearly tell of likes and dislikes. There was one figure who, even after ten years in Japan, refused to drink Japanese tea. But there was another who gave up eating bread and turned to eating rice only. For me today, such documents give, too, hints to questions about why international cultural relations do or do not work in a smooth way.



Tang Zhong Hui

I want to work on behalf of happiness for people in countries all over the world.

Tang Zhong Hui speaks of "happiness" over and over, with a brilliant smile. Just talking to her is enough to make one terribly happy. And it appears that the power with which she communicates her "happiness" is due to the influence of her supervisor, Prof. Shiomi. Born and raised in Xinjiang Uighur Autonomous Region of China, Tang Zhong Hui came to Japan after three years as an attorney at law, out of a sense that the rule of law was not something that people in her native country had yet internalized and made part of their daily lives, despite China's rapid and ongoing economic development. She opted for Kyoto University out of admiration for the Kyoto region, the cultural heart of Japan. It seems that what she actually found, however, was the respective hardships and kindnesses associated with the notion of "freedom of study."

■What are your impressions of Kyoto University?

There was a teacher here who told me just after I'd enrolled that "studying at Kyoto University means doing research in isolation, making you a research scientist, not a student." At the time, I had no idea what that meant. My own thinking was just the opposite: that I was here to study because I was a student. After about three months, however, I started to realize what that instructor meant. Students at Kyoto University really are lonely in their intensive study programs, and the instructors really enjoy educating them. I find this mutual support relationship, wherein students and instructors alike look out for one another, to be very enticing.

■Does the atmosphere at Kyoto University differ from that at Chinese universities?

When I went to school in China, I never had a sense of studying being lonely or something done in isolation, because I thought that students received knowledge from their teachers. That's not how it is at all at Kyoto University, however. Right now, for example, I'm working on my master's thesis, and my instructors are letting me write what I please. They respect students' rights to study what they want, and to pursue whatever research topics they desire. In return, students must actually do the research themselves if they want to accomplish anything. It is important for research scientists to be self-aware, for they must use this very self-aware-

ness as a platform from which to conduct their studies in isolation from one another. I'm truly grateful to have the time and freedom to think about anything and everything, all on my own.

■You have tremendous respect for Prof. Shiomi, don't you?

Indeed I do! You see, about a month after I enrolled at Kyoto University, I wasn't sure whether I should continue my studies here, or go back to China. Meeting the Professor, however, convinced me to stay. It was his smile that did it, the way he always looks so happy. The sight of it just naturally makes me feel happy too. At first, I couldn't figure out for the life of me why the Professor should always be so happy and energetic.

■And have you figured it out yet?

Well, I think it has to do with Prof. Shiomi having already passed beyond the hard and lonely parts, and has now reached the fun part, that of supporting and educating students. He is always telling me to take it easy, not to get in a rush. When I first enrolled, the Professor helped me think through things I didn't understand. He didn't force knowledge on me; instead, he got me to think things through for myself. And I might very well have quit school if he had just forced his ideas on me at that point. I owe what I have now to Prof. Shiomi. I'm sure I would have regretted it for the rest of my life if I had gone back home instead.

■Tell us what your current research work is about.

The topic of my master's thesis is environmental law. Before that, though, I was thinking of writing about credit law instead. But then we had the SARS outbreak in China, which got me interested in environmental law. So I started reading lots of books on environmental law, and I found that the provisions of Chinese and Japanese environmental law are almost entirely the same, which raises the question of why China has never had any environmental awareness. And that got me interested in everything from prevailing notions when these laws were drafted to the religious and cultural differences that led to those notions. And at that point, I finally began to devote some serious thought to the root idea of what exactly law is.



Tang Zhong Hui

- Born in China in 1972.
- Presently in the second year of master's program, Graduate School of Law, Kyoto University

■What are your plans for the future? Do you intend to go back and practice law in China?

My thinking has changed considerably from what it was before I started my study program in Japan. I believe that what I've learned at Kyoto University should be put to use on an international level, not just for the benefit of one single country. Right now, I feel like working for the happiness of people from all over the world, but I haven't made any precise decisions. I want to use my legal expertise in the service of human freedom and happiness, that's the important thing. For now, however, I want to be like Prof. Shiomi! I'm very glad that I've been able to enroll at Kyoto University, get to know the Professor, and do research here. And I want my scholarship to help make people everywhere be happy, as many people as possible.



Ms. Tang goes over her research materials as she sits in a corridor facing onto the courtyard of the Faculty of Law and Economics Main Bldg.

The letter from Yangon Field Station

Nobuhiro Ohnishi



Nobuhiro Ohnishi

- Born in Tokyo in 1966
- D.Sci., Osaka City University
- COE Research Fellow, Graduate School of Asian and African Area Studies, Kyoto University

Fields of regional research as encompassed by Kyoto University run the gamut from collecting samples of natural resources to throwing light on the social systems of village communities. Mr. Ohnishi, a resident researcher at the Yangon Field Station in Myanmar, has a long research career in such fields as molecular biology, evolutionary biology and ichthyology, under the auspices of the Faculty of Science. Being long fascinated by various forms of life, Mr. Ohnishi says, "bacteria, plants, and animals, all have practically the same biological foundation." Based on this recognition, Mr. Ohnishi appears to have embarked on a new direction of research in Myanmar, which should offer various subjects for study, including the behavioral ecology of humans, the most interesting animal of all. With a keen sense of and passion for his own research that is only fitting for a rising scientist on the cutting edge, Mr. Ohnishi's work is worth watching further in future.



Nga kone nyo (herring) fishery in Rakhain State, Myanmar.

Fourteen field stations were launched in Asian and African countries under the 21st Century COE Program "Aiming for COE of integrated Area Studies" from 2003. These stations were established for intensive on-site education and field research. Yangon Field station is situated in our counterpart organization, SEAMEO-CHAT, in Yangon, Myanmar, which is one branch of SEAMEO (Southeast Asian Ministers of Education Organization), the international organization in education, science and culture in the Southeast Asian region.

Recently, many foreign researchers belonging to such universities and institutes as the Natural History Museum and Smithsonian Institute from the USA, or École française d'extrême-Orient (EFEO) from France, are launching joint research projects with Myanmar counterparts. Kyoto University is also conducting joint projects, some of which are participated in by Yangon Field Station.

One focus of Yangon Field Station is the management of the joint research activities for the integrated area studies. According to my understanding, such study is a challenging enterprise to synthesize several scientific disciplines for understanding human beings. Therefore, the main objective is to find out universal rules among the findings from natural science, social science, human science and so on. Behavioral ecology (or sociobiology), one field of natural science based on the evolutionary viewpoint, is considered to be a good guiding discipline, which has revealed adaptational aspects of social behaviors preformed by organisms including humans. In a similar way, psychology, ethics and economics have also started to be cross-fertilized with an evolutionary viewpoint.

Now, we focus on the cooperation of fishery activities in the west coast of Myanmar, as the evolution of the cooperation is one of the major topics in the behavioral ecology. We try to extend our viewpoint to the social matters.

There are wide varieties of cooperative system in fisheries. Family members are very important cooperators in the small-scale fishery. In this case, the



Fish market in Rakhain State, Myanmar.

husband and sons catch fish in the sea, rivers or paddy fields, and the wife and daughters sell them in the villages. They share the catch and the income, that is, the result of the cooperation. On the other hand, the large fishery group is organized by the owner of a boat or net as commercial fishing. A large number of fishermen work together to operate the large boats and nets. Their wives and children may participate in the processing of fish to be shipped. Workers can personally receive the income, which may amount to higher than that obtained through the small-scale fishery. The employment system supports cooperation among unrelated persons, and each worker is paid wages regardless of his or her position in the family. Thus, difference in the way of resource use may cause difference in the cooperative relationship among family members. It is important to note that the family is the cooperative system for the acquisition and distribution of the resources, especially in the small-scale fishery. However, the employment system of commercial fishing does not necessarily depend on family cooperation. In terms of behavioral ecology, the human cooperation may be explained as the division of labor through which the partners can raise their benefits in the evolutionary process. The employment system is common in the cities. This may also give some clues to understanding the recent rapid change in lifestyles in cities, for example, solitary households, the tendency to marry later, and the declining birth rate.

President Oike Goes to Mainland China and Hong Kong

Kazuo Oike, President of Kyoto University, and Vice-President Kojiro Irikura attended the 14th Board of Directors Meeting of the Association of East Asian Research Universities (AEARU) in Shenzhen, Canton Province, China, on April 22nd of this year. AEARU is a consortium of important research universities in the East Asia region, linked by shared geography and cultural similarities. Founded in 1996 by a joint declaration of the Hong Kong University of Science and Technology (HKUST) and the Pohang University of Science and Technology in South Korea, the association currently boasts 17 members, including Japanese representa-

tives of Tsukuba University, The University of Tokyo, Tokyo Institute of Technology, and Osaka University, in addition to Kyoto University, whose president is serving a two-year term on the Association's Board of Directors that began in January of this year.

There are five Board members, presidents of the Hong Kong University of Science and Technology (HKUST), the Korea Advanced Institute of Science and Technology, Taiwan University and the University of Science and Technology of China, whose president currently serves as Chairman.

At the meeting, the report on the previous year's business was ratified, as was the 2004-2005 operating plan. It was further agreed

that the 16th Meeting of the Board and Workshop would be held in Kyoto in 2005.

President Oike also visited the Hong Kong University of Science and Technology (HKUST) and the University of Hong Kong on April 23rd, engaging in discussions with the chancellors of these universities about academic interchange.

In the course of his visit, the President received positive calls from all of these universities for Kyoto University to enter into scholastic exchange agreements with them. As he believes that it would be worthwhile to enter into partnerships with other major East Asian universities, the President is arranging to have the Committee for International Academic Exchange review the matter.

"The First KAGI21 International Summer School on the Active Geosphere" Takes Place in Indonesia



President Oike gives a special lecture on seismology.

The Kyoto University Active Geosphere Investigations for the 21st Century COE Program (KAGI21) held the "First KAGI21 International Summer School on the Active Geosphere" at Institut Teknologi Bandung (ITB), in Indonesia from 11-26 July, 2004. Six professors, seconded from Kyoto University, led 50 rising young researchers and post-graduate students from 13 countries in Asia and Oceania, including eight post-graduate students from Kyoto University. A series of lectures and practical studies on the theme of the "Active Geosphere" was held for six hours each day for two weeks. The students were then

divided into three groups for advanced computer exercises at ITB and for field work at both the Kyoto University Equatorial Atmosphere Radar and at Merapi - one of the most famous volcanoes in Indonesia.

On July 17, the program held an open symposium in collaboration with the Faculty of Earth Sciences and Mineral Technology of ITB. Three emeritus professors from Kyoto University with demonstrated accomplishments in field research in the region were in attendance. Among them was Dr. Kazuo Oike, President of Kyoto University. They took part in an interesting debate with top scientists from universities and research institutes in Indonesia regarding the science of the "Active Geosphere". Simultaneously, nearly 100 KAGI21 participants, including Dr. Kojiro Irikura, Vice-President for

International Relations, were assembled at the Kyoto University Academic Center for Computing and Media Studies, where they used satellite and terrestrial high-speed networks for real-time, two-way audio-visual information interchange with the symposium, thus broadening the range and scope of the possible research collaboration.

KAGI21 defines the "Active Geosphere" as "the critical space required for the sustainable coexistence between man and nature in which geophysical variability develops, in particular, on the time scale of human activity". The primary research goal here is the elucidation of these very variations in the Earth's dynamic behavior, particularly in the Asia-Oceania region, where these variations are greatest. Refer to <http://kagi.coe21.kyoto-u.ac.jp/en/index.html> for details of the KAGI21 program.

Inaugurating the "Research Institute for Sustainable Humansphere"

The "Research Institute for Sustainable Humansphere" has been established in April 2004. Its purpose is to do research on human habitats, forested areas, the atmosphere, and outer space as a collective ecology for mankind, or, a "Humansphere," in a manner both organized and comprehensive; to make precision diagnoses of the state of this "Humansphere," to evaluate and learn the right things about the present and likely future conditions of this realm, and also to develop advanced restorative technologies that will be needed to resolve the many issues that threaten not only mankind's prosperity,

but also its very survival. In addition to core research departments in various specialties, the Institute's organization also calls for building a department for open-ended research, and another center for basic academic research into the "Humansphere." Collectively, these groups will carry out the Institute's four-part research mission. Efficient operation will allow collaboration between the Institute's researchers and other scientists all over the world. The Institute will also undertake to advance the state of the art in research in its fields and train scientists with the skills necessary for it.



The 21st Century COE* Program FY2004 Results

Field of study	Branch of learning	Program title	Program leader
The Cutting Edge of new scientific fields	Applied Entomology	Innovative Food and Environmental Studies Pioneered by Entomomimetic Sciences	Kenji Fujisaki

* COE...Center of Excellence



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P R O M E N A D E 京都逍遙 比叡山

Mount Hiei

A Prayer for Peace on Earth from one of the Most Sacred Sites in Japanese Buddhism

The Kyoto University Yoshida Campus is an ideal place for admiring the holy mountains that adorn the eastern rim of the Kyoto Basin. Of these, the most sublime is the sacred peak of Mount Hiei (Hieizan), which is included on UNESCO's list of World Heritage Sites. Located in the Northeastern part of the Kyoto Basin, the austere majesty of Mt. Hiei has been a place of faith and worship since ancient times.

It was in the Ninth Century that Hieizan became the holiest site in Japanese Buddhism, when Dengyo Daishi Saicho founded Enryaku-ji temple there, inaugurating both the Tendai school of Buddhism and Tendai education and learning, both imported from China. And for the past 1200 years, it has defended and passed down the teachings of Buddha, in its capacity of the heart of Japanese Buddhism. Over the centuries, it has at times allied itself with temporal rulers, and at other times, been threatened by them. And its functions are taking on even greater importance than ever before in these days when intolerance and lack of understanding are giving rise to tragedy on a worldwide scale.

Since 1987, the annual Hieizan Religious Summits have brought religious leaders from around the world under one roof to converse and pray collectively for peace on Earth. The abbot of Tendai school attended the Prayer for World Peace in Assisi, Italy, in 1986, in answer to a call made by Pope John Paul II for that purpose. In 2002, the current abbot invited Islamic, Jewish, and Christian leaders from outside Japan, in reaction to the prejudice and hatred directed at Islam in the wake of the September 11, 2001 terrorist attacks on New York City and Washington. The "Hieizan Message," which states that the future of mankind does not lie in continued armed conflict in the name of religion, was adopted at that time.

Kyoto University also strives to contribute pro-actively to "harmonious coexistence" throughout the world through its research work. Religion and academe, prayer and scholarly research both continue to strive for human happiness, regardless of the differences in their positions and methods.



The view of Mt.Hiei from the Yoshida Campus



Konpon Chu-do. This is the central hall of Mt. Hiei, originally founded by Dengyo Daishi in 788. From the beginning, an "Inextinguishable Dharma Light" burned in this hall.



These straw sandals "waraji" have been well-worn by ascetic Buddhist monks. The monks' voices can be heard chanting nearby.



The Monument of Prayers for Peace by World Religious Leaders' Religious Summit Meeting held on Mt. Hiei