

# 楽

[Raku-Yu]

# 友

吉備大臣  
市川團十郎

新りの野場河原寄座よ  
吉備大臣支那物語と題し  
新田言と取仕組めり吾朝の  
吉備大臣日唐の間は於て  
云々の儀は付唐の玄宗皇帝よ  
追つて貢金と出さしむるの場と復そくの大匠よ

おきりの番名の市川團十郎ありと聞けはるもの  
能辨成以て安禄山等との巖輪妙なるる

作者の有名な河竹翁あはれ定て興ある事とんと評せり



具足屋

Greetings  
from  
Kyoto-U

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**Editorial Collaborator**  
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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.

## Editor's Notes

For the development of global leaders in higher education, the capacity for translation in a broader sense is urgently needed – the ability to translate not only one's native language but also one's familiar ways of thinking and value systems, in the light of the strange and the foreign, and to destabilize one's framework of thinking. It also requires a high command of foreign languages – not only of the kind measured by the scores of TOEFL or TOEIC, but also in terms of a more broader capacity to be engaged in open-minded, bidirectional dialogue with people from other cultures. This would be a higher education worthy of the name: it would be an education that invites the young to be radically awakened, to escape from their state of slumber, and to take the risk of adventuring into unknown environments and into experience that is truly multi-lingual – this in spite of the disturbing experience of being lost in translation.

## Cover: Tokyo Nichi Nichi Shimbun Newspaper #917—From the Newspaper Collection of the Kyoto University Library

The Kyoto University Library has a collection of various newspapers and related materials issued in Japan from the end of the Edo Period to the early stage of World War II (from the latter half of the 19th century to the first half of the 20th century). In the collection, particularly notable are *kawaraban* (printed handbills to inform of major events, sold on the street), issued during the Edo Period, and *nishiki-e shimbun*, single-sheet newspapers issued in Tokyo and Osaka around 1877. The newspapers are comprised of multicolored *ukiyo-e* woodblock prints and short articles concerning interesting topics, such as scandals, gossip, and horror stories. The cover of this issue displays one of these newspapers, depicting a *kabuki* stage featuring Danjuro Ichikawa IX, a celebrated actor who was involved in a movement to modernize and improve *kabuki* drama and make it a high art.

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# Welcome to Kyoto and Kyoto University

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As a result of the rapid progress of globalization, we now have many more opportunities for personnel and information exchanges transcending national, ethnic, cultural, and religious boundaries. Universities can provide optimal opportunities for such exchanges. In particular, Kyoto University is ideally positioned to play a leading role, utilizing its myriad strengths to contribute to global higher education. This university is world-renowned for its cutting-edge research facilities. It has produced many world-class researchers, including recipients of the Nobel Prize, Fields Medal, and Lasker Award. Among Japanese universities, Kyoto University operates the greatest number of advanced research institutes and centers. This is because the university has constantly pioneered new academic frontiers, setting up these research interests ahead of other universities. Kyoto University has an integrated educational system covering both liberal arts and cutting-edge research programs. Kyoto University welcomes students and researchers from around the world to join a wide range of programs offered under this coherent system.

Meanwhile, the advancement of information technology has made it no longer necessary to impart knowledge and information in person. Even without learning directly from teachers, anyone can access necessary information anytime and anywhere through the Internet. In this environment, the role of universities has changed from simply offering knowledge, to providing students with opportunities to learn, through discussion and hands-on studies. These are the optimal ways to combine foresight with information and to move from theory to action.

Since its foundation in 1897, Kyoto University has been promoting self-teaching and self-learning based on dialogues. To foster the spirit of creativity in each student's mind, the university has served as a platform for free discussions, involving people of diverse age groups, backgrounds, and nationalities. In 2013, the university founded the Institute for Liberal Arts and Sciences, dedicated to basic and liberal arts education. In this institute, many lectures are provided in English. In addition, the university has many interdisciplinary research and educational programs, featuring collaborations across the campus.

Seeking partnerships with overseas universities and corporations, Kyoto University currently operates overseas with offices in London, Heidelberg, and Bangkok. We plan to establish two additional overseas offices in the near future. Under the Japanese government's Top Global University project, Kyoto University has been designated as one of the top universities, dubbed a "Super Global University (SGU)." Under this project, we are promoting graduate programs through partnerships with overseas universities. It is my sincere hope that universities around the world will pay keen attention to our activities at Kyoto University, and consider collaborating with us.



Juichi YAMAGIWA  
President of Kyoto University



**Juichi YAMAGIWA** Since his childhood, President Juichi Yamagiwa has been fond of reading. During his elementary school days, he loved adventure stories; when he was in junior high school, he loved science fiction. Along with the changes in his favorite types of books, his future career aspirations also changed, from wanting to become an explorer, then an astronaut, and then, a researcher in physics, searching for the providence of the universe.

In 1970, he enrolled in the Faculty of Science at Kyoto University, driven by his admiration for Dr. Hideki Yukawa, Japan's first Nobel Prize laureate. When he was a sophomore, as a member of the skiing club, he met a student observing monkeys in the snow. After this encounter, he began visiting the Laboratory of Physical Anthropology (in the Faculty of Science), where he learned of a research approach taken by Dr. Junichiro Itani, a Japanese primatologist: to know about human beings, we must first know about non-human animals. In 1974, he began traveling across the Japanese archipelago to observe Japanese macaques in the wild. After enrolling in the Graduate School of Science, he decided to study gorillas. In 1978, he commenced fieldwork in Africa, literally entering a community of gorillas. This fieldwork in Africa enabled him to achieve some remarkable results. He also continued to play a leading role in global research on primatology, serving as president of the International Primatological Society from 2008 to 2012. In diverse academic disciplines, including family dynamics and communication theory, he discusses human society from the perspective of gorilla society. He has also been eagerly involved in environmental preservation campaigns.

When he assumed the office of president of Kyoto University in 2014, President Yamagiwa expressed his determination to ensure that students of Kyoto University can freely select what to do and carry out their own plans. Underlying this resolve is his strong will to adhere to the principle of academic freedom, which Kyoto University upholds, to promote both research and educational activities that will truly benefit society, and to advance the internationalization of the university through these efforts.

## An Invitation to a Limitless Expanse of Intellectual Space

— Roles and Commitments of the Institute for Liberal Arts and Sciences —

### 1. An Outline of the Institute for Liberal Arts and Sciences

The Institute for Liberal Arts and Sciences was established in April 2013 with a view to planning and implementing liberal arts and sciences programs at Kyoto University.

At Kyoto University, each faculty is responsible for its undergraduate programs (4-year programs in general; 6-year programs in the Faculty of Medicine), with courses in specialized education and liberal arts and sciences that are arranged in parallel through the first to fourth years. Within this curriculum framework, the Institute for Liberal Arts and Sciences (hereafter “ILAS”) is responsible for the planning and implementation of courses that are common to all undergraduate programs, such as courses in liberal arts, foreign languages, or major courses (introductory courses) in accordance with each faculty’s policies for organizing undergraduate programs.

### 2. Educational curricula

To plan and implement liberal arts and sciences courses common to all faculties, ILAS has built an organization that is intended to fully reflect the views of respective faculties. All essential aspects of operating ILAS are determined by the Council for Liberal Arts and Sciences,

which is comprised of the deans of all faculties and representatives from independent graduate schools, research institutes, and centers. Practical issues, including courses curricula and class scheduling, are determined by the Committee for Planning and Evaluation. Since the committee is primarily comprised of members transferred from their respective faculties, views of the respective faculties are fully reflected in the practical operation of ILAS under close partnerships with respective faculties.

In addition to the planning of educational content, ILAS is also responsible for implementation of educational programs. Although program-specific professors at ILAS primarily comprise faculty members of the Graduate School of Human and Environmental Studies and the Graduate School of Science, many faculty members from other departments/divisions also teach at ILAS. Accordingly, the liberal arts and sciences programs are supported by the entire university, including its research institutes and centers.

In the past, Kyoto University had some difficulties in planning and implementing integrated policies in the liberal arts and sciences. Therefore, ILAS was established in response to difficulties that had been experienced in the past. The resulting design of ILAS should enable the planning of liberal arts and sciences through much

closer partnerships with respective faculties. Moreover, implementation of such programs has become much easier. Through implementation of this enhanced cooperative system, ILAS can respond to the progress of sciences, social development, and changes in students’ needs, with much more flexibility and immediacy.

### 3. ILAS Approaches to Liberal Arts and Sciences Programs

While a variety of opinions are held concerning liberal arts and sciences courses, Kyoto University takes special note of the following three roles played by these courses.

Firstly, these courses help students to make the transition smoothly from high school education to specialized education at a university. Since Japanese high school students are basically expected to absorb an existing body of knowledge, it is necessary for first-year students to change their methods of learning toward creating new knowledge, driven by their own intellectual curiosity. To enable this essential shift, it is important to help students directly appreciate the significance and joy of learning. In the courses set up by ILAS, highlighted by small group seminars (pocket seminars and basic seminars), faculty members help students understand the significance of learning through close dialogues. In fiscal 2016, an ILAS seminar, which will integrate various existing small group seminars, will be available to all students who desire to participate in it.

The second role of ILAS classes is to help students broaden their intellectual horizons. Rapid progress in academic research means that specialized fields are becoming increasingly segmented. As a result, specialists in specific disciplines find it difficult to understand issues outside their own specialization. Meanwhile, the global community is being confronted by issues that involve different specialized fields. In order to resolutely tackle these issues, it is not enough to merely study one’s own specialized subject; one must have a broad knowledge base that enables events to be observed from various



perspectives. Moreover, it is essential that students thoroughly understand the social significance of their research activities. To this end, ILAS provides students with opportunities to gain familiarity with a broad range of disciplines, in addition to their major.

The third role of ILAS is to assist students to engage with international learning communities. Students need to obtain proficiency in languages to play an active role in the global arena, as well as basic knowledge about contemporary society. Since individual students each have different career plans, to respond to the wide variety of their needs, ILAS provides diverse courses, including those designed to enhance students' English proficiency, their capabilities in foreign languages other than English, and their abilities to understand basic problems affecting contemporary society.

#### 4. Commitments of ILAS

Based on the purposes and philosophy described above, ILAS plans to introduce a new curriculum and class schedule in fiscal 2016. Major features of the new curriculum include the following items.

(1) ILAS is preparing a new curriculum primarily comprised of basic courses suitable for liberal arts and sciences programs. To provide students with greater options, ILAS will provide multiple subjects for basic courses as far as possible. Combined with drastic readjustment of the schedule, this new curriculum will provide students with more options to take basic courses according to their own plans.

(2) ILAS is radically reviewing the curriculum of its introductory courses for respective majors. As for mathematics, an experimental new course will open in some faculties in fiscal 2015; in fiscal 2016, a new mathematics course will open at full scale, together with courses in physics, chemistry, biology, geo-science and informatics. To address various problems facing contemporary society, it has become increasingly important to integrate approaches to

both humanities and natural sciences. In response, a new integrated sciences course will open, which will deal with interrelated themes, such as environment and energy, in a cross-disciplinary manner. In addition, ILAS is currently developing another new course on statistics, a discipline that has become increasingly important for students of both natural sciences and humanities.

(3) Concerning language programs, ILAS will reinforce English education in response to surging needs for English proficiency in the present context of advanced globalization. Although in the past, priority was placed on fostering students' reading and writing abilities, ILAS is reviewing the conventional curriculum and will adopt an approach that enhances development of students' listening and speaking abilities. Language education will be supported by the International Academic Research and Resource Center for Language Education (i-ARRC), which was established in April 2014 within ILAS. Upon the completion of the i-ARRC wing, full-fledged language support programs will be provided in this new facility.

Kyoto University has considered it to be important that students learn various languages, not only English. Consequently, ILAS offers eight language courses, in addition to English. The university hopes that

through the acquisition of language abilities, students will also gain valuable insights into differences in cultures, customs, and values.

(4) Currently, Kyoto University is enhancing its commitment to campus-wide internationalization. In addition to receiving increasing numbers of international students, the university operates diverse programs encouraging Japanese students to develop global perspectives. In line with the university's policy, ILAS is significantly increasing the number of classes provided in English. Now that this initiative has been adopted as part of the national government's program to advance the reform of national universities, government subsidies have been made available for hiring faculty members who will teach classes in English. During fiscal 2014, 88 courses were provided in English. By increasing the number of faculty members responsible for language teaching, the university plans to provide all basic courses in English by the final year of the project. It is expected that providing students with opportunities for more exposure to the English language outside of their English classes will significantly improve their English proficiency. Moreover, students' perspectives will be broadened by learning various disciplines through the viewpoints of English native speakers.



## Our Goal Is To Create an Intellectual Space That Is Free, Open, and Conducive to Learning

The Institute for Liberal Arts and Sciences plays a leading role in promoting the internationalization of Kyoto University and fostering future leaders in the global arena. In this issue of *Raku-Yu*, we are pleased to present an interview with Director Takashi Muranaka, Professor at the Graduate School of Law, who was involved in the establishment of ILAS from the initial planning stage, and who has been serving as the Director of ILAS since October 2014.



**Q : When did Kyoto University begin to conceive the vision of establishing ILAS?**

**A :** The university has been aware of the importance of liberal arts and sciences for many years. Since around 1990, discussions were held and various systems were established. In actuality, however, they did not function well. The major reason for this resided in ambiguities regarding the locus of responsibility. Under the present system, however, ILAS is responsible for liberal arts and sciences education in all stages ranging from planning to implementation. So I believe the present system will function much more effectively.

**Q : You have said that the primary goal of ILAS is to “create an intellectual space that is free, open, and conducive.”**

**A :** In contemporary society, students are expected to open up new intellectual horizons through original thinking, personal experience, and free and open dialogues with other students and faculty members transcending the boundaries of their specialized disciplines. This is the core conviction of Kyoto University, and for many years it has produced students capable of opening up new intellectual horizons. At ILAS, we plan to reinforce small-group educational systems, such as pocket seminars, to provide students with increasing opportunities to engage in free and open discussions, and to stimulate their creativity. I believe this will enable us to develop students who will become active players at a global level. I believe that we can create an excellent environment for achieving that goal.

**Q : I assume that the university plans to receive more international students so that discussions will involve students from many more countries and a diversity of backgrounds.**

**A :** Definitely. Although respective faculties are primarily responsible for increasing the number of international students, ILAS is also making efforts. For instance, we are increasing the number of classes provided in English, opening new courses to introduce Kyoto and Japan’s tradition and culture, and attaching English translation to materials and data introducing ILAS programs and educational systems.



**Q : Finally, may I ask you to offer a message to students outside Japan who are considering applying to enroll at Kyoto University?**

**A :** Since ILAS places priority on the internationalization of its programs, many of its courses are provided in English. I hope that we can create an ideal environment for students from diverse countries to hold open discussions. ILAS should provide an intellectual platform where Japanese students will learn about other countries, and international students will learn about Japan in a friendly and enjoyable atmosphere.

## Inauguration Ceremony Held for President Yamagiwa

October 2, 2014



The day after taking office as the 26th President of Kyoto University, Professor Juichi Yamagiwa presided over an inauguration ceremony at the University's headquarters.

In front of around 150 Administration Bureau employees, President Yamagiwa delivered an address and introduced the seven new Executive Vice-Presidents—Shinji Asonuma, Kayo Inaba, Masao Kitano, Naoki Sato, Toshio Sugiman, Takayoshi Seiki, and Nagahiro Minato.

## High-field MRI System Introduced at Kyoto University Hospital

October 30, 2014

As part of its integrated smart imaging circuit (iSIC) initiative aimed at building intraoperative imaging capabilities required for advanced surgical procedures, Kyoto University Hospital has installed a 3-tesla high-field magnetic resonance imaging (MRI) system in one of its operating rooms, becoming the first medical institution in Japan to host such a

facility.

The University Hospital's newly installed 3-tesla MRI system provides timely pre-, intra-, and postoperative imaging in the operating room to support high-precision surgery. It works in conjunction with the latest-model navigation system to provide dynamic 3D reconstruction of the MR images taken to produce 3D pictures

of target organs in real time. At the University Hospital, these systems will be used for procedures involving high-field imaging techniques, such as functional imaging (brain mapping), MR spectroscopy (*in vivo* molecular imaging), and tractography (imaging of neural tracts).



### The 2nd Kyoto University–National Taiwan University Symposium

The 2nd Kyoto University–National Taiwan University Symposium was held at Kyoto University on September 1–2, 2014. The event aimed to build on the success of the inaugural meeting that took place on December 19–20, 2013 at National Taiwan University (NTU). A delegation of over 110 NTU

scholars and staff members traveled to Kyoto to attend the symposium, which attracted over 300 participants in total, including faculty, students, and staff of Kyoto University.

A signing ceremony was held to conclude a memorandum of

understanding for faculty exchange and a double degree program agreement between the two universities. The agreements will facilitate a more strategic and multifaceted partnership between Kyoto University and NTU, promoting research collaboration and the exchange of students and faculty.



President Matsumoto (left) and President Yang at the MOU signing ceremony



Symposium participants

### Sweden–Kyoto Symposium Held in Stockholm

The Sweden–Kyoto Symposium was held in Stockholm, Sweden on September 11–12, 2014 in collaboration between Kyoto University and four leading Swedish universities: Stockholm University, Uppsala University, KTH Royal Institute of Technology, and Karolinska Institutet. The symposium aimed to provide a platform for researchers from the five institutions to meet, share knowledge and ideas, and develop networks for research collaboration. Over 150 researchers and other members from the participating institutions attended the symposium over the course of its two days.

Ten sessions, covering diverse fields such as energy science, bio-informatics, aging, and philosophy, gave the participating scholars

an opportunity to share their research findings, and explore possibilities for collaboration. Representatives from each session then reported their progress in the closing sessions, which were held at Stockholm University and Uppsala University.

These events are part of a series of international research symposia held

in accordance with Kyoto University's international strategy, *The 2x by 2020 Initiative*, which was formulated in June 2013. Through organizing and holding such events, the university aims to consolidate its position as a leading international university and enhance its international presence by contributing to the global academic community.



Dr. Mishima introduces Kyoto University



Lead delegates and special guests



# Laretna T. ADISHAKTI

World-renowned  
KU Alumni

## Building Community Roles in Heritage Conservation in Indonesia

Laretna T. Adishakti, who received a Doctorate in Engineering from Kyoto University (1997), is an Associate Professor and Coordinator of the Center for Heritage Conservation, Department of Architecture & Planning, Faculty of Engineering, Universitas Gadjah Mada (University of Gadjah Mada) in Yogyakarta, Indonesia. She is also a batik entrepreneur, a painter and a flower arranger.

Currently, Laretna facilitates as the co-founder and Vice President of the Indonesian Heritage Trust; and the Chairperson and co-founder of the Jogja Heritage Society. She is a Facilitator for the International Field School on Asian Heritage, Indonesian Heritage Cities Program, and also for the International Field School on Borobudur Heritage Saujana. She was selected as an Eisenhower Fellow in the USA (2002), served on the Selection Committee for the Rolex Award for Enterprises (2006), and received the Nikkei Asia Prize for Culture (2009), in Tokyo, Japan.



### Indonesian Heritage Movement

The role of the community in Indonesian Heritage Movement, which in 2014 entered its third decade, has been driven by Laretna T. Adishakti, among others. Twenty years ago, civic organizations involved in heritage conservation were limited in Bandung, Jakarta and Yogyakarta on Java. Adishakti is one of the founders of the Jogja Heritage Society in the city of Yogyakarta (1991) and is currently the chairwoman. Nowadays, many cities across the Indonesian archipelago have community organizations devoted to the protection of heritage. In 2004, a national heritage conservation organization was established, called Badan Pelestarian Pusaka Indonesia/BPPI (Indonesian Heritage Trust). This organization is based in the capital city of Indonesia, Jakarta. Laretna T. Adishakti was the first president of this organization. One of the obligations of this organization is to guard the Charter of Indonesian Heritage Conservation 2003. This is the first charter owned by Indonesia, and was launched as a milestone in Indonesia Heritage Year 2003. This charter states that Indonesian heritage is natural, cultural (tangible and intangible) and saujana heritage. The years 1990s - 2003 are noted as the first decade of the Indonesian Heritage Movement.

### Diversity of Heritage

In the second decade of the Indonesian Heritage Movement (2004-2013) under the theme of heritage diversity, there were many heritage activities developed. Adishakti and the Center for Heritage Conservation, Department of Architecture and Planning, Faculty of Engineering, University of Gadjah Mada (CHC-UGM) have contributed to this movement. Among others there has been a collaboration with Prof. DR. Eng. Kiyoko Kanki of Kyoto

University in developing saujana (cultural landscape) heritage conservation by organizing of the Annual International Field School on Saujana Borobudur Heritage since 2004.

Major tectonic earthquakes in Central Java and Yogyakarta became a trigger for the growth of new movements in disaster risk management for heritage. Various new heritage protection schemes have been prepared for natural disasters. Gadjah Mada University also bought a damaged traditional house in the affected heritage district of Kotagede. After renovation, it was converted into the Kotagede Heritage Movement Center UGM. This center has housed the revival of intangible cultural heritage post-disaster such as silver crafts of Kotagede and many other heritage activities since then.

In the field of education CHC-GMU has developed several programs such as:

- Heritage Education for Primary Schools, which was developed by the Center of Curriculum, Ministry of Education and Culture and Erf Goed of the Netherlands, in collaboration with BPPI
- Elective courses on Architectural Heritage Infill Design and Heritage Cities
- Thematic Studio and Finale Thesis on Architectural Heritage Infill Design
- Training modules for government officials as well as professionals in the field of heritage conservation.

After the establishment of Jaringan Kota Pusaka Indonesia/JKPI (Indonesian Network for Heritage Cities), a network for mayors and regents in 2008, the Directorate General of Spatial Planning of the Ministry of Public Works launched a multi-year program called Conservation Program for Indonesian Heritage Cities in 2012. Through this program, pilot projects were developed in several cities in

Indonesia. At the end of Indonesian Heritage Year 2013, under the theme of "Heritage for Social Welfare," the Charter for Conservation of Indonesia Heritage Cities 2013 was declared.

### Heritage for Social Welfare

The third decade of the Indonesian Heritage Movement began in 2014. Various parties including BPPI, Indonesian ICOMOS, JKPI, Coordinating Ministry of People's Welfare, Ministry of Public Works and many others have agreed to highlight the theme "Heritage for Social Welfare," and to implement eight instruments for heritage conservation plans as also stated in the Charter for Conservation of Indonesian Heritage Cities 2013. Those instruments, which highlight the important roles of the community in heritage conservation, are as follows:

1. Institutions and Governance
2. Inventory and Documentation
3. Information, Education and Promotion
4. Economy for Heritage
5. Risk Disaster Management for Heritage
6. Development of a Community Living Culture
7. Spatial Planning and Infrastructure
8. Architectural and District Design

For Laretna T. Adishakti, her contributions to the movement are mostly based on her dissertation at Kyoto University titled "A Study on the Conservation Planning of Yogyakarta Historic-tourist City based on Urban Space Heritage Conception" (1997). Her involvement in heritage conservation, and specifically, heritage cities, also bring her to be an expert for the Organization of World Heritage Cities Asia and the Pacific based in Gyeongju, Republic of Korea, and the facilitator for the Conservation Program for Indonesian Heritage Cities across the country.

World-renowned  
KU Alumni

# How does a chemical reaction take place?

A theoretical study reveals secrets that cannot be easily found experimentally.

## FOREFRONTS OF RESEARCH AT KYOTO UNIVERSITY

### What is a chemical reaction?

In the high school chemistry lab, you heated a compound and sometimes the color changed and a new compound was formed. That is to say that you observed a chemical reaction. A chemical reaction in which a molecule changes its chemical structure can be visualized as a molecule or molecules hiking along a mountain road. Starting from a village, the molecule has to go over a mountain range to reach the next village, which represents a new compound. For a molecule to go over the mountains, some energy is required and this is usually provided by heating the molecule. The easiest way to cross the mountain range is not to go over the top of the mountains but to go through the lowest point in the mountain range, which is often called a “pass,” like the Simplon Pass. The lower the pass, the easier it is for the hiker to go over. The pass is called the “transition state” in chemistry; the lower the energy of the transition state, the easier it is for the reaction to proceed.

### The pass between two villages and the slope

The pass is the highest point on the road, but the lowest point on the mountain ridge. Therefore, when exactly on the pass, the landscape has no slope in any direction, and a ball placed at this point will not roll. The pass can be located efficiently by looking for a point where the “slope” is zero. Once the pass is found, you can put a ball at this point, push it slowly in either direction and follow the motion of the ball from the pass down to the next village below. The ball will roll along the direction of the “slope.” The pathway of the ball, when it is moving very slowly, is called the “reaction coordinate,” which is the path that the molecule is likely to follow during the chemical reaction. As seen here, the “slope” allows you to move around the energy landscape faster, in the same way as skiing allows you to move around on a snowy landscape faster than walking step by step.

### Theoretical information is complementary to experimental information

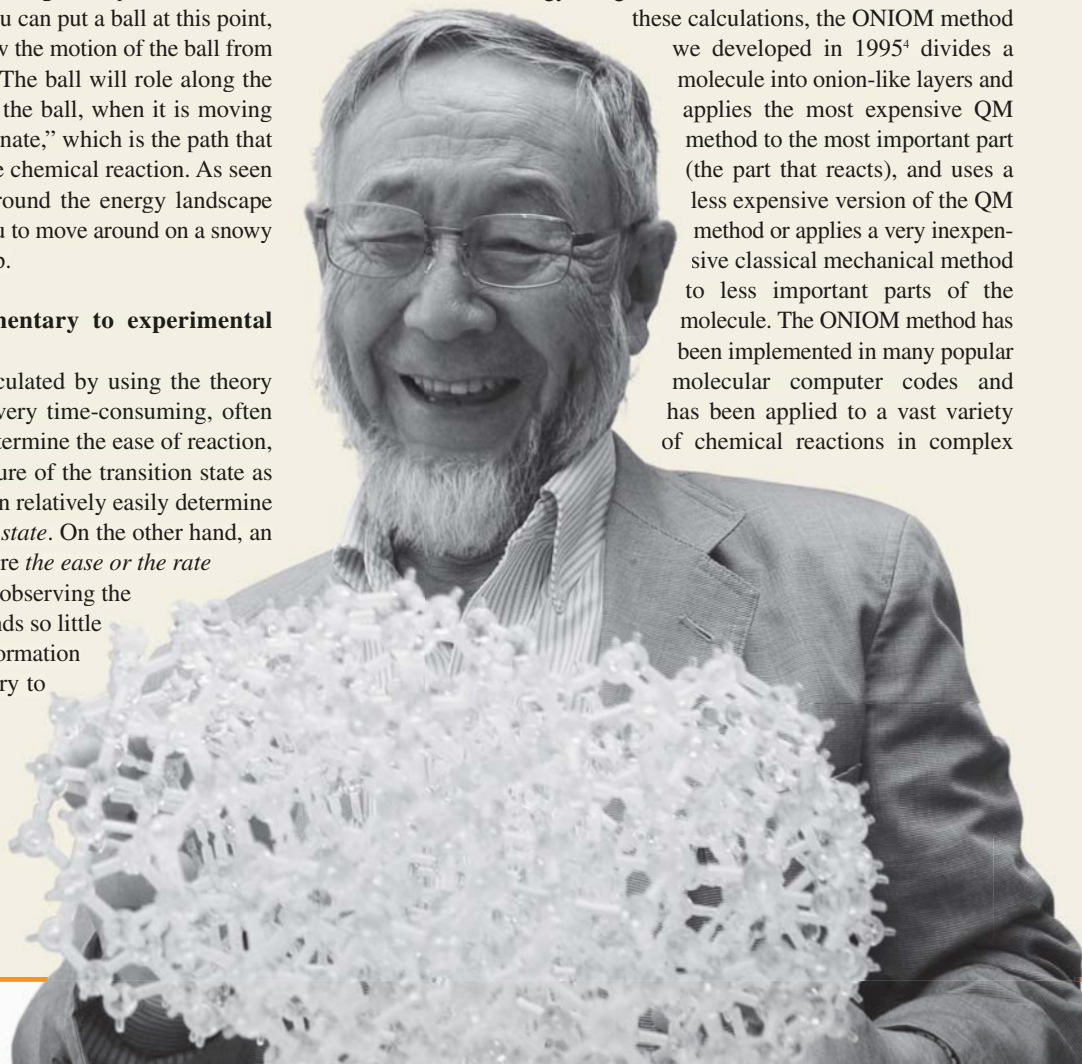
The energy of a molecule can be calculated by using the theory of quantum mechanics. This is usually very time-consuming, often requiring a supercomputer. In order to determine the ease of reaction, it is necessary to find the shape or structure of the transition state as well as its energy. Quantum mechanics can relatively easily determine *the structure and energy of the transition state*. On the other hand, an experiment will allow you to easily measure *the ease or the rate of reaction*, but you will have a hard time observing the transition state, because the molecule spends so little time in the transition state. In this way, information obtained by theory is often complementary to information obtained by experiment.

### The energy gradient and the GRRM strategy

As seen above, the “slope” or “energy gradient” is very useful for a theoretical determination of the transition state. Some thirty-seven years ago,<sup>1</sup> we were the first to use the energy gradient obtained by quantum mechanical calculation to determine the transition state and to follow the reaction pathway of a chemical reaction. In the last decade or so, we have developed a very efficient “global reaction route mapping” (GRRM) strategy that automatically determines all important reaction pathways by heavy use of the energy gradient.<sup>2</sup> With this method, it has become possible to find all important reaction pathways without any prior knowledge, and this is expected to have a large impact on the theoretical study of the chemical reactions of complex molecules. For instance, with the GRRM method we found a totally unknown pathway, which we called “the excited state roaming pathway,” for the light-induced decomposition of the NO<sub>3</sub> molecule, an air-pollution molecule.<sup>3</sup>

### The ONIOM method for large molecules

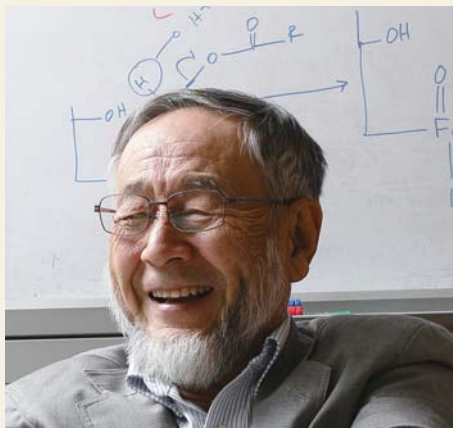
When molecules become large, calculation of the quantum mechanical (QM) energy and gradient becomes very expensive, even on supercomputers. For an efficient search for reaction pathways, very fast calculation of the energy and gradient is essential. In order to accelerate these calculations, the ONIOM method we developed in 1995<sup>4</sup> divides a molecule into onion-like layers and applies the most expensive QM method to the most important part (the part that reacts), and uses a less expensive version of the QM method or applies a very inexpensive classical mechanical method to less important parts of the molecule. The ONIOM method has been implemented in many popular molecular computer codes and has been applied to a vast variety of chemical reactions in complex



systems. For instance, the method has been used by many researchers in the world as well as by us to clarify the mechanism and the controlling factors of many catalytic reactions by transition metal complexes. The ONIOM method has also been instrumental in the study of mechanisms of many reactions in biological systems, such as enzymatic reactions and photoactive proteins.

### Theoretical and computational chemistry 55 years ago and now

Theoretical and computational chemistry has come a long way since I was a graduate student with Prof. Kenichi Fukui about 55 years ago. With a hand calculator that is more than one trillion ( $10^{12}$ ) times slower than the present day personal computer, what one could calculate was extremely limited. Theoretical chemistry was a new and still minor field of chemistry. One cannot imagine what intuition and creativity Prof. Fukui had when, using only hand calculators, he discovered the frontier orbital



theory of chemical reactions in 1952, which resolved fundamental principles of organic reactions and resulted in the Nobel Prize in Chemistry in 1982. Nowadays, thanks to many years of effort by theoretical chemists as well as the availability of supercomputers, theoretical computation can provide much more information that is not easily available experimentally and has become a major and equal partner in traditionally empirical chemistry research. Closer collaboration between experiment and theory will carry the torch in finding new chemical materials that are essential in building a sustainable world in the 21st century.

### References

- 1) *Chem. Phys. Lett.* **45**, 595-602, 1977; *J. Chem. Phys.* **66**, 2153-2156, 1977.
- 2) *Phys. Chem. Chem. Phys.* **15**, 3683-3701, 2013.
- 3) *Science* **335**, 1075-1078, 2012.
- 4) *J. Phys. Chem.* **100**, 19357-19363, 1996.

## Keiji MOROKUMA

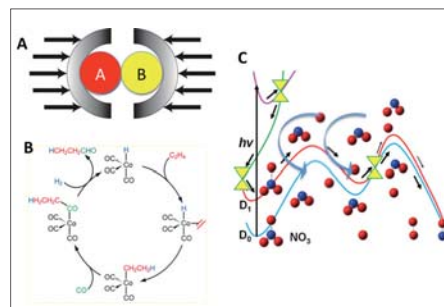
- Born in 1934
- Ph.d., Kyoto University
- Senior Research Fellow, Fukui Institute for Fundamental Chemistry
- URL <http://kmweb.fukui.kyoto-u.ac.jp/top/index.html>

**‘Don’t imitate others.’ I keep firmly in my mind these words by Professor Kenichi Fukui, a Nobel Prize laureate.**

Dr. Keiji Morokuma works so energetically that he gives the impression of being much younger than his actual age. Recalling his childhood, the 80-year-old research leader said, “As a child, I was full of curiosity and the scope of my interests by far exceeded those of other children.” Although he aspired to become an engineer when he enrolled at the Faculty of Engineering of Kyoto University, he became interested in theoretical chemistry when he learned quantum mechanics. At that time, Kyoto University was the only educational institution in Japan that taught quantum mechanics in chemistry courses (in other universities, the subject was taught only in physics courses). Subsequently, he began to dedicatedly study theoretical chemistry under Professor Kenichi Fukui, a laureate of the Nobel Prize in Chemistry.

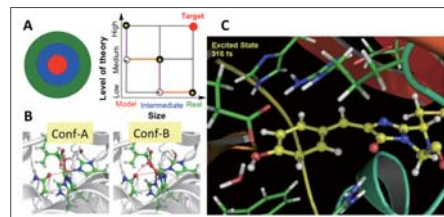
Dr. Morokuma continued to engage in his original research programs, as he found it “interesting to address a question that no one has ever resolved.” In 1995, his dedication to research activities led to the development of the ONIOM Method (our Own N-layered Integrated molecular Orbital and Molecular Mechanics), a method for calculating complex behaviors and chemical reactions of molecular systems. The development of this method had significant impact on research in chemistry. In 2013, when Professor Martin Karplus of Harvard University was awarded the Nobel Prize in Chemistry, the Nobel Committee named Professor Morokuma as one of the seven researchers who significantly contributed to the research that won the Nobel Prize.

In 1964, Dr. Morokuma began working in the United States as a doctoral research fellow. Since then, he has spent half of his research life in the United States. Even after assuming his present post (as research leader) in 2006, he continued shuttling between Japan and the United States. “Using theoretical calculations, I want to clarify complex chemical reactions of protein and other macromolecules, comprising thousands of atoms.” This statement demonstrates that his curiosity and challenging spirit have not waned since his childhood.



**Fig. 1** Global Reaction Route Mapping (GRRM) strategy and a few applications. **(A)** In GRRM, an artificial force is applied between two molecules. As a result, the reaction barrier disappears and the search for transition states can be made automatically.

**(B)** GRRM clarified the mechanism (how and in what order the molecules react) of hydroformylation by a transition metal catalyst. *J. Chem. Theo. Comp.* **8**, 380-385, 2012. **(C)** For dissociation of  $\text{NO}_3$  by light, using the GRRM strategy we found a totally unknown mechanism, named the excited state roaming pathway, in which the nearly dissociated oxygen atom roams around the  $\text{NO}_2$  fragment and eventually dissociates as  $\text{NO}$  and  $\text{O}_2$  molecules. *J. Phys. Chem. Lett.* **2**, 934-938, 2011.



**Fig. 2** The ONIOM method and a few applications. **(A)** In the ONIOM method, a molecule is divided into onion-like layers, and the most expensive QM method is used only for the

most important part (the part that reacts), and less expensive versions of the QM method or a very inexpensive classical mechanical method is used for less important parts of the molecule. **(B)** The ONIOM structure optimization of the ferrous resting state of the soybean lipoxygenase-1 (SLO-1) enzyme reveals that there are two distinct conformations and experiments have been unknowingly observing an average of two structures. *J. Phys. Chem. Lett.* **1**, 901-906, 2010. **(C)** A snapshot of the ONIOM-calculated motion of the wild-type Dronpa green fluorescent protein. In wt-Dronpa the chromophore (in yellow) has a long fluorescent lifetime because it cannot easily isomerize by rotation around the C-C bond due to the presence of histidine 193, while in the H193 mutant where H193 is missing, this rotation occurs easily and the lifetime is short. *J. Phys. Chem. Lett.* **1**, 3328-3333, 2010.

# Why I study Korean archaeology

— Past, present, and future of Japan-Korea archaeological research exchanges —

## FOREFRONTS OF RESEARCH AT KYOTO UNIVERSITY

When studying the primitive age and ancient times of Japanese history, it is essential to explore Japan's relations with people on the Korean Peninsula. At various archaeological excavations around Japan, the artifacts unearthed are often originally from the Korean Peninsula. Many artifacts have also been produced in Japan with the

strong influence of the cultures on the Korean Peninsula. Driven by my curiosity to know the origins of those artifacts discovered in Japan, my interest blossomed in the archaeology of the Korean Peninsula. For instance, I wanted to know when and in which area of the Korean Peninsula each artifact was produced. For items unearthed that were produced in Japan, I wanted to know which region in Korea influenced them. My first interest was in the ancient burial mounds of Paekche and the artifacts unearthed there. During Japan's Kofun (burial mound) period (latter half of the 3rd century – 6th century CE),

many huge keyhole-shaped burial mounds were constructed in various parts of the Japanese archipelago. At that time, the Korean Peninsula was divided into three kingdoms: Goguryeo, Paekche, and Silla, with each developing its own unique culture. Of the three, Paekche maintained particularly friendly relations with Japan's Yamato court. Many people also emigrated from Paekche to Japan at that time. By revealing more clearly similarities between the burial mounds in Japan and Paekche, I felt I would be able to clarify the cultural origins of ancient Koreans who immigrated to Japan.

After I began studying at Kyungpook National University in the Republic of Korea to engage in full-scale surveys of archaeological materials, however, I found that I had to pay attention not only to similarities, but also to differences, among various regions on the Korean Peninsula and in the Japanese archipelago. Archaeological materials indicate that frequent transfers and exchanges of people occurred between the Korean Peninsula and Japanese archipelago throughout the Kofun period. Nevertheless, ancient burial mounds in diverse regions have different shapes, sizes, and structures. For instance, there are various types of burial mounds: rectangular (Goguryeo and Paekche), circular (Silla, Gaya [Fig. 1]), and keyhole-shaped (Japan). Differences are also found in their structures and dimensions. Comparative studies of ways of constructing burial mounds and burying the deceased help

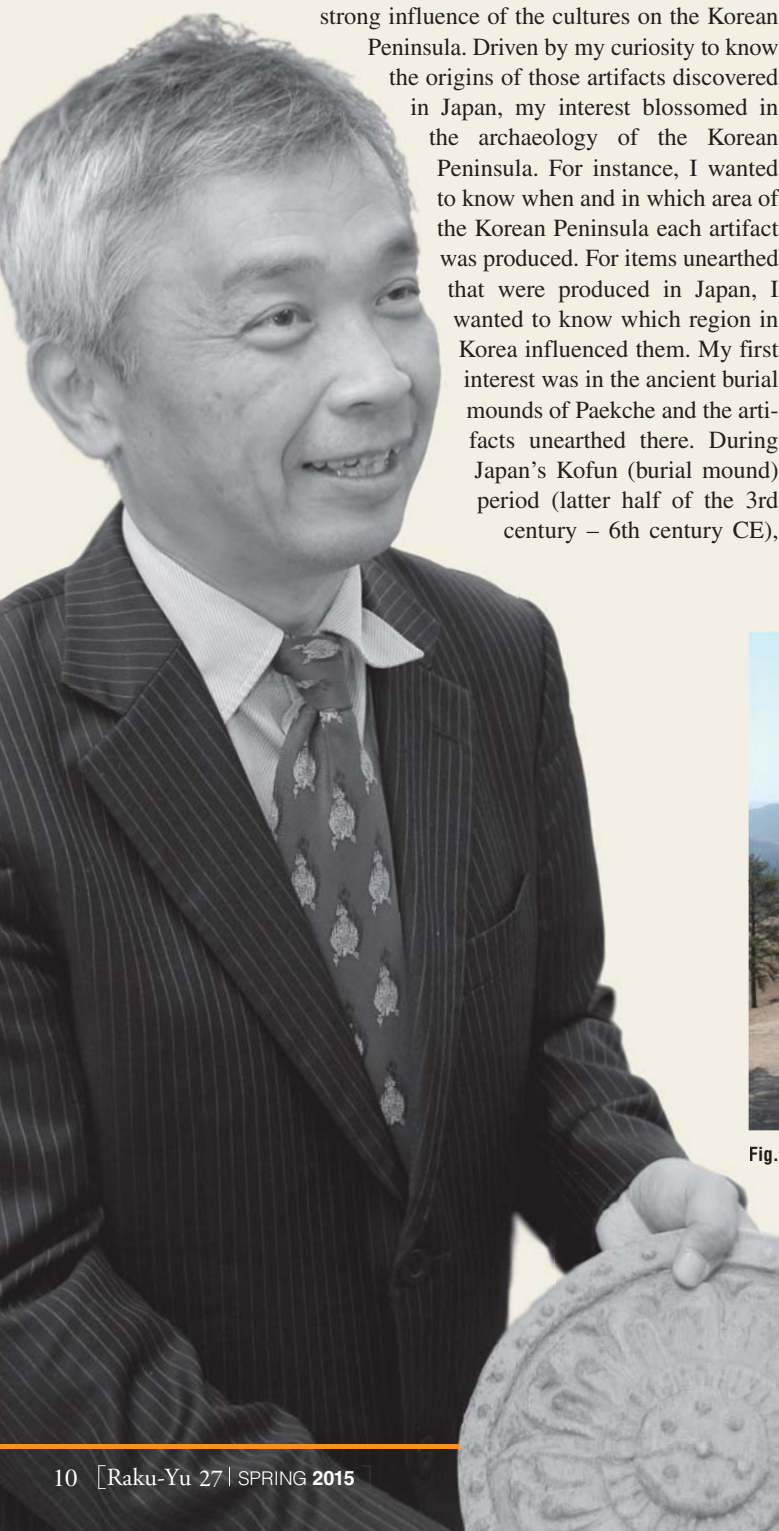


Fig. 1 Ancient tomb site at Jisan-dong, Goryong

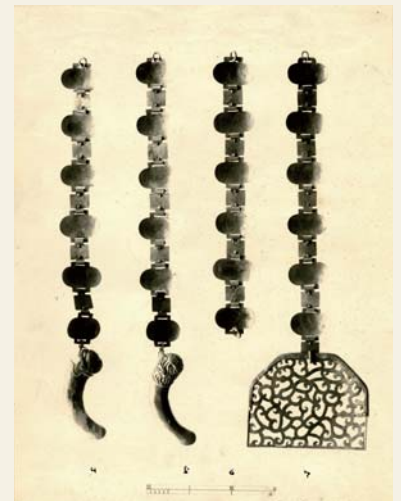


Fig. 2 Original plates for illustrations in the report on the Gold Crown Tomb Excavation Project (collection of the Dept. of Archaeology, Kyoto University)

clarify the unique aspects of respective regions, as well as features they share in common. Through comparative studies, I am also addressing a greater question: why did these ancient people invest so much time and expend such great efforts to construct such huge burial mounds?

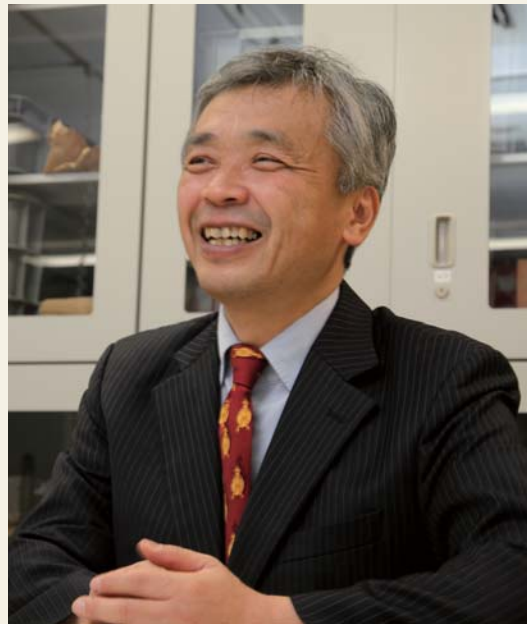
Meanwhile, through my exchanges with South Korean researchers, I began feeling it is my task to reveal the results of archaeological research projects conducted by Japanese researchers on the Korean Peninsula during the colonial period (1910 – 1945). Under Japan’s governance, archaeological projects on the Korean Peninsula were conducted exclusively by Japanese researchers. However, reports were not published on many of these projects. Kyoto University does, however, possess various materials related to these projects, since the Department of Archaeology of Kyoto Imperial University (predecessor of Kyoto University) was deeply involved in such excavation works. Accordingly, together now with South Korean researchers, we are currently analyzing such materials and cross-checking them with materials in South Korea.

As an example of such collaborations, I would like to introduce the excavation project of the Gold Crown (Geumgwanchong) Tomb in Gyeongju. In this project conducted in 1920, lavish burial accessories were discovered, including a gold crown. Professor Kosaku Hamada and Professor Sueji Umehara (the first and second professors, respectively, in the Department of Archaeology of Kyoto Imperial University) assumed the tasks of classifying the numerous artifacts unearthed from the burial mound and

of compiling a report on the excavation project. Although the professors intended to publish a massive report comprising two volumes of texts and an additional two volumes of illustrations, the second volume of text was not published for various reasons. Moreover, from the viewpoint of today’s research standards, the ancient tomb has not yet been thoroughly clarified since there are many artifacts that have not yet been reported. In a joint program with South Korean researchers, we have found a considerable number of excavation records, photographs, and original plates for texts and illustrations (Fig. 2), all of which were prepared for compiling a report on the Gold Crown Tomb. We found that they are kept at the Department of Archaeology of Kyoto University and the Umehara Collection at the Toyo Bunko (Oriental Library). Based on a survey of the materials kept at Kyoto University,

I compiled a report of the remaining materials and introduced some materials at a special exhibition held in South Korea. These materials will be used to reclassify the artifacts excavated from the Gold Crown Tomb in a program being carried out by the National Museum of Korea.

Through these research programs, I found that the archaeological projects of ancient Korea conducted during the colonial period significantly helped develop the field of archaeology in Japan. Revealing these colonial period research projects is essential for reviewing the past and present of archaeology in both Japan and Korea. I also believe that collaborations with South Korean researchers are very significant for archaeologists in both countries in determining the future directions of archaeological programs in both countries.



## Hideo YOSHII

- Born in 1964
- M.A., Kyoto University
- Professor, Graduate School of Letters
- URL <http://hb3.seikyoeu.ne.jp/home/Hideo.Yoshii/> (Japanese text only)

### I am considering the meaning of Japanese researchers’ engagement in Korean archaeology.

Professor Hideo Yoshii said that since his days in elementary school, he had been interested in history. During his early teens, he often spent his spring and summer holidays visiting temples, shrines and other historical sites in Kyoto from his relative’s house in the city. During his senior-high-school days, he was involved in the excavation of Taiyama Burial Mounds in Tatsuno City, Hyogo Prefecture, and the classifying of unearthed artifacts. This experience led him to study archaeology.

After entering Kyoto University, he joined the Kyoto Workshop on Ancient Korean History, marking the start of his career researching Korean

archaeology. This research field is relatively recent, developed primarily by Japanese archaeologists during the first half of the 20th century, when the Korean Peninsula was under Japanese rule. In addition to verifying excavation survey reports compiled at that time, Professor Yoshii has been eager to translate various related materials into Korean. Since the end of World War II, archaeological research has progressed rapidly in South Korea, casting Professor Yoshii in the role of a bridge between archaeologists in the two countries.

“I want to know people’s daily lives, social systems, and culture of ancient Korea. The more I study the ancient artifacts, the more my imagination spreads. It’s truly fun.” Holding in his hand a roof tile produced in ancient Silla, the professor talked with shining eyes, like a young boy seeing the field of archaeology for the first time.

# Prize, Award and Honour Winners

## Professor Isamu Akasaki, a graduate of Kyoto University Graduate School of Science, wins Nobel Prize in Physics (December 10, 2014)

Professor Isamu Akasaki won the Nobel Prize in Physics “for the invention of efficient blue light-emitting diodes, which has enabled bright and energy-saving white light sources.” Along with joint winners Professor Hiroshi Amano of Nagoya University and Professor Shuji Nakamura of University of California, Santa Barbara, Professor Akasaki received the Nobel Medal, Nobel Diploma, and a document confirming the Nobel Prize amount, from King Carl XVI Gustaf of Sweden at the award ceremony held on 10<sup>th</sup> December 2014.



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## Professor Takuro Mochizuki of RIMS gives a Plenary Lecture at the International Congress of Mathematicians (August 20, 2014)

Professor Takuro Mochizuki from the Research Institute for Mathematical Sciences (RIMS) presented a Plenary Lecture at the International Congress of Mathematicians (ICM) held in Seoul, Republic of Korea from 13<sup>th</sup> to 21<sup>st</sup> August 2014.

His lecture was titled “Wild harmonic bundles and twistor D-modules,” which focused on a theory with which he had proven Kashiwara's conjecture, a seemingly intractable problem put forth by Professor Emeritus Masaki Kashiwara, also affiliated with RIMS, Kyoto University. The theory earned Professor Mochizuki worldwide acclaim, and, with its far-reaching scope, may serve as a part of the foundation for 21st-century mathematics.



In addition, Professor Takashi Kumagai, another RIMS member, spoke at the ICM as an Invited Lecturer.



## Professor Kazutoshi Mori receives Lasker Award (September 19, 2014)

The Albert and Mary Lasker Foundation held this year's award ceremony in New York City, and presented its Basic Medical Research Award to Professor Kazutoshi Mori of Kyoto University's Graduate School of Science, and Professor Peter Walter of the University of California, San Francisco.



© Photo courtesy of the Albert and Mary Lasker Foundation

Professors Mori and Walter won the award for their discoveries concerning the unfolded protein response (UPR)—an intracellular quality-control system that detects harmful misfolded proteins in the endoplasmic reticulum and signals the nucleus to carry out corrective measures.

In light of its inner workings, UPR is believed to have significant implications not only for basic research in cell biology but also for translational medicine, which includes finding cures for diabetes and Parkinson's disease.

“Looking back, I can point to many happy meetings that changed the directions of my career. In particular, three meetings come to mind,” said Professor Mori in his acceptance remarks, extending his heartfelt appreciation to all who gave him support and inspiration over the course of his 25 years of research on UPR.

“I decided to go to the United States, where I had my first happy meeting: in 1989, at the University of Texas Southwestern Medical Center, I met the discipline of molecular biology under the mentorship of Mary-Jane Gething and Joe Sambrook,” said Mori, who also touched upon the initial encounter he had with molecular biology in his freshman year at Kyoto University, as well as the long and winding road he took afterwards. “There in Dallas, Texas, I was introduced to the unfolded protein response (UPR)—my second happy meeting.”

“Had I stayed in the United States after Texas days, I would have probably employed a complicated American-style screening approach that would have never allowed me to keep up with a major player like Peter Walter,” continued Mori, highlighting the guidance he received from Professor Takashi

Yura, Professor Emeritus of Kyoto University and then-Director of the Kyoto-based Heat Shock Protein (HSP) Research Institute. “But the development of my simple one-hybrid screening, was my third happy meeting—to me, it was the Japanese version of the American Dream. Thank you again for honouring me with the Lasker Award.”



©Photo courtesy of the Albert and Mary Lasker Foundation

The 21st century has been called the age of human mobility. Globalization and technology provide opportunities to travel across the world for work or pleasure, but there are also an estimated 200 million people now working and living outside their nations of origin, either legally or illegally. In addition, tens of millions are being involuntarily displaced because of development, disasters, conflict, environmental degradation or the impacts of climate change. In fact, with large-scale conflict raging in Africa, west Asia and the Middle East, there are more conflict-induced refugees today than at any time since World War II.

Japan is also experiencing an increase in international residents, with the number doubling since 1991, of whom nearly half have permanent resident status, but there isn't wide recognition of the unique perspectives that long-term residence can impart. As an American who has lived in Japan for more than three decades, I would like to share a few thoughts on the experience.

Long-term residence in Japan promotes language and cultural fluency, familiarity with cultural memes, an appreciation of manzai comedy\*, even second-hand nostalgia for Tora-san movies\* and *The Drifters*\* routines. The longer you stay the more comfortable you become in your new home, while you feel increasingly "foreign" upon returning to your home country. When I visit the US today I react like a Japanese tourist, agog at the contradictions on display: great personal friendliness and high crime rates, consumer abundance and sharp economic disparities. Casual banter, crossword puzzles, and stand-up comedy become challenging, and my penchant for over-enunciating and using simplified English, a product of years of spent teaching non-native English speakers, can make other Americans slightly uncomfortable. Needless to say, this is also maladaptive when making academic conference presentations.

Unlike in countries like the United States with strong multi-ethnic traditions to steer by, integration of long-term foreign

residents into a Japanese neighborhood or workplace can be problematic. There tends to be a binary perception of foreigners' Japanese-language knowledge by many Japanese – either you can barely speak or you're perfectly fluent, thus eligible for assignment to faculty committees and PTA officer posts and expected to articulate your opinion on demand. Long-term residents often want nothing more than to be treated like Japanese colleagues in terms of professional rights and expectations (including being called by one's family name rather than "Jane-sensei"\*) yet at the same time they may suffer from linguistic handicaps that make email correspondence and documentation quite time-consuming when performed in Japanese. As with other people with minor disabilities, small acts of kindness, such as English taglines for email or verbal explanation of obscure Japanese terminology, can be a great help.

I think most long-term residents would agree that the benefits of a long stay in Japan – learning to untangle the rich intricacies of kanji and appreciate Japanese wordplay, venturing on weekends to shrines or zen gardens and all of Kyoto's ever-unfolding historical delights, and becoming enmeshed in local and professional communities and activities – far exceed the drawbacks. I hope that foreign residents and their unique and varied perspectives can be regarded as a valued strand in Japan's increasingly diverse societal tapestry.

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*Manzai comedy*: Stand-up comedy performed by a pair of comedians  
*Tora-san movies*: A series of films with Tora-san as the hero. A total of 48 very popular films were produced from 1969 to 1995. Despite differences in characters and settings, all episodes had similar patterns that won enthusiastic support from Japanese people in all walks of life.  
*The Drifters*: a Japanese band and comedy group that was extremely popular in the 1970s and 1980s. Their TV variety shows had routines that end in the same old gags, but the gags drew belly laughs and became widely used throughout the country.  
"Jane-sensei": "Professor Jane." In Japan, one's first name is rarely used to address adult people.

## ESSAY

# After three decades in Japan

Jane SINGER

Associate Professor, Graduate School of Global Environmental Studies

**Since my university days, I have been interested in the people of Asia, particularly those who have migrated or have been displaced.**

Associate Professor Jane Singer, was born and brought up in the United States, came to Japan for the first time when she was a junior at university. Since she was interested in Asia, she decided to study in Japan for a year. During her stay in Japan, she had her first fieldwork experience of researching Japanese macaques at Takasakyama Natural Habitat Zoo in Kyushu under the guidance of a primatologist from Kyoto University. After graduating from the university, she worked for United

States government to assist refugees from Indochina and traveled around Southeast Asia for nine months, working in refugee camps as a volunteer. This sparked an interest to better her understanding of Southeast Asian development which was furthered by master's-level development studies at Columbia University and a Ph.D. from Kyoto University focusing on development-forced displacement. Although she initially focused her attention on people displaced by conflict or economic development, recently she has been focusing on the plight of evacuees from the Great East Japan Earthquake and nuclear disaster of 2011.





For inquiries regarding *Raku-Yu*, contact:

Public Relations Division

**KYOTO UNIVERSITY**

Yoshida-Honmachi, Sakyo-ku,  
Kyoto 606-8501, Japan

URL <http://www.kyoto-u.ac.jp/en/research/international/publications/rakuyu.html> |  
PDF files of *Raku-Yu* may be downloaded from the above URL

E-mail [kohho52@mail2.adm.kyoto-u.ac.jp](mailto:kohho52@mail2.adm.kyoto-u.ac.jp)  
TEL +81 75 753 2072 FAX +81 75 753 2094

Kyoto is home to many historical sites, including old temples and shrines that are popular among tourists. Other equally attractive sight-seeing spots include *machiyas*, traditional wooden houses inhabited by ordinary townfolk. If you step aside from a busy street crowded with tourists and shoppers, into a narrow Kyoto alley, you will see these old wooden houses, characterized by *inuyarai*\* and lattice windows facing the alleyway.

Many *machiyas* are two-story houses designed for merchants or artisans, comprising of both residential quarters and business premises. A typical *machiya* has a very narrow street frontage but considerable longitudinal depth. This style, known as “*unagi no nedoko*” or “eel’s bedroom,” was designed because in the old days the amount

of fixed asset tax was determined according to the width of the street frontage of each house. Traditional wooden houses of similar designs can be found throughout Japan. If you visit such a house, immediately after entering through the front door, you will notice a long hallway with an earthen floor extending toward the back of the house. This space is called the *toriniwa*. Along this earthen passageway, a series of rooms are accessed; from the street frontage to the back, you’ll see a shop space, kitchen, and family rooms. Since summer in Kyoto is very hot and humid, the layout is designed to enable sufficient ventilation and airflow in the house. Residents sprinkle water in the small rear garden, for passive cooling by creating cool breeze. Since all houses in a block have similar layouts with a rear garden, a breeze created in one garden enters all the houses in the same block.

Although *machiya* preserve a priceless lifestyle culture unique to Kyoto, the number of such dwellings decreases by 2% annually, mainly due to the aging of their owners and difficulties involved in restoration/rebuilding. As a countermeasure, various initiatives are being taken to preserve *machiyas*. For instance, some owners open their houses to tourists, others seek designation of their properties as cultural assets, and still others establish foundations to preserve their traditional-style houses. Kyoto University is also committed to the survey and preservation of *machiyas*, recognizing that they are invaluable assets representing traditional architecture, lifestyle and culture. The Institute for Liberal Arts and Sciences (see pp. 2-4 of this issue) holds classes in which students discuss how to preserve *machiyas* and the time-honored atmosphere of the district by involving residents of Kyoto and other stakeholders, along with researchers.

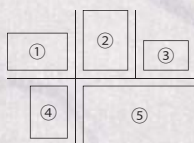
京都

PROMENADE

逍遙

## Traditional Houses in Kyoto — Lifestyle Culture Passed Down from Generation to Generation

① A typical *machiya* with lattice windows and *inuyarai* on the first floor, and *mushiko* (lit. “insect cage”) window on the second-floor facade. The *mushiko* window is designed to secure ventilation and sunlight through openings in the thick clay wall. This photograph shows the house of the Sugimoto family, an Important Cultural Property designated by the national government of Japan. ② Although the lattice window on the first floor prevents people in the alley from seeing inside the house, people in the house can see passers-by and even clearly hear their voices. The window therefore functions to connect people inside and outside the house, rather than separating them. ③ The room facing the rear garden has large sliding doors that can be opened up wide. This design satisfies Japanese people’s desire to enjoy the open air and appreciate viewing the garden in their daily lives. During hot and humid summer, residents sprinkle water in the garden to create a cool breeze that penetrates into the house. This garden has been designated by the national government as a Place of Scenic Beauty. ④ In the kitchen, a wood-stove is installed. On the wall is a charm to prevent fire, and on a rack figures of deities are enshrined. Since there is no ceiling in the kitchen, you can see the roof truss comprising pillars and beams. Above the stove there is a window in the roof for discharging smoke. This opening plays an essential role in ventilating air throughout the house. Skylight windows are also installed near the roof. ⑤ Students inspect the entrance hall in the house of the Nagae family during the pocket seminar “Visiting the Site to Study Architecture in Kyoto,” held by three faculty members of the Graduate School of Engineering: Professor Waro Kishi, Associate Professor Kiyoshi Takeyama, and Associate Professor Tetsu Yoshida.



\**Inuyarai*: A short arched bamboo fence installed at the foot of a roadside wall. It is believed that the fence was originally designed to prevent dogs from urinating against the wall, but the fence is also effective as a protection against splashing rain.

