Kyoto University

# Research Activities

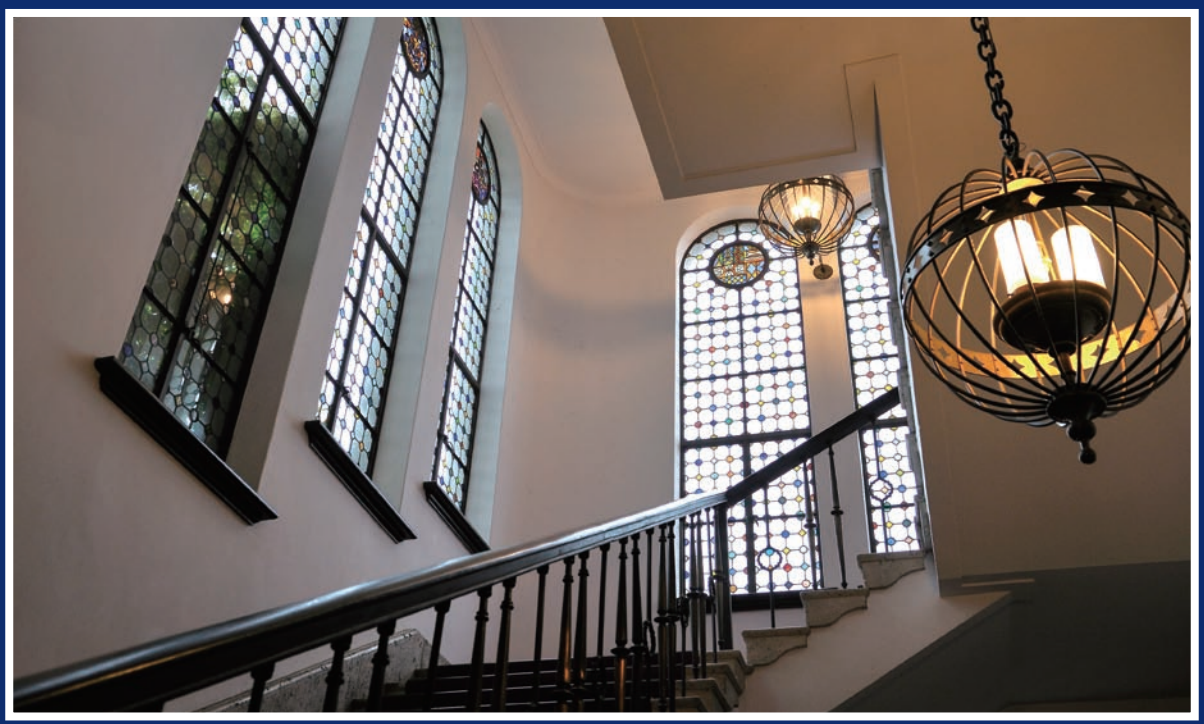
Vol.3 No.2 September 2013

*Special Features:*

Academia-Industry Collaborative Projects

The John Mung Program

The Hakubi Project



京都大学

# Research Activities

Vol.3 No.2
September 2013

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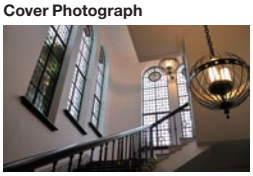


Center for Informatics in East Asian Studies, Institute for Research in Humanities, Kyoto University

## Message from the President

# Building on Tradition, Cultivating New Scholarship

Since its foundation in 1897, Kyoto University has cultivated its own distinct style of scholarship, emphasizing long-term research achievements over short-term results. Throughout that process the university has fostered countless of outstanding graduates, maintaining a spirit of independence and self-reliance built on a philosophy of academic freedom.

The fruits of that tradition continue to be internationally acknowledged: this year, Kyoto University alumnus Dr. Masatoshi Nei of Pennsylvania State University was awarded the Inamori Foundation's internationally prestigious 2013 Kyoto Prize in Basic Sciences. Dr. Nei's accolade comes hot on the heels of last year's award of the Nobel Prize in Physiology or Medicine to Dr. Shinya Yamanaka of our Center for iPS Cell Research and Application. We congratulate Prof. Nei on his achievement, and feel a sense of pride that Kyoto University may have contributed to his development as a world-class scholar.

*Research Activities* was launched in 2011 as a platform to publicize and provide current information on the undertakings and achievements of Kyoto University's researchers. As with previous editions, this issue will introduce some of our most recent developments. It also includes a feature on the work of Dr. Nei, pieces on our historically rich international exchange activities, and a feature on selected collaborative projects with the industrial sector, which have made a significant impact on drug discovery research in Japan.

Kyoto University will continue to be inspired by our excellent location in the rich cultural center of Kyoto, and work on cultivating new scholarship which can contribute to harmonious coexistence among the human and ecological community on this planet. I hope that this edition of *Research Activities* will convey some of our passion and enthusiasm to our readers.

September 2013

H. Matsumoto

**Hiroshi Matsumoto**
*President, Kyoto University*

KYOTO & KYOTO UNIVERSITY

# Behind the Folding Screen:
## Memories of Kyoto University Professors

Near the east side of Kyoto University's Yoshida-South Campus, there is a barbershop called Biryuken which was established in 1899, two years after the foundation of Kyoto Imperial University, and which has been in business for 114 years. In the shop, there is a folding screen adorned with autographs of famous Kyoto University professors. The diverse and dignified styles of handwriting seem to embody the dynamism of the university's guiding principle of "academic freedom."

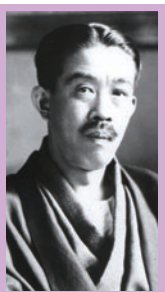
▲ The folding screen donated by Biryuken

**Torasaburo Araki (1866–1942), Medical Scientist**

Professor in the Medical College of Kyoto Imperial University. After serving as the Dean of the Medical College, he became the university's seventh (and first publicly elected) president.

**Torajiro Naito (1866–1934), Oriental Historian**

Professor in the Department of East Asian History in the College of Letters of Kyoto Imperial University. He founded the Kyoto School of Sinology with his colleagues, Naoki Kano and Jitsuzo Kuwabara. He was referred to as a "treasure of the university."



**Kosaku Hamada (1881–1938), Archeologist**

After serving as the first professor in the Department of Archeology of Kyoto Imperial University, he was elected as the university's eleventh president in 1937. He was the founder of the Kyoto School of Japanese Archeology, and contributed to the development of archeological research in Japan.

**Hajime Kawakami (1879-1946), Marxist Economist**

After resigning from his professorship at Kyoto Imperial University, he joined the Communist Party of Japan. He was a close friend of the Biryuken barbershop's first owner.

# 114 Years of Research and Haircuts

In December 2011, a folding screen was donated to the Kyoto University Archives by the owner of the Biryuken barbershop. The screen consists of two panels, each of which is approximately 164 cm high and 79 cm wide. On the screen are pasted thirty-five autograph paperboards, as well as several paintings and poems. The seventy-four personal names identified on the folding screen include the names of forty-nine professors, four administrative staff members, six graduates of Kyoto Imperial University, and four teaching staff members of the Third Higher School.

## The Pioneering Professors of Kyoto University's Early Years

Among the names of many prominent professors found on the folding screen, the following are worthy of particular note:

- **Two former presidents:**
  **Torasaburo Araki** (Faculty of Medicine) and **Kosaku Hamada** (Faculty of Letters)
- **Torajiro Naito** (Oriental History, Faculty of Letters)
- **Kitaro Nishida** (Philosophy, Faculty of Letters)
- **Hajime Kawakami** (Marxian Economics, Faculty of Economics)
- **Toshinojo Mizuno** (Electromagnetism, Faculty of Science)
- **Akira Fujinami** (Pathology, Faculty of Medicine)
- **Buntaro Adachi** (Anatomy, Faculty of Medicine)
- **Sakuro Tanabe** (Faculty of Engineering), designer and architect of the Lake Biwa Canal
- **Shozo Tomonaga** (Faculty of Engineering), mechanical engineering expert, uncle of Nobel laureate Sin-Itiro Tomonaga

## What Were the Professors Thinking During the Reforms of the 1920s?

When were these autographs written? There are nine autographs with dates, which were written in 1920, 1921, and 1922. Among the forty-nine professors who signed the screen, most were working at the university around the same period, so it is likely that most of the autographs were written around that time.

Much as universities are undergoing radical changes today, the early 1920s were also an era of reform for Kyoto University. In December 1918, in the wake of World War I, the government promulgated the University Order, which allowed local public and private institutions to claim university status. At the same time, Prime Minister Takashi Hara's cabinet initiated a large-scale expansion of higher education institutions.

Against this background, Kyoto University implemented a series of institutional reforms that form the basis of its current system: it discontinued graduation ceremonies in 1919[*1], changed its month of enrollment from September to April in 1921, and adopted its first system of mandatory retirement at the age of 60 in 1923. The university also established several new faculties, including the Faculty of Economics in 1919 and the Faculty of Agriculture in 1923.

There is a good chance that the professors who had their hair cut at Biryuken and left their names on the folding screen may have played their own role in those reforms. As we look at the signatures today, we can only imagine those exciting times.

*1 The reason for the discontinuance of graduation ceremonies was to discourage students from thinking that graduation marked the end of learning. The University of Tokyo also discontinued graduation ceremonies during the same period. Graduation ceremonies were resumed at Kyoto University in 1927.

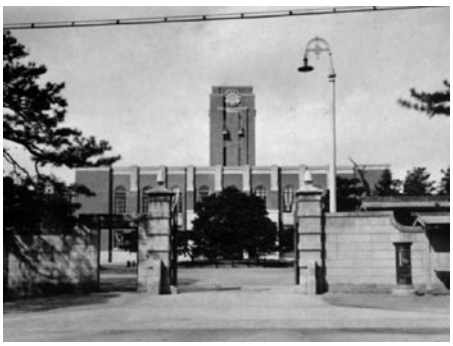
*Author:* **Prof. Shin Nishiyama**
*Professor, Kyoto University Archives*
WEB kua1.archives.kyoto-u.ac.jp/ja/english.html

INTRODUCING KYOTO UNIVERSITY

# Tradition, Innovation and a Global Outlook

**Established in 1897, Kyoto University is the second oldest research university in Japan. Today, as a truly international institution with numerous overseas facilities, it is dedicated to providing a free-thinking academic environment with a global perspective.**

## An Unshakable Commitment to Academic Freedom



Kyoto University's Mission Statement declares its intention to *sustain and develop its historical commitment to academic freedom and to pursue harmonious coexistence within human and ecological community on this planet.* The statement goes on to declare the university's dedication to *freedom and autonomy in research that conforms with high ethical standards*, and its belief in promoting a disciplinary diverse spectrum of research, while also pursuing an integrated, multidisciplinary approach. In this way, a commitment to seeking innovation though conscientiously encouraging academic freedom and interdisciplinary dialogue is at the very core of the university's ethos.

## 自重自敬 — "Self-Reliance and Self-Respect"


Prof. Hiroji Kinoshita

The principles of self-reliance and self-respect are also key elements in Kyoto University's academic approach. Guided by those concepts, the university encourages its students and researchers to be bold, independent and creative—to make the most of their own originality and individuality. The words "self-reliance and self-respect," written in Japanese as 自重自敬 (jichō jikei), were memorialized in calligraphy by Prof. Hiroji Kinoshita, the first president of Kyoto University, and they continue to guide our approach to education and research today.

## Continuous Institutional Growth and Development

As of 2012, Kyoto University comprises the following:

**Personnel**

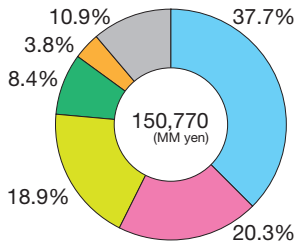
| | |
|---|---|
| Academic Staff | **2,836** |
| Non-Academic Staff | **2,608** |
| Undergraduate Students | **13,551** |
| Graduate Students | **9,244** |

**Facilities**

| | |
|---|---|
| Faculties | **10** |
| Graduate Schools | **17** |
| Research Institutes | **14** |
| Research and Educational Centers | **20** |
| Off-Campus Facilities and Offices in Japan | **35** |
| Overseas Office and Facilities | **48** |

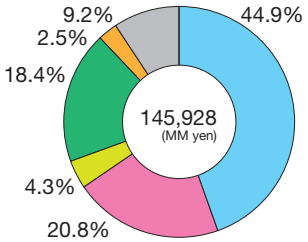
# Finance: Prioritizing Education and Research

Kyoto University has several revenue sources, the largest of which are university administration grants. The largest portion of the university's outgoing expenses goes towards supporting the activities of researchers and providing quality instruction to students.



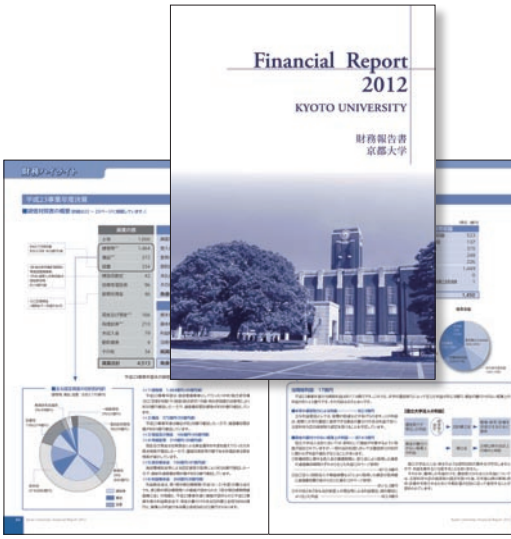

**Revenues in FY 2011**

- Unversity Grants
- Hospital Revenue
- Funding from External Sources
- Tuition Fees
- Facilities Subsidies
- Other




**Expenses in FY 2011**

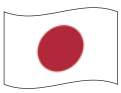
- Instruction and Research Costs
- Hospital Expenditures
- Facilities Maintenance Costs
- Costs Incurred by Projects with Industries
- Payment Forward Long-Term Loans
- Other




Refer to the financial report of Kyoto University for more information.

WEB www.kyoto-u.ac.jp/ja/issue/financial_report/documents/2012/financial_2012.pdf

# Kyoto: The Cultural Heart of Japan



Kyoto flourished as the capital city of Japan for over a thousand years from 794 to 1868, and to this day it is regarded by many Japanese as the nation's cultural heartland. It is a city where the ancient and modern combine, and a unique balance is achieved between tradition and innovation. While preserving its rich cultural heritage and customs, Kyoto has an open and forward-looking spirit, which has been embraced by the many successful international businesses that are based there. The combined influences of the city's contemplative traditional culture and stimulating progressive outlook provide an ideal environment for students and researchers of all disciplines to thrive.

At present the city embraces thirty-eight institutions of higher education, making it one of the most concentrated academic centers of Japan. In this unique, intellectually fertile environment, Kyoto University has cultivated its tradition of cutting-edge education and research for over a century.

AWARDS & HONORS

# International Recognition of KU Research

**On June 21, 2013, the 2013 Kyoto Prize Laureates were announced, and Dr. Masatoshi Nei, professor of Pennsylvania State University, Kyoto University alumnus, became the fourth Kyoto University-affiliated laureate, winning the Kyoto Prize in Basic Sciences.**

## Dr. Masatoshi Nei Awarded Kyoto Prize

***Dr. Nei has developed mathematical theories and techniques to understand the discipline of evolutionary biology as an exact science based on molecular-level data.***

The Kyoto Prize is an international award to honor those who have contributed significantly to the scientific, cultural, and spiritual betterment of mankind. The prize is presented annually in each of the following three categories: Advanced Technology, Basic Sciences, and Arts and Philosophy.

Dr. Masatoshi Nei, an evolutionary biologist and professor of Pennsylvania State University, was awarded the 2013 Kyoto Prize in Basic Sciences for his "research on the evolution of biological populations using quantitative analyses of genetic variation and evolutionary time." Dr. Nei made it possible to discuss evolutionary divergence, genetic diversity, and the mode of selection on genes in a quantitative manner by devising diverse statistical methods such as Nei's Genetic Distance (see "Key Words"), and applying them to molecular data. Using these methods, Dr. Nei's research has yielded important contributions to molecular evolutionary biology, as well as many other academic disciplines including ecology and conservation biology. Dr. Nei received his Ph.D. in Agriculture from Kyoto University in 1959. He also worked as an assistant professor of the university's Faculty of Agriculture from 1958 to 1962. For more details of Dr. Nei's award and achievements, please visit the website of the Inamori Foundation ( WEB www.inamori-f.or.jp/laureates/k29_b_masatoshi/ctn_e.html). (This article appears courtesy of the Inamori Foundation.)

**Dr. Nei's Biography**

| | |
|---|---|
| 1931 | Born in Miyazaki, Japan |
| 1953 | B.S., Miyazaki University |
| 1959 | Ph.D., Kyoto University |
| 1958 | Assistant Professor, Faculty of Agriculture, Kyoto University (-1962) |
| 1962 | Geneticist, National Institute of Radiological Sciences (-1965) |
| 1965 | Head, Population Genetics Laboratory, National Institute of Radiological Sciences (-1969) |
| 1969 | Associate Professor, Brown University (-1971) |
| 1971 | Professor, Brown University (-1972) |
| 1972 | Professor, University of Texas at Houston (-1990) |
| 1990 | Director, Institute of Molecular Evolutionary Genetics, Pennsylvania State University (-present) |
| 1990 | Professor, Pennsylvania State University (-present) |

THIS ARTICLE'S KEY WORDS

### Nei's Genetic Distance

In his 1972 paper, Dr. Nei proposed what is now referred to as "Nei's Genetic Distance," a measure of genetic differentiation which quantifies differences in the vestiges of evolution that remain within proteins and DNA. This innovative idea made it possible to estimate how long ago different biological populations branched off from common ancestors. It was this achievement that first brought Dr. Nei widespread international recognition.

# Award Winning Researchers

The following is a list of Kyoto University researchers who have received international awards —— a testimony to the university's intellectually fertile environment and culture of academic freedom.

| | | | |
|---|---|---|---|
| Nobel Prize *in Physics* | 1949 | **Hideki Yukawa** | (theoretical physicist) |
| | 1965 | **Sin-Itiro Tomonaga** | (physicist) |
| | 2008 | **Makoto Kobayashi** | (physicist) |
| | 2008 | **Toshihide Maskawa** | (physicist) |
| *in Chemistry* | 1981 | **Kenichi Fukui** | (chemist) |
| | 2001 | **Ryoji Noyori** | (chemist) |
| *in Physiology or Medicine* | 1987 | **Susumu Tonegawa** | (biologist) |
| | 2012 | **Shinya Yamanaka** | (physician and biologist) |
| Fields Medal | 1970 | **Heisuke Hironaka** | (mathematician) |
| | 1990 | **Shigefumi Mori** | (mathematician) |
| Gauss Prize | 2006 | **Kiyosi Itō** | (mathematician) |
| Lasker Award | 1987 | **Susumu Tonegawa** | (biologist) |
| | 1989 | **Yasutomi Nishizuka** | (biochemist) |
| | 1998 | **Yoshio Masui** | (cell biologist) |
| | 2009 | **Shinya Yamanaka** | (physician and biologist) |
| Japan Prize | 2005 | **Makoto Nagao** | (information technologist) |
| | 2005 | **Masatoshi Takeichi** | (developmental biologist) |

*Photos provided by the Japan Prize Foundation

| | | | |
|---|---|---|---|
| Kyoto Prize | 1995 | **Chushiro Hayashi** | (astrophysicist) |
| | 1998 | **Kiyosi Ito** | (mathematician) |
| | 2010 | **Shinya Yamanaka** | (physician and biologist) |
| | 2013 | **Masatoshi Nei** | (evolutionary biologist) |

*Photos provided by the Inamori Foundation


POINTS OF INTEREST 2

## Commemorative Exhibition for Dr. Kenichi Fukui

The Fukui Institute for Fundamental Chemistry (FIFC) is located in front of the Takano River, about fifteen minutes' walk northwest of the Kyoto University main campus. In the entrance hall of the Institute, a commemorative exhibition area has been established in honor of Dr. Kenichi Fukui, who was awarded the Nobel Prize in Chemistry in 1981, becoming Asia's first Nobel laureate in Chemistry.

Through the printed materials and other items in the exhibition, visitors can gain an impression of Dr. Fukui's daily life and career. A particularly poignant item is his final research memo on the orbital interaction analysis of a fullerene $C_{60}$, written the night before he was taken to hospital for the last time—a testimony to his dedication to research.

**Dr. Kazuyoshi Tanaka**

*Professor, Director, Fukui Institute for Fundamental Chemistry*

www.fukui.kyoto-u.ac.jp/publication/PublicationTop.htm#Pamphlet


Entrance of the FIFC

GLOBAL RESEARCH NETWORK

# International Relations at KU

**International cooperation and exchange is an indispensible component of Kyoto University's operations as a world-class higher education and research institution seeking to make a significant contribution to a stable and harmonious global society.**

## Extensive Roster of International Partnerships

As of May 1, 2012, Kyoto University has concluded general memoranda for academic exchange and cooperation with 86 universities, three university alliances and one national academy in thirty one different countries/regions. In addition to those university-level agreements, a substantial number of international collaboration agreements have also been concluded between individual faculties, graduate schools, institutes, and centers. The university has also concluded fifty-eight student exchange agreements with overseas partner institutions.

WEB www.kyoto-u.ac.jp/en/research/international/agreement/index.htm

NEWS TOPICS

## The Kyoto University Bhutan Friendship Program

*Kyoto University's long-standing relationship with Bhutan began with a meeting between the Queen of Bhutan and two KU professors in 1957.*

In the fall of 1957, Queen, Ashi Kesan Choden Wanguchuk (front row, right), was welcomed by Prof. Kuwabara (rear row, second from right) and Prof. Ashida (rear row, far right).

Not many people know about the role that mountaineering has played in Kyoto University's long-standing tradition of academic fieldwork. The university's original mountaineering club was founded in 1913 at the 3rd Imperial High School of Japan, which would later be integrated into Kyoto University. This year, 2013, marks the 100th anniversary of the university's mountaineering tradition. In 1931, the alumni members of the original club formed the Academic Alpine Club of Kyoto (AACK), aiming to be pioneers in both mountaineering and academic field study. 1958 was a significant year in the history of Kyoto University: the AACK members succeeded in making the first ascent of Chogolisa (7654 m) in the Karakorum Himalaya, the first primatological survey of Africa, the first over-winter stay in the Antarctic, and the first field trip to Bhutan. The study in Bhutan was carried out by Dr. Sasuke Nakao. His collection of photos provides a precious visual record of the country more than fifty-five years ago. His visit was arranged by Her Majesty, Ashi Kesan Choden Wanguchuk, Queen of the Third King of Bhutan. She visited Kyoto in the fall of 1957, and was welcomed by two professors who were members of the AACK: Profs. Takeo Kuwabara and Joji Ashida. This meeting initiated what is now a long-standing connection between Kyoto University and Bhutan. Bhutan is a small country in the Himalayas. The population is about 700,000, and the country is approximately the same size as the island of Kyushu in Japan. Bhutan is famous as the birthplace of the concept of Gross National Happiness (GNH). In October 2010, Kyoto University launched a new project called the Kyoto University Bhutan Friendship Program (KU-Bhutan). The first visiting party met Bhutan's Fourth King, Jigme Syngye Wangchuk, who originally coined the phrase GNH. The KU-Bhutan was created as an umbrella consortium supporting a wide variety of academic activities in Bhutan, including cultural anthropology, education, religion, agriculture, biodiversity, health, field medicine, and risk management. Since then, the KU-Bhutan has successfully sent eleven parties, representing a total number of seventy-one professors, administrative staff, and students, to Bhutan. Kyoto University has

In February 2011, Hiroshi Matsumoto, the president of Kyoto University, welcomed Princess Ashi Kesang Choden Wangchuk. The daughter of the Fourth King, she is named after her Grandmother.

In May 2013, Michiaki Mishima, executive vice-president of Kyoto University, and others, visited Dasho Pema Thinley, vice-chancellor of the Royal University of Bhutan, in the capital Thimpu, to conclude an MOU.

also welcomed three parties (a total of fifteen scholars) from Bhutan. The most recent exchange revived the historical tie between Kyoto University and Bhutan, and resulted in the conclusion of a Memorandum of Understanding (MoU) between Kyoto University and the Royal University of Bhutan. More details of the activities of the KU-Bhutan are available at the following web site and Facebook page.

**Dr. Tetsuro Matsuzawa**

*Coordinator of the KU-Bhutan Friendship Program / Professor, Section of Language and Intelligence, Primate Research Institute/President, the International Primatological Society*

WEB www.kyoto-bhutan.org/ FACEBOOK facebook.com/KU.Bhutan

NEWS TOPICS

# Supporting Engineering Education in Myanmar in Cooperation with JICA

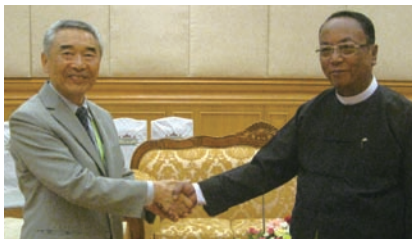
*Enhancing the friendship between Myanmar and Japan through a broad network of personal connections.*

At the beginning of 2012, Daw Aung San Suu Kyi appealed to the British Broadcasting Corporation (BBC) about the shortage of engineers and teachers in Myanmar, saying, "National reconstruction and development should be achieved by Burmese hands. However, we currently have neither the necessary skills nor people who can educate engineers in our country." It was that statement which prompted Kyoto University's determination to support education in Myanmar.

In May 2012, a delegation from Kyoto University made its first visit to Yangon to investigate what can be done to support education in Myanmar. Although it was the first visit, thanks to several helpful contacts, the delegation was able to visit the Ministry of Education, Yangon University, Myanmar Engineering Society, Yangon Technology University and other institutes. They also visited the Embassy of Japan in Myanmar and the Myanmar Office of the Japan International Cooperation Agency (JICA). The visits enabled the team to build a network of personal contacts in Myanmar.

During the visit, the delegation realized that various kinds of support are needed to enhance higher education in Myanmar. They also found that there is a considerable shortage of laboratory equipment, and discovered that each university falls under the jurisdiction of the corresponding government ministry: Yangon University is under the jurisdiction of the Ministry of Education, Yangon Technology University is under the Ministry of Science and Technology. Myanmar Engineering Society expressed their need for technical and engineering information and specialized books. Support in the field of infrastructure was also identified as the first priority.

In August 2012, the 1st Engineering Workshop between Myanmar and Kyoto University was held at MES, and the 2nd workshop was held at Yangon Technology University in March 2013. Kyoto University's Global Engineering made a very big contribution to the workshops. During the workshop, the Kyoto University participants were able to develop close connections with U Khin Aung Myint, speaker of the Pyidaungsu Hluttaw (the Upper House of the Myanmar Parliament), Dr. Ko Ko Oo, minister of Science and Technology, and Mandalay Technological University.



With U Khin Aung Myint, At the Myanmer parliament house

Further to those initiatives, Kyoto University was requested by JICA to provide civil engineering education support for its project, Enhancement of Engineering Higher Education in Myanmar. The five-year project includes various initiatives, such as educating the new graduate school students and leveling up the present teaching staff, seeking out talented Ph.D. students and supporting their study abroad at Kyoto University, introducing a Japanese-style laboratory system, assisting faculty education reforms, and cooperating to build a Myanmar-Japan Engineering Research Center. After the necessary preparation, Kyoto University commenced the JICA project

in summer 2013, and since the end of August 2013, approximately twenty teaching staff members and professors, mainly from the Global Engineering Department and the supporting industrial sectors have been delivering lectures and providing research advice for graduate students at Yangon Technology University and Mandalay Technological University.

As Myanmar and Japan have similar natural disaster issues including earthquakes, floods, landslide, and typhoons, collaborative research on those issues is expected to improve the disaster security of the two countries. It is also highly anticipated that the friendship between Myanmar and Japan will advance through this JICA education project.

**Dr. Koichi Ono**

*Professor Emeritus, Kyoto Univeresity/Senior Research Administrator (SRA)*

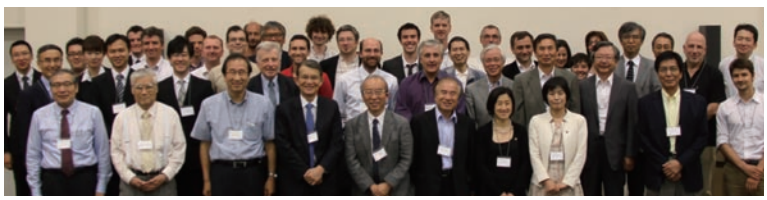
SYMPOSIA & WORKSHOPS

# The 10th Japan-France Workshop on Nanomaterials

***A four-day event bringing the six C'Nano centers of the French National Center for Scientific Research and the four Japanese WPI institutes together for the first time.***

Kyoto University's Institute for Integrated Cell-Material Sciences (iCeMS) and three other Japanese World Premier International Research Center Initiative (WPI) institutes co-hosted the tenth annual Japan-France Workshop on Nanomaterials in Kyoto on June 6-9, 2013. The four-day event was the first to bring the six Centers of Competence in Nanosciences (C'Nano) of the French National Center for Scientific Research (CNRS) together with the four Japanese WPI institutes: iCeMS; the International Center for Materials Nanoarchitectonics (MANA); the Advanced Institute for Materials Research (AIMR); and the International Institute for Carbon-Neutral Energy Research ($I^2$CNER).

Since 2000, the nanomaterials workshop has been organized by the French CNRS and the Japanese National Institute for Materials Science (NIMS), alternating venues between France and Japan every eighteen months. The main objective of the meeting has been to exchange scientific ideas, foster inter-disciplinary collaborations, and forge new friendships between researchers from both countries. The 2013 gathering marked the first time the workshop was held at Kyoto University. About seventy participants from France and Japan attended the workshop, which featured thirty-three presentations by scientists from specialized backgrounds in material sciences. Eighteen of the invited speakers represented the six French C'Nano centers, while the



Voices of International Researchers

# GSGES Encourages Independent Research and a Global Approach

On my first day on the job at the Graduate School of Global Environmental Studies (GSGES) in March 2010, I was surprised to be told that I needed to pack my bags right away – to join a delegation going to Vietnam that week to exchange research findings! I soon realized that GSGES encourages both independent research and a global approach. As someone who is interested in development studies and Southeast Asia, I have greatly benefitted from our enthusiastic international and Japanese students, our strong ties with universities all over Southeast Asia, and my very supportive colleagues.

**Prof. Jane Singer**

*Associate Professor, Graduate School of Global Environmental Studies*

WEB www.ges.kyoto-u.ac.jp/cyp/modules/contents/index.php/shokai/faculty_staff/singer_jane.html?ml_lang=en

other fifteen represented the four Japanese WPI institutes.

After three days of presentations, the workshop concluded with the visiting French researchers taking a facility tour of iCeMS on the final day. The next Japan-France Workshop on Nanomaterials will be held in Rennes, France, with dates and details to be announced later.

WEB www.icems.kyoto-u.ac.jp/e/pr/2013/06/11-tp.html

SYMPOSIA & WORKSHOPS

# AUTM Asia 2013 Kyoto

*The rising importance of technology transfer : tackling problems and providing education.*


AUTM Asia 2013 Kyoto was held at the Kyoto International Conference Center on March 20-22, 2013. The event was organized by Kyoto University in collaboration with the University Technology Transfer Association (UNITT), with the support of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) of Japan.

The Association of University Technology Managers (AUTM) is a nonprofit association of university technology transfer offices, research organizations, hospitals and companies that license from universities, research organizations and hospitals based in the U.S. AUTM Asia is a platform for academic research institutions, industry, technology transfer professionals, and entrepreneurs to meet and discuss current issues related to commercializing technology, with a particular focus on the characteristics of the Asian region.

The three-day conference included eighteen seminar sessions on topics such as venture trends, license negotiation, and R&D trends. Exhibition booths operated by law firms and other companies provided attendees with information regarding business and R&D activities, as well as licensing opportunities. The seminar portion of the conference featured various professionals engaged in the commercialization of university research, and provided an arena for not only the speakers and moderators, but also the attendees, to share their experience and knowledge.

The event was a pronounced success, drawing over 600 participants. AUTM Asia 2014 will be held in Taiwan on April 9-11, 2014.

WEB www.autm-kyoto.jp/

Voices of International Researchers

# My Time at Kyoto University

*A combination of work and pleasure at its best.*

I felt in love with Japan in 1992 and Kyoto has been by far my favorite city. I have always been fascinated and stimulated by the countless cultural and religious sites and treasures, the elegant gardens and gorgeous mountain scenery, and not to say the least, the refined food and sake. Kyoto people are very kind and know well how to make me feel at home here. So I consider myself as extremely lucky to have been invited to join Kyoto University since 2005 as a visiting professor. Staff in the Human Brain Research Department have done their best to provide me with a comfortable working environment. I have enjoyed very much working with the knowledgeable and friendly colleagues and students there, and also those from the Radiology department, developing very creative projects which have already received national and international recognition.

**Dr. Denis Le Bihan**

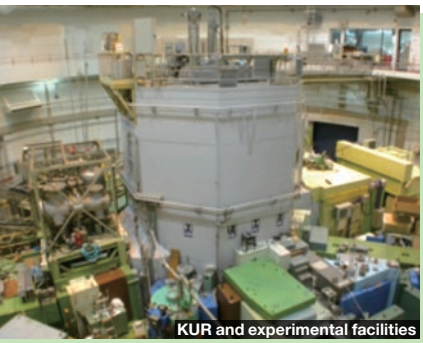
*Visiting Professor, Human Brain Research Center, Graduate School of Medicine, Kyoto University / Director, NeuroSpin (ultra-high field MRI facility for brain research), CEA, Gif-sur-Yvette, France / Member of the French Academy of Sciences / 2012 Honda Prize laureate*

WEB www.meteoreservice.com/dlb

CUTTING-EDGE EXPERIMENTAL EQUIPMENT

# Facilities for High Quality Research

**The Kyoto University's state-of-the-art laboratories and research facilities provide students and researchers with the hands-on practical experience vital to their development as world-class scientists and scholars.**

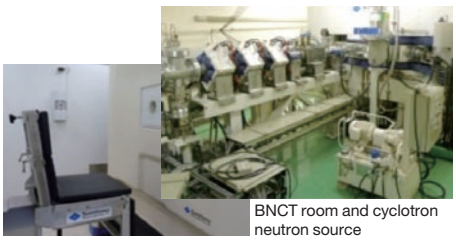

KUR and experimental facilities

## Research Reactors and Radiation Facilities for Joint Use Program

*Kyoto University Research Reactor Institute*

The Kyoto University Research Reactor Institute (KURRI) was established in 1963 for joint use programs between Japanese universities to promote research and education in the fields of nuclear energy and radiation application. The main facility, called the Kyoto University Research Reactor (KUR), is a light-water moderated tank-type reactor of 5MW, which is widely used for various experiments, as are the Kyoto University Critical Assembly (KUCA) and accelerators.

In the 2012 fiscal year, 5,858 man-day researchers and students visited the KURRI to use research facilities or attend scientific meetings. The facility's activities cover a large number of research subjects in various fields of nuclear science and technology, material science, radiation life science, and radiation medical science.


BNCT room and cyclotron neutron source

Particularly remarkable progress is being made in clinical studies of Boron Neutron Capture Therapy (BNCT) for a new effective cancer treatment, which enables the selective destruction of only cancer cells. The number of patients treated so far is the largest in the world. Based on the successful results obtained at the KUR, the world's first clinical trial of BNCT began last fall using a cyclotron neutron source, which was developed through collaborative research with the industrial sector.

Other research is also being conducted using the Accelerator Driven System (ADS), which has recently been receiving much attention due to its potential to improve the flexibility and safety of future nuclear systems. By combining a 150MeV proton accelerator with the KUCA, the world first and most successful ADS experiment began in March 2009.

Conveniently located close to Kansai International Airport, the KURRI has been developing into a center of excellence to promote leading research on the efficient multidisciplinary utilization of nuclear science and technology.

**Dr. Hirotake Moriyama**

*Professor/Director, Kyoto University Research Reactor Institute and Graduate School of Engineering*

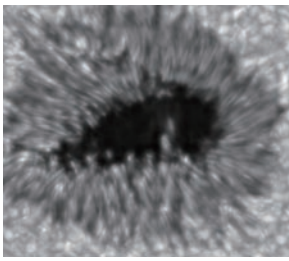
WEB www.rri.kyoto-u.ac.jp/en


## Taking a Close Look at the Sun

*Advanced Solar Telescopes at the Hida Observatory*

The Hida Observatory, a facility of the Graduate School of Science of Kyoto University, was constructed in 1968 on the mountain area in the northern part of Gifu-prefecture of Japan. The observatory is equipped with a 65cm refractor telescope (the largest refractor in Asia) and two advanced solar telescopes. The observatory's current main research target is to unveil the origin of the solar magnetic activities that govern the space environment surrounding the Earth.

The Domeless Solar Telescope (DST) is a 60 cm aperture vacuum telescope installed on a tower 22 m high from ground level. The DST is used for high spatial resolution observations of solar atmosphere with detailed spectroscopic diagnosis of magnetized plasma. A high precision spectro-polarimeter, an adaptive optics system for suppressing the atmospheric turbulence effect and a universal tunable filter for spectroscopic imaging observations are new technical features that promote advanced solar observations. The Solar Magnetic Activity Research Telescope (SMART) is a set of refractive telescopes with apertures of 20 cm and 25 cm. The SMART observes the full disk sun and also active regions on a regular basis, aiming to capture flare explosions and mass ejections that influence the earth's space environment. Unique features of the SMART are that the system can measure the velocity of plasma clouds erupting from the sun, image the dynamic evolution of flares with the highest (sub-second) time resolution, and obtain magnetic fields of active regions with the highest sensitivity and time resolution. With these instruments, the Hida Observatory provides unique solar research data that is highly compatible with those of solar observing satellites and other ground-based solar observatories in the world.



A sunspot image taken in blue light at 430 nm. The field of view covers approximately 45 x 45 arcsec$^2$ (42000 x 42000 km$^2$ on the sun).

◀ SMART

**Dr. Kiyoshi Ichimoto**

*Professor, Hida Observatory, Graduate School of Science*

WEB www.kwasan.kyoto-u.ac.jp/general/facilities/index_en.html

Ujigawa Open Laboratory

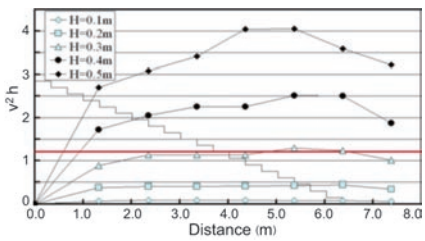
# Ujigawa Open Laboratory

The Ujigawa Hydraulics Laboratory (UHL) of the Disaster Prevention Research Institute (DPRI) was established in 1953. The laboratory is located near the southern edge of Kyoto City, near the right-hand levee of the Uji River on a site covering an area of 68,700 m$^2$. The main purpose of the laboratory is the investigation of various problems concerning natural disasters caused by floods and sediments. In 2002, the UHL has changed its name to the Ujigawa Open Laboratory (Ujigawa OL). The inclusion of "open laboratory" in the name refers to the fact that the laboratory facilities are available for use by every researcher and student in the world.

The real scale model of staircase

The Ujigawa OL is one of the world's leading experimental laboratories. It is equipped with many observational and experimental facilities, where different kinds of hydraulic and sedimentation experiments are carried out. In addition to the various research activities by the academic staff of the DPRI, the facilities installed at the laboratory are also used for faculty and graduate school education, industry-government-academia collaborative research, international academic cooperation, and other purposes. Additionally, experimental facilities are available to researchers throughout Japan, and events such as simulated disaster experiences have been carried out for the public with the help of technical staff.

One of the most unique devices in the laboratory is a real scale model of a staircase, which is used to investigate the flow characteristics and evacuation methods for urban floods. The model has frequently been featured in the media. When an urban flood occurs, underground spaces like shopping malls and subway stations are inundated with water, endangering human lives and properties. As quick evacuation from underground spaces is one effective measure to reduce damage by flood disaster, water flow characteristics over stairs and evacuation from underground spaces have been investigated using this model.




Distribution of unit width momentum of the flow on the staircase taking with a parameter of inundated water depth on the ground [v = flow velocity(m/s) and h = flow depth(m) on the staircase, respectively]

**Dr. Hajime Nakagawa**

*Director, Ujigawa Open Laboratory / Head, the Research Center for Fluvial and Coastal Disasters / Professor, Disaster Prevention Research Institute*

WEB www.dpri.kyoto-u.ac.jp/openlab/

LARGE-SCALE PROJECTS

# Academia-Industry Collaborative Projects

**When the statistics on academia-industry collaborative research by Japanese universities was published in 2011, Kyoto University occupied the number one position, reflecting the university's pro-active approach to working with the industrial sector. The figures for 2012, indicated a further increase in the number of collaborative research undertakings. In this issue, we introduce a selection of recently initiated large-scale academia-industry collaborative projects.**

## Daikin-Kyoto University Innovation Program (DK Program)

*A comprehensive academia-industry collaboration project between Daikin Industries and KU*

WEB www.kyoto-u.ac.jp/ja/news_data/h/h1/news7/2013/130621_1.htm
www.daikin.co.jp/press/2013/130621_k/index.html

On June 21, 2013, Kyoto University and Daikin Industries, Ltd. concluded a collaboration agreement to implement a university- and company-wide project for fundamental research, the development of new products, and the pursuit of innovation. Under the agreement, the Daikin-Kyoto University Innovation Program (DK Program) was launched.

President Hiroshi Matsumoto of Kyoto University (left) and Mr. Noriyuki Inoue, President and CEO of Daikin Industries, Ltd. (right)

The project enables both parties to mutually utilize their intellectual resources, facilities, equipment, and human resources such as teaching staff, researchers, engineers, and students to achieve the following goals in three years.

- **1. Create new themes focusing on social values (drawing on the knowledge of humanities fields)**
- **2. Build a global technology network (including participation by Kyoto University's partner universities)**
- **3. Develop technology management methods (to continuously foster innovation)**

It is anticipated that these initiatives will lead to the creation of new academic fields, the formation of multidisciplinary research units, and the fostering of human resources who can contribute to society.


Technology and Innovation Center in Settsu, Osaka (Daikin Industries)

To manage the project, Kyoto University and Daikin Industries will form a committee, and establish up the DK Innovation Program Promotion Office on Kyoto University's campus. The office will be staffed by employees of Daikin Industries and Kyoto University faculty members.

# The Kyoto University Medical Innovation Center (MIC)

*Drug Discovery Opportunities and Innovation*

*Director:* **Dr. Shuh Narumiya**
*Professor, Graduate School of Medicine*

WEB www.mic.med.kyoto-u.ac.jp/english/index.html

The Kyoto University Medical Innovation Center (MIC) aims to identify drug targets that are truly useful in clinical practice by using various technology platforms to analyze the highly accurate patient information and clinical samples available through the university's medical school and university hospital, and linking the clarification of the basic structure and mechanism of living organisms—a tradition at the Kyoto University Medical School—with the analysis of human disease mechanisms. Under one-to-one institution-level collaborations with pharmaceutical companies, the MIC assigns appropriate professors of our Medical School as project leaders, recruits young distinguished scientists worldwide, and provides a laboratory where basic medical scientists, company scientists, and clinicians work together by sharing clinical samples and information and drug discovery technology. Each project is managed as an equal partnership between the university and the partner company, and scientific input, output, knowledge, and intellectual property are shared by both parties. In addition to the ongoing Astellas-Kyoto University Project (AK Project), covered in the previous edition of Research Activities, the MIC has four other projects: the Takeda-Kyoto University Project (TK Project), the Dainippon Sumitomo-Kyoto University Project (DSK Project), the Mitsubishi Tanabe-Kyoto University Project (TMK Project), and the Shionogi-Kyoto University Project (SK Project). The MIC welcomes proposals of new collaboration from pharmaceutical companies.

The Kyoto University Medical Innovation Center

## *TK Project* *Takeda-Kyoto University Project*

The Basic and Clinical Research Project for Central Nervous System (CNS) Drugs, a collaborative project with Takeda Pharmaceutical Co. Ltd., focuses on discovering innovative drugs and biomarkers to treat obesity and schizophrenia. Under the leadership of Professors Kazuwa Nakao, Kenji Kangawa and Akira Sawa, over forty researchers are investigating ways to cure patients utilizing the capabilities and assets of Kyoto University and Takeda. This open innovation laboratory gives young researchers an exciting opportunity for academia-industry collaboration. Please visit the web page (http://www.tk.med.kyoto-u.ac.jp/) to learn more about the project's mission, vision, and research activities.

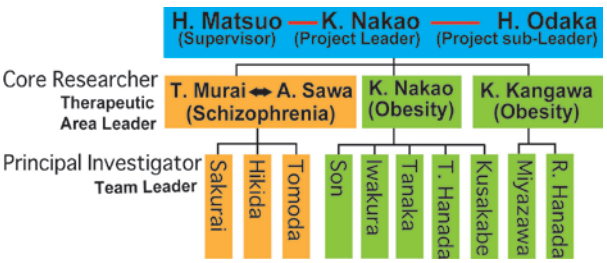
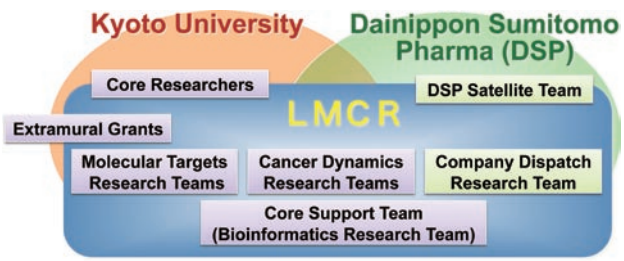



PHOTO: Kyoto Tsushinsha Press

## *DSK Project* *Dainippon Sumitomo-Kyoto University Project*

The Laboratory for Malignancy Control Research, a collaborative project with Dainippon Sumitomo Pharma Co. Ltd. (DSP), aims to discover innovative anticancer drugs. Under the leadership of Professors Makoto Noda and Masakazu Toi, seven principal investigators and their teams, together with the satellite team from DSP, are taking diverse approaches to achieve

that goal. Their efforts focus on several promising areas (e.g. angiogenesis, invasion/metastasis, hypoxia-response, epigenetic regulations, alternative splicing, and bioinformatics) to elucidate the essential features and molecular bases of malignant phenotypes, and to rapidly translate their discoveries into clinical use for the benefit of cancer patients.

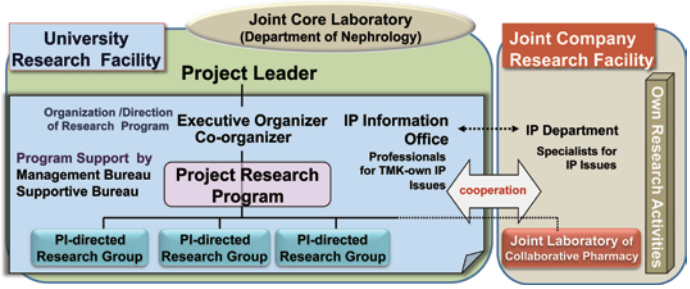



## *TMK Project* *Tanabe Mitsubishi-Kyoto University Project*

The Basic and Clinical Research Project for Discovering Innovative Treatments for Chronic Kidney Disease(CKD), a collaborative project with Mitsubishi Tanabe Pharma Corporation, aims to overcome chronic kidney disease and coexisting diseases.

The project consists of three research groups including 17 investigatores, who are mutually interacting to maximize respective expertise under supervision and direction by Prof. Dr. Motoko Yanagita, chaired at Department of Nephrology, Graduate School of Medicine, Kyoto University. Our research goal is to clarify the pathologic mechanisms of CKD and figure out new ways of the disease-treatment. This leads to remission and regression of the disease.

**Basic and Clinical Research Project on Chronic Kidney Disease**




## *SK Project* *Shionogi-Kyoto University Project*

The drug discovery and medical research for the regeneration of synapses and neuronal function, a collaborative project with Shionogi & Co. Ltd., aims to create innovative medicines for the treatment of Alzheimer's disease and other central nervous system disorders. The SK project consists of five research groups, and these groups are mutually interacting to maximize respective expertise and are actively challenging to achieve the project goal. Under the project leader, Prof. Ayae Kinoshita at Kyoto University Graduate School of Medicine, the project conducts basic and clinical research to identify new drug targets and novel medicines based on regeneration of synapses and neurological function.


# The Wireless Power Transfer Consortium for Practical Applications (WiPoT)

*Focusing on Microwave Power Transmission*

*WiPoT general chair :* **Dr. Naoki Shinohara**
*Professor, Research Institute for Sustainable Humanosphere, Kyoto University*
WEB www.wipot.jp/english/index.html

Kyoto University's researchers have been engaged in research into wireless power transmission (WPT) technologies since the 1980s, playing leading roles in many research projects. The research of Dr. Naoki Shinohara and his colleagues focuses on microwave power transmission (MPT), a WPT technology which can be applied to battery-less sensor networks, wireless charging of mobile phones, wireless charging of electric vehicles while driving or parked, and solar power satellites (SPS). Recently, the worldwide WPT market is growing, and some WPT technologies, such as coupling technologies other than MPT, are being put into commercial use. This is a rapid and global-scale development. Unfortunately, however, global standardization of WPT has not been given due consideration in Japanese research activities. To remedy that situation and respond to world trends in WPT usage, the Wireless Power Transfer Consortium for Practical Applications (WiPoT) was established on April 1, 2013. The objectives of the consortium are: 1) matching new ideas and solutions to society's needs regarding WPT technologies, particularly with regards to MPT, and 2) accelerating the development of practical applications of WPT. To achieve these objectives, the WiPoT shares information about not only technology, but also standardization, safety, and user needs. The consortium also advertises WPT technologies, including MPT, throughout the world. Twenty-seven companies, thirty universities, and two institutes have joined the WiPoT to work towards the same goals. The activities of the WiPoT are as follows;

- **Members will compile a portfolio of their WPT technologies and make it available to the public.**
- **Members can attend the closed symposium for business matching, which is held three times per year. The symposium provides members with opportunities to introduce their technologies and share their needs, as well as ask questions about WPT.**
- **Members can participate in discussions about WPT with government officials.**
- **Members can join the consortium's working group activities.**
- **Members can obtain up-to-date technical information about WPT throughout the world via the symposia or through the consortium's e-mail newsletters.**
- **Members can have technical discussions about both the needs of industry and society and new technologies and solutions, and give feedback to domestic and international authorities engaged in the standardization of WPT.**

The WiPoT's working groups (WG) are one of its most important activities. Four WGs have been established: 1) Energy-Harvesting and Power-Saving Remote Power Supply WG, 2) Electric Vehicle WPT WG, 3) Living and Industrial Space WPT WG, and 4) Space Application WG. In the working groups, members actively discuss the practical application of WPT.

The WiPoT is not the only WPT consortium. There are other WPT consortia or forums in Japan and other countries. The WiPoT collaborates with other Japanese WPT consortia to accelerate the development of practical applications of WPT, and endeavors to represent Japan's point of view in establishing international technical standards for WPT. The WiPoT welcomes communication from individuals or organizations with an interest in WPT. The company membership fee is 250,000 yen per year. Please refer to the WiPoT website for more details.

Future Vision: 'WPT Society'

FOSTERING THE NEXT GENERATION

# 白眉 — The Hakubi Project

## A Unique Opportunity for Outstanding Young Talent

**The Hakubi Project was established by Kyoto University in 2009 to foster outstanding young researchers. The program recruits twenty international researchers per year as associate and assistant professors. It gives them a valuable opportunity to devote themselves entirely to their research. The project is open to any researcher in any academic field. For further information please refer to the following website.**

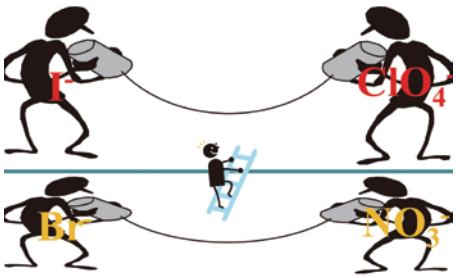
WEB www.hakubi.kyoto-u.ac.jp/eng

CHEM

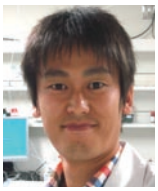
## Unveiling the 125-year-old Mystery of Water

*The origin of specific ion effects at the air-water interface.*

Water is everywhere. Nevertheless, we human beings still don't fully understand this fundamental liquid. For example, we can't explain why some ions (e.g. $SO_4^{2-}$) in water precipitate proteins and prevent unfolding, while others (e.g. $I^-$) block the precipitation and increase the unfolding. Ions must play a role at the protein-water interface, but the origin of such specific ion effects, known as the Hofmeister effects, have been veiled for 125 years. Using a novel experimental method, Dr. Shinichi Enami found that ions interact with specific partners over long distances at the air-water interface. Furthermore, he showed evidence that such long-range specific ion effects are mediated by hydrogen-bonding networks of water at the interface. These findings may have significant implications —from reactions on droplets surfaces in the atmosphere to protein behavior in our bodies.



Ions interact with specific partners
via H-bond network of interfacial water



**Dr. Shinichi Enami**

*Associate Professor, The Hakubi Center for Advanced Research*

www.rish.kyoto-u.ac.jp/labs/shiotani_lab/enami_web.pdf

HIST

## Islamic Dialogues with China

*Uncovering the Wisdom of Chinese-speaking Muslims.*

Chinese-speaking Muslims have inspired many researchers to seek a "dialogue among civilizations." Establishing their own communities throughout China around the 16th century, they have maintained their own beliefs under non-Muslim political rule and social pressures, surviving until the present day as a minority.

Dr. Tatsuya Nakanishi is working to elucidate the wisdom which enabled their survival and co-existence with non-Muslims in China. How have they harmonized Islamic ideas with Chinese society and culture: Islamic law with Chinese law, Islamic mysticism with Chinese traditional thoughts (Confucianism, Buddhism, Taoism), and traditional Islam in China with Islamic revivalism or modernism? Dr. Nakanishi endeavors to unlock these secrets by investigating original historical materials in Chinese, Arabic, Persian, and Turkish, in addition to undertaking fieldwork to uncover new privately-owned historical sources.

**Dr. Tatsuya Nakanishi**

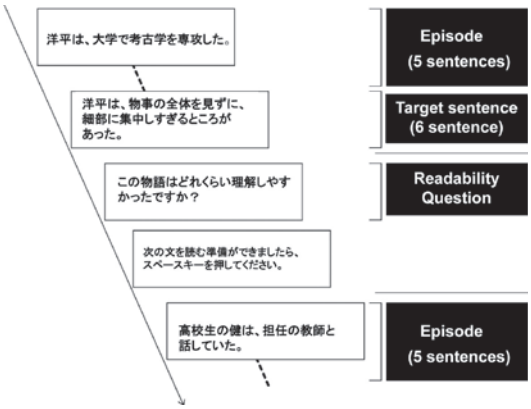
*Program-Specific Assistant Professor, The Hakubi Center for Advanced Research*

www.hakubi.kyoto-u.ac.jp/eng/02_mem/h24/nakanishi.html

PSYCH

# Episodic Memory Retrieval for Story Characters in Autism Spectrum Disorder

*It is easier for people with autism to remember other people with autism.*




Dr. Hidetsugu Komada's group has examined the recognition of stories among people with autism spectrum disorder (ASD). Story episodes (featuring characters with ASD or typically developing [TD] characters) and congruence (congruent or incongruent) were manipulated, and they found significant differences between ASD and TD groups in the recognition times. Whereas TD people retrieved TD episodes faster than ASD episodes, people with ASD retrieved congruent ASD stories faster than incongruent ASD stories. The results show that people with ASD deeply encode stories with congruent ASD episodes when reading stories about characters with ASD. ASD and TD groups reacted differently to those who are similar to themselves, and their patterns of doing so also differed. In terms of clinical implications, the study suggests that people with ASD characteristics may be able to help people with ASD.

**Dr. Hidetsugu Komeda**

*Program-Specific Associate Professor, The Hakubi Center for Advanced Research*

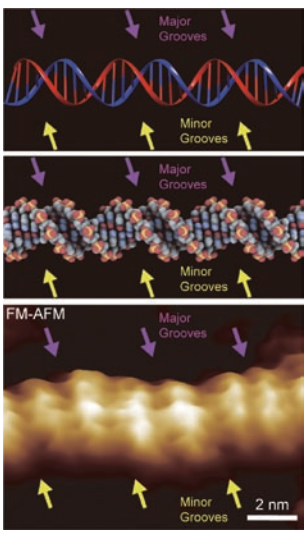
researchmap.jp/komeda/?lang=english

NANO

# DNA Double Helix Resolved "Under a Microscope"

*Major and Minor grooves, and individual phosphate groups identified.*

The double helix structure of deoxyribonucleic acid (DNA) was first elucidated by Watson and Crick, based on X-ray studies, over a half century ago. Surprisingly, however, no one has ever been able to see the well-known double helix structure under a microscope. Dr. Kei Kobayashi, Dr. Hirofumi Yamada, and their colleagues recently developed an ultrahigh-resolution frequency modulation atomic force microscope (FM-AFM) that can visualize atoms and molecules in liquid environments. They successfully visualized the detailed structures of the DNA double helix in water. The major and minor grooves, and even individual phosphate groups were identified under a microscope for the first time. This work is a significant milestone in real-space biological imaging, and the FM-AFM will definitely be a powerful tool to elucidate the structures and functions of individual biomolecules *in vivo*.




**Dr. Kei Kobayashi (left)**

*Program-Specific Associate Professor, The Hakubi Center for Advanced Research* www.hakubi.kyoto-u.ac.jp/eng/

**Dr. Hirofumi Yamada (right)**

*Associate Professor, Graduate School of Engineering*

piezo.kuee.kyoto-u.ac.jp/en/members/staff/yamada/

## What's in a Name?

The term hakubi (白眉), literally means 'white eyebrows' in Japanese (白 : white, 眉 : eyebrows). The word originates from a Three Kingdoms era (220-280 AD) Chinese legend: "Three kingdoms saga (三国志)". According to the legend, one of the kingdoms, called Shu (蜀), was home to five brothers with extraordinary talents. The fourth brother; 馬良季常 (Baryo Kijo), who was particularly outstanding, had white hairs in his eyebrows, and so the term hakubi has come to refer to particularly talented individuals.

FOSTERING THE NEXT GENERATION

# The John Mung Program

## Giving New Opportunities to Explore Global Frontiers

**Kyoto University launched the John Mung Program in 2012, as a project to support mid- and long-term research by junior faculty members at leading academic institutions overseas. In 2013, the program was expanded to support study abroad for students and staff members.**

WEB www.kyoto-u.ac.jp/ja/research/young/support/john_man/

PHYS

## How Do Things Change at the Nanoscale?

*Full quantum simulation of phase transition after dimensionality quench.*


At low temperatures, thermal fluctuations are reduced and many materials undergo phase transitions to more ordered states. Examples of such ordered phases include magnetism and superconductivity. However, in low dimensions, quantum fluctuations can destroy ordering even at absolute zero temperature. Recent experimental advances have allowed switching the effective dimension of some microscopic systems. Dr. Masaki Tezuka theoretically studies the gradual destruction of superconducting order after the dimension of the system is abruptly reduced. He aims to understand such dynamics by combining analytical and numerical methods of quantum mechanics.

The contributions of the Cavendish Laboratory to modern science are tremendous; among them are the discovery of electrons and neutrons, and the development of the double helix model of DNA molecules. Dr. Tezuka attended numerous lively seminars, visited other universities in United Kingdom, and started new collaborations. He was also impressed by the exhibitions of the actual experimental apparatus used for epoch-making discoveries at the Cavendish Laboratory.

**Dr. Masaki Tezuka**

*Assistant Professor, Graduate School of Science / Visiting Researcher, Cavendish Laboratory, University of Cambridge*

cond.scphys.kyoto-u.ac.jp/~tezuka/

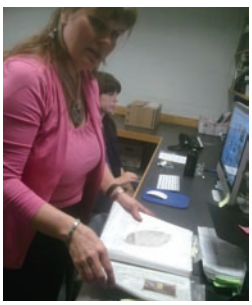
ECOL

## Exploring the Effects of Leaf-Eating Primates on Forests

*Comparative Study of Community Structure and Resource Limits of Old World Monkeys.*

Dr. Goro Hanya had the opportunity to engage in research at McGill University, Montreal, Canada, for three months from December 2012 until March 2013. His host professor was Dr. Colin Chapman, a well-known primate ecologist undertaking a long-term study on the primate community in Kibale, Uganda.

Dr. Hanya's major achievement during his time in Montreal was a paper assessing the impact on forest ecosystems of fruit- and leaf-eating primates. His host Dr. Chapman recently published a paper based on long-term data of forest tree species composition that suggested primate leaf-eating in Kibale, Uganda could affect some tree species negatively. Dr. Hanya's research estimated the amount of food ingested by primates on Yakushima island in Japan, and compared it with the amount of leaves and fruits produced by the forest. In contrast to Dr. Chapman's findings, he found that primates on Yakushima have only a negligible impact on forest leaf production, which was explained by the difference in primate biomass between Kibale and Yakushima.



**Dr. Goro Hanya**

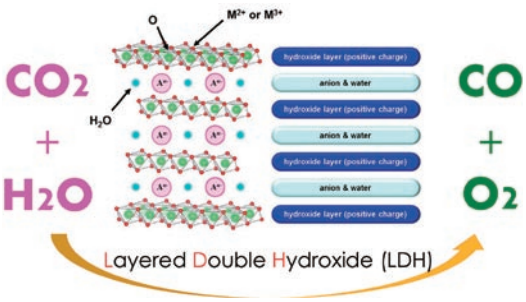
*Associate Professor, Primate Research Institute*

www.pri.kyoto-u.ac.jp/sections/ecolcons/hanya/index-e.html

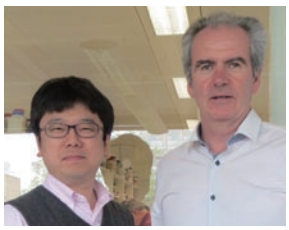
CHEM

# Sustainable Chemistry Study Using Solar Energy and Photocatalysts

*Development of novel layered double hydroxides for artificial photosynthesis.*




Dr. Kentaro Teramura spent three months working in Prof. Dermot O'Hare's group in the Chemical Research Laboratory of the University of Oxford. His project was the fabrication of novel layered double hydroxides (LDHs) for the photocatalytic conversion of carbon dioxide in water (so-called Artificial Photosynthesis). Prof. O'Hare and his colleagues have developed several innovative techniques for fabricating LDHs, and were the first group in the world to fabricate nano-sized LDHs using surfactant templates. During his time with the group, Dr. Teramura learned some of their techniques and synthesized Mg-Al and Ca-M (M = Al, Ga, In) LDHs in practice in his laboratory. He learned the techniques of homogeneous and conventional coprecipitation, ion exchange in the interlayer, and synthesis of nanoplatelet LDHs. The synthesized samples were assigned using an X-ray diffractometer in the Chemical Research Laboratory. Prof. O'Hare will provide Dr. Teramura with a number of LDH samples synthesized in his laboratory as candidates for active catalysts and photocatalysts. Dr. Teramura hopes to continue his productive collaborative projects with Prof. O'Hare in the future.



▲ With Prof. O'Hare

**Dr. Kentaro Teramura**

*Associate Professor, Graduate School of Engineering*

www.moleng.kyoto-u.ac.jp/%7Emoleng_04/teramura/index_E.html

AGRI

# Visiting the Birthplace of a Forest Pathogen

*Off-my-feet months at Louisiana State University.*

In Japan, mountains used to be covered with beautiful pine forests in the days when they were free from the pine wood nematode, a tiny 1mm-long forest pathogen that was introduced from North America in the early 19th century. Under the John Mung Program, Dr. Yuko Takeuchi visited Bogalusa, Louisiana, where the nematode was first discovered, to document its present status. On the university campus, in woodlands, and at Christmas tree farms, the nematodes still exist in Louisiana, but without causing a serious epidemic. Nematode cultures established by Dr. Takeuchi are now being comparatively studied with Japanese isolates of the same species to deepen our understanding of this disease. Dr. Takeuchi believes that the network developed during the surveys, experiments, and meetings will be a great asset to this important field of research.

Christmas tree farm (left) a source of both the vector beetle (upper right) and the pathogenic nematode (bottom right).

◀ Dr. Takeuchi with her supervisor, the nematologist Dr. E.C. McGawley

**Dr. Yuko Takeuchi**

*Assistant Professor, Graduate School of Agriculture, Kyoto University*

remach.kais.kyoto-u.ac.jp/~ems/

## What's in a Name?

PHOTO: Wikipedia

The program is named after the Japanese sailor, Nakahama Manjirō, also known in English as "John Mung." Rescued by an American whaler after a terrible shipwreck in 1841, Manjirō became the first Japanese to set foot on American soil. He enthusiastically learned about new technologies, laws, and customs. After he returned to Japan, he became a pioneering figure in developing the country's international relations. Inspired by his colorful life story, the program seeks to give junior faculty, staff members, and students opportunities to explore new academic and professional frontiers throughout the world.

RESEARCH FRONTIERS

# Cutting-Edge Research in a Broad Range of Fields

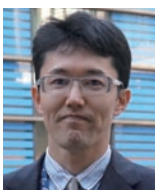
**Kyoto University is known for the quality and diversity of its research. Each issue of Research Activities can only highlight a small selection of those endeavors, but we hope to convey an impression of the university's rich academic milieu.**

MED

## 4D Visualization of Skin

*Two-photon microcopy visualize the inside of skin without invasion.*

Diagnostic and experimental tools to understand the pathophysiology of skin include the histology of skin biopsy samples thus far. With a two-photon microscopy system, Dr. Kenji Kabashima and his colleagues have succeeded non-invasively visualizing skin. It is now possible to evaluate skin inflammation via the visualization over time of skin blood vessels in a steady state and in inflammation. The system also enables the time-lapse analysis of skin immune responses by visualizing immune cells in murine skin. Moreover, Dr. Kabashima's group is currently working on the development of a non-invasive system to diagnose human skin diseases.

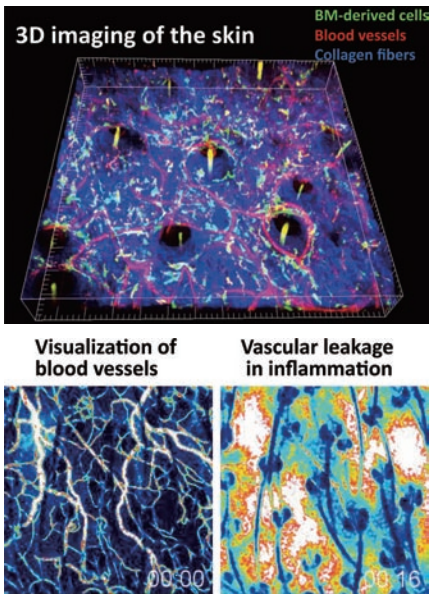



**Dr. Kenji Kabashima**

*Associate Professor, Graduate School of Medicine*

www.kenjikabashima.com/blog/

www.kuhp.kyoto-u.ac.jp/~skin/


MATH

## Something May Appear from Nothing...

*Noisy evolution with trivial remote past may involve nontrivial randomness.*

A noisy evolution may be described in a mathematical formulation as a stochastic equation with a time parameter. It is quite natural that the solution should involve the evolutionary noise[*1]. The surprising fact is that the solution sometimes involves a nontrivial randomness which exists at any time and is independent of the evolutionary noise, although the remote past is trivial[*2]. This is as if something had existed since the remote past where nothing should exist!

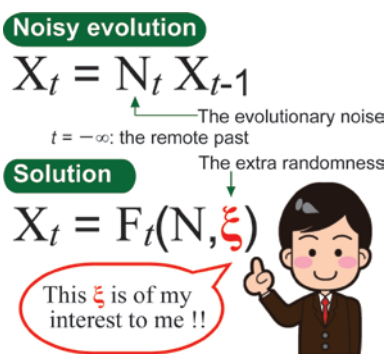
The research originates from Tsirelson's pioneering example of a stochastic differential equation[*3]. Yor's generalization revealed the fact that the extra randomness is uniform[*4] on a subgroup when the state space is a group[*5]. Dr. Kouji Yano studied the equation whose state space has a priori no group structure and proved that the extra randomness is still uniform on a certain group which is hidden behind the model. Dr. Yano seeks to acquire a thorough understanding of the mechanism which causes the appearance of such an extra randomness.

*1 [noise] means a random perturbation. *2 [trivial] is a mathematical term which roughly means no information. *3 [stochastic differential equation] its mathematical foundation was established by Dr. Kiyosi Itô (1915-2008), who was the director of RIMS during 1976-1979. *4 [uniform] is a mathematical term which means invariance of the distributions with respect to multiplications. *5 [group] is a mathematical term which means a set equipped with a multiplication structure.


**Dr. Kouji Yano**

*Associate Professor, Graduate School of Science*

www.math.kyoto-u.ac.jp/~kyano/

BIOL

# Diet, Gut Microbiota, and Obesity

*Host energy regulation by short-chain fatty acids receptors through diet and gut microbiota.*


Food intake regulates energy balance and its dysregulation leads to metabolic disorder, such as obesity and diabetes. During feeding, gut microbiota affects host nutrient acquisition and energy regulation and can influence the development of obesity and diabetes. Short-chain fatty acids (SCFAs), produced by the gut microbial fermentation of dietary fiber, are recognized not only as host energy sources but also as signal transduction molecules via G-protein coupled receptor GPR41 and GPR43. Dr. Ikuo Kimura and his colleagues discovered that these SCFAs receptors are related to host energy homeostasis, i.e., GPR41 regulates sympathetic activity and GPR43 regulates adipose-insulin signaling by sensing SCFAs. These further studies are expected to represent a central mechanism to account for the effects of diet and probiotics on bodily homeostasis and suggest a promising therapeutic target for the treatment of metabolic syndromes.

**Dr. Ikuo Kimura**

*Assistant Professor, Graduate School of Pharmaceutical Sciences*

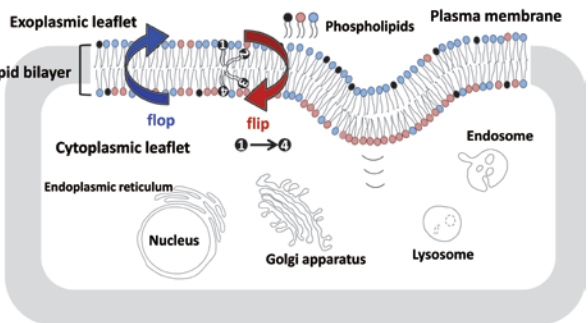
kyouindb.iimc.kyoto-u.ac.jp/e/hH5fH

BIOL

# Biological Membrane Bending

*Changes in lipid composition across lipid bilayers play a key role in membrane remodeling.*

Eukaryotic cells require dynamic membrane shape changes in many cellular activities including intracellular trafficking, cell migration, cell division, invasion, and neurite outgrowth. Biological membranes are composed of a lipid bilayer, and local changes in lipid composition between the two leaflets allow membrane deformation. Dr. Hye-Won Shin and her colleagues are seeking answers to the question of how changes in lipid composition (lipid flip-flop) contribute to the cellular activities accompanying membrane deformation. They have focused in particular on flippases (P4-ATPases) which translocate lipids across the lipid bilayers. The study is expected to establish a new concept for a functional association of local changes in lipid composition in various cellular activities.




**Dr. Hye-Won Shin**

*Associate Professor, Graduate School of Pharmaceutical Sciences*

www.pharm.kyoto-u.ac.jp/hshin/

LAW

# For Better Legislation

*Role of the constitutional court in the legislative process.*

It is generally said that the role of the constitutional court's statute review is to ensure the protection of fundamental human rights. However, this conception of the constitutional court's review seems to be one-sided. In fact, more attention should be paid to interaction between the cabinet, parliament, and constitutional courts produce better legislation and, moreover, better government. From this perspective, Prof. Masahiro Sogabe studies on the French Constitutional Council (Conseil Constitutionnel). The Council is an exceptional constitutional court in that it rules on whether statutes conform to the Constitution, after they are passed by Parliament, but before, they come into force. This function is conducive to the interaction between courts described above.

The Constitutional council of the French Republic (from their web site)

**Prof. Masahiro Sogabe**

*Professor of Graduate School of Law*

lawschool.law.kyoto-u.ac.jp/teacher/profile/law/sogabe.html

ELECTROCHEM

# Research for Fukushima Reconstruction with Advanced Technology

*Use of UFB water for the remediation of radioactive contamination and horticultural applications.*

It has recently been found that ultra fine bubbles (UFB) can be applied in various fields. Dr. Yoshikatsu Ueda and Dr. Yomei Tokuda reported the effectiveness of water containing UFB (approx. 100 nm diameter) in removing radioactive cesium from soil and gravel conglomerate and nonwoven cotton. The method of radioactive contamination removal using UFB water is currently under trial in Fukushima. Dr. Ueda and Dr. Tokuda have also investigated the effect of UFB water in retaining the freshness of cut flowers such as gentiana, and its effect on their coloring. The detailed mechanism of the UFB's function in these applications is yet not well understood, but the relevance of ions [proton ($H^+$) and hydroxide ($OH^-$) ion] in solution is thought to be a key factor.

Coloring effects of UFB and purified water on gentiana
a comparison of the coloring agent, diluted with UFB water and purified water.

**Dr. Yoshikatsu Ueda (left)**
*Assistant professor, Research Institute for Sustainable Humanosphere*
www.rish.kyoto-u.ac.jp/space/people/yueda

**Dr. Yomei Tokuda (right)**
*Associate professor, Institute for Chemical Research*
noncry.kuicr.kyoto-u.ac.jp/

LAW

# Exporting Japanese Criminal Law

*An excellent fusion of different justice systems around the world.*

Cour Pénale Internationale
International Criminal Court

It has been common practice in Japan to import and adopt foreign legal systems. Beginning with Chinese criminal law, many elements of laws from many different countries, including England, France, and Germany, were introduced into the Japanese legal system during the Meiji modernization period. After World War II, American law greatly influenced the establishment of the Constitution and criminal procedure law. That history has developed the uniquely mixed legal system of Japan. Today, the importance of such a mixed system is becoming more apparent as a fusion of different legal systems from around the world is required for international criminal procedures involving multiple countries. Further research and development of Japanese criminal law is expected to contribute to the improvement of the international justice system.

**Prof. Kanako Takayama**
*Professor, Graduate School of Law*
www.kt.rim.or.jp/~k-taka/eindex.html

# Students Also Drive Research

*KU students embark on promising international careers.*

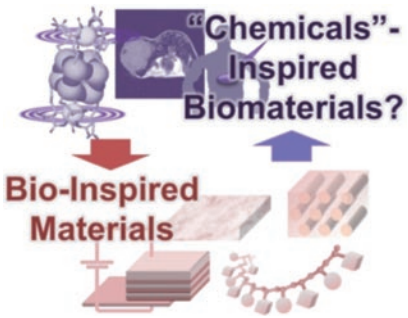
Kyoto University's cutting-edge research outcomes are not only produced by the university's dedicated researchers—our students also play a role. The intelligence, creativity, and originality of Kyoto University students has been acknowledged in the form of several international academic awards. In this feature we will introduce a small selection of those awards. We look forward to following the development of our students as they embark on promising international careers!

CHEM

# Chemically-Inspired Biomaterials

*New design strategy for biomaterials based on the chemistry in artificial materials or devices.*

By using natural materials or mimicking mechanisms in nature, functionalized materials have been developed, which are known as bio-inspired materials. However, little research has been undertaken regarding the reverse process. The studies of Dr. Kazuo Tanaka and his colleagues focus on polymers to develop thermally-resistant materials or opto-electric devices. By applying the chemical principles of artificial products unrelated to biology, they have recently succeeded in developing unique biomaterials, such as ultra-sensitive MRI contrast agents developed by applying a function of rigid molecules used for reinforcing the thermal stability of plastics. The concept of "chemically"-inspired biomaterials is anticipated to contribute to the development of new functions for and improve the properties of existing devices.




**Dr. Kazuo Tanaka**

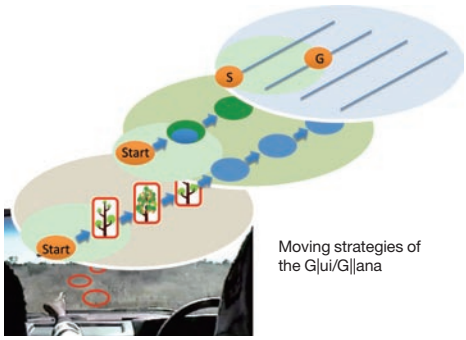
*Assistant Professor, Graduate School of Engineering*

chujo.synchem.kyoto-u.ac.jp/en/

ANTHROP

# Desert Topography

*Wayfinding practices of the San of the Central Kalahari (G|ui / G||ana).*




Moving strategies of the G|ui/G||ana

The San are known to be indigenous to southern Africa. Among the groups of San, the G|ui and the G||ana live in the central part of the Kalahari Desert. Their spatial cognition is complemented by a multi-scaled integration of folk knowledge, through which they transform "nature" into "culture." Dr. Takada has clarified that the key points regarding their moving strategies are (1) a keen perception of ground conditions to avoid obstacles, such as burrows of animals and thorny plants; (2) an immense knowledge of specific trees, used as landmarks in the bushveld; (3) an understanding of woodlands and basins as nodes in the environment (these areas provide valuable resources for the G|ui and G||ana and serve as campsites during their nomadic travels); and (4) a conceptualization of sequences of woodlands and/or basins with reference to ecological features that are sometimes employed as a route for nomadic movement.

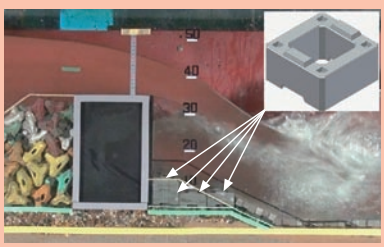
**Dr. Akira Takada**

*Associate Professor, Graduate School for Asian and African Area Studies*

jambo.africa.kyoto-u.ac.jp/africa_division/en/staff-takada-akira

## Kyoto University Researcher Awarded De Paepe-Willems Award 2013 by PIANC

The De Paepe-Williems Award is presented annually by the World Association for Waterborne Transport Infrastructure (PIANC) for the best technical paper by a young researcher. On January 31, the 2013 award was presented to Mr. Hiroshi Matsushita, a second-year doctoral student in the Prof. Hiraishi laboratory of the Disaster Prevention Research Institute (DPRI) for his paper titled Breakwater Reinforcement Method against Large Tsunami. This is the first time that the award has been presented to a student from the Asian region. Mr. Matsushita's study introduces a method of reinforcing breakwaters against large tsunamis by installing newly developed blocks behind the breakwaters on the harbor side.




A hydraulic model experiment demonstrating the award winning research.

**Mr. Hiroshi Matsushita**

*Chief Engineer, Nikken Kogaku Co., Ltd. / Researcher, Disaster Prevention Research Institute*

www.dpri.kyoto-u.ac.jp/~rcfcd/cse/lab/eng/indexeng.html

INFORMAT

# Youth Mediated Communication for Vietnamese Agriculture

*Utilizing the Language Grid for Japanese-Vietnamese Knowledge Communication.*


Youth Mediated Communication (YMC) is an agricultural support project, in cooperation with the NPO Pangaea, the University of Tokyo, and the Vietnamese Government. Since the literacy rate of farmers in Vietnam is fairly low, the project trains Vietnamese youths to serve as communication mediators between the farmers and Japanese agricultural experts. The youths receive questions from Vietnamese farmers, communicate with Japanese experts via the YMC system, and then transfer agricultural knowledge from the experts to the farmers. In addition, they collect daily field data (e.g. temperature, humidity, pictures, etc.) and send them to the Japanese experts. The YMC system is a multi-language online Social network service (SNS) built on the top of the Language Grid, which has been operated by Kyoto University since 1997 in cooperation with 140 research organizations worldwide.

**Dr. Toru Ishida**

*Professor, Department of Social Informatics, Graduate School of Informatics, Kyoto University*

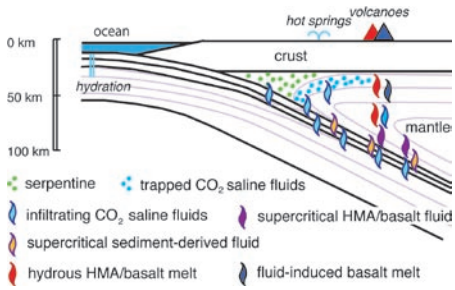
www.ai.soc.i.kyoto-u.ac.jp/communication_design.html

GEO

# Sea Water Producing Salty Hot Springs and Volcanoes

*Mantle wedge infiltrated with saline fluids from subducting plate.*

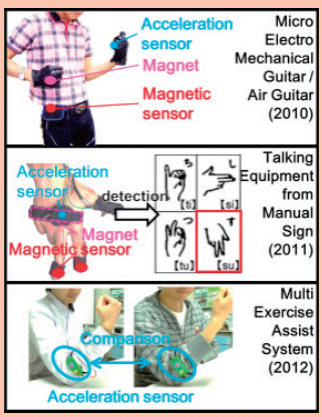
Subducting plates carry $H_2O$ the into mantle beneath island arcs like Japan and the Philippines. Earthquakes, hot springs, and volcanoes are caused by the addition of the $H_2O$ fluids. Dr. Kawamoto found saline fluid inclusions in crystalline mantle rocks collected from the 1991 Pinatubo eruption. They contain 5.1 wt. % NaCl, which is a little saltier than sea water (3.5 wt. %). His observation suggests the hydration of the mantle by sea water dehydrated from subducting plates. Such saline fluids dehydrated in shallower depths return to salty hot springs such as Arima, Takarazuka, and Shirahama, which are located away from volcanoes. At greater depths, they reduce the melting temperature of mantle to produce magmas. When you cook barbeque on a lava plate, you do not need much salt.




**Dr. Tatsuhiko Kawamoto**

*Assistant Professor, Graduate School of Science*

www.vgs.kyoto-u.ac.jp/InetHome/kawamoto/default-E.htm




# The Success of Team TBT in iCAN

**Team TBT The 2012 Team: Atsushi Nakano, Junya Suzuki, Naoyuki Tamura, Daimon Matsusi, Daisuke Takagi**

The International Contest of Applications in Nano/Micro Technologies (iCAN) aims to promote the development of applications using MEMS (Micro Electro Mechanical System) sensors. Team TBT, composed of students from the Nano/Micro System Laboratory, has participated in the contest three times. Their entries include an innovative musical instrument (2010), a translator which converts finger writing into voice (2011), and a device to assist motion copying in sports and rehabilitation using ultra-compact acceleration and magnetic sensors (2012). Their prototypes for these inventions were presented at the iCAN contest, winning them 3rd (2010), 1st (2011), and 2nd (2012) prizes respectively.

**Mr. Atsushi Nakano**

*Department of Micro Engineering, Graduate School of Engineering*

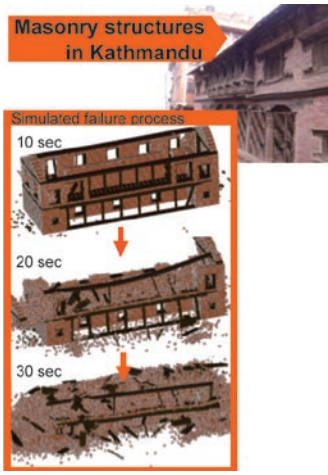
www.nms.me.kyoto-u.ac.jp/ (Lab.'s website) www.ican-contest.org/index.html (iCAN website)

EQ-ENG

# Toward Reducing Deaths Caused by Earthquakes

*Development of a numerical analysis method for predicting collapse behavior of structures during earthquakes.*

Catastrophic earthquakes are responsible for nearly 60% of casualties from natural disasters in the world. The principal cause of death is the collapse of buildings, accounting for about 75% of earthquake fatalities over the last century. In earthquake-prone developing countries, there are many masonry buildings with low earthquake-resistance. These buildings have been found to collapse even at low intensities of ground motion and, worse still, collapse very rapidly at high intensities. In order to reduce the number of casualties attributed to earthquakes in those countries, it is necessary to improve the earthquake resistance of these primarily weak masonry buildings. However, knowledge is still limited as to how buildings collapse, and how earthquake resistance can be effectively improved.




Against this background, Dr. Furukawa has developed a numerical analysis method which can handle a series of seismic behaviors—from elastic to collapse. Her research involves evaluating the seismic resistance of masonry structures overseas through on-site experiments and numerical simulations.

**Dr. Aiko Furukawa**

*Associate Professor, Graduate School of Global Environmental Studies*

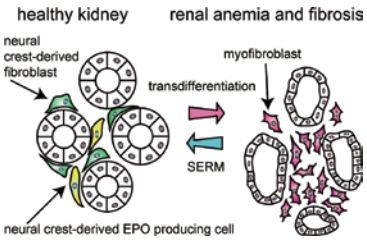
www.ges.kyoto-u.ac.jp/cyp/modules/contents/index.php/shokai/faculty_staff/jishinsaigai_risukuron.html?ml_lang=en

MED

# From Incurable to Curable: Renal Anemia and Renal Fibrosis

*Elucidating the molecular mechanisms of renal anemia and renal fibrosis.*

Renal fibrosis and renal anemia are common complications in end stage renal disease, however the molecular mechanisms and reversibility of these complications remain unclear. Erythropoietin is a hormone that stimulates red blood cell production. Prof. Motoko Yanagita employed a genetic lineage tracing method to demonstrate that erythropoietin-producing cells in healthy kidney and scar-producing myofibroblasts during fibrosis originate from neural crest during embryogenesis. She also demonstrated that the dysfunction of the neural crest-derived fibroblasts is the cause of renal anemia and renal fibrosis, and that these two conditions could be reversed by a selective estrogen receptor modulator (SERM). These findings highlight a potential therapeutic approach for anemia and fibrosis associated with chronic kidney disease. (See also the article of TMK Project in p.16.)




**Dr. Motoko Yanagita**

*Professor, Graduate School of Medicine*

www.kidney.kuhp.kyoto-u.ac.jp

www.kyoto-u.ac.jp/ja/research/forefront/vol14.htm

## Gold Medals at iGEM 2010 and iGEM 2012 World Champion in Genetic Engineering

The International Genetically Engineered Machine (iGEM) competition is a worldwide synthetic biology competition for undergraduate students. Using genetic modification technology, each team creates an organism with a new capacity, and competes with other teams.

In 2010, iGEM Kyoto team (representative: Wataru Shihoya) won a gold medal for introducing genes which commit suicide after a certain period of time to *Eschericha coli*, thereby preventing biohazard. In 2012, the team (representative: Tomohiro Nobeyama) also won a gold medal for modifying *E. coli* genes to make them bloom flowers, regardless of season. It is anticipated that their work will have further success in the future.

**Mr. Tomohiro Nobeyama**

*3rd Grade Undergraduate Student, Faculty of Science*

2012.igem.org/Team:Kyoto/Project (iGEM 2012 website) 2010.igem.org/Team:Kyoto/Projec (iGEM 2010 website)


This presentation is available at the following WEB site; WEB 2012.igem.org/files/video/Kyoto_Championship.mp4

# Specialist Administrative Support for Researchers

**Kyoto University has established the Office of Society-Academia Collaboration for Innovation, a support system for university ventures, and the University Research Administrator (URA) system of administrative support for researchers.**

HELPS ON COLLABORATION

## SACI

WEB www.saci.kyoto-u.ac.jp/en/

*The Office of Society-Academia Collaboration for Innovation.*

The Office of Society-Academia Collaboration for Innovation (SACI) performs Industry-Academia Collaboration and Technology Transfer and Innovation Activities as the following functions:

**1. Launch and promotion of national projects**

**2. Launch and promotion of industrial liaison programs based on university seeds**
Matching university research seeds with industrial needs.

**3. Administration of intellectual properties and promotion of technology transfer**
Patents, clinical data, materials, copyrights, software and contents. With Kansai Technology Licensing Organization, iPS Academia Japan, Shirankai, etc..

**4. Protection of Kyoto University's rights and project stability through proper contracts**
Legal negotiation and support for research contracts and basic IP contracts.

**5. Education on business literacy and entrepreneurship**
For undergraduates and graduate students.

**6. Supporting start-up companies and venture companies related to Kyoto University**
Establishment of venture funds and development of investment schemes (detail issue is below).

**7. Contribution to general education and establishment of research internship programs**

As shown in Fig.1, applications for international patents are increasing. SACI also assists with external funding, collaborative research with industry, and research sponsored by the public sector (Fig.2).

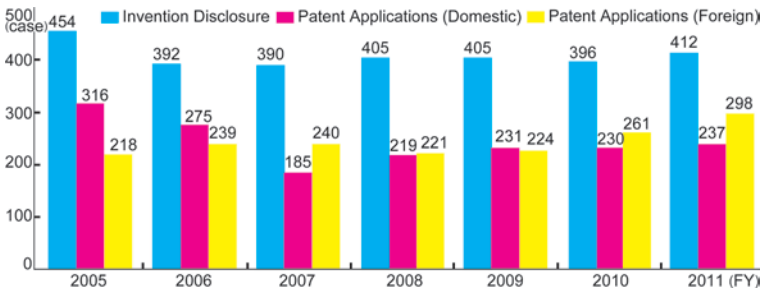



Fig.1 Intellectual Property Management

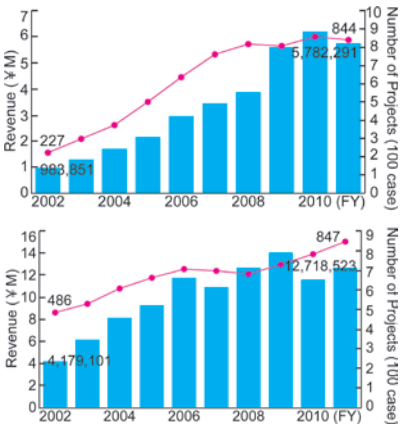



Fig.2 Collaborative Research [Industry] (top) and Sponsored Research [Public Sector] (bottom)

HELPS ON BUSSINESS

# Promoting Entrepreneurship


Tommy kaira ZZ of GLM

At Kyoto University Society-Academia Collaboration for Innovation (SACI), Endowed Research Chair Innovation Management Science has been established with primary focus for the study and promotion of entrepreneurship and innovation at Kyoto University and its community.

- Builds connections between students and the entrepreneurship, business community, and sponsors and supports entrepreneurship research.
- Focus on the entrepreneurs and how to empower them.
- Creating a broad-based ecosystem for entrepreneurship centered on the institution.
- Providing education to familiarize students with concepts and skills of entrepreneurship.
- Helps inventors, innovators and entrepreneurs to make their ideas and concepts more commercially successful. This early stage support is pivotal to success of new technology companies in what is often seen as a high-risk section of the investment spectrum.

In order to promote and nurture university spin-offs, a venture capital called KUVF (Kyoto University Venture Fund) has been established in 2007 with amount of 4.5 billion JPY (or approximately 45 million USD). At the end of FY 2012, KUVF has an investment portfolio of 16 companies.

WEB www.saci.kyoto-u.ac.jp/en/?page_id=2305

## Example Kyoto University Entrepreneurs

aucfan 買うときも 売るときも オークファン

**Aucfan** A web-based services provider successfully concluded IPO (initial public offering) in April 2015. Services include comparison of multiple platforms to auction sellers. WEB aucfan.com

GLM Green Lord Motors

**Green Lord Motors** A manufacturer of EV (Electric Vehicle) sports cars. Its unique concept of crush safety and vehicle design has been known to the public by wide range of media coverage. The company already started production in April 2015, and the vehicle is currently showcased at newly opened Grand Front Osaka. WEB greenlordmotors.co.jp

HELPS ON RESEARCH

# The Kyoto University URA Network

*Supporting Kyoto University Researchers.*


The Kyoto URA Network

As part of a new national government initiative, the Kyoto University Research Administration Office (KURA) was officially launched in April 2012 as an organization to provide consistent research support for project planning, obtaining research funds, project execution, and public relations by providing a well-organized research support network.

Several measures have recently been taken to strengthen the network. In autumn 2012, the university hired twenty-one new university research administrators (URAs) for seven newly established offices that work in close collaboration with the KURA main office. Each of the offices acts as a headquarters for designated graduate schools, research institutes and centers, and intensively works to support the researchers with a deep understanding of their needs and demands. The Kyoto University Research Administration Network, which is formed by the KURA main office and the seven new URA offices, seeks to be a pioneering model for university research administration in Japan, and to contribute to the generation of world-class knowledge. WEB www.kura.kyoto-u.ac.jp/img/english.pdf

KYOTO UNIVERSITY FACILITIES IN JAPAN

# Supporting Research throughout Japan

**In addition to its three campuses, Kyoto University operates a number of diverse facilities at various locations throughout Japan. Kyoto University is renowned for the rich achievements stemming from its diverse fieldwork endeavors, and each of its facilities is a unique and valuable resource for the activities of its researchers.**

## Field Science Education and Research Center

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Kamigamo Experimental Station ····· 14
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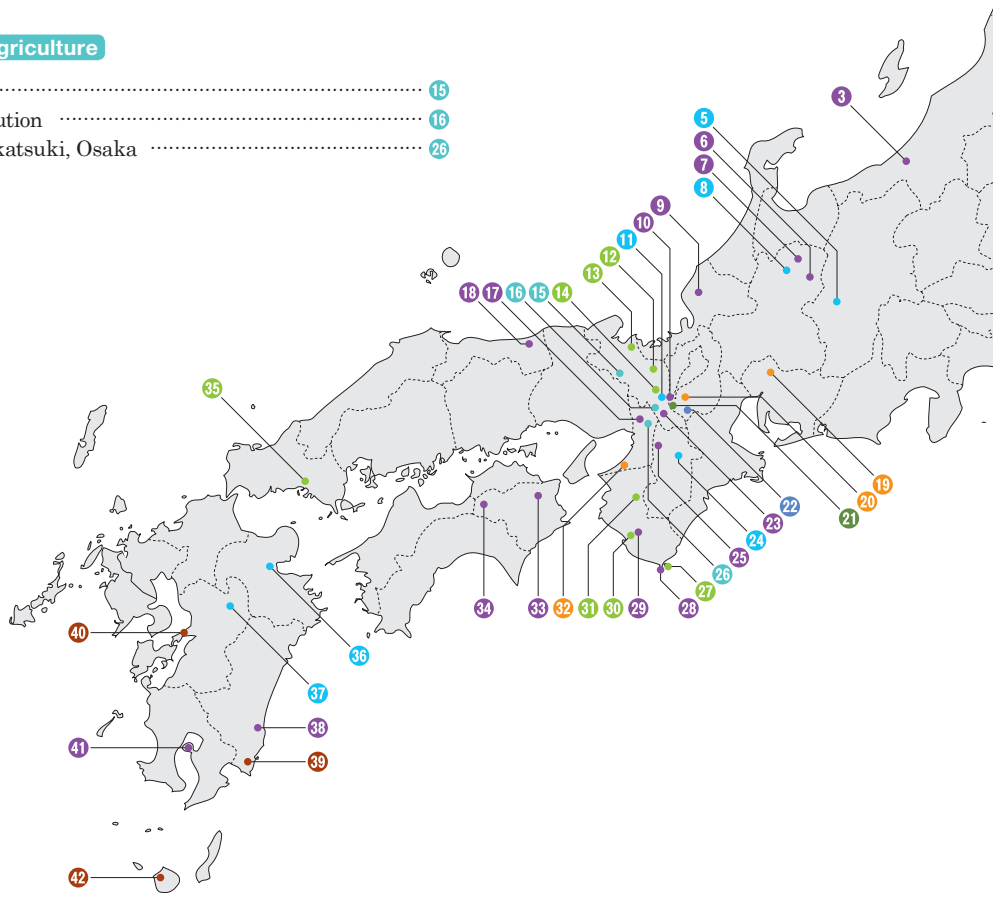

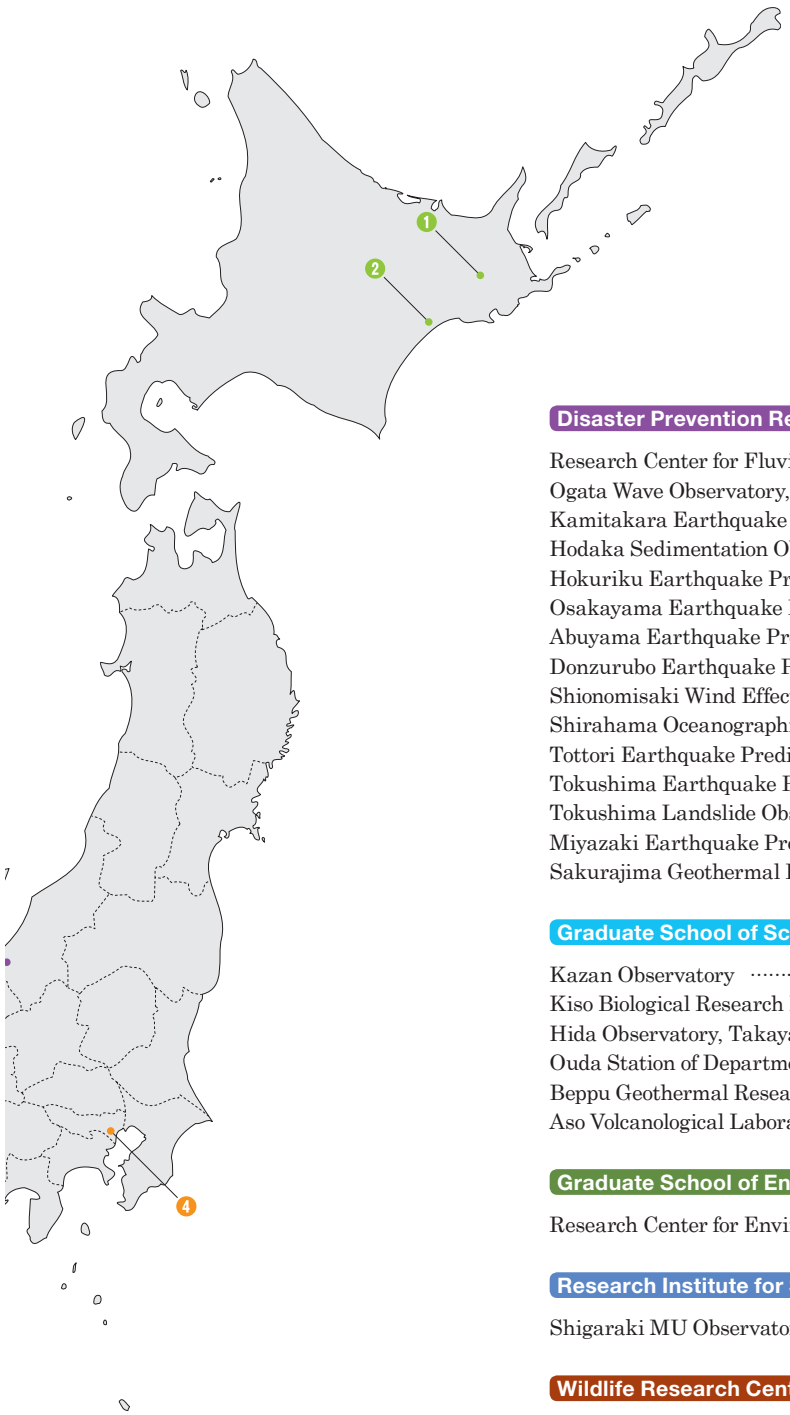


## Disaster Prevention Research Institute

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## Other

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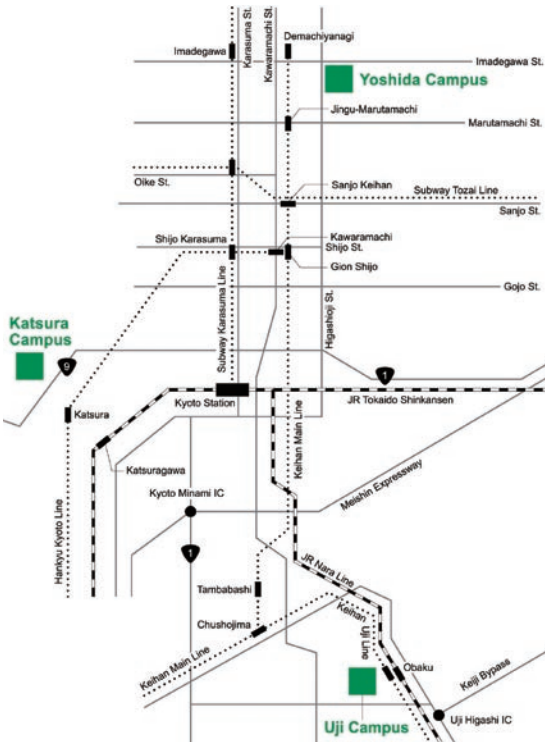
This information is also available online. WEB www.kyoto-u.ac.jp/ja/issue/research_activities


## Map and Access

More information on how to visit Kyoto University can be found at the following WEB site;
www.kyoto-u.ac.jp/en/access

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