

Kyoto University

Research Activities

Vol.3 No.3 December 2013

Special Features:

Interdisciplinary Initiatives

The Hakubi Project • The John Mung Program



京都大学

Research Activities

Vol.3 No.3
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Cover Photograph



A plaque commemorating Kyoto University's 100th anniversary. Located behind the Clock Tower Centennial Hall.

MESSAGE FROM THE PRESIDENT

Exploring Pre-science through Interdisciplinary Fusion

PUBLISHED since 2011, Kyoto University Research Activities aims to regularly showcase diverse examples of the university's current research undertakings.

Pursuing the exploration of pre-science is one of Kyoto University's policies for the enhancement of our research. This policy demonstrates our commitment to challenging common wisdom and opening new scientific frontiers. Under its philosophy of academic freedom, Kyoto University has developed a number of new and unique academic fields since its founding. In recent years, we have increasingly emphasized collaborative efforts which cross the boundaries that have conventionally divided academic fields, as well as national, academic, and societal boundaries.

This issue highlights several interdisciplinary initiatives being undertaken at Kyoto University, and also includes a feature on the pioneering group of philosophers known as the "Kyoto School," which was formed when Kyoto University was still known as Kyoto Imperial University. The Kyoto School included the two renowned philosophical scholars Kitaro Nishida and Hajime Tanabe, and the group developed an original brand of thought which continues to influence thinkers to this day.

I hope that this edition of Research Activities will convey to our readers some of our passion and enthusiasm for cultivating new scholarship that stretches beyond established boundaries, and which can contribute to harmonious coexistence among the human and ecological community on this planet.

December 2013



Hiroshi Matsumoto
President, Kyoto University



INTRODUCTION

Kyoto University: A Global Perspective

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

Overview: University Profile

Mission	The mission of Kyoto University is to sustain and develop its historical commitment to academic freedom and to pursue harmonious coexistence within the human and ecological community on this planet.
Foundation	Kyoto University was originally founded as Kyoto Imperial University on the June 18, 1897. It was the second imperial university to be established in Japan.
Students (As of May 1, 2013)	Undergraduate students: 3,421 Master's course students: 4,846 Professional course students: 728 Doctoral course students: 3,682
Faculty and Staff (As of May 1, 2013)	Faculty members: 3,406 Non-teaching staff members: 2,655
Facilities and Environment (As of May 1, 2013)	Faculties: 10 Graduate Schools: 18 Research Institutes: 14 Intra-University Networks and Organizations: 6 Education and Research Centers: 21 Overseas Offices and Facilities: 50



KU Key Words

Freedom and Autonomy ◆

Kyoto University values **freedom and autonomy** in research that conforms to high ethical standards, and believes in promoting a disciplinarily diverse spectrum of research, while also pursuing an integrated, **multidisciplinary approach**.

Self-Reliance and Self-Respect ◆

The principles of **self-reliance** and **self-respect** are key elements in Kyoto University's academic approach. Guided by those concepts, students and researches are encouraged to be bold, independent, and creative in their study and research.

The Hakubi Project ◆

A unique program to foster outstanding young researchers, the Hakubi Project recruits **twenty international researchers per year** as associate and assistant professors, and gives them the valuable opportunity to devote themselves entirely to their research.

The John Mung Program ◆

A program to support **mid-** and **long-term** research by junior faculty members at leading academic institutions overseas. Since 2013, the program is also open to students and non-teaching staff members.

2× by 2020 ◆

2× by 2020 (Double by Twenty-Two) is the slogan of Kyoto University's new international strategy, by means of which the university aims to double its international indices in research, education, and international service by the year 2020.



By the Numbers

JPY 202,124 million	FY2012 revenues
16%	Percent of funding from external sources in the revenues
JPY 158,526 million	FY2012 expenses
44%	Percent of instruction and research costs, the largest portion of the expenses
JPY 220 million	Revenue from patent licenses (FY2012)
1,733	International students (As of May 1, 2013)
779	Students studying abroad (FY2012)
240	International faculty members (as of May 1, 2012)
2,950	International researchers hosted Annually (FY 2011)
281,948	Academic paper citations (total from 2007-2011. From InCites™, Thomson Reuters)
8	Number of Nobel laureates that have taught on campus

More about Kyoto University

International Accolades ◆

In addition to eight **Nobel Prizes**, Kyoto University researchers have garnered two **Fields Medals**, one **Gauss Prize**, four **Lasker Awards**, two **Japan Prizes**, and four **Kyoto Prizes**.

Academic Exchange Agreements ◆

Kyoto University has academic exchange agreements with ninety-three universities, four university associations, and one national academy.

Kyoto: The Academic Center of Japan ◆

Kyoto has a long history as a university town. In the Heian period (794-1185), when Kyoto was the nation's capital, it was the location of an imperial institution of higher education called the *Daigaku-ryō*. Comparable to today's national universities, staff members at the *Daigaku-ryō* held posts equivalent to the current positions of university president, teaching staff, and administrative staff, and departments within the institution were also the equivalent of current university faculties. At present, Kyoto embraces thirty-eight institutions of higher education, making it one of the most concentrated academic centers in Japan.



The Kyoto School of Philosophy and its Genealogy

A Prominent Group of Philosophers in the History of Modern Japanese Philosophy



Kitaro Nishida with staffs and students around 1913
[K. Nishida, *"Nishida Kitaro Zenshu, Vol.14"*, Iwanami Syoten, Tokyo (1951)]



Landscape of the department of literature in the end of the Meiji period

IN 1906, the College of Letters was founded at Kyoto Imperial University, and lectures began in the department of philosophy. Kitaro Nishida (1870-1945) was assigned to Kyoto Imperial University in 1910, and Hajime Tanabe (1885-1963) was invited to the university as an assistant professor in 1919. The two professors mentored many capable philosophers at Kyoto Imperial University, and a group of philosophers known as the Kyoto School was formed.

What is the Kyoto School? It is difficult to clearly answer the question. However, an appropriate answer would be that the Kyoto School was an intellectual network of philosophers directly influenced in a personal and scholarly manner

by the two prominent philosophical scholars mentioned above, Kitaro Nishida and Hajime Tanabe.

The reason it is appropriate to describe the Kyoto School as a “network” is because its members were very closely related and profoundly influenced by each other. The relationship or influence is not a unilateral one, such as that of teacher to student. Even the students had a significant influence to their teachers’ thoughts. In addition to being inspired their students, Nishida and Tanabe also criticized and influenced each other.

In that sense, the Kyoto School may be described as a craft workshop. However, unlike craftspeople,



Member of the inaugural class of the literature department

the Kyoto School philosophers encouraged mutual criticism. Tanabe openly attacked Nishida's thought, and their students developed their own views, refuting Nishida and Tanabe's thoughts. Through such mutual criticism, a lot of distinctive ideas were generated.

A creative relationship that allowed for mutual criticism was built as Nishida taught his students the importance of classical literature, whilst simultaneously encouraging them to have their own views independent of the classics. In other words, Nishida urged his students to study not as researchers of philosophy, but as actual philosophers themselves. His approach produced many distinguished philosophers, notably the Zen Buddhist philosophers Shin'ichi Hisamatsu (1889-1980) and Keiji Nishitani (1900-1990), the Marxist philosophers Kiyoshi Miki (1897-1945) and Jun Tosaka, (1900-1945), and Torataro Shimomura (1902-1995) who produced outstanding works in

the areas of scientific philosophy and cultural history.

Another distinctive characteristic of the Kyoto School is that the philosophers developed an original brand of thought largely influenced by the Zen Buddhist concept of "nothingness," which was in direct contrast with Western philosophy. While Western philosophy was rooted in the philosophy of "being", the Kyoto School of philosophy developed an original perspective which stood between the Western philosophy of "being" and the Buddhist conception of "nothingness."

In 1995, a new chapter was added to the history of Japanese philosophy with the establishment of the Japanese Philosophy Course in Kyoto University's Faculty of Letters. The Japanese Philosophy Course aims to carry on the tradition of the Kyoto School and develop their thoughts further. However, the nature of the curriculum differs



Kitaro Nishida (1870-1945)

Nishida Kitarō was the most significant and influential Japanese philosopher of the twentieth-century. (from the WEB site "stanford encyclopedia of philosophy," <http://plato.stanford.edu/entries/nishida-kitaro/>)

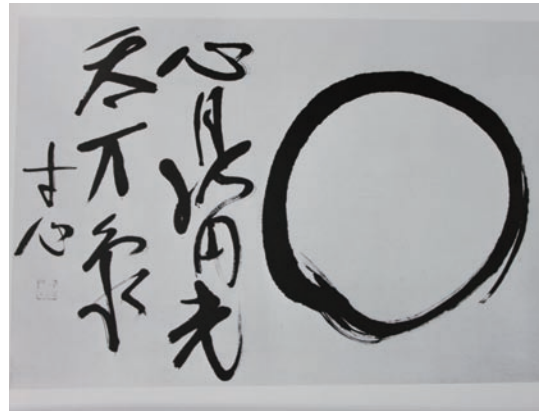
The Kyoto School (Kyōto-gakuha) is the name given to the Japanese philosophical movement centered at Kyoto University that assimilated western philosophy and religious ideas and used them to reformulate religious and moral insights unique to the East Asian cultural tradition.



Nishida's article on the first page of the primer issue of a philosophical magazine in April, 1916

from the studies of Nishida, Tanabe and their students, as the Kyoto School itself is a subject of research.

Nearly seventy years have passed since the end of World War II, and we can now examine Nishida's and Tanabe's work from the perspective of classical philosophy. This distance enables us to study the Kyoto School as a research subject from a wider perspective, examine its implications in the context of modern philosophy, and discover what it can contribute to current issues and circumstances.



A calligraphy that was drawn by Nishida in 1935 [Nishida Kitaro Ibokusyu Henshyu Iinkai, ed., "Nishida Kitaro Ibokusyu", Toeisha, Inc., Kyoto (1976)]

Another important role of the course is to promote collaboration on Japanese philosophy studies between Japanese and international researchers, as there was previously no platform for such discourse. In the past, diverse research activities were independently conducted without close collaboration or mutual criticism, which inhibited their progress. The course is anticipated to promote discussion among researchers in Japan and overseas, and contribute to the formation of a network for research into Japanese philosophy.

Author: **Prof. Masakatsu Fujita**

Professor, Graduate School of Advanced Integrated Studies in Human Survivability

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

www.bun.kyoto-u.ac.jp/en/departments/div_of_philosophy/japanese_philosophy



The Kyoto School Archive

Handwritten manuscripts by Kitaro Nishida are available on the website: Kyoto School Archive. The archive also contains thousands of digital images including works by Hajime Tanabe.

As the archive includes an imaged-based search engine, user can search for specific words in the images of handwritten documents.

Website manager: **Prof. Susumu Hayashi**

Professor, Graduate School of Letters

www.shayashi.jp



WEB www.kyoto-gakuha.info

AWARDS & HONORS

International Recognition of Kyoto University's Research



Prof. Susumu Kitagawa

Director of The Institute for Integrated Cell-Material Sciences (iCeMS)

INTERVIEW »

Do not be Discouraged

By criticism from anyone or to go against current trends.

Susumu Kitagawa is a pioneer in the field of porous metal-organic frameworks. He has been the recipient of many prestigious honors including the de Gennes Prize in 2013 from the Royal Society of Chemistry (RSC), the Humboldt Prize in 2009, and a Thomson Reuters Citation Laureate in 2010. In this interview, we sat down with him and got an inside look at his research philosophy.

— What is your personal motto as a researcher?

Kitagawa: My motto is to be an “unbending blade of grass in the wind.” A Chinese philosopher named Zhuangzi once

said that “strong winds test the rigidity of grass” — meaning that adversity is a test of character. Just like this unbending blade of grass, I want to be an unwavering researcher. To do so, self-discipline and the pursuit of knowledge are essential. Only through such patience and diligence can I withstand strong winds — meaning, not to be discouraged by criticism from anyone or resist being just a follower of current trends. Moreover, I must maintain a strong conviction and unshakable scientific disposition.

I also keep in mind another of Zhuangzi's proverbs that states “the usefulness of uselessness,” which led us to finding novel uses for lattice-like porous coordination polymers (PCPs) that we had discovered. The holes in the lattices at first appeared to be useless, empty spaces, but by ignoring conventional thinking we realized that PCPs are in fact extremely useful.

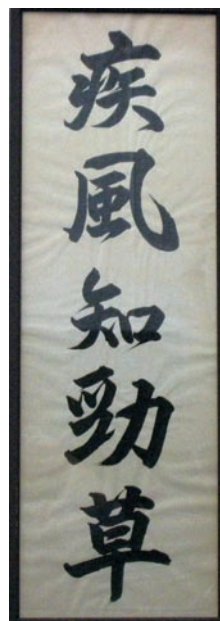
— What is your future vision as a scientist?

Kitagawa: I hope that PCPs we develop can be used for practical applications in the world. For example, materials that are able to store or transform CO₂ and methane may serve as essential tools to solve energy and environmental issues.

I also seek to train young people who are unwavering and resolute, like an unbending blade of grass. Since there are many talented, young scholars at iCeMS, one of my ongoing missions is to turn them into world-class researchers.



The “Three Cs”: the requirements to become world-class researchers that Prof. Kitagawa imparts to young researchers



The motto of “strong winds test the rigidity of grass” hangs on the wall of Prof. Kitagawa's laboratory

TOPIC » Prof. Tasuku Honjo the Order of Culture Awarded

Tasuku Honjo, a professor emeritus in Graduate School of Medicine, received the Order of Culture in 2013. The Order of Culture (*Bunka-kunshō*) is Japan's most prestigious cultural award conferred by the Emperor in recognition of outstanding contributions to the development of art, culture, science and technology. Honjo received the award for his academic achievements and for playing a leading role in the development and advancement of molecular immunology research.



Tasuku Honjo

*Professor Emeritus, Kyoto University,
Professor, Graduate School of Medicine*
www2.mfour.med.kyoto-u.ac.jp/E_Home.htm

*Please refer to the following link for more information on Kyoto University researchers who have been awarded the Order of Culture:

WEB www.kyoto-u.ac.jp/ja/profile/intro/honor/award_b/culture

TOPIC » Two KU professors Selected as Persons of Cultural Merit

Tetsuro Matsuzawa, a professor in the Primate Research Institute, and Tadao Yoshikawa, a professor emeritus of Kyoto University, were selected as Persons of Cultural Merit (*Bunka Kōrōsha*) in 2013. The award of Person of Cultural Merit is Japan's second highest cultural honor after the Order of Culture, and is given to those who have made outstanding cultural contributions. Matsuzawa is a pioneer who has uncovered the evolutionary origins of human cognition and behavior through his unique research on chimpanzee intelligence. Yoshikawa is an authority on the history of thought in Middle Ages China. He is renowned for significantly influencing the development of Sinology through his creative research tracing Chinese intellectual history.



Tetsuro Matsuzawa (left) *Professor, Primate Research Institute*
langint.pri.kyoto-u.ac.jp/langint/staff/tetsuro_matsuzawa.html (Japanese only)

Tadao Yoshikawa (right) *Professor Emeritus, Kyoto University*
ja.wikipedia.org/wiki/吉川忠夫 (Japanese only)

*Please refer to the following link for more information on KU researchers who have been designated as Persons of Cultural Merit:

WEB www.kyoto-u.ac.jp/ja/profile/intro/honor/award_b/cultural_merit

TOPIC » The Kyoto University Shi-Shi Award

The Kyoto University Shi-Shi Award was established in November 2012 to honor Kyoto University scholars for outstanding efforts and achievements in education, research, and social service. The first award ceremony was held in June 2013.

The first recipients of the award:

Koichiro Oshima

Professor/Director, Agency of Health, Safety and Environment

Shuichi Kawai

Professor/Director, Research Institute for Sustainable Humanosphere

Susumu Kitagawa

Professor/Director, Institute for Integrated Cell-Material Sciences (iCeMS)



Yasushi Kosugi

Professor, Graduate School of Asian and African Area Studies

Shigekazu Nagata

Professor, Graduate School of Medicine

Shinya Yamanaka

Professor/Director, Center for iPS Cell Research and Application (CiRA)

WEB www.kyoto-u.ac.jp/ja/news_data/h/h1/news7/2013/130627_1.htm (Japanese only)

HONORS

Award Winning Researchers

The following is a list of just some of the 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*

Hideki Yukawa (1949), Sin-Itiro Tomonaga (1965),
Makoto Kobayashi (2008), Toshihide Maskawa (2008)

in Chemistry

Kenichi Fukui (1981), Ryoji Noyori (2001)

in Physiology or Medicine

Susumu Tonegawa (1987), Shinya Yamanaka (2012)

Fields Medal Heisuke Hironaka (1970), Shigefumi Mori (1990)

Gauss Prize Kiyosi Itō (2006)

Lasker Award Susumu Tonegawa (1987), Yasutomi Nishizuka (1989),
Yoshio Masui (1998), Shinya Yamanaka (2009)

Japan Prize Makoto Nagao (2005), Masatoshi Takeichi (2005)

*Photos provided by the Japan Prize Foundation

Kyoto Prize Chushiro Hayashi (1995), Kiyosi Ito (1998),
Shinya Yamanaka (2010), Masatoshi Nei (2013)

*Photos provided by the Inamori Foundation

Die Schaudinn-Hoffmann-Plakette ◆ Shin-ichi Matsumoto (1965)

Huxley Memorial Medal ◆ Itani Junichiro (1984)

Order of the White Elephant - 3rd Class ◆ Yoneo Ishii (1987)

Ross G. Harrison Prize ◆ Tokindo Okada (1989)

Salem Prize ◆ Shishikura Mitsuhiro (1992)

Robert-Koch-Preis ◆ Shigekazu Nagata (1995), Shinya Yamanaka (2008),
Tasuku Honjo (2012)

The Keio Medical Science Prize ◆ Nakanishi Shigetada (1996), Masatoshi Takeichi (2001),
Koichi Tanaka (2002), Yoshinori Fujiyoshi (2005),
Shimon Sakaguchi (2008), Kenji Kangawa (2009)

Frank Nelson Cole Prize ◆ Hiraku Nakazima (2003)

John Dawson Prize ◆ Tetsuya Sato (2005)

Yuri Gagarin Medal ◆ Hiroshi Matsumoto (2006)

Booker Gold Medal ◆ Hiroshi Matsumoto (2008)

The Ulysses Medal ◆ Shuh Narumiya (2008)

L.S.B. Leakey Prize ◆ Toshisada Nishida (2008)

Prix du Rayonnement de la langue
et de la littérature françaises ◆ Kazuyoshi Yoshikawa (2010)

de Gennes Prize ◆ Susumu Kitagawa (2013)



International Relations at Kyoto University

International cooperation and exchange is an indispensable 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.

Strengthening the Kyoto University and UK Network

2013 has been a fruitful year for international relations between Kyoto University and a number of institutes in the United Kingdom (UK). Three symposia served as platforms for researchers in the UK and Japan to build and strengthen collaborative ties. Kyoto University's Institute for Integrated Cell-Material Sciences (iCeMS), led by director Susumu Kitagawa, has played a pivotal role in these events.



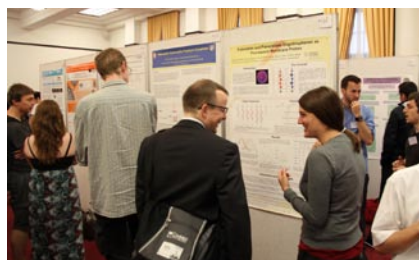
SYMPOSIA & WORKSHOPS

The 10th International Symposia on Advancing the Chemical Sciences (ISACS10)



The 10th International Symposia on Advancing the Chemical Sciences (ISACS10) was held at Kyoto University and focused on "Challenges in Organic Materials and Supramolecular Chemistry." The symposium was co-hosted by the Royal Society of Chemistry, Kyoto University's iCeMS, and The Chemical Society of Japan with Susumu Kitagawa serving as committee chair.

The event attracted over 220 participants from twenty countries and featured twenty-six talks by leading experts in the fields of porous, self-assembled and organic materials; supramolecular chemistry; and sensing and imaging.



ISACS10 participants engaging in active discussions during the poster session

SYMPOSIA & WORKSHOPS

Workshop on Organic-Inorganic Framework Materials October 10-11

As part of a new international strategy for top British scientists to engage with elite researchers from around the world, the UK-Science and Innovation Network of the UK Foreign Office teamed up with Kyoto University's iCeMS for the first ever UK-Japan Workshop on Organic-Inorganic Framework Materials. Held at the iCeMS main building, the workshop included eighteen talks about research on materials for use in a wide range of applications such as medical therapies and energy storage.



Professor Kitagawa giving the opening remarks at the Workshop



SYMPOSIA & WORKSHOPS

7th Annual Symposium on Nanobiotechnology November 6-7

The University of Bristol played host to the 7th Annual Symposium on Nanobiotechnology in Bristol, UK. Since 2007, participation has been by invitation only in order to maintain a casual atmosphere aimed at encouraging open discussions. iCeMS, the host for the sixth meeting in 2012, sent five researchers, joining scientists from around the globe.

Over 80 attendees were treated to a wide range of talks that covered synthetic biology; nanoparticles and nanotherapies; nano-imaging, manipulation and diagnostics; and nanomaterials in health and medicine.



University of Bristol's Stephen Mann delivering the keynote speech at the symposium



Committee chair: **Dr. Susumu Kitagawa**

Professor/Director, Institute for Integrated Cell-Material Sciences(iCeMS)

WEB www.icems.kyoto-u.ac.jp/e/rsch/smnr/2013/06/18-isacs-symp.html

FRIENDSHIP & COOPERATION



Study Tour for Delegation from TU/e

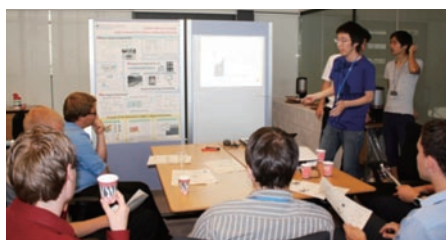


A group of students and professors from the Eindhoven University of Technology (TU/e) in the participated in a study tour of Kyoto University's Katsura campus on July 25, 2013.

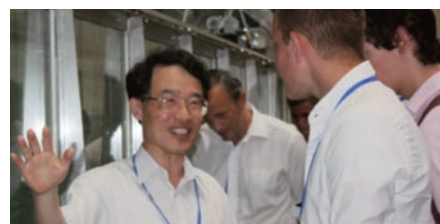
The tour opened with a welcome speech by Prof. Masao Kitano, dean of Kyoto University's Graduate School of Engineering. In the morning, the group

visited three laboratories in the A cluster: optoelectronic materials science and engineering, quantum optoelectronics, and integrated function engineering. During their lunch break in the B cluster, they enjoyed conversations with Kyoto University students and faculty members. In the afternoon, the group was shown the large-scale experimental systems for environmental fluids and low-temperature physics, and visited two laboratories in the C cluster: machine element and function device engineering and nano/micro system engineering. These visits were followed by poster presentations delivered by Kyoto University students. The tour concluded with poster presentations and group discussions in which students of both universities discussed selected scientific topics.

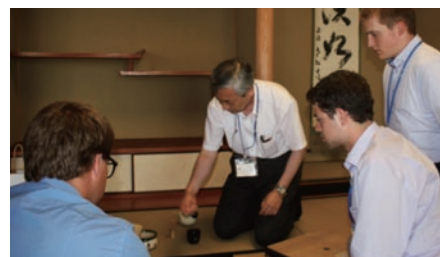
This study tour served as an opportunity for scientific and cultural exchange between the two universities, and raised the awareness of students and faculty members about the importance of communication, intercultural understanding, and maintaining a global outlook.



Group discussion. Students from TU/e and KU debate about scientific topics



TU/e students enjoy a laboratory tour of Katsura campus



Introduction to Japanese tea ceremony

Author: **Dr. Kazunobu Kojima**

Senior Lecturer, Graduate School of Engineering

WEB www.kyoto-u.ac.jp/ja/news_data/h/h1/news/7/2013/130725_1.htm (in Japanese)



Unique Environment for Business Research

Academic research at Kyoto University brings together three advantages. One is the presence of numerous potential collaborators in my areas of interest in Kyoto City, plus Osaka and Kobe. Another is institutional prestige – the name opens doors. Lastly, the atmosphere of the campus and city is conducive to research. As a business researcher, I am sensitive to the ancient business traditions of the city and region from the business models of shrines and Tea Houses to sanpou yoshi (三方よし), and the business value of relationship and prestige. Any negative points? Well, I do try to visit locations outside of Kyoto in August!

Will Baber

Associate Professor, Graduate School of Management, Kyoto University

WEB www.gsm.kyoto-u.ac.jp/ja/faculty-information/business-administration-chairs/194-baber.html



FRIENDSHIP & COOPERATION

Enhancing Engineering Higher Education in Myanmar



at Kyoto University. The new unit is highly anticipated to further promote academic and cultural exchange between Japan and Myanmar.

The Unit for Enhancement of Engineering Higher Education in Myanmar was officially established in Kyoto University's Graduate School of Engineering in September 2013. The unit aims to educate graduate students and enhance the skills of teaching staff at Yangon Technological University (YTU) and Mandalay Technological University (MTU), and also to facilitate and support talented Ph.D. students in undertaking study abroad

Author: **Dr. Hiromichi Shirato**

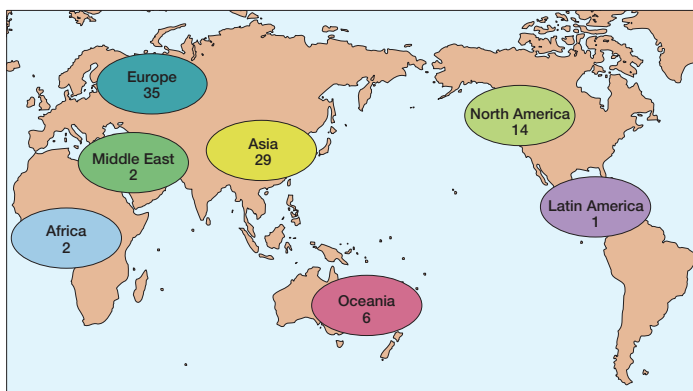
Professor, Graduate School of Engineering

WEB brdgeng.gee.kyoto-u.ac.jp/



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 31 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 58 student exchange agreements with overseas partner institutions.



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

Voices of International Researchers

Do Visit Kyoto!

I had always dreamed of visiting Japan, but never had the opportunity to do so before. For my first experience of Japan to be a three-month research visit to Kyoto University was almost too wonderful for words. From the very first day, I fell in love with the Japanese environment and culture, which formed the backdrop of all my work and leisure activities. My coworkers at the Kokoro Research Centre were friendly, supportive, and extremely knowledgeable, and the project itself was a great success. Do visit Kyoto! I, for one, shall be returning.

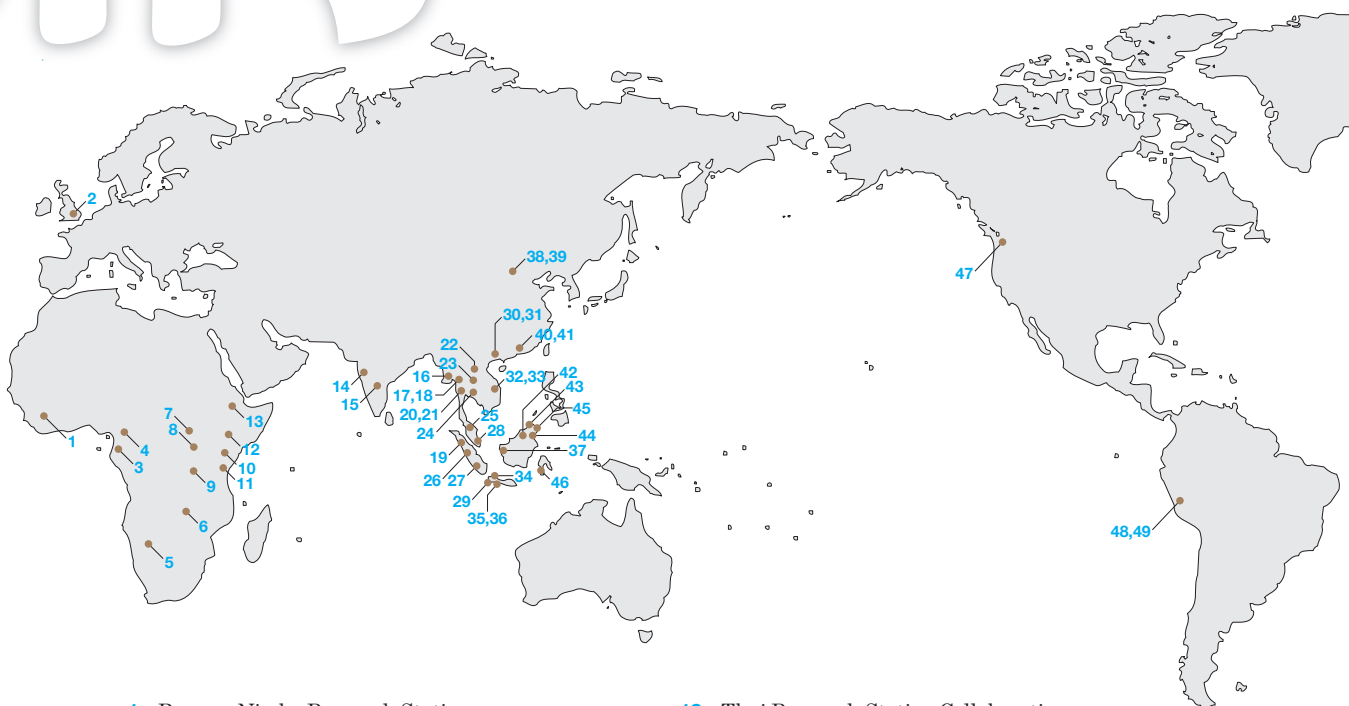
Dr. Rob Jenkins

Reader, Department of Psychology, University of York

WEB www.york.ac.uk/psychology/staff/faculty/rob-jenkins/



Overseas Offices and Facilities



- 1 Bossou–Nimba Research Station
- 2 Euro Representative of Kyoto University SACI
- 3 Research Base for Biodiversity of African Tropical Forest
- 4 Cameroon Field Station
- 5 Namibia Field Station
- 6 Zambia Field Station
- 7 Research Project on Bonobos in the Luo Reserve
- 8 Kalinzu Forest Research Project by the Primate Research Institute
- 9 Kyoto University African Ape Expedition
- 10 African Anthropological and
- 11 Tanzania Field Station
- 12 Nairobi Field Station
- 13 Ethiopia Field Station
- 14 Global Center of Excellence Kyoto University– the Municipal Corporation of Greater Mumbai (MCGM) for GCOE Joint Research and Education Center
- 15 iCeMS Satellite at NCBS–inStem
- 16 Myanmar Field Station
- 17 Joint Education and Research Centre on AIT Campus under the Global Centre of Excellence, Kyoto University
- 18 Thai Research Station Collaborative
- 19 Equatorial Atmosphere Radar
- 20 Satellite Office at Chulalongkorn University
- 21 Bangkok Liaison Office
- 22 Laos Field Station
- 23 Khon Kean Research Office of the Graduate School of Agriculture, Kyoto University
- 24 Cambodia Field Station
- 25 Kyoto University–University on Malaysia Overseas Base in Malaysia for Education and Research
- 26 Indonesia Pekanbaru Field Station
- 27 MHP Acacia Research Office
- 28 Global Centre of Excellence Kyoto University– Centre for Maritime Studies National University of Singapore Transport Logistics Joint Research Centre
- 29 RISH-RDUB Satellite Office
- 30 Hanoi Office
- 31 Vietnam National University, Hanoi–Kyoto University Collaboration Office
- 32 Contact Office of Research and Education of Graduate School of Global Environmental Studies
- 33 Fue Office
- 47
- 48,49

1 ► Bossou-Nimba Research Station

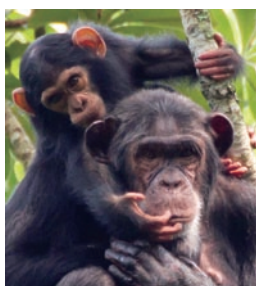
The Primate Research Institute has been conducting long-running field studies of wild chimpanzees in Bossou, Guinea, West Africa, since 1976. The Bossou chimpanzees are well known for their technique of cracking open oil-palm nuts with a pair of stones in order to eat the edible kernel inside.



The Bossou research station is located to the west of the Nimba Mountain, a world natural heritage site in Guinea. In addition to chimpanzee studies, they also provide medical services to the local people.

(Author: **Dr. Tetsuro Matsuzawa**)

8 ► Kalinzu Forest Research Project



Kalinzu Forest is located in western Uganda and is easy to access, being only a six hour-drive from Kampala. Six species of diurnal primates, including chimpanzees, inhabit in the Kalinzu Forest, and their population densities are estimated to be high. Dr. Hashimoto and her colleagues have been conducting ecological research on primates in Kalinzu Forest since 1993. All of the groups of chimpanzees and monkeys in the forest are well-habituated and easily-observed. Dr. Hashimoto also supervises an education program for young students.

(Author: **Dr. Chie Hashimoto**)



37 ► Kuala Sungai Danum Research Station

The Wildlife Research Center (WRC) conducts field studies of wild orangutans in Danum Valley, Sabah, Borneo, Malaysia.

The Kuala Sungai Danum Research Station (KSDFS) is a field station for long-term research which was built in collaboration with the Sabah Foundation. The station opened on February 18, 2010. Young researchers at the station have been observing orangutans, an arboreal species of ape. (Author: **Dr. Asako Kanamori, Dr. Shiro Kohshima**)



34 Jakarta Liaison Office

35 Global Center of Excellence Kyoto University–
Institut Teknologi Bandung for GCOE Joint
Research and Education Center

36 Satellite Office at Institut Teknologi Bandung

37 Kuchin Field Station (Kuchin, Malaysia, 2011)

38 Kyoto University–Renmin University Joint
Research Center

39 Kyoto University Liaison Office at Tsinghua
University

40 Cooperative Research and Education Center for
Environmental Technology Kyoto University–
Tsinghua University

41 Shenzhen Office

42 Field Station for Tropical Forest and Biodiversity
Studies

43 Japanese Research–Team Laboratory, Kinabalu
Park Headquarters

44 Kuala Sungai Danum Research Station

45 Japanese Research–Team Laboratory, Deramakot
Forest Reserve

46 Makassar Field Station

47 Seattle Satellite Office

48 CHAIN Peru Station

49 CIAS Lima Office

LARGE-SCALE PROJECTS

National Projects at Kyoto University

The promotion of large-scale research projects is a key policy of the Japanese government. Technology and knowledge to pursue uncharted research frontiers. Kyoto University is commissioned to undertake several large-scale projects each year.



Institute for Integrated Cell-Material Sciences (iCeMS)

Breaking new ground.

Director: **Dr. Susumu Kitagawa**

Director of iCeMS/Professor, Graduate School of Engineering

WEB www.icems.kyoto-u.ac.jp/e/



iCeMS' main building near the main gate of Kyoto University (top), and iCeMS scientists and staff at the institute annual retreat in September 2013 (bottom)

In 2007, the Institute for Integrated Cell-Material Science (iCeMS) was selected for the World Premier International Research Center (WPI)^{*1} initiative by Japanese science ministry (MEXT). Currently there are nine WPI centers throughout Japan, all of which aim to:

- 1) Advance leading edge research.
- 2) Create new interdisciplinary domains.
- 3) Establish truly international research environments.
- 4) Reform existing research organizations.

The iCeMS nurtures a rich interdisciplinary research environment — consisting of the finest chemists, biologists, and physicists from around the world — to investigate the interface between cells and materials. By focusing on life processes that occur in a mesoscopic domain, a realm that lies between one and hundreds of nanometers, iCeMS strives to create chemicals to control cellular functions and cell-inspired materials to mimic them. Ultimately, iCeMS' goal is to forge a new field of science.



iCeMS' research building near Hyakumanben

^{*1} The WPI program was launched in 2007 by MEXT in an effort to build “globally visible” research centers within Japan that boast a very high research standard and outstanding research environment, capable of attracting talented researchers from around the world. (reference : **WEB** www.jsps.go.jp/english/e-toplevel/index.html)



The Astellas Pharma-Kyoto University Project (AK Project)

Best drugs on best science.

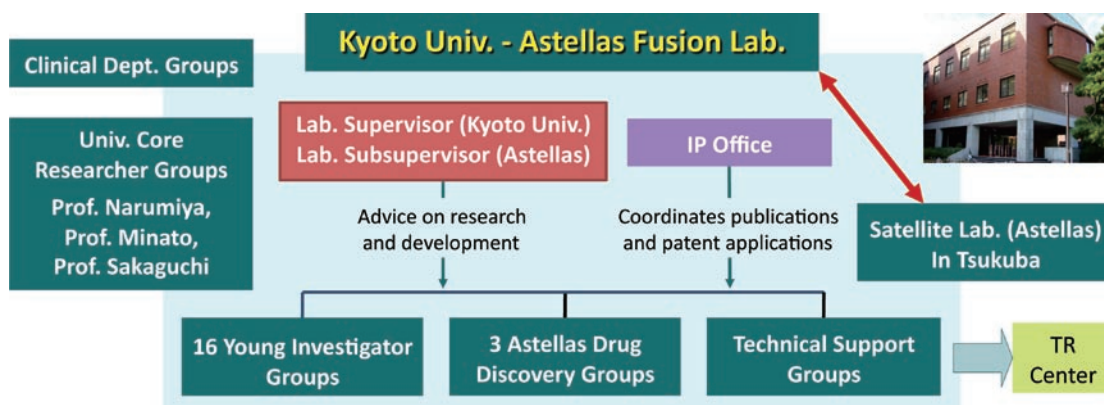
Project Leader: **Dr. Shuh Narumiya**

Professor, Graduate School of Medicine

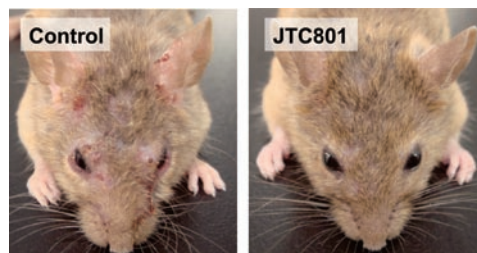
WEB www.ak.med.kyoto-u.ac.jp (Japanese Only)



The Innovation Center for Immunoregulation Technologies and Drugs (The AK Project) was established in 2007 through the joint efforts of Kyoto University and Astellas Pharma Inc. Focusing on the immunology area the project aims to develop innovative therapeutics for intractable diseases, and to make a discovery model for game-changing drugs in Japan.



The main site of the AK Project is the Fusion Laboratory in Kyoto University's Medical School, where fifteen groups led by young principal investigators (PI) and three groups from Astellas work together under the guidance of three key researchers from the Medical School, Prof. Shuh Narumiya, Prof. Nagahiro Minato, and Prof. Shimon Sakaguchi. Each group independently searches for unique drug targets. Furthermore, the AK project collaborates with clinical departments to discover biomarkers and verify the clinical significance of drug targets. The satellite laboratory at Astellas conducts high-throughput screening and compound optimization. Kyoto University's Translational Research Center carries out early clinical trials on drugs developed by the AK project, and the intellectual property (IP) office in the Fusion Lab handles all IP matters on-site. One notable achievement of the project was the discovery of the compound (JTC 801) that ameliorates atopic dermatitis through filaggrin induction in a mouse model. The project aims to stimulate excellent scientific research and drug discovery. Its motto is *Best Drugs on Best Science*.



Effects of JTC801 on atopic dermatitis in Nc/Nga mice
[A. Otsuka et al., *J. Allergy Clin. Immunol.*, in press]



Canon-Kyoto University Project (CK Project)

Creating a healthy society.

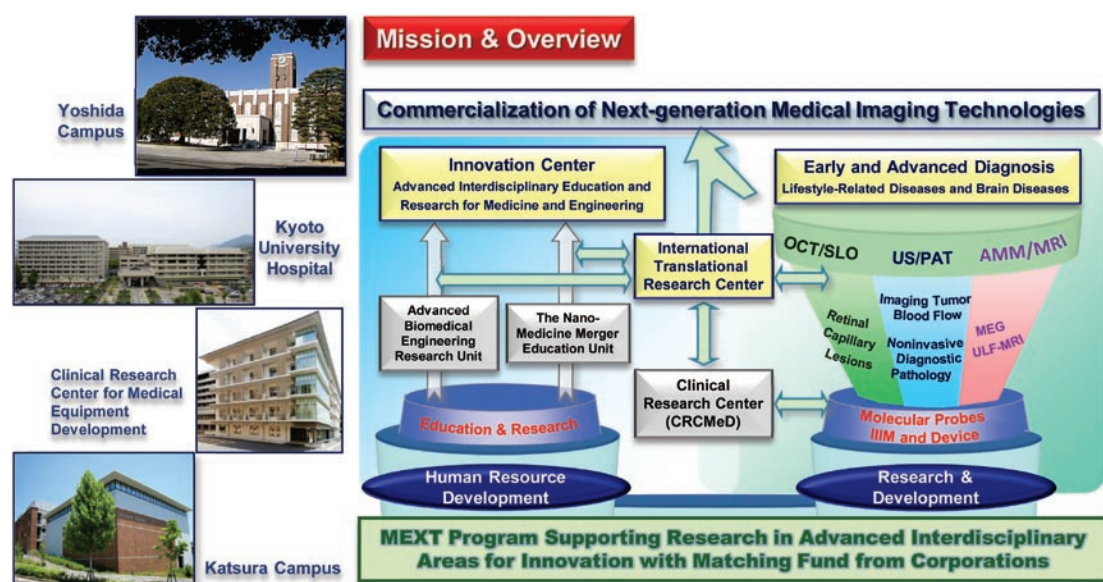
WEB ckpj.t.kyoto-u.ac.jp/

The Innovative Techno-Hub for Integrated Medical Bio-Imaging Project, or the CK Project, which was launched in 2006, combines Kyoto University's integrated scientific knowledge and clinical research

resources with Canon's technological product-development capabilities. With the participation of Otsuka Pharmaceutical in 2012, the development of new molecular probes has been further accelerated.

The ten-year national project aims to promote innovation for the development of high-performance diagnostic systems, including a new generation of optical coherence tomography (OCT) and the first commercially available photoacoustic mammography (PAM). The project also seeks to develop MRI (magnetic resonance imaging) with integrated molecular probes. There are also plans to develop bio-magnetic imaging modalities using high-sensitivity optically pumped atomic magnetometers (AMMs) as detecting sensors without cryogenic cooling, and image diagnosis systems.

The ultimate goal of this project is to create a "healthy society" by promoting cutting-edge research and development, improving quality of life (QOL) and reducing medical expenses for the aging society, while fostering talented researchers in an interdisciplinary research area of medicine and engineering (medico-engineering).



The Graduate School of Advanced Integrated Studies in Human Survivability

Producing the next generation of leaders.

Dean: **Dr. Shuichi Kawai**

Dean/Program-Specific Professor, GSAIS

WEB www.gsais.kyoto-u.ac.jp/en_top



The Graduate School of Advanced Integrated Studies in Human Survivability (GSAIS), established at Kyoto University in 2013, is a five-year graduate school aiming to produce top-level global leaders who can address complex and diverse social issues with a strong sense of responsibility, humanity and morality. Advanced integrated studies in human survivability is an integrated field of scholarship that studies the means to structuralize knowledge for human survivability. In the GSAIS program, students are expected to develop a sense of mission, ethical perspectives, and high-level management skills to be active as global leaders. The program is supported by the Leading Graduate School Program of the

Japanese Ministry of Education, Culture, Sports, Science and Technology (MEXT).

The GSAIS program is founded on the traditional Buddhist philosophy that human wisdom is acquired through mon-shi-shu (hearing, thinking, and practicing). The school's Japanese name Shishu-Kan is derived from this concept. Along with research work in their own specialization, students are expected to develop the ability to adopt an all-encompassing perspective in various fields through a broad spectrum of professional learning from the humanities to science, in addition to the academic knowledge acquired from their undergraduate studies. The education and research training is globally focused and is given mainly in English. The curriculum is customized for each student based on their academic background and future goals, and the opportunity to debate with external lecturers invited from the industrial and government sectors is given in the Industry-Government Cooperation Special Seminar (*Jukugi*).

Internship, fieldwork, and project-based research are among the course requirements. Students participate in a one-year overseas internship at an international organization or the overseas office of a Japanese organization. Such internships are made possible through the support of leading international companies, universities, and organizations.

The GSAIS accepts 20 students per year, keeping the student-to-instructor ratio very low. They live in a residential college on campus, which enhances the environment for learning by facilitating student interaction across disciplines, and faculty members are available onsite to provide necessary support and mentoring. Eligible students receive a scholarship from the university as well as a financial support for their research activities.



The Koshibo Residential College

A notable feature of the curricula offered at the Graduate School of Advanced Integrated Studies in Human Survivability (also known as the Shishu-Kan Graduate School) is that it is a residential college. This enables students to share daily life together and discuss a broad range of issues with faculty members and fellow students with different academic backgrounds, thereby cultivating the development of diverse thinking abilities and practical skills.

The unveiling ceremony for the name plaque of the school's first residential facility was held on July 23, 2013. The plaque features the name of the facility, "Koshibo," written in calligraphy by President Hiroshi Matsumoto of Kyoto University. Approximately eighty people, including visitors to the university, attended the unveiling ceremony. The ceremony opened with an address by President Matsumoto, and was followed by a tour of the facility and a discussion session. The name "Koshibo" means "a place where people with expansive aspirations gather."



INTERDISCIPLINARY INITIATIVES

The Dynamics of Charting Unexplored Intellectual Domains

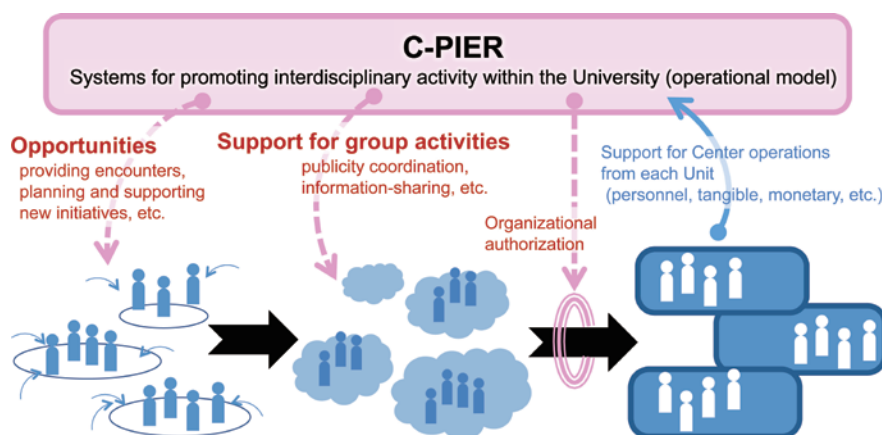
It is becoming increasingly unfeasible to address the problems facing contemporary society through research in any single discipline. Universities are now expected to produce interdisciplinary research that crosses conventional boundaries of academic discipline and college organization. Kyoto University is working to create mechanisms that induce and accelerate these interdisciplinary processes. Promotion of Interdisciplinary Education and Research (C-PIER) plays a key role in those efforts.

Center for the Promotion of Interdisciplinary Education and Research



An innovation engine to accelerate cross-organizational integration.

WEB www.cpier.kyoto-u.ac.jp



The decentralized structure of comprehensive universities in Japan limits their capacity to develop projects crossing divisional boundaries and encompassing the entire university organization. In the current social climate, however, there is more demand for cross-sectional initiatives. The Center for the Promotion of Interdisciplinary Education and Research (C-PIER) was established in order to accelerate such initiatives. Rather than waiting for interdisciplinary integration to develop spontaneously, the Center takes a strategic approach to facilitating integration. It is a pioneering presence in Japan's university community.

Specifically, the Center is engaged in the following activities.

1. Creating “encounters” that bring together researchers from a variety of disciplinary fields

- ▶ Hosting cross-disciplinary forums and industry engagement initiatives
- ▶ Researching the current status of interdisciplinary activity on campus (questionnaire surveys and dissemination of results)

2. Generating “flexible connections” among researchers from different fields

- ▶ Proposing research grant applications involving interdisciplinary teams of investigators
- ▶ Planning and supporting the organization of self-directed seminars and research forums

- ▶ Hosting a research idea contest for interdisciplinary research teams within the university (see the next section)
- ▶ Operating a bulletin board-style website to connect researchers within the university

3. Forming interdisciplinary organizations known as “Units” (see the section after next)

- ▶ Units are official organs of the university and can grant course credit to students

Communicating Innovative Ideas in a Single Page

Kyoto University Interdisciplinary Research Idea Contest.

The Kyoto University Interdisciplinary Research Idea Contest brought together researchers working in different disciplines to form teams and present a concept map illustrating their proposal on a single A3 page. A judging panel was organized with members beyond the university including entrepreneurship, government, and creative industries, in addition to the University President and Executive Vice-President. Ten teams which passed the initial documentary screening gave presentations on September 30, and the following prizes were awarded.



Prize for excellence

Development of food constituent modification techniques including allergen breakdown using physical stimuli (Dr. Kaori Shiojiri, Assistant Professor of Graduate School of Agriculture)

Development of techniques for transmission of olfactory information: Toward greater sensibility in information transmission (Dr. Katsura Koishi, Assistant Professor of The Hakubi Center for Advanced Research)



Honorable mention

African-style jika-tabi* developed through community collaboration (Dr. Toshikazu Tanaka, 3rd year doctoral student of The Center for African Area Studies)

* Jika-tabi is a traditional style of Japanese footwear suited to outdoor manual labor.



In the lead-up to the contest, the Center for the Promotion of Interdisciplinary Education and Research hosted a networking event for researchers of different disciplinary backgrounds.



Dinner Party to Promote Multidisciplinary Research



The Center for the Promotion of Interdisciplinary Education and Research (C-PIER) holds a buffet-style dinner party on the last Tuesday of every month. The event provides an opportunity for Kyoto University's researchers to gather and get to know each other regardless of their research fields or affiliations. Each dinner party sets a theme for free discussion, with the aim of exploring new research opportunities and promoting personal networking.

Not only researchers, but also administrative staff members, students, as well as persons from outside the university are welcome to the party—please come along!

Formation of Interdisciplinary “Units”

Developing groups to address the social issues and academic challenges of the present day.

The term “Unit” refers to a group of researchers gathered on a limited-term basis to work together on a common issue. There are currently 26 Units operating under C-PIER.

Advanced Biomedical Engineering Research Unit

Unit Head: **Dr. Yasuo Mori** Professor, Graduate school of engineering

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



Career-Path Promotion Unit for Young Life Scientists

Unit Head: **Dr. Shigekazu Nagata** Professor, Graduate school of Medicine

WEB www.cp.kyoto-u.ac.jp/index_en.html



Educational Unit for Adaptation to Extreme Weather Conditions and a Resilient Society

Unit Head: **Dr. Hirohiko Ishikawa** Professor, Disaster Prevention Research Institute

WEB 133.3.251.107/index.php?id=3



International Research Unit of Integrated Complex System Science

Unit Head: **Dr. Kazuo Mino** Professor, Institute of Economic Research

WEB www.kier.kyoto-u.ac.jp/ICSS/english/eindex.htm



Unit of Computational Science

Unit Head: **Dr. Satoru Ushijima** Professor, Academic Center for Computing and Media Studies

WEB www.cs.kyoto-u.ac.jp/

Green Innovation Management Education Unit

Unit Head: **Prof. Hiroyuki Matsui** Professor, Faculty of Economics

WEB www.cpier.kyoto-u.ac.jp/about/unit06/ (Japanese Only)

Nanotechnology Hub

Unit Head: **Dr. Kazuyuki Hirao** Professor, Graduate School of Engineering

WEB www.mnhub.cpier.kyoto-u.ac.jp (Japanese Only)



Japan-Egypt Cooperative Education and Research Unit

Unit Head: **Dr. Osamu Tabata** Professor, Graduate School of Engineering

WEB www.cpier.kyoto-u.ac.jp/about/unit08/



Unit for Advanced Studies of the Human Mind

Unit Head: **Dr. Kazuo Fujita** Professor, Graduate School of Letters

WEB www.kokoro-kyoto.org/index.html

Education and Research Unit for Regional Alliances

Unit Head: **Dr. Shigeru Takami** Professor, Graduate School of Education

WEB www.cpier.kyoto-u.ac.jp/about/unit10/ (Japanese Only)



Research Unit for Physiological Chemistry

Unit Head: **Dr. Kazuhiro Irie** Professor, Graduate School of Agriculture

WEB www.physichem.kais.kyoto-u.ac.jp/en/index.php



Pioneering Research Unit for Next Generation

Unit Head: **Dr. Masato Shiotani** Professor, Research Institute for Sustainable Humanosphere

WEB kupra.iae.kyoto-u.ac.jp/en.html



Institute of Sustainability Science

Unit Head: **Dr. Hiroshi Watanabe** Professor, Institute for Chemical Research

WEB iss.iae.kyoto-u.ac.jp/iss/jp/



Resilience Research Unit

Unit Head: **Dr. Satoshi Fujii** Professor, Graduate School of Engineering

Resilience Research Unit, Kyoto University

WEB trans.kuciv.kyoto-u.ac.jp/resilience/

Science for Public Policy Unit

Unit Head: **Dr. Koji Kawakami** Professor, Graduate School of Medicine

WEB stips.jp/



Inter-Graduate School Unit for Sustainability and Survivable Societies

Unit Head: **Dr. Kaoru Takara** Professor, Disaster Prevention Research Institute

WEB gss-sv01.gss.sals.kyoto-u.ac.jp/ja.html



Education Unit for Studies on the Connectivity of Hills, Humans and Oceans

Unit Head: **Dr. Yoh Yamashita** Professor, Field Science Education and Research Center

WEB fserc.kyoto-u.ac.jp/cohho/en/index.html



Elements Strategy Initiative for Catalysts and Batteries

Unit Head: **Dr. Tsunehiro Tanaka** Professor, Graduate School of Engineering

WEB www.esicb.kyoto-u.ac.jp/ (Japanese Only)



Elements Strategy Initiative for Structural Materials

Unit Head: **Dr. Isao Tanaka** Professor, Graduate School of Engineering

WEB esism.kyoto-u.ac.jp/en/index.html



Research and Educational Unit of Leaders for Integrated Medical System (LIMS)

Unit Head: **Dr. Hidenao Fukuyama** Professor, Graduate school of Medicine

WEB www.lims.kyoto-u.ac.jp/?lang=en



Unit of Design

Unit Head: **Prof. Toru Ishida** Professor, Graduate school of Informatics

WEB www.design.kyoto-u.ac.jp

Asian Studies Unit

Unit Head: **Prof. Emiko Ochiai** Professor, Graduate School of Letters

WEB www.kuasucp.kyoto-u.ac.jp/english/



Human Security Development Educational Unit

Unit Head: **Dr. Eiji Nawata** Professor, Graduate school of Agriculture

WEB www.hsd.epier.kyoto-u.ac.jp/ja/index.html

Advanced Information Education Unit

Unit Head: **Dr. Katsumi Tanaka** Professor, Graduate School of Informatics

WEB www.dl.kuis.kyoto-u.ac.jp/~tanaka/ (about Prof. Tanaka)

Unit of Synergetic Studies for Space

Unit Head: **Dr. Tohru Tanimori** Professor, Graduate School of Physics

WEB www.uss.kyoto-u.ac.jp/e/index-e.html



Integrated Area Studies Unit

Unit Head: **Dr. Shigeki Kaji** Professor, Graduate School of Asian and African Area Studies

WEB kyouindb.iimc.kyoto-u.ac.jp/e/a18bY (about Prof. Kaji)



FOSTERING THE NEXT GENERATION

白眉 — The Hakubi Project

A Unique Opportunity for Outstanding Young Talent

The Hakubi Project was established by Kyoto Univ. 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. **WEB** www.hakubi.kyoto-u.ac.jp/eng

ECON-HIS Making Medicine a Business

The economic history of the Japanese health system.

In developed countries, health presently represents approximately 10% of the GDP. While it was still essentially a charitable activity at the end of the 19th century, medicine shifted towards becoming a fast-growing business during the 20th century. Focusing on technological innovations Dr. Donzé's research aims to gain an understanding of how this change was made.

The first medical technology with a major impact on the health care system was the X-ray machine. Developed mainly by German and American electric appliance manufacturers after the discovery of X-rays by Roentgen in 1895, the X-ray machine contributed to changing the way medicine was practiced during the first third of the 20th century. Together with other equipment, such as operation tables, it transformed hospitals into "medico-technological platforms."

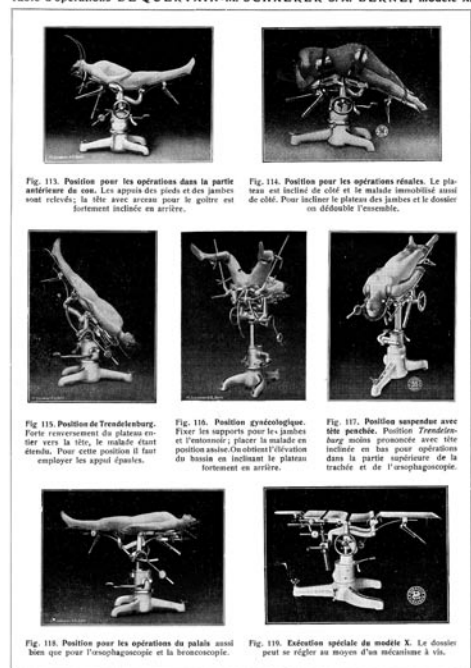
Patients began to pay to have access to such new technologies, which contributed to the emergence of a health care market centered on hospitals.

Dr. Pierre-Yves Donzé

Associate Professor, The Hakubi Center for Advanced Research
sites.google.com/site/pydonze/



Table d'opérations DE QUERVAIN-M. SCHAEFER S. A. BERNE, modèle X.



LINGUIS Are Changes in Language beyond Our Control?

A clue from the pious people of Ancient Italy.

It has been taken for granted that languages may change over the course of time. Remember *The Tale of Heike*, Dante's *Divine Comedy*, or Shakespeare's dramas that you may have studied in high school. The languages of such written works are quite different from their modern counterparts. How did such linguistic development occur? A variety of reasons may be adduced. The research of Dr. Nishimura focuses on verbal activities like praying in the languages of Ancient Italy, including Latin, and assumes that such religious contexts compelled people to show as much reverence as possible for deities and to go so far as to distort some lexical items for this purpose. Dr. Nishimura also seeks to apply this approach to other contexts, even to modern languages.

Dr. Kanehiro Nishimura

Assistant Professor, The Hakubi Center for Advanced Research
www.hakubi.kyoto-u.ac.jp/eng/02_mem/h23/nishimura.html

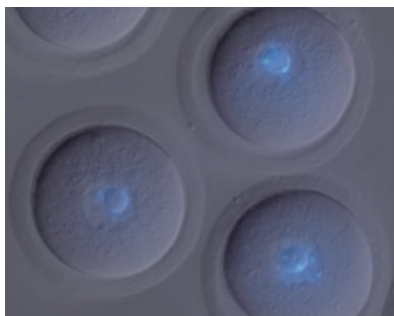


Porta di Giove ('Jupiter's Gate') in the twilight, in the remains of the city of Falerii Novi, Italy



BIO-CHEM The Usefulness of the Useless

Finding new nucleolus function through apparently inactive oocyte nucleolus.



that oocyte nucleoli are required for proper nucleus formation. It would be very interesting if organisms had evolved nucleoli in order to package the genomic information correctly into the cell nucleus.

Nucleoli are spherical organelles that make parts for cellular protein factories called ribosomes. Ribosome synthesis ceases in fully-grown oocytes and fertilized eggs, however, Dr. Ogushi has found that nucleoli in oocytes are absolutely essential for early embryonic development. To reveal new aspects of the nucleolus and its molecular components, Dr. Ogushi is now determining the proteins and RNAs present in their structure in collaboration with the University of Oxford in the UK. Evolutionarily, nucleoli are first observed when organisms start to package their huge genome into the small cell nucleus, which is not present in bacteria and archaea. Dr. Ogushi has also recently found

Dr. Sugako Ogushi

Assistant Professor, The Hakubi Center for Advanced Research
Academic Visitor, Prof. Nasmyth Group, Department of Biochemistry, University of Oxford
www.hakubi.kyoto-u.ac.jp/eng/02_mem/h23/ogushi.html

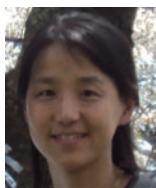


With Prof. Nasmyth Group, Dr. Ogushi is forth left on the front.

ECOL Dialects Used by Plants

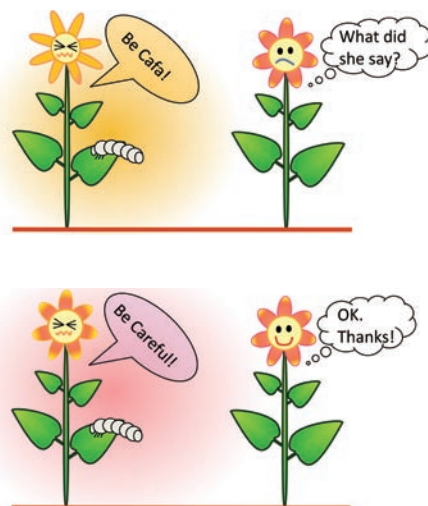
Plant-to-plant communication through volatiles.

Damaged plants release volatiles. If neighboring plants receive those volatiles, they become more resistant. This phenomenon is called plant communication, and it has been reported in more than ten species of plants. Dr. Shiojiri and her colleagues analyzed the volatiles of the sagebrush plant (*Artemisia tridentata*) which is already known to communicate using volatiles. The volatiles from individual sagebrush plants are different. Dr. Shiojiri's group found that the similarity of volatiles correlates with the degree of kinship between the plants. Moreover, they demonstrated that if plants receive volatiles which are similar to their own, they became more resistant than those which receive different volatiles. In other words, plants have dialects to better communicate with their relatives. Dr. Shiojiri and her colleagues are seeking to explain why plants need such dialects.



Dr. Kaori Shiojiri

Assistant Professor, The Hakubi Center for Advanced Research
www.hakubi.kyoto-u.ac.jp/eng



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

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.

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

INFO-SCI University of Colorado

Natural language processing research.

I am visiting the University of Colorado at Boulder, which is located at an elevation of 1,600 meters, and is famous for altitude training. I am working on natural language processing research, particularly natural language understanding, with Prof. Martha

Palmer who is an authority in this field. During my time at the University of Colorado at Boulder, I would like to achieve breakthrough results to contribute to the advancement of natural language understanding and artificial intelligence. I believe that this research will be able to elucidate human linguistic intelligence, which is one of the most essential human intelligences.

Dr. Daisuke Kawahara *Associate Professor, Graduate School of Informatics*
nlp.ist.i.kyoto-u.ac.jp/member/kawahara/index-en.html



ZOO Bogor Agricultural University

Studying the Javan lutung, a wild primate species.

At Bogor Agricultural University (IPB) in Indonesia, I am studying the Javan lutung, a wild primate species living in western Java. The IPB has great facilities for conducting various kinds of analyses, and good staff in the field of forestry. I'm enjoying my discussions with them after hard work in the field. I also actively communicate with Indonesian students through lectures and informal counseling. During my stay in Indonesia, I would like to elucidate the social system of the lutung, about which little information has been available so far. Through the John Mung Program, I would like to become someone who can act as a bridge between Japanese and Indonesian primatologists and students.

Dr. Yamato Tsuji

Assistant Professor, Primate Research Institute
kyouindb.iimc.kyoto-u.ac.jp/j/sW0wN blog.goo.ne.jp/yamato_tsuji



Also Supporting Students



As part of its efforts to cultivate the next generation of leading internationally-minded talent, Kyoto University has recently established The John Mung Program, which provides students with the opportunity to study-abroad at leading universities overseas.

THE people are very friendly and full of energy for research at the University of Cambridge. I have acquired a lot of cutting-edge knowledge beyond my imagination, including technical skills and cultural knowledge about the UK. The most important thing is the opportunity to develop friendships with international scholars who are ambitious and talented. Such connections will help us to become global leaders who can be active all over the world.

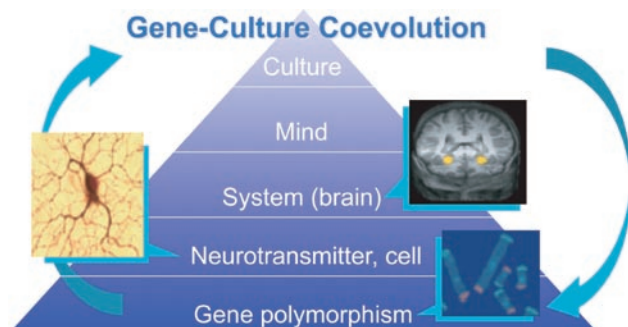
Author: Nao Minakata
Graduate School of Engineering





Northwestern University

Examination cultural influences on genetic and behavioral responses.



As a senior visiting scholar, I visited the Social, Affective and Cultural Neuroscience laboratory (Prof. Chiao's Lab) at Northwestern University (NU) for a collaborative project to examine cultural influences on genetic and behavioral responses in Japanese and Asian-Americans. One of my great experiences at NU was the opportunity to communicate with researchers from many countries. Through having a wide range of academic discussions with them, I hope that my stay at NU will contribute to enhancing my relations with international researchers in psychology, as well as to the development of a new research field.



◀ With Prof. J. Chiao

Dr. Michio Nomura

Associate Professor, Graduate School of Education
www.design.kyoto-u.ac.jp/faculty/m-nomura.html



CNRS, Gif sure Yvette

Disease resistant behavior in insects.

Bon appetite, itadakimasu or sahia taieba—in the restaurant of the institute, we start lunch with those words. Thanks to the John Mung Program, I have been engaging in research at Center national de la recherche scientifique (CNRS), the largest governmental research organization in France, to analyze how *Drosophila* can detect microbes with their taste system and brush them off their cuticula to limit pathogenic infections. With the help of Prof. Marion-Poll who is one of the most well-known researchers

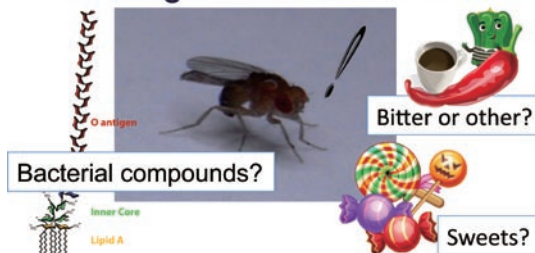


in the field of insect physiology and my lab-mates, this project has given me many great surprises and much inspiration, and I'm really grateful for their kindness and friendliness. I would like to make this opportunity beneficial not only for my research, but also for my host lab in France and the lab in Japan.

Dr. Aya Yanagawa

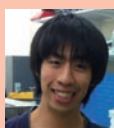
Assistant Professor, Research Institute for Sustainable Humanosphere
www.rish.kyoto-u.ac.jp/W/LIH/15/yanagawa.php

Which type of stimulus can induce cleaning behavior in insects?



STUDYING at the University of Cambridge has provided me with an amazingly fruitful experience. In my host laboratory there were many PhD students who have various interesting careers. This experience has greatly stimulated my curiosity and I have decided to become a globally active scientist to contribute to a better world.

Author: **Takuma Nakamura**
 Graduate School of Engineering



THIS summer, I studied at the University of Cambridge engaged in a short-term-project. I belonged to a laboratory in the Chemical Engineering Department and studied with various students from the UK, and also from other different countries including China and Thailand. It was really exciting that I could talk with them about my research every day. Everything I experienced is sure to have a great influence on my research life.

Author: **Hidaka Asonuma**
 Graduate School of Engineering



Cutting-Edge Research in Kyoto University

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.

BIO How Cells Build Up the Body

The amazing world of genes and cells during animal development.



A fertilized egg, the start of our life, divides repeatedly to produce many types of cells and tissues (heart, muscles, bones, brain, etc.). These developmental processes are regulated by the genetic program. Genes tell the cells what to do: some cells make up a tube-like structure (e.g. gut, lung, and spinal cord), and other cells undergo a long process to become neurons. Amazingly, cells “talk” to each other, and such cell-cell communications is important in the construction of the body. For example, neurons interact not only with muscles, but also with bones and blood vessels. Inter-cell communications is far more sophisticated than imagined. Dr. Takahashi and her colleagues are trying to understand how such communication is established at the molecular level through studies on chicken embryos. They say that they are continually amazed by the “beauty” in the process of animal development.

Dr. Yoshiko Takahashi

Professor, Graduate School of Science

www.zool.kyoto-u.ac.jp/labo/zoology04.html

develop.zool.kyoto-u.ac.jp/takahashi.html



MET Airflow Simulation at the Neighborhood Scale

Building-resolving model enables simulation of turbulent airflow in urban districts.

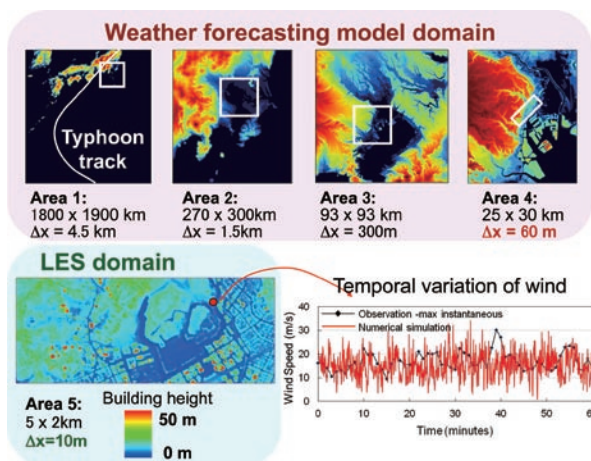
Simulation and forecasting of airflow at the neighborhood scale is a great challenge in atmospheric science and engineering. Dr. Takemi and his colleagues have developed a new approach to directly simulate turbulent airflow within urban districts, including around skyscrapers, by combining a numerical weather prediction model and a large-eddy simulation (LES) model. The LES model is an advanced fluid-dynamics computational model that explicitly includes the effects of buildings on airflow. This approach is capable of representing the turbulent nature of airflow within urban districts. Using very high resolution digital data of buildings, Dr. Takemi's group successfully simulated

wind gusts during a typhoon passage in downtown Tokyo. The computational system can also be applied to air pollution simulation at the district scale.



Dr. Tetsuya Takemi *Associate Professor, Disaster Prevention Research Institute*

ssrs.dpri.kyoto-u.ac.jp/~hp/index_en.html





CHEM Right- or Left-Handed!?

Optically active structures created by planar chiral [2.2]paracyclophanes.

[2.2] Paracyclophane has a unique structure consisting of two face-to-face benzene rings. Substitution of functional groups in [2.2] paracyclophane provides conformationally stable planar chirality. Dr. Morisaki has focused on planar chiral [2.2] paracyclophanes and created various optically active compounds using them as chiral building blocks. The obtained compounds form chiral second-ordered structures, such as 8-shaped, V-shaped, M-shaped, and helix structures. In other words, they form right-handed or left-handed structures. Some of them exhibit circularly polarized light (CPL) with unprecedented anisotropy factors: they emit right-handed or left-handed luminescence.



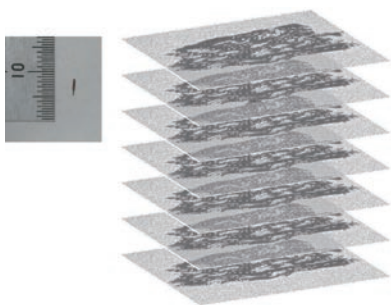
Dr. Yasuhiro Morisaki

Lecturer, Graduate School of Engineering
chujo.synchem.kyoto-u.ac.jp/en/



WOODSCI Wood is a Time Capsule!

Identification of wood used in culturally important artifacts.



The identification of wood used in historical and archaeological artifacts provides useful information about, and sometimes a new perspective on, the origin of the artifacts. Microscopic observation is a common method used to identify the materials used in wooden works, but it is not suitable for cases in which only a very small sample is available, as is always the case for artifacts of national heritage class.

Microcomputed tomography using synchrotron X-ray radiation, however, has tremendous potential for use in such studies. In addition to the benefit of its high spatial resolution, the nondestructive evaluation technique enables the reuse of the identified samples for chemical analysis,

including component analysis. Recent advances in the stable isotope analysis of wood to trace its geographic location will eventually allow us to determine the origin of such wooden artifacts, i.e. to determine when and where they came from.



Dr. Junji Sugiyama

Professor, Research Institute for Sustainable Humanosphere
www.rish.kyoto-u.ac.jp/W/LBMI/sugiyama_e.html

NEUROSCI How Do Social Influences Shape the Tweeting of Birds?

Unraveling the molecular mechanism of how neural systems are developed with social influences.

Songbirds tweet with each other using sounds woven into sequences, which are referred to as “songs.” Like human speech, their ability to communicate through songs has been developed with genetic and social influences. Dr. Abe studies the neural mechanism that enables songbirds to communicate with each other through vocal signals, and how such ability is acquired in postnatal development. By separately regulating intrinsic and extrinsic influences, and using his unique method to generate transgenic songbirds and instill songs under an experimentally controlled postnatal environment, he is now engaging in research to reveal how such ability is developed and plastically changed by postnatal experiences. Through an experimental approach, he seeks to provide insight into how human children acquire their own languages, which remains a mystery in the field of animal development.



Dr. Kentaro Abe

Senior Lecturer, Graduate School of Medicine
www.phy.med.kyoto-u.ac.jp/index.html



PRIMATOL Leopards Eat Chimpanzees?!

Predation pressure on our closest living relatives and its implication for human evolution.



A chimpanzee mother and infant (above) and a leopard (below) at Mahale

Evolutionary speaking, chimpanzees are the closest living species to humans, and it is therefore important to study their behaviors and ecology in order to gain an insight into human evolution. A research team at Kyoto University has been studying wild chimpanzees in the Mahale Mountains National Park in western Tanzania, for nearly half a century. Although Mahale chimpanzees are sympatric with leopards, there had been no evidence that leopards ate chimpanzees. However, when the team collected leopard scats from the forest floor and investigated its content, they eventually found some that contained chimpanzee bones. This is the first evidence that chimpanzees are actually eaten by leopards, not only Mahale chimpanzees but also the whole subspecies of East African chimpanzee. This may imply a potential predation pressure by large carnivores on great apes, and probably on our ancestral hominids.

Dr. Michio Nakamura (left)

Associate Professor, Wildlife Research Center

Ms. Nobuko Nakazawa (right)

Graduate Student, Wildlife Research Center

www.wrc.kyoto-u.ac.jp/



OPT-SCI Femtosecond Laser Processing beyond the Diffraction Limit

Nanoprocessing of solid surfaces with ultrashort laser pulses.

Intense femtosecond laser pulses can produce self-organized, periodic nanostructures on solid surfaces. The size is typically 1/10-1/5 of the laser wavelength, which suggests that femtosecond lasers have the potential to sculpt structures smaller than the diffraction limit. Dr. Miyaji and his colleagues have shown that laser-induced near-fields and surface plasmon polaritons play a fundamental role in the nanoscale, periodic ablation of a surface. Through the ultrafast light-matter interaction processes controlled with the laser pulses, they have successfully fabricated a nanograting with a uniform period on a crystalline gallium nitride surface. It is expected that these results can be applied to a new class of versatile nanoprocessing techniques using femtosecond laser pulses.



Dr. Godai Miyaji

Assistant Professor, Institute of Advanced Energy

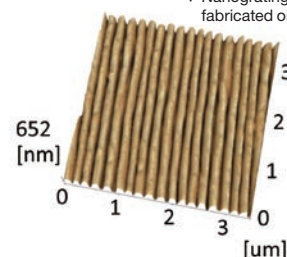
www.iae.kyoto-u.ac.jp/english/soshiki/laser.html



▲ Intense, ultrashort pulse laser system



▼ Nanograting fabricated on GaN

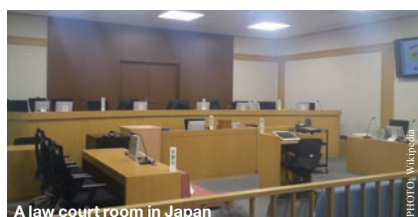


LAW “Bad” or “Mentally Ill” ??

Is the brain the criminal?

In criminal law, whether a person is deemed “criminal” or “mentally ill” depends on the existence of “free will” (which is denied to mentally ill people). German brain scientists have recently argued that the human brain determines all of a human being’s acts, and free will itself is, therefore, an illusion. This assertion implies that criminal law should be abolished. Could this hypothesis be true? Dr. Yasuda disagrees with this idea, asserting that human acts are connected to human brains and nervous systems, and follow causal principles.

The free will, a normative hypothetical construct, is compatible with these principles. Dr. Yasuda aims to analyze the conditions under which people can and should be responsible for their criminal acts.



A law court room in Japan

Dr. Takuto Yasuda

Professor, Graduate school of Law

kyouindb.iimc.kyoto-u.ac.jp/e/jN7aZ

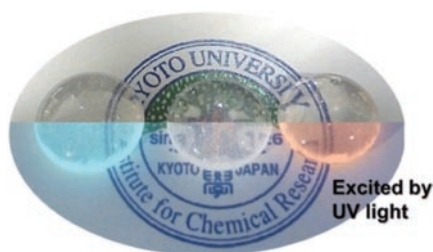


CHEM Inorganic Oxide Glass as a Candidate for Phosphors

Local structure design of inorganic glasses for future glass-based optical devices.

Light emitting devices and various kinds of phosphors are being actively developed recently. However, the host materials for those phosphors still remain limited with respect to a high-power or short-wavelength excitation light source. A transparent oxide glass possessing good chemical durability and exhibiting high emission intensity comparable to crystalline phosphor would be a novel emitting material capable of good formability. In addition, a random network of inorganic glasses allows diversity in composition and in local structure. Such diversity is the origin of various functionalities of inorganic glasses.

Dr. Masai and his colleagues demonstrated that transparent glasses containing Sn^{2+} center show a broad emission with a high value of quantum efficiency, comparable to conventional crystal phosphors. The emission can be tailored by changing the local coordination field of Sn^{2+} . Transparent inorganic glass phosphors will be a fascinating emitting material, which can be adopted as a strong light source in the future.



Dr. Hirokazu Masai

Assistant Professor, Institute for Chemical Research
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HISTORY International Law and Sinocentrism

A study of Russo-Qing negotiations leading to the conclusion of the Treaty of Kyakhta.

In the first half of the 18th century, Russia and Qing China concluded the Treaty of Kyakhta which dealt with the border between the two countries and their diplomatic and economic relations. Almost three years (1726-28) passed from the commencement of negotiations to the signing of the treaty, and an agreement was reached only after much twisting and turning in the negotiations, with their venue being shifted from Beijing to the Bura River, near the Russian border with Mongolia in the process. The reason that the negotiations proceeded in such an irregular fashion was not so much that the positions of both parties were far apart, but rather that they both vied to take the initiative in setting the agenda, and the Qing stuck to Sinocentric thinking in its dealings with Russia, which was following international law. But once the Treaty of Kyakhta was concluded, East Asia enjoyed peace and stability for more than one hundred years.



Dr. Shigeru Matsuura Professor, Graduate school of Human and Environmental Studies

www.h.kyoto-u.ac.jp/staff/222_matsuura_s_0_e.html



PSYCH Culture and Happiness

Balance-Oriented Happiness in Japan.

Dr. Uchida, a cultural psychologist, has been engaging in empirical research on happiness, the meaning of which differs across cultures. She was a member of the Commission on Well-Being Studies of the Japanese government. It has been pointed out that Japanese score of happiness is lower than other industrialized countries, but Dr. Uchida found that the meaning of happiness in Japan has “yin and yang”—thus for example, their ideal level of happiness is as a 7 on a 10-point scale. Unlike European-American cultures, happiness in Japan is

evaluated by taking into account the ups and downs of life as a whole, and by “balancing” social relationships and harmony. Through these research findings on the cultural construction of happiness, Dr. Uchida aims to identify ways that the Japanese model of “balance-oriented happiness” could contribute to sustainability in the future society.



Dr. Yukiko Uchida Associate Professor, Kokoro Research Center

kokoro.kyoto-u.ac.jp/en/cultureko_net/index.html

Culture and happiness

JP dialectic model relationship	U.S. incremental model Personal achievement
Calmness	Elation, excitement
Balance between positive and negative	Incremental view
Relationship harmony Emotional	Self-esteem Personal goal attainment
Social comparison	Personal choice

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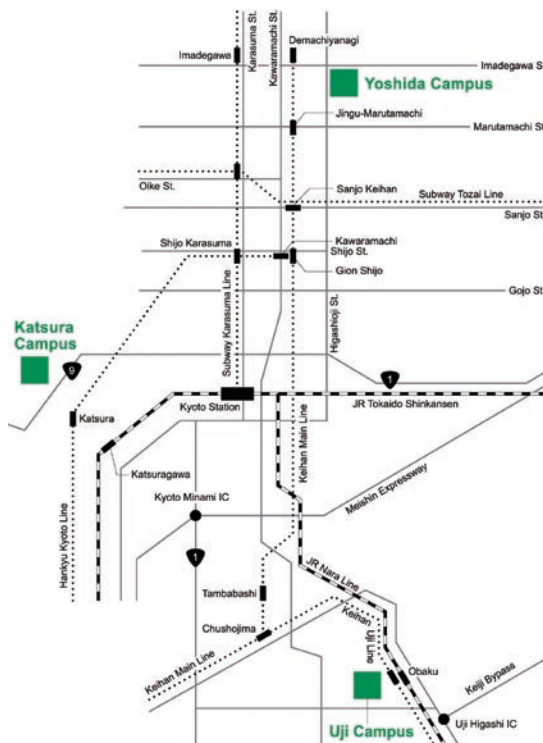
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This information is also available online. **WEB** www.kyoto-u.ac.jp/ja/issue/research_activities



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www.kyoto-u.ac.jp/en/access



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