

ENCOURAGE WOMEN TO RESEARCH

The Tachibana Award

For Most Outstanding Female Researchers



The Tachibana Award Ceremony was held on 3 March 2014. Each recipient received an award certificate and plaque from Hiroshi Matsumoto, the president of Kyoto University, as well as an extra prize from Hironobu Yasuhara, the president of the Wacoal Corporation. Following the ceremony, the awardees, Katayama and Wang gave the presentations on their research.

The Tachibana Award for the Most Outstanding Female Researcher was established in 2008 to acknowledge the excellent research achievements of young female researchers at Kyoto University. By publicly honoring young female researchers for their outstanding work in the humanities, social sciences, and natural sciences, the Tachibana Award aims to further motivate not only the awardees themselves, but also other young female researchers following in their footsteps, thereby helping cultivate accomplished female researchers who will lead the future of academic research at Kyoto University and in Japan as a whole.

■ Eligibility (Academic Year 2013)

Candidates must be Kyoto University postgraduate students or researchers (whose job descriptions include academic research, including postdoctoral researchers and JSPS fellows) of female gender, aged 39 or below, with outstanding research achievements. The age limit can be extended to include candidates aged 42 years or below for candidates who had difficulty in securing time for research due to child birth, child care, or care for an elderly or sick family member.

Student Division: Candidates must be enrolled in a doctoral course at Kyoto University at the end of the academic year in which the award is presented. (Those on temporary leave are not eligible.)

Researcher Division: Candidates must hold a doctoral degree or have proven academic research ability equivalent or superior to that of a doctorate holder.

■ Awarding

One awardee selected from each division will receive a certificate and extra prizes (a commemorative gift and ¥100,000). An incentive award may be presented to an appropriate candidate.

■ Selection and Announcement of Results

A selection committee established within Kyoto University will examine application documents in the first screening. Short-listed candidates will be invited to an interview in the second screening. Awardees will be selected based on the results of the interview.

■ Award Ceremony

The award ceremony will be usually held on 3 March*. After the award ceremony, the awardees will be asked to deliver lectures about the research themes for which they received the Tachibana Award. Awardees will be provided with further details of the award ceremony in advance.

*The day of the Doll Festival, which is a traditional Japanese event to pray for young girls' growth and happiness.

2014 TACHIBANA AWARD LAUREATE : STUDENT

Towards Green Photonics

Material design of rare-earth-ion-doped wavelength converters and elucidation of luminescence mechanisms.

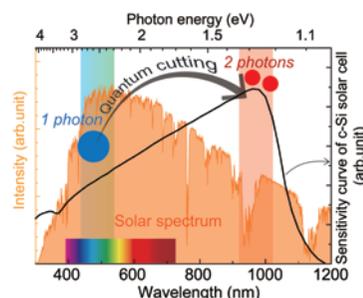
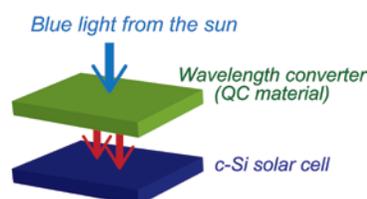
"Green photonics" is a technology of light which contributes to a sustainable environment. In order to improve the photovoltaic efficiency of crystalline Si solar cells, we designed rare-earth-doped glasses as wavelength converters to modify the solar spectrum by characteristic electric energy levels of rare-earth ions. These materials have the potential to show the quantum cutting (QC) phenomenon converting one blue photon into two near-infrared photons. In glass materials, we firstly reported the QC evidence in experiments. By heat treatment of the glass, an enhanced conversion efficiency was obtained by controlling its atomic-level structure. My work can create valuable luminescent materials based on scientific knowledge!



Yumiko Katayama, PhD

JSPS postdoctoral fellow, Graduate School of Human and Environmental Studies

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2014 TACHIBANA AWARD LAUREATE : STAFF

Chinese Diaspora in Asia and the Search for a New Paradigm of Multi-Diversified Co-existence



Chinese Muslims gather around a mosque for 'id al-fitr ritual, Yunnanese Chinese Mosque, Chiang Mai. Jan.1999

required for the 21st century in order to meet today's rapidly advancing globalization, namely: a real-world understanding of migrants; a conceptual study of the region which enables coexistence with others; and a new framework for mutual respect and understanding between migrants and nations.

Wang Liulan, PhD *Associate Professor, The Hakubi Center for Advanced Research*

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2014 HONORABLE MENTION AWARD : STUDENTS

Social Learning Mechanisms in Early Infancy

The power of human gaze in infant learning.

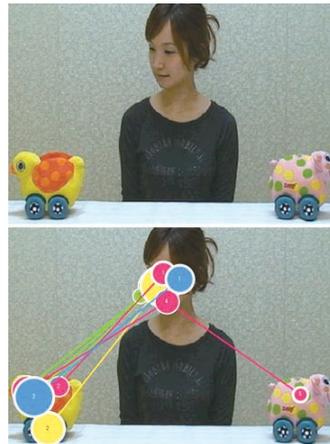
Infants need to extract useful information from a distractive world. They can efficiently do so by learning from others (social learning). I examine the importance of social learning in early infancy, experimentally showing that preverbal infants learn specifically from human agents. Infants learn about objects in their environment from human gaze rather than nonhuman agents (robots). In addition, I have demonstrated that this specific learning from humans

is based on referential expectations from human gaze. Thus, infants may have a powerful learning mechanism that enables efficient learning from humans.



Yuko Okumura

PhD Candidate, Graduate School of Letters
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2014 HONORABLE MENTION AWARD : STAFF

Mutualism or Bargain?

Relationships between plants and their pollen couriers.



In pollination, plants and animals exchange nectar and pollen delivery, thus it is considered as a win-win business. As found in trades in human society, does the trade between plants and animals depend on the supply-demand balance? Are there buyers' and sellers' markets in pollination? Analyzing theoretical models and worldwide datasets, my collaborators and I found a geographical gradient in the pollination supply. It also indicates that plants in the tropics have showy and splendid flowers and attract unusual and costly pollen couriers such as birds and bats, because pollination supply is severely limited.



Shoko Sakai, PhD

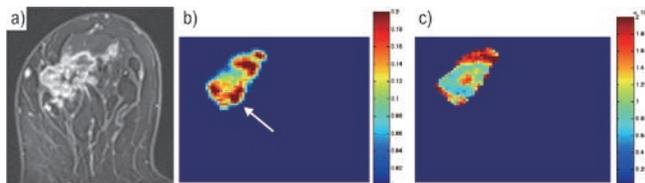
Associate Professor, Center for Ecological Research
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2013 TACHIBANA AWARD LAUREATE : STUDENT

A New Non-Invasive Method for the Diagnosis of Breast Cancer

Establishment of a new diffusion MR imaging method for the diagnosis and management of breast cancer.

Breast cancer is the most prevalent cancer among women worldwide. However, current imaging approaches (such as mammography) often do not provide enough information for proper lesion management, which sometimes results in unnecessary invasive treatments. My colleagues and I, under the supervision of Denis Le Bihan who has introduced the concept of diffusion MRI, have succeeded in identifying patients presenting low-risk lesions (ductal carcinoma in situ) with very high specificity, precluding the necessity for invasive treatments. Diffusion MRI is a new, non-invasive diagnostic approach to evaluating tumor types and their perfusion, and a step toward "tailor-made" oncology treatment.



(a) Conventional postcontrast MRI image (b) Perfusion map (c) Diffusion map. The malignant nature of the lesion is established based on the high perfusion fraction area (b, white arrow) associated with low water diffusion (c).



Mami Iima, MD, PhD

PhD Candidate, Graduate School of Medicine (at the time)
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2013 TACHIBANA AWARD LAUREATE : STAFF

Cis-Acting Transcriptional Repression Establishes a Sharp Boundary in Chordate Embryos

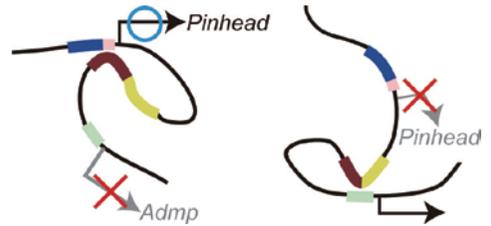
The function of the bone morphogenetic protein (BMP) signalling system in dorso-ventral (DV) patterning of animal embryos is widely conserved among Bilateria. In vertebrates, the BMP ligand Admp is expressed dorsally and moves to the opposite side to specify the ventral fate. Associate Professor Yutaka Satou and I showed that Pinhead is an antagonist specific for Admp with an essential role in establishing the sharp boundary of the ascidian epidermis along the DV-axis. Pinhead and Admp exist in tandem in the genomes of a wide range of animals. This genomic configuration is important for mutually exclusive expression of these two functionally opposed genes through cis-acting transcriptional repression. Our data suggest



that this dual negative regulatory mechanism is widely conserved in a wide range of animals.

Kaoru Satou-Imai, PhD

Research Fellow of the Japan Society for the Promotion of Science (RPS)
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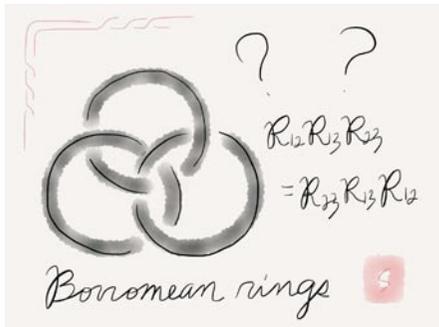


Models of chromosome conformations of the Pinhead and Admp genomic region when Pinhead transcription is active (left) and inactive (right).

2012 TACHIBANA AWARD LAUREATE : STUDENT

Quantum Invariants of Knots

A wonderful encounter of low-dimensional topology and mathematical physics.



Knot theory, which is a branch of topology, aims to understand the structure of knotted strings in space. Knot theory made great strides in the 1980s, with the discovery of quantum invariants. Quantum invariants originate not only in topology but also in mathematical physics related to quantum mechanics. I am trying to understand quantum invariants in the language of topology, with a view to new innovations. Incidentally, the knot in the picture is my favorite; it has a nice property in which every pair of two strands is not knotted. Can you see that?



Sakie Suzuki, PhD

Assistant Professor, The Hakubi Center for Advanced Research
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2012 TACHIBANA AWARD LAUREATE : STAFF

Plant Volatiles as Information Tool

Ecological interaction networks triggered by plant volatiles.

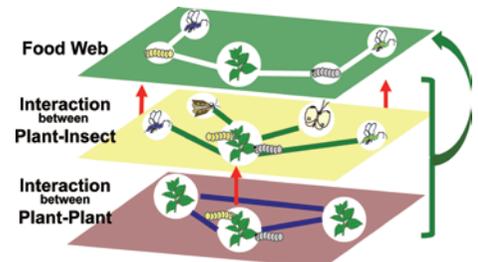
When plants get damaged, they release volatiles. These volatiles are called Induced Plant Volatiles. I have been studying how and to what extent induced plant volatiles affect biological communities. I have found that induced plant volatiles affect 1) distributions of both herbivore insects and predator insects, 2) diurnal and nocturnal behaviours of some insects, and 3) communication between plants.



According to this research, I suggest that induced plant volatiles are important in creating and maintaining biological diversity.

Kaori Shiojiri, PhD

Assistant Professor, The Hakubi Center for Advanced Research
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Food web is supported by two layers which interacts among living things through induced plant volatiles.

2011 TACHIBANA AWARD LAUREATE : STUDENT

Pushing laser beams to the diffraction limits

Fine-tuning laser beam shape and polarization to achieve a needle-like focus.

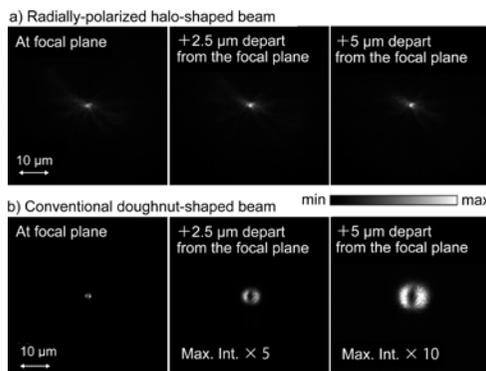
Laser beams have led to the development of various advanced technological fields, such as optical data storage, lithography, and laser microscopy, due to their excellent focusing characteristics. A beam, however, cannot create a spot size smaller than its wavelength; this is popularly known as Abbe's diffraction limit. Therefore, many laser applications have attempted to change the color of lasers (wavelength) from red to blue (shorter wavelength). I have been pushing the envelope in my designs for the polarization and shape of laser beams. By engineering photonic-crystal lasers,

I have demonstrated their needle-like focus characteristics, which may lead to the further development of various fields in optics.



Kyoko Kitamura, PhD

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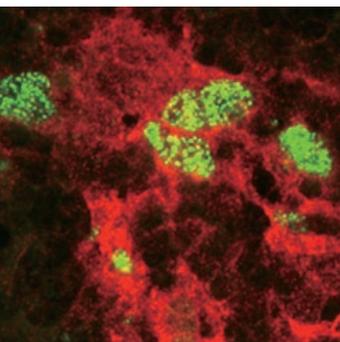


Focusing properties of photonic crystal ring-cavity laser (wavelength = 0.98 μm). Experimental results for radially polarized halo-shaped beam (a) and results for radially polarized doughnut shaped beam (b).

2011 TACHIBANA AWARD LAUREATE : STAFF

Discovery of Thymic Cells Ensuring T-cell Self-Tolerance

Identification of specific cells educating T-lymphocytes about discrimination between immunological self and non-self in thymic tissues.



Immunology influences many aspects of our life. Recovery from influenza, vaccines, pollen allergy, and graft rejection – all of these involve immunology. The most important part of the immune system is to distinguish between self and non-self, which enables foreign pathogens to be attacked, but not our healthy cells. My research focuses on how the immune system acquires this ability. The thymus is an organ for generating T-cells, which are major players in immune responses. I identified specific cells (teachers) which instruct T-cells (students) about “what is self?” within the thymus (classroom) for sending educated T-cells out into our body (society). Thus, my research is anticipated to contribute to human health.

Yoko Hamazaki, PhD Associate Professor, Graduate School of Medicine

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2010 TACHIBANA AWARD LAUREATE : STUDENT

A New Vision of Solar Sunspots

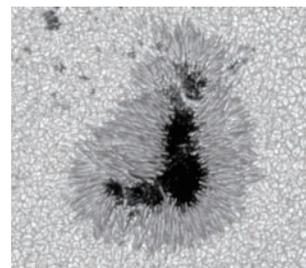
Investigating the mechanism of magneto-convection through a detailed observation of small structures inside sunspots.

Have you ever seen a sunspot? Sunspots are dark regions on the solar surface with a low temperature and strong magnetic field. I had imagined that such solar phenomena were already well investigated; however that was not the case. A high spatial resolution telescope called the Hinode Satellite was launched into space in 2006, and it captured unexpected images of sunspots. I looked into the details of the small bright structures inside sunspots called “umbral dots,” including their kinetic and magnetic properties. The umbral dots showed manifestations of magneto-convection, and so this study can provide experimental proof of the complicated physics of magneto-convection.



Hiroko Watanabe, PhD PhD Candidate, Kwasan and Hida Observatories (at the time)

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2010 TACHIBANA AWARD LAUREATE : STAFF

Business Groups

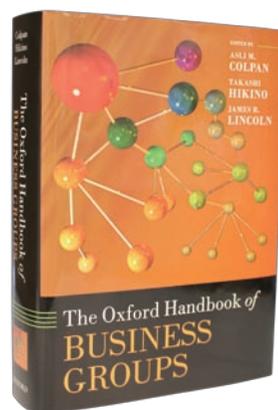
Diversified Big Business in Emerging Economies.

The Japanese zaibatsu, the Korean chaebol, the grupos economicos in Latin America and the family holdings in Turkey are all examples of large, diversified, and often family-controlled organizations that are collectively referred to as “business groups.” Such forms of big business are especially common in emerging economies, and many business groups have shown remarkable resilience, adjusting to economic and political turbulence, international competition, and technological change. My research provides a systematic and balanced understanding of the nature, characteristics, and welfare effects of business groups from theoretical, empirical, and internationally comparative perspectives. I assert that, under certain conditions, business groups can be resilient and contribute to national economic growth.



Asli M. Colpan, PhD

Associate Professor, Graduate School of Management and
The Hakubi Center for Advanced Research
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“The Oxford Handbook of Business Groups,”
A.M. Colpan, T. Hikino and J. R. Lincoln eds.,
Oxford University Press, Oxford (2010)

2009 TACHIBANA AWARD LAUREATE : STUDENT

Molecular mechanisms of lifespan regulation

Sakiko Honjou, PhD

PhD Candidate, Graduate School of Biostudies (at the time)

2009 TACHIBANA AWARD LAUREATE : STAFF

Unstable Nuclei studied with Antisymmetrized Molecular Dynamics

Yoshiko Enyo, PhD

Professor, Yukawa Institute for Theoretical Theoretical Physics

What is TACHIBANA? *Origins of the Name*

The tachibana tree, which produces small blossoms in summer and inedible citrus fruits in winter, is very well known in Japan. In the country's oldest historical record, *the Kojiki*, the tree is called *tokijikunomi*, which means “ever-fragrant fruit,” and it was respected as a symbol of vitality. Likewise, it is featured in sixty-six verses of *the Manyōshū*, Japan's oldest poetry anthology, making it one of the collection's most frequently referred-to plants. In those verses its evergreen quality is used as a metaphor for eternal life and prosperity. In the Heian period, the tachibana tree was used, together with the cherry tree as an auspicious symbol, and the two trees were planted outside important buildings such as the Kyoto Imperial Palace. The tachibana blossom was also used as the basis for the five-leafed design of the Japanese Order of Culture medal. Originally, a design based on the cherry blossom was proposed for the medal, but the Emperor Showa requested that the tachibana be used instead. The Emperor explained that “falling cherry blossoms have meaning, but culture should be everlasting,” and so the flower of the perpetually green tachibana tree was adopted to symbolize the permanence of culture. In that tradition, Kyoto University chose to name its award for outstanding young female researchers after the tachibana tree, to express the hope that the work of the awardees will continue to flourish.

