

Annual Report on Research Activities

2012

## Preface

Vice chancellor of the Ritsumeikan Trust, Ritsumeikan University Vice-President

Kozo WATANABE



The mission of universities, as stipulated in Japanese law, is to conduct educational and research activities with a focus on academics, share those results with society at large, and contribute to the development of society. Research is especially subject to high expectations to give the knowledge and results gained through research activities back to the educational field, as well as give research results back to society at large.

In 1994, Ritsumeikan moved the College of Science and Engineering to the Biwako-Kusatsu Campus(henceforth, BKC) and took advantage of the opportunity to promote industry-academia-government collaboration. Thus, by giving back the University's Knowledge and Skills, Ritsumeikan contributed to society, improved its quality as a university, and promoted the advancement of education and research.

As a result of these efforts, we have been able to increase our external research funds from corporate, governmental, and other groups. Especially from the point of view of the strengthening of basic research, the number of projects chosen for Grants-in-Aid for Scientific Research is largely increasing. Also, as independent strategies to strengthen basic research, Ritsumeikan has formulated Advanced Research Programs at Ritsumeikan University that take into account the characteristics of research fields.

Also, through four research organizations, Ritsumeikan Global Innovation Research Organization(R-GIRO), Kinugasa Research Organization, BKC Research Organization of Social Science and Research Organization of Science and Technology, as well as the research institutes and centers established under these research organizations, we have developed organizational and academic research, and strengthened research systems to make industry-academia-government collaboration and research exchange more active.

To advance these research activities to the next level, in 2006, Ritsumeikan formulated the "Ritsumeikan University Research Enhancement Mid-Term Plan Phase I (AY 2006-2010)" and to further continue the plan progressively, formulated the "Ritsumeikan University Research Enhancement Mid-Term Plan Phase II (AY 2011-2015)" in 2011. We now enter the second half of this plan's period, and although there is a sense of accomplishment with our efforts to build a strong foundation for supporting industry-academia-government collaboration and promoting the plan, the issues we face are also more apparent. We shall continue to work vigorously toward the development of young researchers to lead the next generation and the internationalization of research. With the goal of becoming a one-of-a-kind global research university, we shall release unique research results through further vitalization of research.

Moreover, next year (AY 2014), which marks the 20th anniversary of BKC, will bring the opening of the Osaka-Ibaraki Campus and a new platform for research activities.

It is my belief that this annual report was launched last year in order to record and compile such ideas that support the university's research activities, how those ideas came about, and what history they carry over. For this reason, this issue includes a three-man talk between the chancellor and two vice presidents. I conclude with my sincere hopes that you will enjoy the contents of these pages.

December 2013

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## Aiming for a Global Research University— The Past and Future of Ritsumeikan University's Research



**Kiyofumi KAWAGUCHI** Chancellor of The Ritsumeikan Trust, President of Ritsumeikan University

**Kozo WATANABE** Vice-Chancellor of The Ritsumeikan Trust, Vice President of Ritsumeikan University

**Masanori MURAKAMI** Vice-Chancellor of The Ritsumeikan Trust, Research Affairs

### The Advancement of Research in Natural Sciences, Starting with the Opening of the Biwako-Kusatsu Campus

**KAWAGUCHI** For Ritsumeikan University, the biggest breakthrough towards the advancement of research activities was the 1994 opening of the Biwako-Kusatsu Campus (BKC), and the transfer of the College of Science & Engineering. In order for Ritsumeikan University to develop as a multidisciplinary university, it was necessary to expand the College of Science & Engineering and make its presence felt in the national and international research world. The transfer coincided with the preparation of a system for industry-academia-government collaboration. This not only enriched the breadth, depth and quality of research in natural sciences, but also stimulated research in humanities and social sciences.

**MURAKAMI** Many private universities in Japan had been hesitant towards industry-academia-government collaboration. It was groundbreaking when Ritsumeikan University took the lead of private universities in this regard.

**WATANABE** The strength of our university's industry-academia-government collaboration is that it is driven by faculty and staff collaboration. Our university, which has long put priority on education, stands on the principle that "tuition should be used for education, and research funds should be secured by the researchers." The university created a system that supports

industry-academia-government collaboration so that researchers can acquire research resources without depending on tuition. Our method of close coordination between faculty and staff members and successful matching with corporations is garnering attention from other universities as the "Ritsumeikan Model." As a result, there has been a dramatic increase in the number and amount of external funds as well as funding from Grants-in-Aid for Scientific Research.

### Promoting the Sophistication of Research with a View on the World

**KAWAGUCHI** After arranging this research environment, the next step was to promote the sophistication of research with a global perspective. With the goal of creating unique research bases that meet global standards, we began to establish one-of-a-kind, creative bases such as the Art Research Center and Graduate School of Core Ethics and Frontier Sciences. These bases that integrate natural sciences with humanities and social sciences have a great impact even beyond the university,



Kiyofumi KAWAGUCHI

particularly through the Ritsumeikan Global Innovation Research Organization (R-GIRO) launched in the 2008 academic year.

**MURAKAMI** R-GIRO succeeded because the whole university made an effort under the strong leadership of the chancellor. We



Masanori MURAKAMI

worried at first whether research in natural sciences can really integrate with humanities and social sciences, as they use different research methods, but integration is currently underway with 33 projects for Stage 1 and eight research cores for Stage 2. For example, a humanities and science integration is now

bearing fruit beautifully at the “Food Supply Research Base” with natural science research groups working under an economics researcher.

**KAWAGUCHI** The importance of R-GIRO is in its principle of “Tackling issues that humanity faces in the 21st Century.” I believe every researcher has the desire to contribute to humanity and society. This may be an outrageous goal for one person, but as a team each member can play his or her own role. I’m sure the researchers were also quite inspired.

**WATANABE** Contributing to the solution of issues common to all humanity is a very important mission for humanities and social sciences as well. When the Graduate School of Core Ethics and Frontier Sciences opened, we discussed that its research should focus on problems concerning basic human ethics. Today R-GIRO has grown into an ideal model for research in Japan.

**KAWAGUCHI** Many of the research findings have had an impact on society and in the academic world. In the 2013 academic year, the Ministry of Education, Culture, Sports, Science and Technology-Japan selected two R-GIRO bases as COI-Trials (COI-T), which are secondary selections, for the Center of Innovation Science and Technology based Radical Innovation and Entrepreneurship Program (COI STREAM). I look forward to seeing how they can contribute to society with their research.

**MURAKAMI** When a university and corporation collaborate on research towards a common dream (vision), it will always lead to the achievement of a common dream for society and humanity also. This is the kind of new, ideal industry-academia-government collaboration we hope to achieve.

Towards Becoming a Global Standard Research University that Contributes to the World’s Future

**KAWAGUCHI** We must continue to promote the further sophistication of research and aim to become a research university that suits the Ritsumeikan spirit and that we can be proud of.

**MURAKAMI** What we see in the future of R-GIRO research is, in

50 years, a “model that can continue to develop even in an aging society with a decreasing birthrate.” I believe all R-GIRO bases must demonstrate a new path for the future of Japan, which is progressing towards an aging society with a decreasing birthrate.

**WATANABE** For this it is also important to nurture young researchers who will carry the next generation.

**MURAKAMI** I agree. It is important to cultivate young researchers through project research, including R-GIRO. I think that watching discussions between researchers from different disciplines and learning a variety of research methods will foster the development of young researchers.

**KAWAGUCHI** The point is to establish a system and structure for this. I think it is a university’s job to show young people a definite path so that they can choose that path with a sense of hope. And the most important theme is “internationalization.” Starting with R-GIRO, each project must communicate more and increase its presence in the international field.

**WATANABE** For example, the Research Center for Pan-Pacific Civilizations Ritsumeikan University, newly opened in the 2013 academic year, is collecting and analyzing annually laminated sediments from Lake Suigetsu in Fukui Prefecture and is attempting to analyze the earth’s climate and environmental changes during the past 70 thousand years. I think that using Japan’s unique research resources like this to dig down research that is only possible in this location will lead to creative results that can have an international impact.



Kozo WATANABE

**KAWAGUCHI** In the future, if other Asian countries and African countries follow the same path that developed countries have already traveled, the earth won’t be able to stand it. I believe it is Japan’s role to demonstrate a different way for sustainable development. Looking at the future of the earth, what can we suggest to other Asian countries, African countries and the world? I am certain that this question will open a new phase for the true internationalization of Ritsumeikan University and its research activities.



# Great East Japan Earthquake What We Can Do

## —Disaster Recovery Assistance Through Research



<http://www.ritsumei.ac.jp/rs/20110311/>

The Great East Japan Earthquake hit Japan in March 2011. Ritsumeikan launched the “Special Investigative Project on Matters Related to the Great East Japan Earthquake” at the end of March, and in April began preparing a base for assistance to disaster-struck areas mainly through the “Ritsumeikan Office for the Support of Post-Disaster Recovery.”

As for recovery assistance through research, the school made a university-wide call for “Research Promotion Programs for the Great East Japan Earthquake” to support

research activities such as projects concerning recovery assistance in disaster-struck areas, damage reduction in a disaster, and other related themes, as well as joint research projects with universities and research institutions affected by the disaster. There were 69 applications for the first appeal in FY2011, and 30 programs were selected. In FY2012 there were 55 applications (of which 24 were projects continued from FY2011), and 52 were selected. In both cases, the total amount of financial assistance was 50 million yen.

### List of selected new research programs for FY 2012 (Department, Order of the Japanese syllabary)

Leaders	Department	Position	Research Field	Research Project
Norifumi KAWAHARA	Letters	Professor	Humanities and Social Sciences	Geographical Research Regarding Restoration Assistance for the Fishing Industry Through Fishing Ship Donations to Disaster-struck Harbors
Tatsuya SATO	Letters	Professor	Humanities and Social Sciences	Study on and Theorization of Damage by Rumors Based on Rumor Research and Cultural Psychology Theory — Possibilities of Measures for Reducing Damage by Rumors
Manabu TAKAHASHI	Letters	Professor	Humanities and Social Sciences	A Study on Predictions of Earthquake Disasters and the Safety of Evacuation Routes and Locations Based on Land History
Yasuji ISHIKURA	Social Sciences	Professor	Humanities and Social Sciences	Research on the Role Accomplished by Welfare Workers During the Disaster and Recovery Efforts of the Great East Japan Earthquake and Disaster Manuals
Katsuyuki HIDAKA	Social Sciences	Professor	Humanities and Social Sciences	Grief and Healing — “Stories” Created by the Media After the Great East Japan Earthquake
Yoshimitsu SHIOZAKI	Policy Science	Tokubetsu Shohei Professor	Humanities and Social Sciences	Research on Ideal Housing Reconstruction After the Great Earthquake — Based on Examinations on the Great Hanshin-Awaji Earthquake
Kyungmi SON	Policy Science	Assistant Professor	Humanities and Social Sciences	Planning Administration for the Enforcement and Future of Administrative Policies Regarding Restoration and Recovery After the Great East Japan Earthquake
Akinori NAKAMURA	Image Arts and Sciences	Professor	Humanities and Social Sciences	Development of a Regional Promotion Media That Uses GPS Technology and Empirical Research on Its Effectiveness
Koichi HOSOI	Image Arts and Sciences	Professor	Humanities and Social Sciences	Empirical Research on the Potential of a “Disaster Prevention Media That Links Campuses and Local Areas” with Area 1Seg Broadcasting Using White-space Special Areas
Toshihiko KUBO	Economics	Professor	Humanities and Social Sciences	Earthquake Recovery and Crisis Management — From Fukushima (Subtitle: Corporate Restoration and the Elimination of Anti-social Forces During Earthquake Recovery)

Leaders	Department	Position	Research Field	Research Project
Yoichi KOIKE	Economics	Professor	Humanities and Social Sciences	Economic Recovery and Industry/Job Creation — Around the Kesen District
Kengo YASUI	Economics	Associate Professor	Nature Sciences	Long-term Effects of Earthquakes on the Creation of Human Capital, Sense of Happiness and Preference Parameters
Takeyuki OKUBO	Science and Engineering	Professor	Nature Sciences	Investigation on Private “Tourism Disaster Prevention” Activities that Supported Tourists After the Earthquake
Issei DOI	Science and Engineering	Assistant Professor	Nature Sciences	Understanding the Pattern of Ultra-microearthquake Foreshocks that Preceded the Great Earthquake
Toru HORIGUCHI	Science and Engineering	Associate Professor	Nature Sciences	Establishment of a Landscape Guideline for Housing Reconstruction Plans in the Ogatsu District of Ishinomaki City, Miyagi Prefecture — Plan for Restoring a Regions Cultural Essence
Shinsaku MUNEMOTO	Science and Engineering	Associate Professor	Nature Sciences	Research Regarding the Use of Simplified Meeting Places that Aim to Revive Local Communities — Targeting Salon Activities in Miyako City
Yasuhide MOCHIDA	Science and Engineering	Professor	Nature Sciences	Investigative Research Regarding Effectiveness and Future Outlook of Rooftop Gardening on Temporary Housing After the Great East Japan Earthquake
Hirimitsu SHIMAKAWA	Information Science and Engineering	Professor	Nature Sciences	Universalization of Volunteering Activities by Promoting Listening Volunteering Using Cloud-stored Photographs
Jooho LEE	Information Science and Engineering	Professor	Nature Sciences	Creation of Three-dimensional, Wide-range Map of Disaster-struck Areas Using a Launched Camera Sensor
Yuji SUZUKI	Life Sciences	Professor	Humanities and Social Sciences	Practical Application of a Life-long Model of the “Project-Based English Program,” an English Program for Great East Japan Earthquake Recovery Assistance
Izumi TABATA	Sport and Health Science	Professor	Nature Sciences	Research Regarding Health and Exercise / Eating Habits of Children During Periods of Development
Shinji TANI	Science for Human Services	Professor	Humanities and Social Sciences	Recovery Assistance for the Great East Japan Earthquake and the Creation of Science for Human Services
Shoji AZUMA	Language Education and Information Science	Professor	Humanities and Social Sciences	Public Language for the Empowerment of Citizens: Earthquakes and Leadership
Hiroshi SAITO	School of Law	Professor	Humanities and Social Sciences	Research on the System of Special Zones for Reconstruction
Toshikazu SETO	Kinugasa Research Organization	Post Doctoral Fellowship	Humanities and Social Sciences	Establishment of Assistance Methods for Community Recovery Through Participatory Map Drawing Activities
Yoshiyuki SUZUKI	Ritsumeikan-Global Innovation Research Organization	Tokubetsu Shohei Professor	Nature Sciences	Development of Techniques / Technology for Repair and Earthquake-resistance Reinforcement on Traditionally Constructed Wooden Buildings in Disaster-struck Areas, and Disaster Recovery Assistance
Xuanming SU	Ritsumeikan-Global Innovation Research Organization	Post Doctoral Fellowship	Humanities and Social Sciences	Optimize distributed renewable mix for climate change mitigation options in post-Fukushima Japan
Masato YAMAZAKI	Ritsumeikan-Global Innovation Research Organization	Post Doctoral Fellowship	Humanities and Social Sciences	Quantitative Evaluation of Sequential Scenario for Decommissioning Nuclear Power Plants Using a Multi-regional Computable General Equilibrium Model

# Research Vision

Ritsumeikan University formulated the “Ritsumeikan University Research Enhancement Mid-Term Plan (AY 2006-2010)” in 2006. It has been designated as the Phase I Research Enhancement Mid-Term Plan, and the Research Enhancement Mid-Term Plan formulated in 2011 has been designated as the “Ritsumeikan University Research Enhancement Plan Phase II (AY 2011-2015)” (henceforth, the

“Phase II Plan”), representing a five-year plan.

The Phase II Plan has defined the following goals to take action toward the realization of the “Challenge to Create a Distinctive Research University which Contributes to Humanity, Nature and Society,” which is part of the vision of the Ritsumeikan Trust toward the year 2020.

## Principles of Research Enhancement

- (1) By giving the knowledge and results gained through research activity back to education and providing society with the fruit of research results, contribute to the welfare of mankind, social progress, world peace, and the development of local communities.
- (2) Promote research that sets of Ritsumeikan University apart by emphasizing both scientific research based on the free, creative intellectual interests of individual researchers, and policy-driven research emphasized by the university, and by integrating them at times.
- (3) Increase functions that integrate research and graduate school education and endeavor to develop young researchers.
- (4) Strengthen collaboration with overseas research institutions and promote the internationalization of research activity and dissemination of research results both inside and outside of Japan.
- (5) Promote research activity in collaboration with national and local governmental agencies, private-sector industries, non-profit agencies and other organizations.

## Basic Goals

- (1) Establish Ritsumeikan University as a university with top-class domestic research capabilities and aim for recognition as a university with a unique research base and research fields as well as high international standards.
- (2) Constantly strive for even higher research standards, and promote the creation of a climate where researchers ambitiously engage in research and the creation of a research environment which supports research activity.
- (3) Through industrial-academic-government partnership activities, promote commissioned and collaborative research with national and local government agencies and industry, and use the research results to benefit society, therefore giving back to society.

## Implementation Policies for Goal Attainment

- (1) Promotion of original and diverse research
- (2) Creation a world-class research base
- (3) Reinforcement of the activity bases of research organizations, research institutes and research centers
- (4) Promotion of the internationalization of research activity
- (5) Strengthen the dissemination of research results both in Japan and overseas
- (6) Development of young researchers and others who will lead the next generation
- (7) Creation and expansion of a research environment and research support functions
- (8) Promote using research results to give back to society
- (9) Disseminate information on the status of research activities



# Strengthening Basic Research

## Promotion of Diverse Research with a Focus on Grants-in-Aid for Scientific Research

At Ritsumeikan University, we implement research support systems within the University budget, which lead to the acquisition of external grants such as Grants-in-Aid for Scientific Research (henceforth, KAKENHI), and endeavor in the development and enrichment of research content, a process on which we place great importance. As a result, the number of proposals selected for KAKENHI considerably

increased from 210 in 2005 to 456 in 2012 (the rank rose from number 40 nationwide in 2005 to number 26 in 2012). Ritsumeikan University will continue to position KAKENHI as a key source of external research funding, make efforts toward increasing the number of selected proposals and the monetary amount, and promote basic research.

## Expansion of the Advanced Research Programs at Ritsumeikan University

We are endeavoring in the expansion of our research capabilities and have established the following various

Advanced Research Programs:

### Advanced Research Programs at Ritsumeikan University

Expansion of research capabilities	
<b>Program to Support General Research Activities (Kiban-kenkyu)</b>	This is a research grant to support and strengthen diverse research within the university, and is a system that aims to actively introduce external research funding such as KAKENHI to further develop and promote research content.
<b>Program for Application of the Grants-in-Aid for Scientific Research (KAKENHI)</b>	The purpose of this system is to support applications the following year for rejected research topics in which a researcher applies for KAKENHI as a Principal Investigator.
<b>Program for Research of Young Scientists (Wakate-kenkyu)</b>	This system supports and strengthens scientific research by young scientists at the university.
<b>Program for Post Doctoral Fellowship</b>	The purpose of this system is to expand a wide range of basic research by the Ritsumeikan University faculty and promote the creation of research results by increasing the number of young research staff in addition to developing young researchers who can be active in educational and research institutions and industries, etc. (as researchers) both domestically and abroad.
Dissemination of research results	
<b>Program for Promotion of International Research</b>	The purpose of this system is to promote the international dissemination of research results in order to promote the enhancement and internationalization of research activity.
<b>Program for Overseas Travel Support</b>	This system subsidizes travel expenses required to present the results of research or create international networks for the purpose of promoting the international dissemination of research findings.
<b>Program for Promotion of Academic Publication</b>	The purpose of this system is to support outstanding research results in specialized fields and young researchers, as well as promote the international dissemination of research results in foreign languages such as English.

Forming of research hubs	
<b>Program for Research Institute Mission</b>	This system supports the endeavors for focused projects based on the comprehensive plan established by each laboratory. The purpose of this program is to promote the development of young researchers in addition to creating a positive reputation for the laboratory.
<b>Program for Core-to-Core Research</b>	The purpose of this system is to establish a world-class research hub (Global COE Program, MEXT) that meets the standards of Ritsumeikan University from a mid- to longterm standpoint.
<b>Program for the Second-Phase R-GIRO Research (Core Topics for Ecology, Humanity and Society)</b>	The purpose of this system is to create a new core for a research hub specifically for research areas which Japan must urgently solve (environment, energy, food, materials/ resources, medical care/health, peace of mind/safety, people/way of life, peace/governance, Japan research/area studies) at the Ritsumeikan Global Innovation Research Organization, which is under the direct supervision of the University President, while developing the young researchers who will lead the next generation.

Other programs	
<b>Individual Research Allowance (Material Allowance)</b>	The purpose of this system is to improve maintenance of research standards and contribute to the advancement of research by supporting individuals' daily research.
<b>Individual Research Allowance (Travel Allowance)</b>	
<b>Academic Development Leave for Faculties</b>	The purpose of this system is to enhance academic success and promote academic research, thereby period of research leave is guaranteed by university.
<b>Academic Development Leave for Assistant Professor</b>	
<b>Faculty Research-Priority Program</b>	
<b>Operational Grant for Academic Conferences in Ritsumeikan</b>	The purpose of this system is to subsidize conference hosting fees held in Ritsumeikan Univ. for those fulfill conditions.
<b>Operational Grant for Academic Conferences (facility use fee waivers)</b>	The purpose of this system is to exempt facility charge held in Ritsumeikan Univ. for those fulfill conditions(Excluding cleaning fee).
<b>Publication Incentives for Ritsumeikan University Journals (for faculty of humanities and social sciences, BKC)</b>	This system is targeted those who have submitted papers with fee.
<b>Academic Paper Publication Fee Subsidy (for faculty of natural sciences, BKC)</b>	The purpose of this system is to subsidize necessary submission fee from the publication company

Grants-Aid for Scientific Research

A system for disaster mitigation and universal designs developed from the viewpoint of people who are vulnerable to disasters



Scientific Research (B)  
AY 2010-2012

College of Science and Engineering  
Professor **Kazuyuki IZUNO**

Outline of Research Goals

The aim of this research is to initiate three projects— (1) development of disaster management technology, (2) establishment of an evacuation guidance plan, and (3) creation of universal designs for disaster management—and also to develop a system that can be used in disasters as well as on a daily basis. This is based on the understanding that for a disaster management system to function effectively during a disaster for people who are vulnerable to disasters, it must be one they are accustomed to on a daily basis. The basic research structure will be collaborative research, where the issues of projects (1) to (3) are resolved individually and integrated as a whole. (1) Development of disaster mitigation technology will involve proposing the development of a disaster management system that can be used on a daily basis and that is designed to help people who are vulnerable to disasters because they have limited access to information about disaster preparedness, cannot

evacuate even if they have access to the information, and find it difficult to respond to environmental changes. (2) Establishment of an evacuation guidance plan will be an examination of appropriate evacuation site locations and evacuation guidance plans using a “simulation of evacuation behavior by people who are vulnerable to disasters,” based on analyses of walking speed during disasters and feasible evacuation distances. (3) The project on universal designs for disaster management will propose disaster-proof designs that use expressions easy to understand for people who are vulnerable to disasters, and considers their perception characteristics and actual rescue systems. The above projects will be combined comprehensively and organically to propose a system for disaster mitigation and universal designs for disaster management developed from the viewpoint of people who are vulnerable to disasters, and will contribute to saving their lives.

Outline of Research Results

People who are vulnerable to disasters usually have limited access to information about disaster preparedness and this limits the effectiveness of the existing disaster management system. In recent years, the range of people who are vulnerable to disasters has become increasingly complex, including commuters who have difficulty returning home and tourists as well as children, elderly people,

people with disabilities, people requiring long-term care or assistance, and international residents. This study examined how to build a disaster-proof system which is capable of protecting the lives of vulnerable people, even when disaster management information is not available. We also proposed how to design signs which enable people without special knowledge of disaster management to evacuate safely.

<b>Field of Research</b>	Complex systems
<b>KAKENHI Discipline and Research Field</b>	Social/Safety system science, Natural disaster /Disaster prevention science
<b>Key Words</b>	regional plans and policies for disaster prevention, people who are vulnerable to disasters, people who need support during disasters, evacuation guidance, urban environment, universal design for disaster mitigation, tourism, multi-agent simulation

Grants-Aid for Scientific Research

Loss and Conflict in Infertile Couples: Qualitative Research on Invisible Choice Trajectories and Support

Grant-in-Aid for Young Scientists (A)  
AY 2010-2012

Kinugasa Research Organization  
Postdoctoral Fellow **Yuko YASUDA**



Outline of Research Goals

This research was designed to provide information that can contribute to the clinical psychological services provided to couples experiencing infertility or infertility treatment, particularly with regard to issues of loss and conflict. It will also examine the practical and developmental possibilities of TEM (Trajectory Equifinality Model), a methodological approach to analysis and description that elucidates clashes between sociocultural forces.

The research will consist of three phases: 1) Examination of theories—understanding the phenomena under study and a literature review: I will analyze raw data regarding loss and conflict gathered from interviews with individuals who have experienced infertility treatments. I will also study TEM-related materials to elaborate on this theoretical approach. 2) Examination in practice—human services and research collaboration: I will create a variety of opportunities for practical learning, such as gatherings of concerned parties, cooperative discussions with overseas research collaborators, Professor Valsiner of Clark University in

the US and Professor Emeritus Hermans of Radboud University Nijmegen in The Netherlands, meetings devoted to qualitative research at which participants are trained in the application of TEM, presentations at national and international conferences, and exchanges of ideas with researchers in similar fields and other supporters. 3) Examination of practical applications—consideration of the qualitative research method TEM and support: I will integrate the findings of phases 1 (examination of theories) and 2 (examination in practice) regarding reproductive medicine, the sociocultural phenomenon of infertility, the sense of loss particular to infertility, and the conflict experienced by infertile couples. I will also offer observations regarding the clinical psychological support needed by infertile couples. Furthermore, I aim to contribute to the development of the qualitative research method TEM to improve its ability to elucidate phenomena that involve sociocultural forces and the passage of time.

Outline of Research Results

I examined the process by which the sense of self of a woman undergoing infertility treatments was transformed and maintained via her continual reconsideration of the meaning of her experiences. Her personal narrative, told to me in chronological order, revealed the evolution of a multifaceted and continuous identity over time. It also suggested approaches for helping individuals cope with the

difficulties involved in infertility treatments. We collaborated to develop the qualitative research method TEM(Trajectory Equifinality Model), which, in narrative practice and conjunction with Dialogical Self Theory and similar concepts, yielded four theoretical and methodological approaches focusing on the notion of BFP(Bifurcation Point).

<b>Field of Research</b>	Psychology
<b>KAKENHI Discipline and Research Field</b>	Psychology, Clinical psychology
<b>Key Words</b>	Qualitative research method TEM, infertile couples, experience of loss, life-span development, narrative, psychological support, collaborative practice, international exchange between researchers

Grants-Aid for Scientific Research

The dynamic analysis of Technology Transfer for  
The global production system

Grant-in-Aid for Young Scientists (B)  
AY 2010-2012

College of Business Administration  
Associate Professor **Tetsuo YOSHIMOTO**



Outline of Research Goals

The aim of this research is to reveal the material and knowledge linkage between bases in different production areas, targeting the Japanese manufacturing industry. New bases located in emerging production areas are in need of models and samples of operation, that is, technology and knowledge transfer from a model site. However, there are cases in which technology transfer does not work well between the new plant and the so-called “mother plant” in Japan. Therefore, production bases already established in emerging production areas are sometimes used as models or samples for new plants. In order to understand the global production system of today, we must reveal the reality of how technology transfer and knowledge flow are established between overseas plants. The research will examine the linkage and relationship between bases that

are multipolarizing, by illuminating the reality of technology transfer and knowledge flow which at first glance can look complex, and organizing and analyzing the roles of each plant within the global production system.

Global strategy does not only involve production activities. Therefore, I will also examine the actual situations of marketing and services by manufacturers, with a comprehensive take on the process of manufacturing, and research and analyze technology transfer and linkage in production in general.

In conclusion, the aim of this research is to illuminate the global production system from the flow of materials, services and information, and reveal the current situation of international division of labor.

Outline of Research Results

Through the point of view of the management structure and technology transfer, this study analyses the relationship of the Global Network of Japan electronics manufacturers. I discuss the technology transfer flow of overseas bases while

located in the emerging production areas and the role of the “mother plant”. From consideration of current situation of global production system, this study revealed the presence of “senior plant”.

<b>Field of Research</b>	Management
<b>KAKENHI Discipline and Research Field</b>	Management
<b>Key Words</b>	technology transfer, production linkage, emerging production areas

## Grants-Aid for Scientific Research

## The effects of exercise-inducible factors on lipid metabolism in adipocytes

Grant-in-Aid for Young Scientists (B)  
AY 2010-2012College of Sport and Health Science  
Associate Professor **Takashi HASHIMOTO**

## Outline of Research Goals

(1) Elucidate the adipose tissue histochemically and biochemically in animal models of obesity, diabetes, and other metabolic disorders, in order to identify the lipid metabolism in terms of lipid droplet-associated proteins. (2) Demonstrate the relationship between deterioration of mitochondrial function in adipocytes and the energy

metabolism in a whole body. (3) Examine the effect of lactate on the mitochondrial biogenesis of adipocytes and the energy metabolism in a whole body. (4) Examine the effect of exercise training on the energy metabolism in animal models of metabolic disorders.

## Outline of Research Results

Many new lipid droplet (LD)-binding proteins and lipase have been discovered and we have gradually learned more about their physiological functions. However, remarkably little is known about molecular mechanisms by which lipid droplet-binding proteins regulate lipogenesis and lipolysis. For this research, 3T3-L1 adipocytes were used to analyze the responses (e.g. localization, hydrolysis activity) of lipid droplets and lipid droplet-binding proteins to lipolytic stimuli. As a result, we found that fatty acids (FAs) generated from the lipolysis process become neutral fat (triglyceride) by re-esterification at the endoplasmic reticulum (ER), and emerges as micro lipid droplets (mLDs). In conclusion, the physiological significance is that this increases the surface area of the LDs and enhances lipase hydrolysis activity. Furthermore, it was found that besides the surface of pre-existing central LDs, LD-associated proteins are actively involved in lipolysis on mLDs that are formed by FA re-esterification.

Based on the above mechanism of lipolysis, we also assessed physiological stresses that enhance lipolytic activity. We examined the effects of compounds, that are known to reproduce some of the exercise effects in skeletal muscle such as H<sub>2</sub>O<sub>2</sub>, sodium-lactate, caffeine, AICAR, and the nitric oxide (NO) donor S-nitroso-N-acetylpenicillamine (SNAP), on the expression of LD-associated proteins and mitochondrial biogenic signaling to explore putative factors induced by exercise training to activate lipolysis in differentiated 3T3-L1 adipocytes. We found that exercise-inducible factors such as lactate, reactive oxygen species (ROS), calcium signals, AMP Kinase, and NO, some of which could be generated in adipose tissue, and some of which could be transported from skeletal muscle, were able to enhance the lipolytic activity in differentiated 3T3-L1 adipocytes. Moreover, animal testing clarified that a mixture of these compounds that can enhance lipolytic activity has an anti-obesity effect.

Field of Research	Exercise Biochemistry
KAKENHI Discipline and Research Field	Health / Sports science, Sports science
Key Words	lipid metabolism, lipolysis, lipid droplets, metabolic syndrome, obesity, exercise, mitochondria

## Advanced Research Programs at Ritsumeikan University

### Development of a passive trans-femoral prosthesis that enables stair climbing based on inertial matching concept

Program for Application of the Grants-in-Aid for Scientific Research (KAKENHI)

College of Information Science and Engineering  
Professor **Takahiro WADA**



### Outline of Research Plan

Trans-femoral prostheses utilize mechanical knee joints. The design method and control method of those mechanical joints significantly affect the user's activities of daily living (ADL). Technological advances in recent years have led to a significant increase in the safety and convenience of level-ground walking with trans-femoral prostheses. By contrast, although there are significant user needs related to ascending steps, there are many unresolved issues.

Accordingly, this research will be conducted to measure the walking of individuals using prostheses to ascend steps, conduct a human-machine-system analysis from the perspective of biomechanics, establish methods of determining the characteristics of lower limb prostheses that are best suited to level-ground walking and ascending steps, establish methods for the adaptation of those characteristics, and in addition, to create prototype lower limb prostheses that are suited to ascending steps, then evaluate those prototypes.

The difficult of stair ascending by a trans-femoral

prosthesis comes from 1) the collision of the prosthetic foot to the stairs in the swing phase and 2) the unexpected knee flexion of the prosthesis in the stance phase. For difficulty 2), we will propose a novel passive trans-femoral prosthesis that enables the users to climbing stairs. The ground reaction force will be used to generate knee extension function. For 1), the possibility of designing a passive prosthesis's gait motion that prevents collision with the stairs is investigated by changing inertia property of the prosthesis. Thus, we will identify changes in gait according to differences in biomechanical strategies of non-disabled individuals in the action of ascending steps, then examine whether the technology can be applied to users of lower limb prostheses. Specifically, we will conduct computer simulations based on the actual measurement data obtained from experiments to assess gait, and identify the mass, moment of inertia, center of gravity, and joint viscosity, etc., of a trans-femoral prosthesis that will enable trans-femoral amputees to reproduce the same movement as non-disabled individuals.

### Outline of Research Results

We developed a new mechanism which utilizes ground reaction as the functional expression trigger to prevent knee flexion, while also increasing ground reaction in that state to achieve knee extension. This lower limb prosthesis does not use motors or other actuators, or sensors, etc., nor does it use an external energy source. It is a complete-mechanism lower limb prosthesis.

Further, we conducted experiments in which individuals ascended steps while wearing a simple prototype of the lower limb prosthesis that had been developed to enable the wearer to ascend steps. In addition, we conducted a mechanical analysis of the mechanism, and identified the conditions under which the designed functions were displayed. By comparing both, we were able to demonstrate empirically that

the designed functions would be displayed normally by the invented lower limb prosthesis when ascending steps.

Meanwhile, we conducted biomechanical research on changes in gait caused by differences in the biomechanical strategies utilized by non-disabled individuals in their movement when ascending steps. The results indicated that the strategy of placing the front approximately half of the foot portion on the step (HFC) imposed less of a burden and made it more possible to avoid a collision with the step than the strategy of placing the entire foot portion on the step (FFC). In addition, the results of computer simulation based on actual measurement data obtained from experiments indicated that HFC makes it possible to utilize inertial motion alone to generate a gait in which collision with the step is avoided.

## Advanced Research Programs at Ritsumeikan University

The child drawing process and development of behavior adjustment functionality: A study using the “Digital Pen” behavior measuring device

Program for Application of the Grants-in-Aid for Scientific Research (KAKENHI)

College of Letters  
Associate Professor **Yuko YATO**



### Outline of Research Goals

This research aims to clarify the development process of children’s behavioral regulation, with a focus on children’s drawing process (how they draw) in addition to the completed pieces (what they draw). The research will use a digital pen as a behavior measuring device in order to efficiently analyze the drawing process, such as pen pressure, pen speed changes and sequence of strokes. This will allow quantitative research on the development of drawing in children. The digital pen will be used in conjunction with the drawing analysis software “Elian” (by Seldage), which easily generates data from information on behavioral control, such as how pen pressure and speed is controlled at the beginning and end of each line, or how each line is positioned. The software can also provide automatic diagnostic information, for example

on developmental disorders, by instantly analyzing behaviors based on pathological findings such as saccadic movements in quickly drawn lines or obsessive-compulsive movements in repeatedly drawn lines, which may be difficult to observe in a clinical environment. The research findings may, therefore, have potential for proposals for practical application in clinical examinations on development.

The research will target approximately 80 children between ages 3 and 6, and use indicators such as the BGT (Bender Gestalt Test), DAM (Draw a Man) test, and DAL (Draw a Line Slowly) test which uses verbal instructions to intentionally make children draw slowly. The research aims to clarify the development of behavioral regulation in children through the process of drawing.

### Outline of Research Results

This research revealed, among other findings, a relation between children’s scores on development examinations that use drawing (Bender Gestalt Test, Goodenough Draw a Man test) and the characteristics of their behavioral regulation such as their control of pen pressure, drawing speed and sequence of strokes. For example, children that achieved a low Koppitz score for copying design A of the Bender Gestalt Test (a circle and diamond touching at one point), in other words children that were able to copy the design accurately, began drawing the second shape from the point where the shapes touch. Regarding stroke speed, children that drew the two geometrical shapes with a significant size difference, in other words not accurately, drew each shape at greatly different speeds. That is, children

with high scores (not accurately) drew the first shape (circle) of design A quickly and big, and the second shape (diamond) slowly and small. Many of the tests in the Bender Gestalt Test, which involves copying geometric shapes, require delicate pen control that is thought to be necessary when writing text, such as the ability to arrange multiple shapes with consideration to balance between shapes, like in design A. Because we can predict that the act of drawing is continually connected to the development of writing ability, which is considered necessary during school age, and because finger control in drawing is a behavioral regulation that is also important in social activities, further findings from an expansion of this research may offer beneficial information for group education.



## Advanced Research Programs at Ritsumeikan University

## Research and development on chiral catalyst alternatives to metal

Program to support General Research Activities (Kiban-kenkyu)

College of Pharmaceutical Sciences  
Assistant Professor **Toshifumi DOHI**



## Outline of Research Goals

As represented by the award of the 2010 Nobel Prize in Chemistry to Eiichi Negishi and Akira Suzuki for their work in coupling, the utilization of rare metallic catalysts has led to rapid development of the field of synthetic chemistry up to this point. On the other hand, Japan, which is poor in natural resources, will need to promote the use of resources that can substitute for scarce elements and establish sustainable chemistry in the future. Our laboratory has demonstrated that iodine, which is in abundant supply domestically, is useful for coupling without using a metallic catalyst. It is now anticipated that iodine will serve as an element resource that substitutes for rare metals. Meanwhile, although asymmetric synthesis is an important indicator of catalyst maturity, there are still few cases in which application has been successful using iodine as the catalyst. Supposing that it were possible a reliable asymmetric reaction model using iodine were released to the world, it is certain that it would open the way for the potential as a metal substitute for iodine.

This research provides the solution to improvement of the asymmetric efficiency and catalytic activity needed to achieve that,

from the perspective of the molecular design of the catalyst. In other words, because this research is the first in the world to succeed in the development of an iodine catalyst and displays an asymmetric efficiency of close to 90%, it hypothesizes a transition state based on this information, and precisely redesigns an advanced catalyst that can meet or exceed the target level of performance. An iodine cation structure is implemented in the catalyst in order to increase activity at the same time as well. Because there is a strong interaction between this type of iodine catalyst and the substrate, increased activity and asymmetric yield can both be expected. Phenol oxidation is not only important from the perspective of synthetic chemistry, but is also an extremely important reaction as a biosynthetic mechanism. The oxidant that is obtained is important as a mother nucleus or useful precursor to bioactive natural products for use in pharmaceutical substances, agricultural chemicals, and pigments, etc. Research will proceed toward the goal of achieving the world's first asymmetric catalytic phenol oxidation.

## Outline of Research Results

In 2008, we designed a new asymmetric reagent which had a chiral spirobiindane skeleton, and succeeded in asymmetric intramolecular coupling of naphthols based on the high reactivity of the oxygen bridge structure. It garnered attention as an asymmetric iodine preparation that displayed an unprecedented high asymmetric yield (maximum 86% ee,  $-78^{\circ}\text{C}$ ), but the reaction at room temperature and catalytic amount was limited to moderate selectivity. We modified the structure of the catalyst in accordance with the above research plan, and found that, in general, the ortho position iodine substituent is important, and the asymmetric yield improves. In particular, catalysts with an alkyl group in the ortho position had the best asymmetric yield and reactivity, and by using a 5 to 15 mol% catalytic amount, it was possible to obtain an optically active substance with a maximum 92% ee and 96% yield. Through this, we achieved a world-class level of catalytic iodine oxidation around room temperature, and identified the mechanism of asymmetric induction. These results constitute the first

successful asymmetric phenol oxidation using a nonmetallic catalyst.

In contrast to metallic catalysts, which consume functional groups for bond formation, our method has the synthetic chemical advantage of making it possible to obtain new compounds with a large number of functional groups remaining. Many of the natural products with optically active spiro carbons obtained through this method display fascinating bioactivity, and the development of this research has made application to the synthesis of a number of useful compounds, including lactonamycin, possible. In addition, there is a wide range of demand for the optically active compounds handled in this research, including the fields of pharmaceuticals, agricultural chemicals, electronic materials, and chemicals. Because the original goals of this research were, in general, achieved, in the future, we would like to expand it to drug discovery research and pharmaceutical development based on the useful compounds obtained through this method.

# Industry-Academia-Government Collaboration Activities

## Endeavors Related to Industry-Academia-Government Collaboration Activities

Ritsumeikan University founded the “Biwako-Kusatsu Campus” (henceforth, “BKC”) in order to relocate and expand the College of Science and Engineering in 1994. In conjunction with this, the University established a “Liaison Office,” which served as the office for industry-academia-government collaboration activities, in 1995, and has actively developed industry-academia-government collaboration activities ahead of other universities nationwide. As a result, in 2005 and 2006, Ritsumeikan was a leading figure in the Ministry of Economy, Trade and Industry’s “University Activity Evaluation Method Survey Project (an evaluation of an industry-academia collaboration office at a university, etc. by industry),” where it ranked first place for two years in

a row, receiving high praise from society.

Regarding industry-academia-government collaboration activities, for the Phase II Plan basic goals, the University stated the following as its goal: “through industry-academic-government collaboration activities, promote commissioned and joint research, etc. with national and local government agencies and corporations, and contribute to society by giving research findings of a broad spectrum back to society.” Ritsumeikan University is enhancing its basic foundations to develop industry-academia-government collaboration activities in an organized manner, and aspires to give research results created from these foundations back to society.

### Research Introduction

#### “TABATA PROTOCOL” development

Ritsumeikan University, Universal International Entertainment

College of Sports and Health Science

Professor **Izumi TABATA**

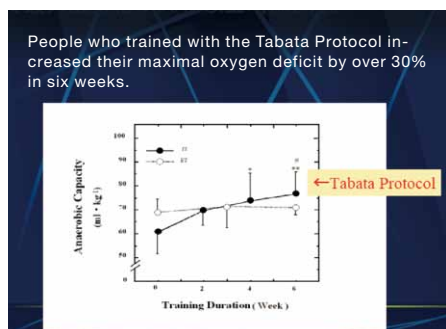


### Case Study Outline

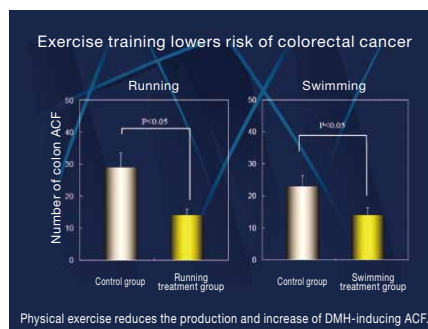
TABATA PROTOCOL is an exercise regimen created by professor Tabata of Ritsumeikan University, based on analyses of high-intensity, short-duration training performed by Japanese athletes. The regimen uses sets of 20-second high-intensity exercise followed by 10 seconds of rest, which is repeated successively for four minutes (total of eight sets). The key is to elevate oxygen uptake dramatically rate and achieve both aerobic and anaerobic exercise.

In the past aerobic exercise was considered effective for preventing lifestyle diseases, but this research revealed that high-intensity exercise, which is anaerobic exercise, performed in short sessions with rests in between increases

aerobic capacity also and further improves the effectiveness of exercise. There are also expectations regarding studies on exercise to understand how colorectal cancer develops and on using short-duration exercise training to prevent lifestyle diseases. On November 8, 2012, a commercialization agreement was made with Universal Pictures International Entertainment in the UK. Big Shot Productions, a cooperative company of Universal Pictures International Entertainment, has been working toward commercialization of the TABATA PROTOCOL. A TABATA PROTOCOL iTunes app will be released on December 6, 2013, and a DVD on December 26, 2013.



Research on and evaluation of effectiveness of method that enhances performance in sports by increasing maximal oxygen uptake and maximal oxygen deficit



Research on the relation between sports and the development of colorectal cancer

Research Introduction

# Development of Structural Member Optimum Arrangement System for Practical Application to Stand-alone Houses



College of Science and Engineering

Associate Professor **Shinta YOSHITOMI**

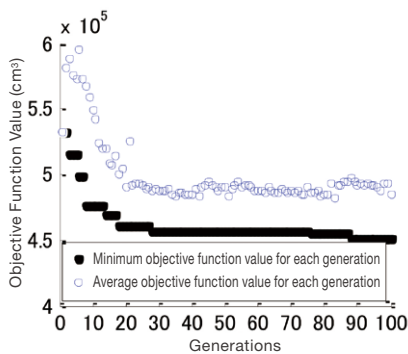
Ritsumeikan University, PanaHome Corporation

## Case Study Outline

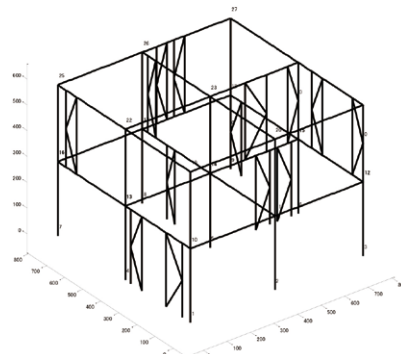
We developed a method for optimizing the arrangement and cross-sectional forms of structural members by applying a genetic algorithm (GA), an optimization method that mimics biological evolution, to steel frame houses which use mainly pillars, beams and load-bearing walls as structural members. The method was further expanded to even handle the arrangement of small floor beams and horizontal braces that are necessary to prevent the floor from distorting. There are very few cases of similar methods

developed with practical application in mind, and none that offer comprehensive optimization, as does this case study, using three elements (size, section size, arrangement) of load-bearing walls in addition to the arrangement of small beams and horizontal braces. We plan to design and sell low-cost, resource-saving houses using the findings from the developed technology.

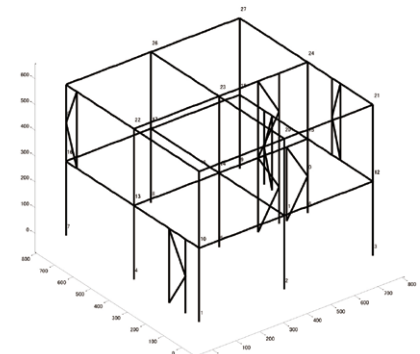
We made two joint patent applications from the results of this development (2013-024344, 2013-024345).



Reduction of steel frame volume due to optimization

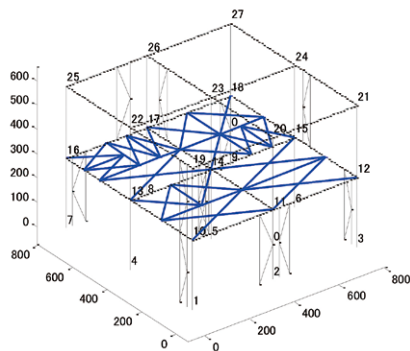


(a) Optimal solution for first generation

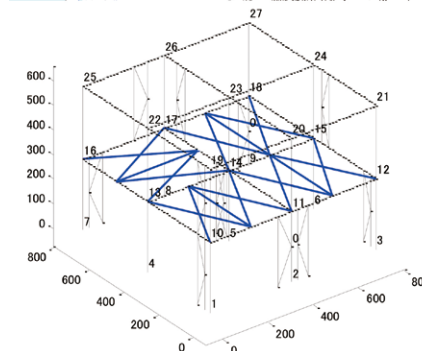


(b) Optimal solution for last generation

Change in wall arrangement due to optimization



(a) Optimal solution for first generation



(b) Optimal solution for last generation

Change in arrangement of small beams and horizontal braces due to optimization

Research Introduction

Development of silicon chemical slicing technology to reduce the manufacturing cost of solar batteries



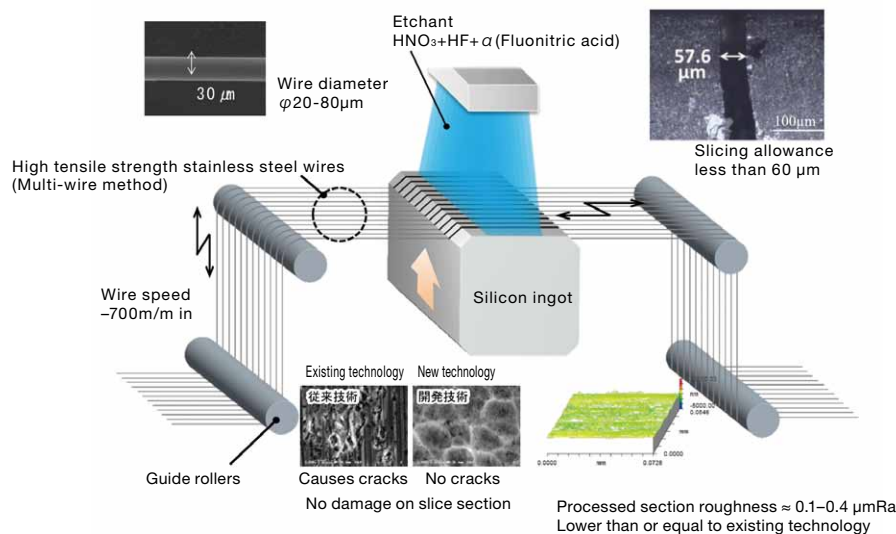
Ritsumeikan University, Tool Bank East Co.Ltd.,Crystal Optics Inc.

College of Science and Engineering  
Professor **Yasuhiro TANI**

Case Study Outline

Solar power is expected to offer a safe and clean alternative to current energy options. However, the cost of solar power generation is high when compared to conventional power generation facilities, and we have not seen a substantial increase in the use of this technology. When we look at solar panel production costs, silicon substrates account for the largest percentage of the overall cost. Therefore, cutting the production costs of silicon substrates will help reduce the overall production costs of solar panels. Silicon substrates used in solar batteries are manufactured by multi-slicing silicon ingots, which are crystalline silicon. Mechanical processing has been the prevalent technology for slicing silicon ingots, but mechanical slicing creates various problems and this has been one cause for the high costs of solar panels. Ritsumeikan University proposed a new slicing technology in which the silicon is etched chemically using a chemical

solution, and is currently developing the technology with university-affiliated venture capitals Tool Bank East Co. Ltd. and Crystal Optics Inc. The ingots are sliced by metal wires that move at high speed within a chemical solution that etches the silicon. Unlike conventional mechanical processing, this technology does not damage the sliced silicon substrates, therefore subsequent steps for removing damages can be simplified. Furthermore, the minimum kerf loss possible in mechanical processing was 100 μm, but this technology brings it down to less than 60 μm, a substantial improvement. Using this technology will improve the yield of silicon material and also greatly streamline the manufacturing process. Practical application of this technology is expected to significantly cut production costs of solar panels and contribute to an increase in the use of solar power.



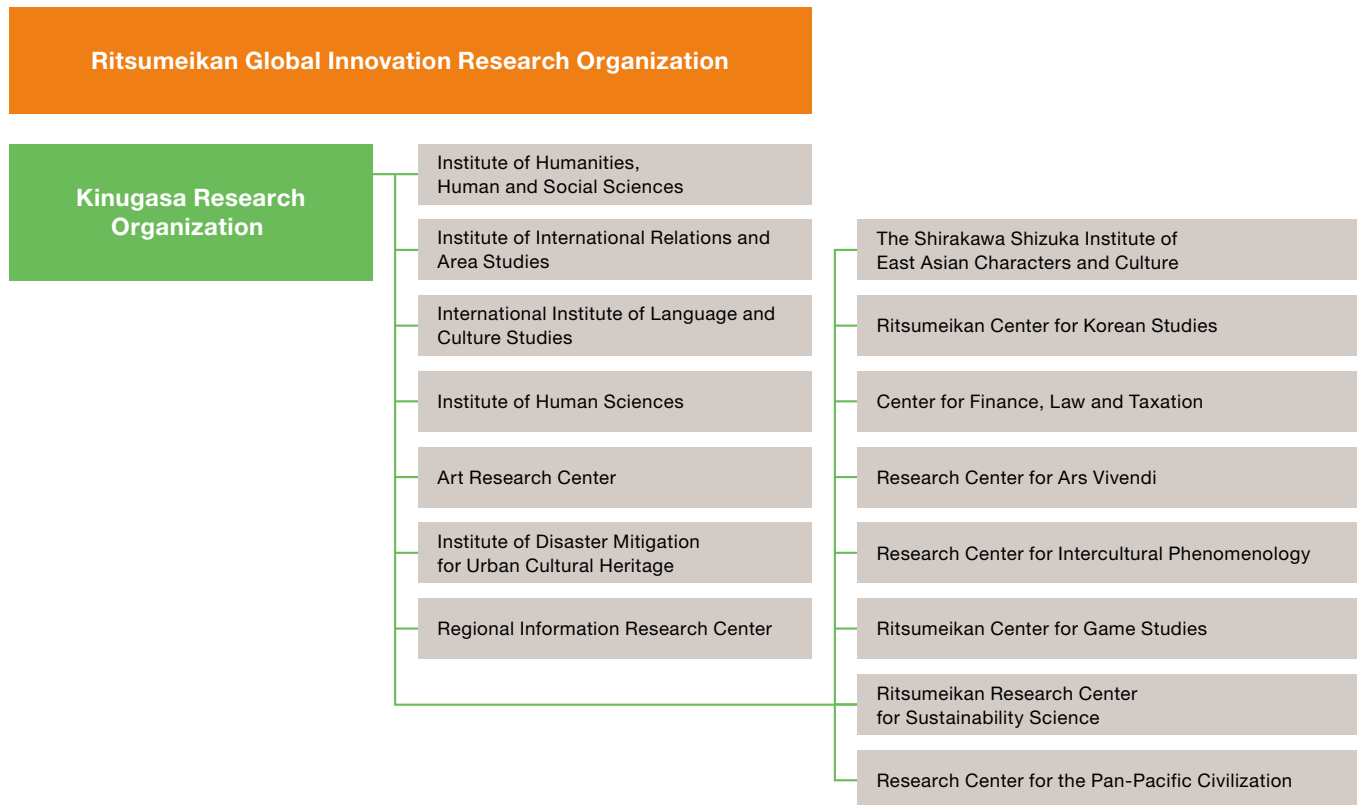
Characteristics of the Etching Slicing Technology

# Research Organizations, Research Institutes and Research Centers

Ritsumeikan University’s research activities are promoted with its four research organizations, Kinugasa Research Organization, BKC Research Organization of Social Science, Research Organization of Science and Technology, and

Ritsumeikan Global Innovation Research Organization (R-GIRO) , as well as the research organizations under the four, as the basis of the activities.

(November.1.2013)

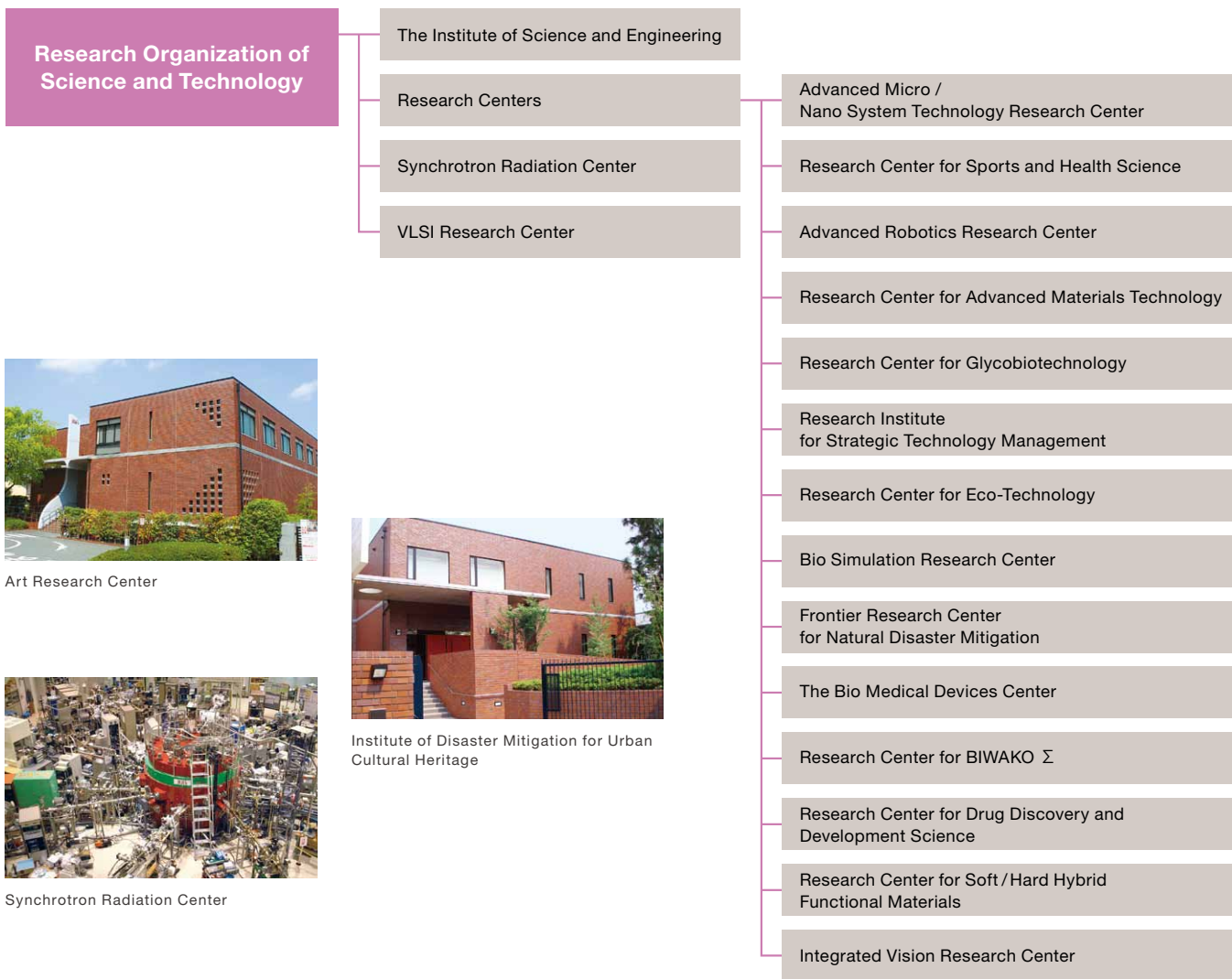
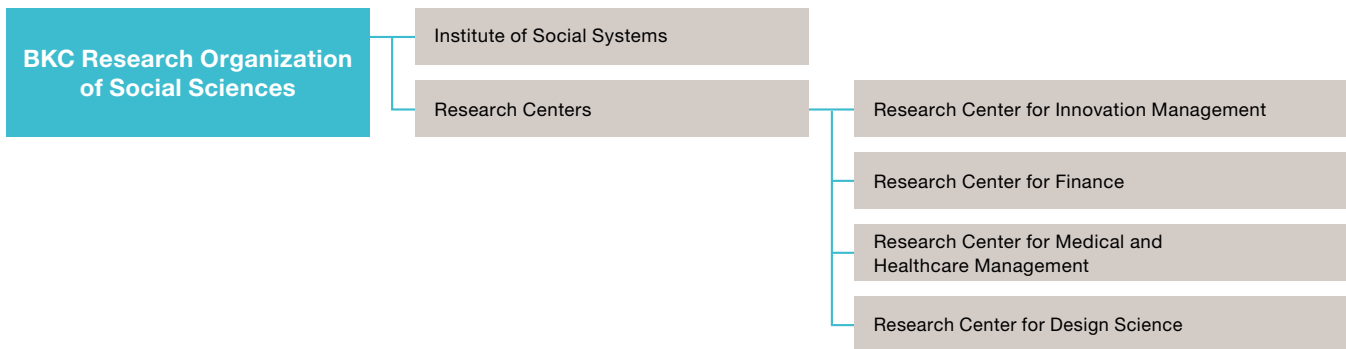


## Ritsumeikan Global Innovation Research Organization (R-GIRO)

R-GIRO is a research organization under the direct control of the University President, and was established in 2008 with the goal of “forming a research hub specifically for policy-driven research topics” and “strengthening the development of young researchers who will lead the next generation.” The organization’s goal is to contribute to the next generation of society by producing valuable research findings and actively disseminating them through the promotion of interdisciplinary research activity which aims to integrate the natural science fields with those in the humanities and social sciences toward the realization of a symbiotic society that the 21st century demands.

## Kinugasa Research Organization

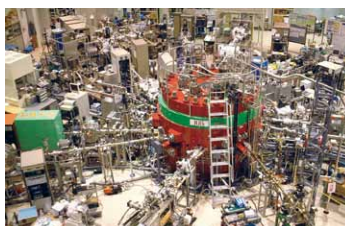
Kinugasa Research Organization was founded in 1998 and it supports research activity as a research organization which manages the research institutes and research centers. The organization’s goal is to contribute to human welfare and social progress under the four principles of “autonomy,” “democracy,” “openness,” and “peaceful use”.



Art Research Center



Institute of Disaster Mitigation for Urban Cultural Heritage



Synchrotron Radiation Center

### BKC Research Organization of Social Sciences

Research Organization of Social Science (BKC) was founded in 1998 in order to promote research activity in business-related fields, in conjunction with the relocation of the College of Economics and the College of Business Administration to BKC. Its goal is to advance research with greater social connectivity by promoting research which fuses economics, management and technology.

### Research Organization of Science and Technology

Research Organization of Science and Technology was established in 1994 as the Research Organization of Science and Engineering (changed to its present name in 2012) to contribute to the development of science and technology and local society. The organization's goal is to contribute to the development of science and technology and contribute to local society through joint research in industry-academia-government partnerships.

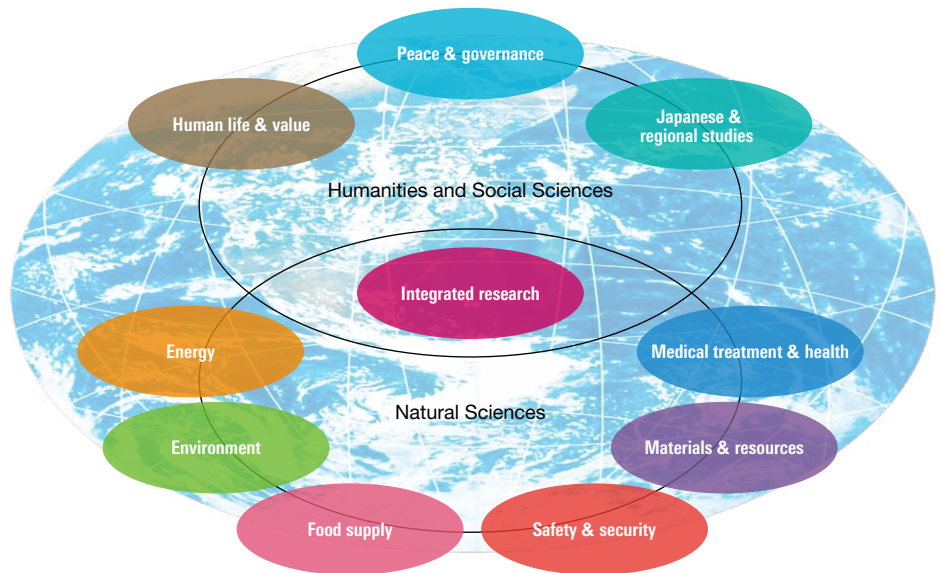
# Strengthening Policy-Driven Research

## Endeavors Related to R-GIRO Research Program (Specific Topics for Sustainable Society)

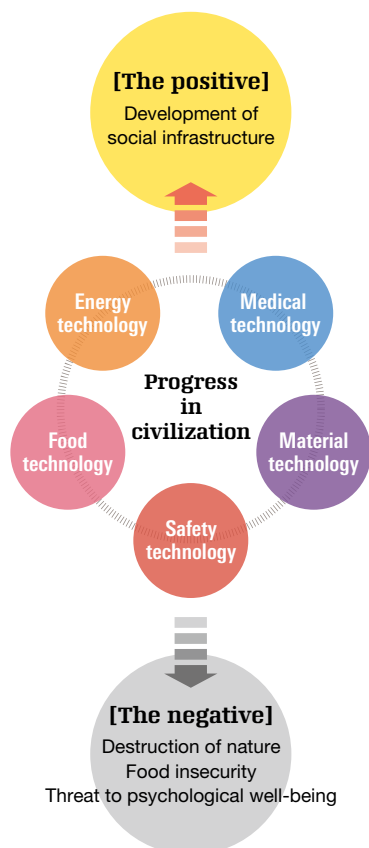
Ritsumeikan University aims to “create a sustainable, prosperous society,” and established Ritsumeikan Global Innovation Research Organization (henceforth, “R-GIRO”) in 2008 as a research organization to promote research in specialized research fields which Japan must urgently resolve. R-GIRO has defined policy-driven research areas and has developed the “Program for the First-Phase R-GIRO Research (Specific Topics for Sustainable Society)” in order to support the formation of distinctive research hubs, and 32

research projects (10 in the humanities and social sciences, 21 in the natural sciences and 1 in the interdisciplinary of humanities, social and natural sciences) are underway. Each project presents its research findings externally via symposiums and is engaged in the formation of research hubs. Also, focus is placed on developing young researchers who will lead the next generation, and young researchers such as post-doctoral fellows are developing research activities by participating in numerous projects.

Conquest of the important subject of the earth in the 21st century is challenged. Aim at construction of human ecology society.

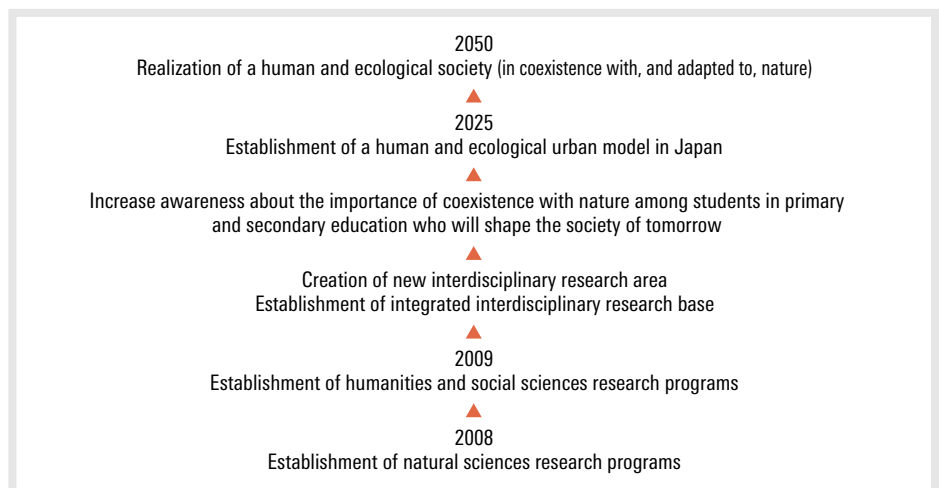


### 20th Century science and technology: The positive and the negative



### Duties of science and technology in the 21st century






Realization of a human and ecological society



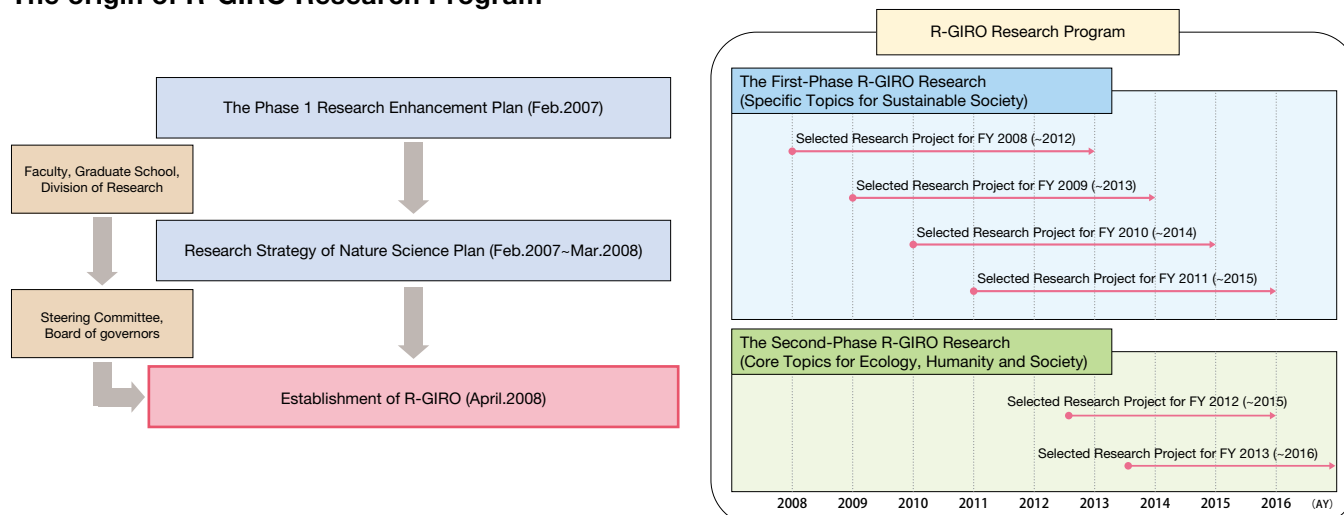
Phase 2 of R-GIRO, “Program for the Second-Phase R-GIRO Research (Core Topics for Ecology, Humanity and Society)” was initiated in FY2012. Phase 2 aims to create “unique trans-disciplinary research hubs” using the university’s strengths in cross-discipline and discipline integration in order to further accelerate progress towards R-GIRO’s principles and objectives with a foundation on

phase 1 achievements. As with phase 1, the program consists of ten research areas. There was a university-wide call for research projects in which unique trans-disciplinary research is possible, such as joint projects between the arts and sciences. Four research hubs (five projects) were selected for FY2012.

**List of Program for the Second-Phase R-GIRO Research Selected Research Project for FY2012**

Research Areas	Research projects	Leaders	Position	Department
Energy	Research Core for Energy Utilization based on Photovoltaics Technologies	 Takashi MINEMOTO	Associate Professor	Science & Engineering
Food supply	Research Core for Value-Added Industries of Agriculture and Fisheries	 Toyohiko MATSUBARA	Professor	Economic
Medical treatment & health	Research Core for Medical / Health Technology based on “Monozukuri”	 Satoshi KONISHI	Professor	Science & Engineering
	Research Core for Next Generation e-Health Integrated with IT Technology and Medicine	 Yen-wei CHEN	Professor	Information Science & Engineering
Human life & value	Research Core for Forensic Clinical Psychology	 Mitsuyuki INABA	Professor	Policy Science

**The origin of R-GIRO Research Program**





**(1) No. of Faculty and Research Scholars (as of May 1, 2012)**

(unit: person)

		Position	Suzaku Campus	Kinugasa Campus	Biwako-Kusatsu Campus	Total
Full-time	Sennin	Professor	24	273	273	570
		Associate Professor	6	109	92	207
	Fixed Term Teaching Staff	"Ninkisei" Professor	7	12	6	25
		"Ninkisei" Associate Professor	0	21	8	29
		"Ninkisei" Lecturer	0	7	12	19
		Assistant Professor	1	11	70	82
		"Tokubetsu Keiyaku" Professor	18	9	1	28
		"Tokubetsu Keiyaku" Associate Professor	1	3	0	4
		"Tokubetsu Ninryo" Professor	3	27	20	50
		"Tokumei" Professor	2	1	3	6
		"Tokubetsu Shohei" Professor	1	15	16	32
		"Tokubetsu Shohei" Associate Professor	0	4	3	7
"Shokutaku" Full-Time Lecturer	0	105	7	112		
Part-time	Visiting Professor	27	52	67	146	
	Visiting Associate Professor	1	0	0	1	
	Chair Professor	0	3	33	36	
	"Tokubetsu Shohei" Professor	0	5	15	20	
	"Tokubetsu Shohei" Associate Professor	0	1	0	1	
	Part-time Lecturer	20	591	302	913	
Research Scholar	Postdoctoral Fellow	0	24	60	84	
	Research Assistant	0	5	20	25	
	Research Associate	0	0	40	40	
Total			111	1,278	1,048	2,437

**● Suzaku Campus**

School of Law, Graduate School of Management, Graduate School of Public Policy

**● Kinugasa Campus**

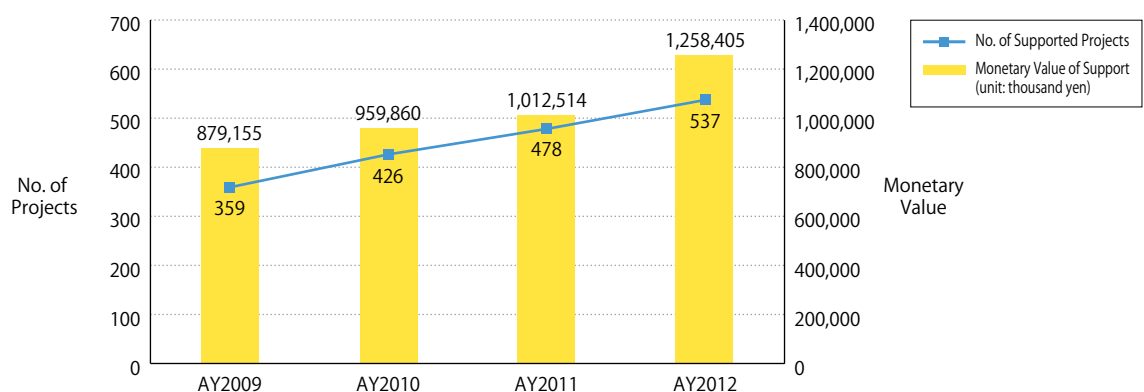
College of Law, College of Social Sciences, College of International Relations, College of Policy Science, College of Letters, College of Image Arts and Sciences, Graduate School of Science for Human Services, Graduate School of Core Ethics and Frontier Sciences, Graduate School of Language Education and Information Science, Ritsumeikan-Global Innovation Research Organization (Humanities and Social Sciences), Kinugasa Research Organization, Others

**● Biwako-Kusatsu Campus**

College of Economics, College of Business Administration, College of Sport and Health Science, College of Science and Engineering, College of Information Science and Engineering, College of Life Sciences, College of Pharmaceutical Sciences, Graduate School of Technology Management, Ritsumeikan Global Innovation Research Organization (Natural Sciences), Research Organization of Science and Technology, BKC Research Organization of Social Science

**(2) No. of Projects Supported by Grants-in-Aid for Scientific Research and Monetary Amount (Figures are for March 31 each year)**

	AY2009	AY2010	AY2011	AY2012
No. of Supported Projects	359	426	478	537
Monetary Value of Support (unit: thousand yen)	879,155	959,860	1,012,514	1,258,405

**(3) Year-on-year Comparison of the No. of Projects Selected for Grants-in-Aid for Scientific Research (Figures are as of the preliminary approval stage for the first grant of each year.)**

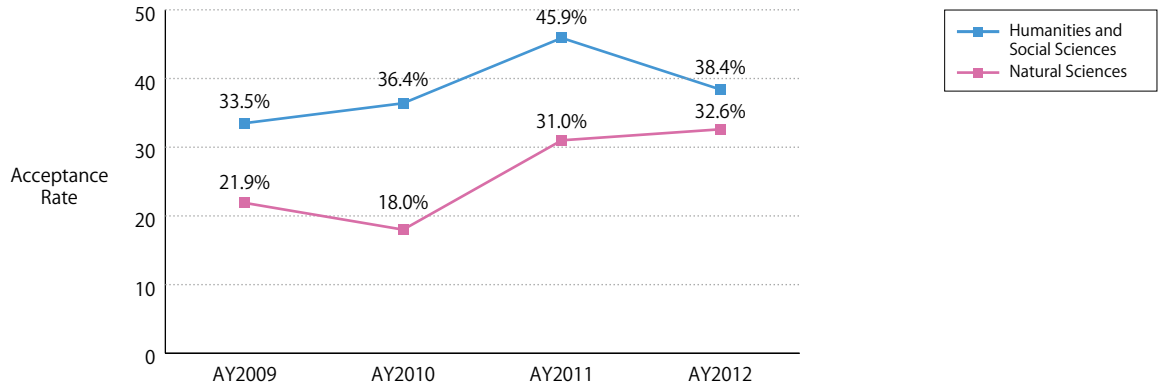
		AY2009	AY2010	AY2011	AY2012
No. of Applications		404	417	472	456
Grant awarded (for new projects)	No. of Projects	108	107	174	160
	Amount (unit: thousand yen)	278,740	290,720	465,800	454,220
Grant awarded (for continuing projects)	No. of Projects	175	234	237	297
	Amount (unit: thousand yen)	434,069	557,635	486,393	619,848
Total	No. of Projects	283	341	411	457
	Amount (unit: thousand yen)	712,809	848,355	952,193	1,074,068

**(4) Acceptance Rate of Applications for Grants-in-Aid for Scientific Research and Project-Faculty Ratio**  
(Figures are as of the preliminary approval stage for the first grant of each year.)

**① Changes in the Acceptance Rate for Grants-in-Aid for Scientific Research**

	AY2009			AY2010			AY2011			AY2012		
	Applications	Accepted Projects	Acceptance Rate	Applications	Accepted Projects	Acceptance Rate	Applications	Accepted Projects	Acceptance Rate	Applications	Accepted Projects	Acceptance Rate
Humanities and Social Sciences	167	56	33.5%	173	63	36.4%	185	85	45.9%	198	76	38.4%
Natural Sciences	237	52	21.9%	244	44	18.0%	287	89	31.0%	258	84	32.6%

Acceptance rate = the No. of accepted projects / the No. of applications x 100

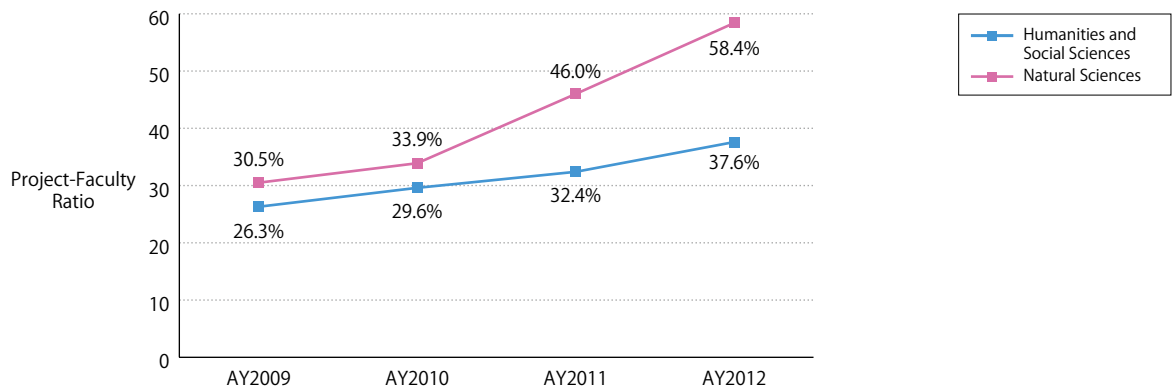


**② Changes in the Project-Faculty Ratio for Grants-in-Aid for Scientific Research**

	AY2009	AY2010	AY2011	AY2012
Humanities and Social Sciences	26.3%	29.6%	32.4%	37.6%
Natural Sciences	30.5%	33.9%	46.0%	58.4%

Project-Faculty Ratio = No. of accepted projects / No. of faculty x 100

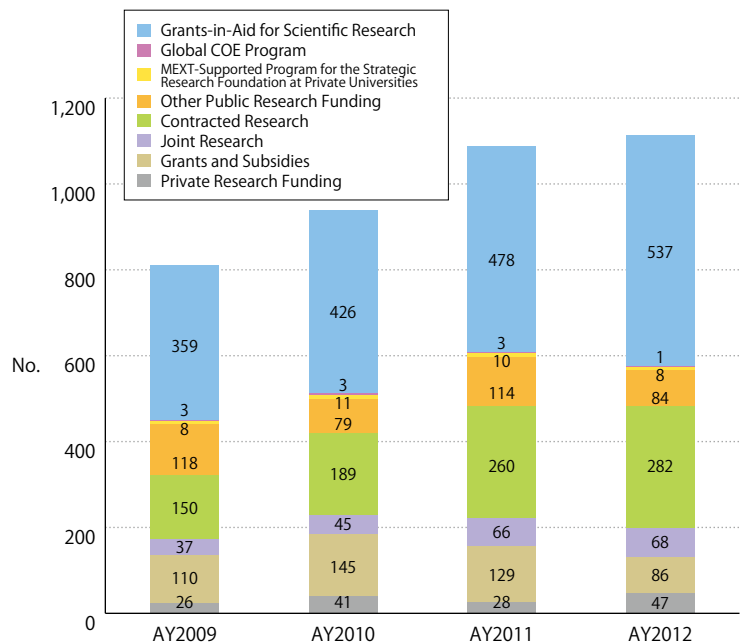
The Project-Faculty Ratio is calculated by dividing the No. of accepted projects by the No. of faculty at Ritsumeikan University.



**(5) External Research Funding**

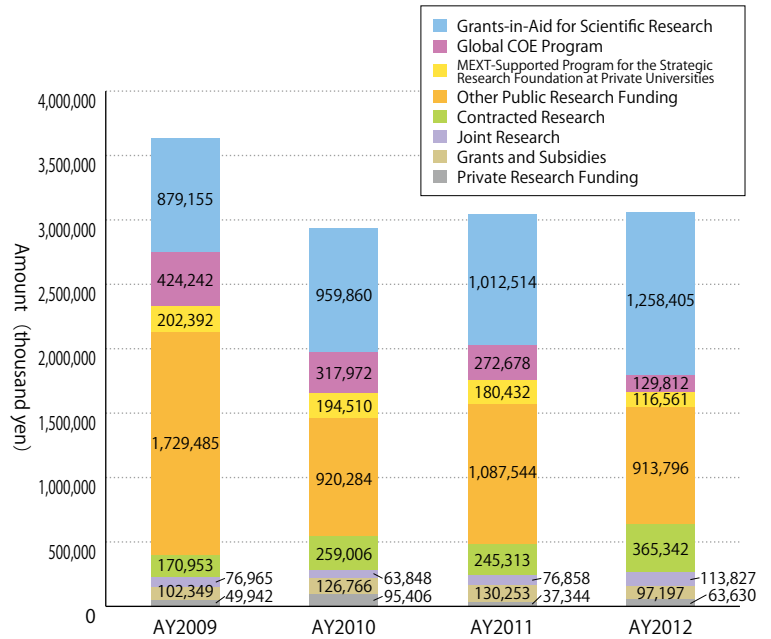
**① No. of Projects by Funding Source**

	AY2009	AY2010	AY2011	AY2012
Grants-in-Aid for Scientific Research	359	426	478	537
Global COE Program	3	3	3	1
MEXT-Supported Program for the Strategic Research Foundation at Private Universities	8	11	10	8
Other Public Research Funding	118	79	114	84
Contracted Research	150	189	260	282
Joint Research	37	45	66	68
Grants and Subsidies	110	145	129	86
Private Research Funding	26	41	28	47
<b>Total</b>	<b>811</b>	<b>939</b>	<b>1,088</b>	<b>1,113</b>



② Monetary Amount by Funding Source (unit: thousand yen)

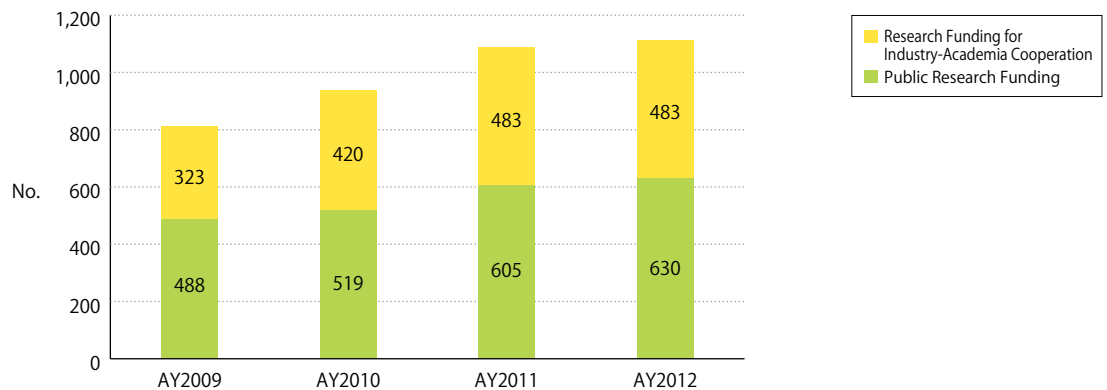
	AY2009	AY2010	AY2011	AY2012
Grants-in-Aid for Scientific Research	879,155	959,860	1,012,514	1,258,405
Global COE Program	424,242	317,972	272,678	129,812
MEXT-Supported Program for the Strategic Research Foundation at Private Universities	202,392	194,510	180,432	116,561
Other Public Research Funding	1,729,485	920,284	1,087,544	913,796
Contracted Research	170,953	259,006	245,313	365,342
Joint Research	76,965	63,848	76,858	113,827
Grants and Subsidies	102,349	126,766	130,253	97,197
Private Research Funding	49,942	95,406	37,344	63,630
<b>Total</b>	<b>3,635,483</b>	<b>2,937,652</b>	<b>3,042,936</b>	<b>3,058,570</b>



③ No. of Projects by Funding Source (research funding for industry-academia cooperation / public research funding) (No. of projects)

	AY2009	AY2010	AY2011	AY2012
Research Funding for Industry-Academia Cooperation	323	420	483	483
Public Research Funding	488	519	605	630
<b>Total</b>	<b>811</b>	<b>939</b>	<b>1,088</b>	<b>1,113</b>

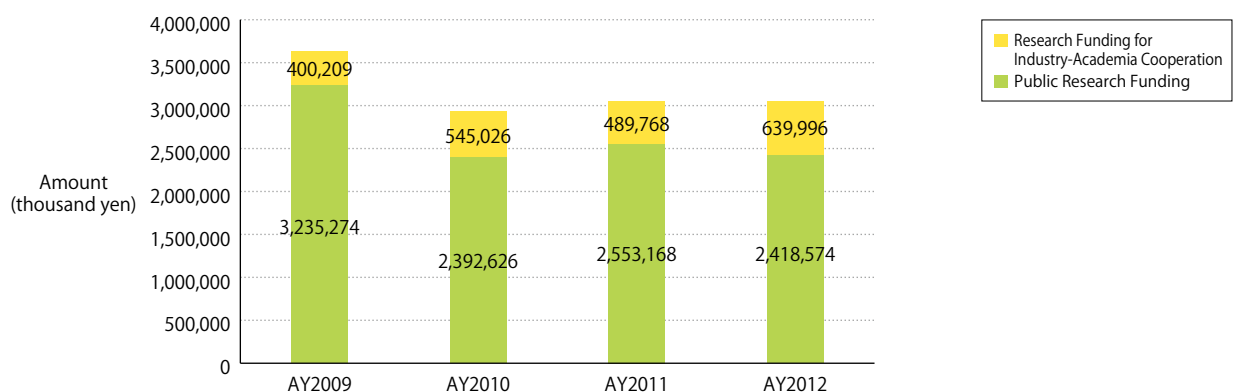
Research funding for industry-academia cooperation=contracted research, joint research, grants and subsidies, private funding subsidies  
 Public research funding=Grants-in-Aid for Scientific Research, Global COE Program, MEXT-Supported Program for the Strategic Research Foundation at Private Universities, other public research funding (government subsidies, contracted research, joint research, etc.)



④ Monetary Amount by Funding Source (research funding for industry-academia cooperation / public research funding) (unit: thousand yen)

	AY2009	AY2010	AY2011	AY2012
Research Funding for Industry-Academia Cooperation	400,209	545,026	489,768	639,996
Public Research Funding	3,235,274	2,392,626	2,553,168	2,418,574
<b>Total</b>	<b>3,635,483</b>	<b>2,937,652</b>	<b>3,042,936</b>	<b>3,058,570</b>

Research funding for industry-academia cooperation=contracted research, joint research, grants and subsidies, private funding subsidies  
 Public research funding=Grants-in-Aid for Scientific Research, Global COE Program, MEXT-Supported Program for the Strategic Research Foundation at Private Universities, other public research funding (government subsidies, contracted research, joint research, etc.)



### (6) No. of Applications / No. of Acceptance/Acceptance Rate / Amount of Advanced Research Programs at Ritsumeikan University (Basic Research) AY2012

	No. of Applications	No. of Acceptance	Acceptance Rate	Amount (unit: thousand yen)
Program to Support General Research Activities (Kiban-kenkyu)	114	47	41.2%	39,836
Program for Application of the Grants-in-Aid for Scientific Research (KAKENHI)	47	44	93.6%	25,996
Program for Research of Young Scientists (Wakate-kenkyu)	116	65	56.0%	40,250
Program for Post Doctoral Fellowship (for new projects)	63	12	19.0%	47,520
Program for Post Doctoral Fellowship (for continuing projects)	17	17	100.0%	67,320
Program for Promotion of Academic Publication	18	10	55.6%	9,751
Program for Promotion of International Research	97	58	59.8%	41,007

### (7) No. of Applications / No. of Acceptance / Acceptance Rate / Amount of Advanced Research Programs at Ritsumeikan University (Research Hubs) AY2012

	No. of Acceptance	Amount (unit: thousand yen)
Program for Research Institute Mission	32	34,896
Program for Core-to-Core Research	3	50,000
Program for the First-Phase R-GIRO Research (Specific Topics for Sustainable Society)	32	256,000
Program for the Second-Phase R-GIRO Research (Core Topics for Ecology, Humanity and Society)	5	12,133

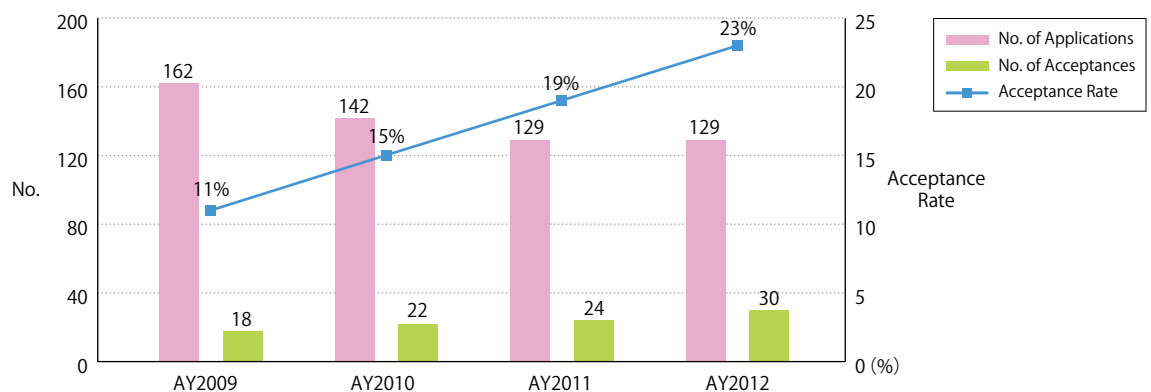
### (8) Other internal research grants AY2012

	No. of grants	Amount (unit: thousand yen)
Program for Overseas Travel Support	60	3,781
Operational Grant for Academic Conferences	28	1,951
Individual Research Allowance (Material Allowance)	1,082	260,737
Individual Research Allowance (Travel Allowance)	904	101,114

### (9) No. of Applications / No. of Acceptances / Acceptance Rate of Research Fellowships for Young Scientists

(unit: person)

	AY2009	AY2010	AY2011	AY2012
No. of Applications	162	142	129	129
No. of Acceptances	18	22	24	30
Acceptance Rate	11%	15%	19%	23%

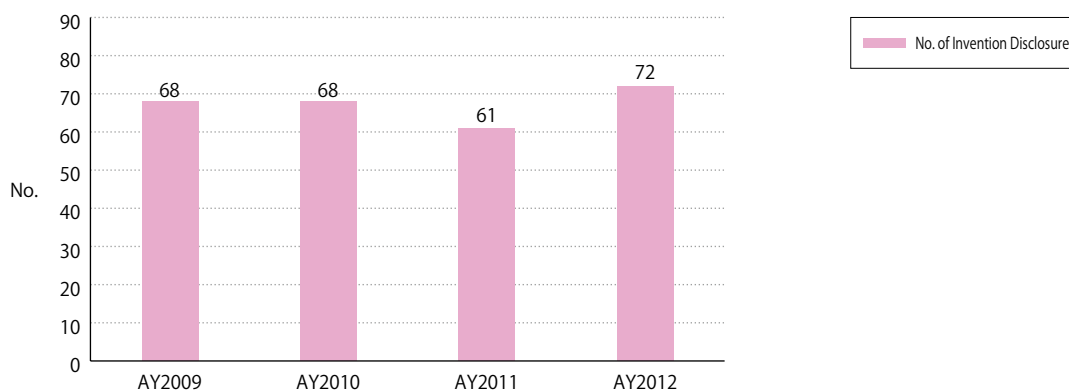


#### Research Fellowships for Young Scientists:

In view of the growing need to foster young researchers who will play an important role in future scientific research activities, JSPS provides a special program under which fellowships are granted to 1) young Japanese postdoctoral researchers who conduct research activities at Japanese universities or research institutions on a non-employment basis and to 2) graduate students who conduct research in Japanese university doctoral programs.

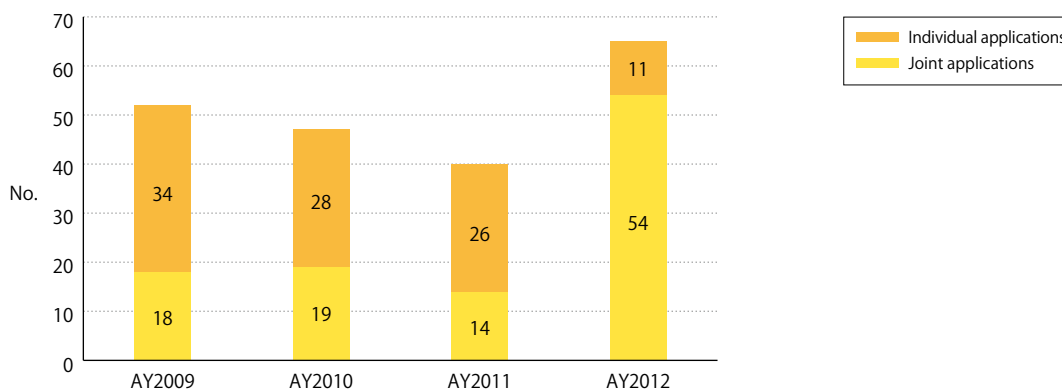
**(10) No. of Invention Disclosures**

	AY2009	AY2010	AY2011	AY2012
No. of Invention Disclosures	68	68	61	72



**(11) No. of Domestic Patent Applications**

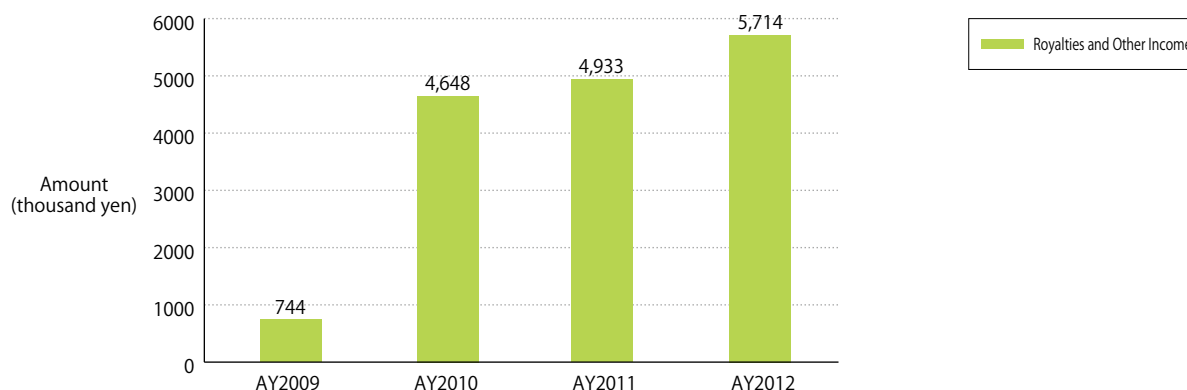
	AY2009	AY2010	AY2011	AY2012
Individual applications	18	19	14	54
Joint applications	34	28	26	11
Total	52	47	40	65



**(12) Royalties and Other Income**

(unit: thousand yen)

	AY2009	AY2010	AY2011	AY2012
Royalties and Other Income	744	4,648	4,933	5,714



Including patent, utility model right, design right, trademark right, copyright, plant breeder's rights, right of layout-designs of integrated circuit, know-how and materials.



Ritsumeikan University Annual Report on Research Activities 2012

December 2013 Published by the Division of Research

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