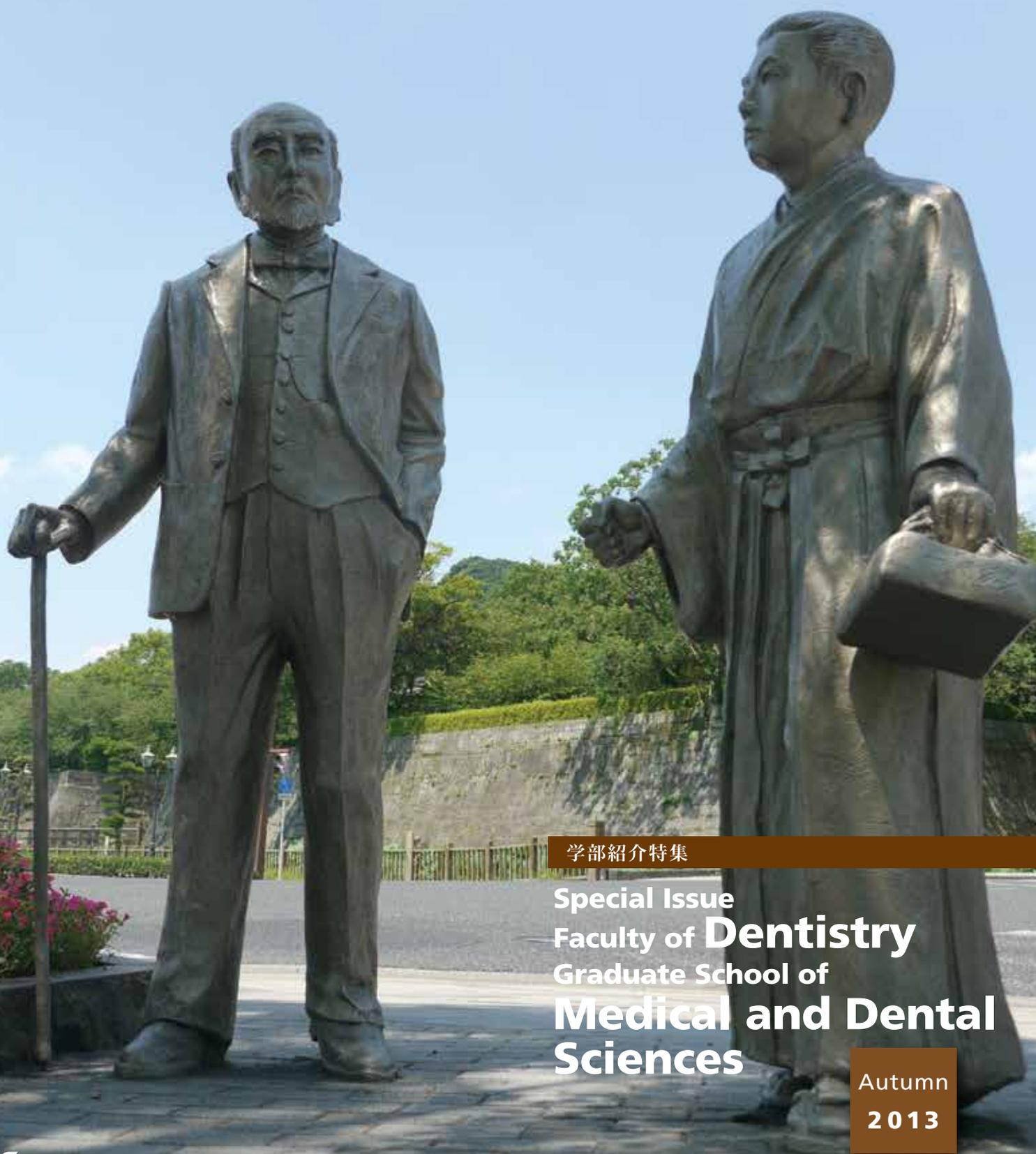


# KU Today

KAGOSHIMA UNIVERSITY NEWSLETTER



学部紹介特集

Special Issue  
Faculty of **Dentistry**  
Graduate School of  
**Medical and Dental  
Sciences**

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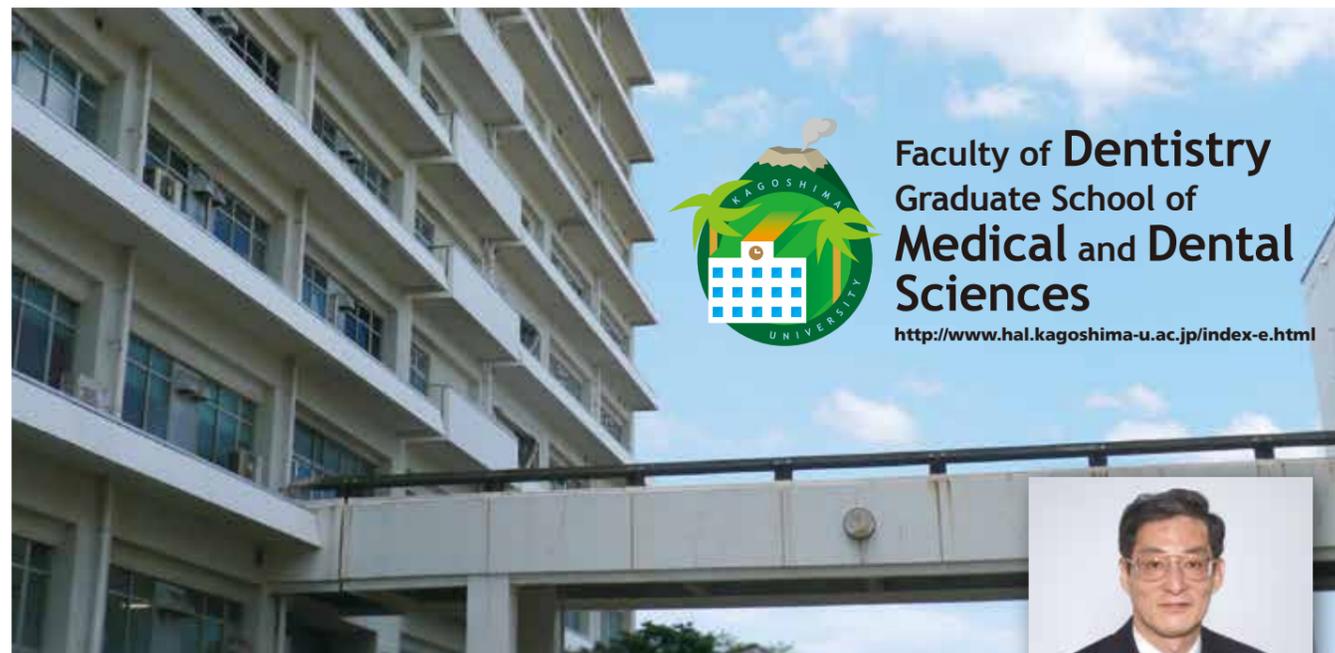
KUToday is a biannual publication to present information about Kagoshima University to a wider international audience. Each edition will feature one faculty for prospective overseas students as well as other topics such as educational programmes, research and alumni information. Some articles are translations from the Japanese-language publication, Kadai Journal, upon which KUToday is loosely based. Any comments or suggestions about KUToday will be warmly received.

PDF files on KUToday can be downloaded from  
<http://kokusai.kuas.kagoshima-u.ac.jp/kucip/>

A Note on Names  
Following convention East Asian names appearing in KU Today are written family name followed by given name.

CONTENTS

	SPECIAL ISSUE <b>FACULTY OF DENTISTRY &amp; GRADUATE SCHOOL OF MEDICAL AND DENTAL SCIENCES</b>	1
	CAMPUS WALK AROUND <b>CENTRE FOR MARINE RESOURCES AND ENVIRONMENT</b>	9
	DISCOVER KU <b>DR. FUJIEDA AND STUDY OF MARINE DEBRIS</b>	10
	EXTRACURRICULAR ACTIVITY <b>KU WALK-CAMP CLUB</b> <i>Uchida Shunki, BSc student, Faculty of Engineering</i>	12
	INTERNATIONAL COMMUNITY <b>NUMBER OF INTERNATIONAL STUDENTS AND ACADEMIC EXCHANGE UNIVERSITIES</b>	13
	INTERNATIONAL PROGRAMME <b>CONNECTING SOCIETY AND THE WORLD THROUGH VIDEO PRODUCTION</b>	14
	<b>FACES AND SNAPSHOTS</b>	16
	EXPLORING KAGOSHIMA <b>SATSUMA BIWA AND STORYTELLING</b> <i>Nakatani Sumie, Associate Professor, International Planning Centre</i>	18



**Faculty of Dentistry  
Graduate School of  
Medical and Dental  
Sciences**

<http://www.hal.kagoshima-u.ac.jp/index-e.html>



SHIMADA, Kazuyuki, Dean

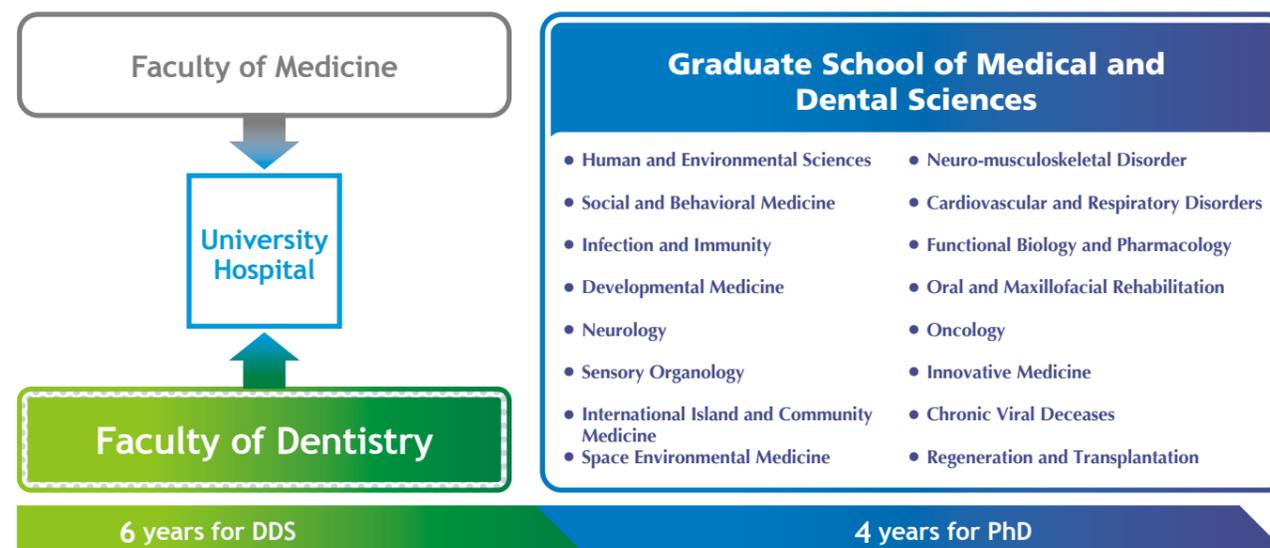
## BEFORE BEING A GOOD DENTAL PROFESSIONAL, BE A GOOD INDIVIDUAL.

The Faculty of Dentistry was established in 1977. Its motto is to embody an ideal human being who has deep insight and understanding of humanity. Our faculty is committed to producing outstanding dental surgeons, who can provide holistic dental care and services to their community as well as be capable dental educators and researchers who are fully equipped with a broad and complete knowledge and are able to maintain the highest standards of scientific creativity.

Our curriculum is a 6 year programme, designed to foster qualified dentists who can make examinations and treatments of oral problems or diseases. In their first year, students acquire a broader knowledge and

understanding on the general education course. From the second year, studies on basic medicine such as anatomy, physiology and biochemistry are started. Then, internal medicine, external medicine, and specialized subjects for dentistry are studied. The fourth and fifth year students have practical training in the university hospital. Each grade has integrated lectures of basic medicine and clinical medicine. One of distinctive classes in our faculty is our dentistry training programme in the remote islands of Kagoshima.

We welcome students from all over the world to develop human resources that promote oral health at the global level.





## Distinctive education - remote island dentistry training programme

NAKAMURA, Norifumi, professor,  
Graduate School of Medical and Dental sciences



One of the goals of Kagoshima University Faculty of Dentistry is to eliminate the problem of the lack of dentists in Southern Kyūshū, with the aim to meet the demand for dentists and oral surgeons set by the Dental Associations of Kagoshima, Miyazaki and Okinawa. Kagoshima Prefecture has 28 populated islands, with the greatest number of remote island inhabitants in the country, and accounting for 10.7% of Kagoshima's total population. And so for over 30 years, the faculty has been working on remote islands

without dentists and has made a great contribution to the oral health of the local population, as well as raising public awareness about the issue.

In 2007, the remote island dentistry training programme was started, using Kagoshima's remote islands and back country as a model. Currently, considering the problem in Japan of a surplus of dentists in the cities but a serious lack in the countryside, the programme is aspiring to contribute to the nurturing of dentistry professionals in remote islands and areas both home and abroad.

Students in their fifth or sixth years take part in the training programme in which they together with university dentists, dental interns, Kagoshima Dental Association dental hygienists and training instructors visit remote islands for providing dental care. The travelling clinics by the dental professionals are set twelve times a year. So far only 3-4 students could have joined in each tour. However there is a plan in motion that will allow all students to participate in these dentistry tours as of 2014.

In remote islands the dentistry practice is held in a local community centre which lacks medical facilities. The students learn how to build dental apparatuses and assist doctors in making denture adjustments, carrying tooth decay repairs and giving oral hygiene instruction. They can have an experience which they would never be able to in the classroom. After returning to university the students are encouraged to inform others what they have experienced



and discuss the problems related to dentistry in remote areas and ways to improve this in the future.

### Student programme report from summer 2012

Uemura Kyōko, 6th year DSS student

I travelled to Suwanosejima, one of the islands in the Toshima chain and a 10 hour ferry trip from Kagoshima. At the heart of Suwanosejima is the active volcano, Ōtake, and its population of nearly 60 people live surrounded by beautiful forests. The trip was for three days, with the first day on the ferry, the real training starting from the second morning. The dental check-ups were held in a town hall and in a travelling clinic bus. In the hall, led by the dental hygienist, we set up the portable chair-bed, engine and lights. The facilities were insufficient if compared to a normal hospital with all its equipment and ample lighting. Anyone could not say that it was the perfect environment for medical treatment. However, at that time as I watched the devotion the teacher displayed when attending to patients complaints, I realized the splendor of these remote island clinics. Amongst the local population we did not see any great dental problems and the state of their overall oral health was relatively good. However, we did find many dental caries/cavities amongst the children, one was even bad enough to recommend that they come to the university hospital at a later date for treatment. Together with the dental hygienist we taught the children about the use of coloured dye to identify dental plaque as well as better brushing techniques. Teaching the children how to use dental floss allowed them to take control of their own oral health. We told them it was alright to take the floss home with them and they cheerfully thanked us, even though we were just giving them instructions on how to clean their teeth, we also had a very good time. For allowing me to have the opportunity to observe the clinic and interact with the community, I express my deepest gratitude to the island inhabitants. In the future, I hope this unique programme will continue to contribute to the training of highly-motivated dentists and together with the social mission of the Faculty of Dentistry, will produce talented people who will work to correct inequalities in access to health-care throughout the globe.



### Student Voice

Fanchiang Hungyun (Taiwan)  
DDS Student

Since I was a child, I always had a question about tooth decay. I don't know why, but no matter I was the one who brushed his teeth the hardest, I always got the most caries out of me, my brother and sister. And that's also when I became interested in dentistry. I'm now studying dentistry. I have solved the problems that had plagued me for a long time. And the reason I choose this university is because I've never seen a school treat international students as friendly as this one. If you still have not decided which university you want to go to yet. Trust me Kagoshima University is your best choice and you will never regret it.

Lee Ji-yeong (Korea)  
DDS Student

I am originally from Seoul and am currently a 6th year student in the Faculty of Dentistry. To be honest, I didn't even know where Kagoshima was until I booked the ticket to come and do the entrance exam. So I started my studies here, not knowing anyone in Japan nor anything about Kagoshima! But now I am completely used to life here and am even considering staying on for an extra year of training at the university once I have graduated. Kagoshima has many good points – its rich natural environment of beautiful seas and the active volcano of Sakurajima, delicious food and welcoming people. When I do go home to Korea, I am sure I will definitely miss Kagoshima where I have spent more half of the past ten years in what has become my second home.

Jung Young-jae (Korea)  
DDS Student

I came to Japan when I was in the 8th grade and attended Fukuoka International School. So when I decided to come to Kagoshima for college, to be honest, I really did not want to leave Fukuoka. However, it did not take me long to fall in love with Kagoshima, for its great onsen, delicious food, shōchū, and of course the active volcano of Sakurajima. It is my 5th year in Kagoshima University and I feel that I am very blessed with great teachers and great classmates. It may sound clichéd, but I really do think that it has been a privilege for me to study dentistry in Kagoshima University.



Seong Chang-keon (Korea)  
DDS student

Before I talk about my college life, which I enjoy a lot, I want to talk about the city of Kagoshima a little. Well, I can guarantee that Kagoshima has the best environment for studying! Taking the bus after you arrive at the airport, you can see nothing but mountains fully covered in green trees. There is not only fresh air, but you can also enjoy fishing or travelling to the island of Sakurajima, the active volcano that is constantly spewing out steam and ash. You will soon get used to a slow life in Kagoshima. My personal interest is oral cancer. It has an attack rate which is quite high compared with other cancers, but we still haven't found the main factor behind oral cancer. Dental surgery requires not only skill with the scalpel but considerable expertise of the entire body. So far, what I have learnt is quite basic but essential, although I am sure that there are many things that I can learn from professors who have operated on oral cancer for many years.

Seong Chang-hwan (Korea)  
DDS Student

It's been two and a half years since I left high school and came to Kagoshima. When I was living in Korea, I had no idea what life overseas would be like, and I can tell you that something new and interesting happens almost everyday. It did take a while to get used to everything when I first arrived, whether it was seeing a volcano erupt for the first time in my life, speaking Japanese with my Japanese friends, the hot and humid Kagoshima weather, or the trams that run up and down the roads in Kagoshima. But, gradually and without realising it, I seem to have picked up a lot of Japanese culture while living in Kagoshima, something which I noticed when I went back to Korea during the holidays. In fact, my parents were happy that I had started to be a little more considerate to those around me like Japanese people tend to be. I am currently training to be a dentist. I haven't decided yet whether I will stay in Japan or return to Korea once I graduate, but I hope that I will be able to contribute to both countries. Before that, I have to get ready for the exams that start tomorrow!!



## Education and Research Centre for Advanced Oral Science and its work

NOGUCHI, Kazuyuki, professor  
Head of the Education and Research Centre for Advanced Oral Science  
Graduate School of Medical and Dental Science



The 2012 Dentistry Graduate Students Research Conference

In an ageing society, maintaining oral health and protecting the ability to enjoy food as well as promoting the whole body health and improving the quality of life (QOL) has become increasingly important. The Education and Research Centre for Advanced Oral Science was established in 2008 at the Graduate School of Medical and Dental Sciences in Kagoshima University as well as the faculties of dentistry of six other national universities: Niigata, Okayama, Hiroshima, Tokushima, Kyushu and Nagasaki as part of the Ministry of Education's Special Education and Research Spending Project called 'Researching the oral health and QOL through the dentistry cooperation network'. Its aim is improving the QOL of the oral cavity as well as promoting joint research and inter-university cooperation, advancing graduate research, human resource development and increase international competitiveness. It is centred around the cooperation between the dentistry faculties and teaching staff and managed accordingly.

To pursue these ends, the following procedures have been established:

1. Promotion of collaborative research for oral health and improved QOL.
2. Support for graduate students and young researchers in the field of advanced oral science.
3. Acquiring funds to form a hub for an educational research basis.
4. Financial support for graduate students and young researchers.
5. Cooperation with undergraduate education.

After the closing of the project last year, the centre's work has continued. Among the achievements worth mentioning in the centre's 5-year existence is the establishing and management of the Dentistry Graduate Students Research Conference. The participants are young researchers aged 37 or younger as well as graduate students and presenters are selected after passing a preliminary screening based on paper abstract reviews. Furthermore, after all abstracts are reviewed, the exceptional ones are given public acknowledgement and allocated monetary grants. For the purpose of training gifted students there is also the International Advanced Dental Research and Education Network to which students are sent after being selected through cooperation of universities across the country. The organization of the conference improves year by year and last year there were also undergraduate students' presentations: including the number of undergraduates the event has grown to include about 150 participants. After the presentations are over, an award ceremony takes place followed by a social gathering where graduate students and teaching staff can deepen their friendship and cooperation.

The recent trends show a decreasing number of students entering graduate research. To maintain the numbers of the graduate students events such as in-faculty briefings on graduate research in dentistry and the introduction of the scientific activities in the various fields of dental science are organized. In order to train and assist the young researchers and dental physicians who will continue developing dentistry education, research and clinical pathology, the centre functions as place where efficient research activities can be developed and these are hoped to be widely used in devising new ones in the future.



Lunch meeting with participants of the conference

## The Department of International Island and Community Medicine

TAKEZAKI, Toshiro, professor  
Graduate School of Medical and Dental Sciences

The department was established in 2002 to conduct education and field research on community medicine and disease prevention in island regions such as Kagoshima Prefecture which has 28 inhabited islands and the largest island population in Japan.

Education into community medicine has recently been increasing in importance, because of the decreasing number of doctors in remote regions and the increasing proportion of elderly people in Japan. Primary medical care is an important concept and tool for community medicine and is especially essential in remote and island regions. Our department gives lectures on community medicine to all medical students, and manages practice at clinics and hospitals in remote island areas, which provide an ideal model to learn community medicine and primary medical care.

The importance of the prevention of lifestyle-related diseases, i.e. non-communicable diseases (NCD), is also increasing. As medical resources are limited on the outer-lying islands, this prevention should have an even higher priority there. Our department has been conducting a genome-cohort study in five areas in the Amami islands in Kagoshima since 2005. Over 5,000 subjects were recruited from the general population who attended the local government's health check-up programme. The baseline survey data, all collected with the consent of the subject, consisted of a questionnaire, blood samples, and examination of arterial stiffness using CAVI. The same subjects were asked to participate in a second survey five years later at another routine check-up. A further 2,500 people were asked to take part in three cities on the



JICA Training course closing ceremony

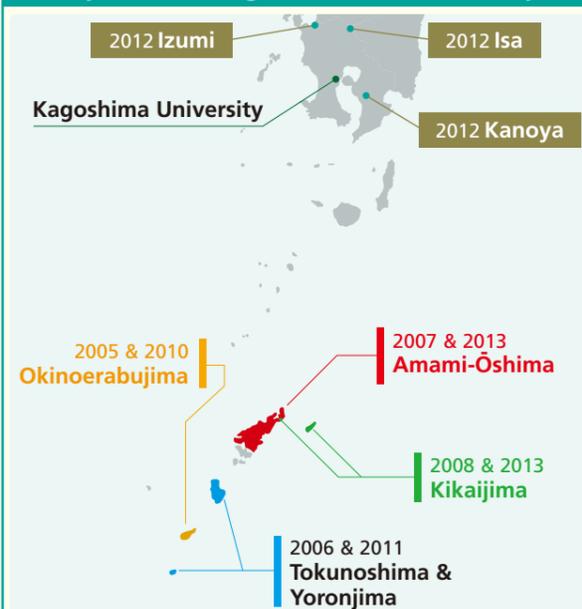
Kagoshima mainland to compare the data between the island and mainland areas. This research is a part of a Japan Multi-Institutional Collaborative Cohort Study (J-MICC study), which focuses on cancer prevention.

This study found that the proportion of atherosclerosis is relatively lower in the population of Amami islands than amongst the Kagoshima mainlanders and other Japanese. It is revealed that Amami population in total have a higher life expectancy, but male population has shorter longevity than those in mainland. Various factors such as natural and social environments, lifestyles, and access to medical services, and chronological changes of these factors, affect longevity, and it is still difficult to explain the reasons for higher proportion of longevity amongst the population in Amami, although atherosclerosis may be one important factor. We are following up the study subjects to clarify its reasons in our long-term cohort study of Amami. It is expected that the study in Amami islands will bring fruitful findings for lifestyle-related diseases and cancer as a representative genome-cohort study in Japan.

The increasing trend of NCDs is also becoming a new burden in low-income developing countries, such as those in the Pacific. Their medical resources are poor, and human resources on NCD prevention are also limited. Our department has been managing the human resource development training course of JICA to invite participants in public health from Asian and Pacific Ocean countries since 2008. We conduct a 4-week course with lectures, practice and field visits to the island of Amami-Ōshima, where participants can learn health promotion activities of local residents. Afterwards, they make action plans to apply in their own countries. We also conduct follow-up visits with mini-workshops and to look into their activities in each country once a year after they returned, supported by JICA.

Islands are the main fields for our education and research and they are also places where our activities for regional and international cooperation are made.

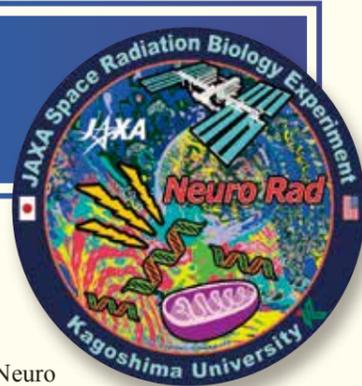
### Study areas for genome-cohort study





## Space Environmental Medicine

MAJIMA, Hideyuki J, professor  
Graduate School of Medical and Dental Sciences



Neuro Rad research team at NASA

Station (JEM). Now the property of cells can be characterized in our department after the space travel. The project name is Neuro Rad in JAXA and NASA. The aim of the project is to explore the effects of space radiation on human neuron cells, which is to elucidate the effects for a long-term human space mission.

Another project, the Hair Project is now being conducted together with former female Japanese astronaut, Dr. Mukai Chiaki. It is now going on to examine the effects of space on human health.

On a lighter note, we have a unique project in which yeast is sent up to the space station for 16 days and then when returned to earth is used to make space shōchū, Kagoshima's local spirits. This project has less of a scientific purpose but rather more for the fun of Kagoshima, Japan's space prefecture.



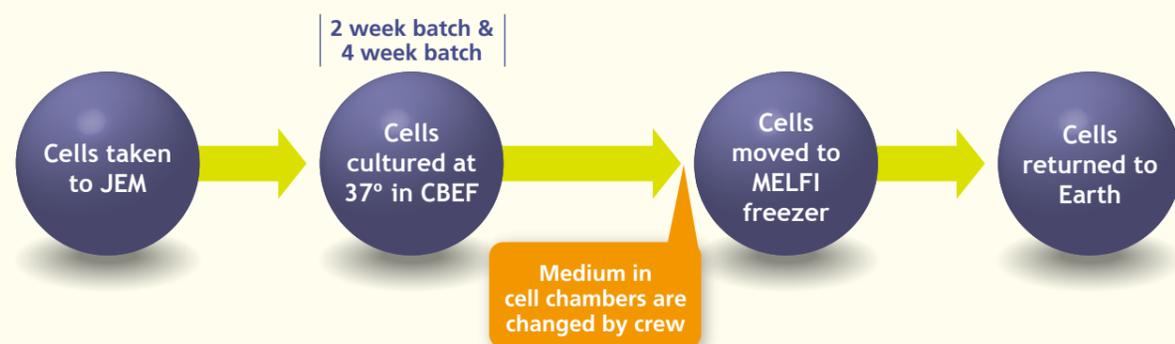
Hair Project presentation at the symposium of International Academy of Astronautics 2013

The Department of Space Environmental Medicine is a unique cooperative department based on an agreement between Kagoshima University and Japan Aerospace Exploration Agency (JAXA). Started in 2003, it is part of the Health Research Course in the Graduate School of Medical and Dental Sciences and one of the university's more distinctive programmes. Kagoshima University and JAXA have another collaborative entity, the Department of Astronomy and Space Science in Faculty of Science and classes are shared across both.

Kagoshima Prefecture is home to Japan's only two space centres, Tanegashima Space Centre (TNSC) and Uchinoura Space Centre (USC), making it the closest part of Japan to space. The H-II Transfer Vehicle, a shuttle for transporting payloads to the International Space Station (ISS) launches from Tanegashima on the H-II rocket.

As part of our research, we sent human neuron cells to the Japan Experimental Module of the International Space

### Space flight time course for the Neuro Rad Experiment



CBEF - Cell Biology Experiment Facility  
MELFI - Minus Eighty Degree Celsius Laboratory Freezer in the ISS

Neuro Rad Project : [http://iss.jaxa.jp/en/kiboexp/news/neuro\\_end.html](http://iss.jaxa.jp/en/kiboexp/news/neuro_end.html)  
[http://www.nasa.gov/mission\\_pages/station/research/experiments/641.html](http://www.nasa.gov/mission_pages/station/research/experiments/641.html)

Hair Project : <http://ci.nii.ac.jp/naid/130002136795>

## Centre for Chronic Viral Diseases

ARIMA, Naomichi, professor  
Graduate School of Medical and Dental Sciences



Established in 1993, the centre has just celebrated its 20th anniversary this May. The center is formed by four research units, each conducts unique researches and occupies a floor of four story new building. At the top floor there is a research unit of antiviral chemotherapy led by Professor Baba Masanori. Next is a research unit of persistent and monogenic viruses currently recruiting a professor. The unit of molecular pathology research led by Professor Izumo Shūji is located at the first floor, and finally at the ground floor there is a research unit of haematology and immunology led by Professor Arima Naomichi.

The antiviral research unit of Professor Baba mainly focuses on the development of antiviral treatments against HIV and HVC. They have achieved especially good results with HIV antiviral compounds and this year, for the discovery of the CCR5 antagonist drug as well as for his overall contribution to the field, Professor Baba was awarded the Gertrude Elion Memorial Lecture Award from the International Society for Antiviral Research, the first Asian researcher to do so. His research unit is also discovering many other antiviral compounds. The P3 laboratory has now been equipped for the study of diseases other than HIV.

The research unit of persistent and monogenic viruses accumulated a lot of data from its previous professor's research into herpes viruses. However, recently it has been expanding their investigations into other areas, such as the study of the human papillomavirus and carcinogenesis, looking into the interactions between HIV tat proteins or HTLV-1 Tax proteins with phospholipid scramblase and the search for anti-ATL cellular compounds.

Professor Izumo's research unit has, for many years, been studying the pathological clarification of HTLV-1-associated Neurological Disease (HAM: HTLV-1 associated myelopathy) and the development of its therapeutic medication, fields in which they lead the world



Prof. Baba at the P3 laboratory



PhD student from Nigeria

based on the clinical examinations in Kagoshima with a high rate of HAM sufferers. They are also studying the pathology of HIV-associated dementia and have even received high acclaim for their research into finding a cure.

Using clinical experience at the university hospital, the research unit of Professor Arima conducts pathological research as well as the development for new treatments of HTLV-1 related haematopoietic tumors, known as ATL (adult T cell leukemia/lymphoma), which has a high rate of occurrence in Kagoshima. They are obtaining good results through the development of new antibody therapies and of new antitumor medication produced from natural substances and developmental research into vaccine therapies.

The centre's most distinguishing feature over the last 20 years has been the active expansion of the unique research within the above mentioned fields, while at the same time continuing with interlaboratory cooperation and complimentary research. They regularly hold in-depth joint conferences to advance their practical collaborative research projects. One of the interunit collaborative projects further developed into an interdisciplinary research. The center has embarked on a five-year collaborative project, funded by MEXT, with three departments of engineering at the university. The theme of this collaborative research is 'Addressing chronic viral diseases through the cooperation among medicine, science, and technology, with the basic goal of producing advanced prevention techniques and medical treatments - Facing the frequent occurrences in Kagoshima Prefecture of ATL, HAM as well as AIDS and viral hepatitis'.

The centre also has many postgraduate students, research students and research workers from overseas studying alongside the many Japanese masters' students working within. Everyday these young minds meet in the conference room or laboratories for vigorous discussion and experimentations. Together with these young people, our centre, through its research, will continue to contribute to the good of the local area, Japan as a whole and the entire international community.

## International Joint Research in the Graduate School of Medical and Dental Sciences (April 2013)

Medical &amp; Dental Sciences

Principal Researchers	Titles of International Joint Research	Counterpart Institutes
FURUKAWA, Tatsuhiko Molecular Oncology	Study about drug transportation by ABC transporters.	St. John's University, USA
	Study about the mechanisms of copper transporter ATP7A, ATP7B mediated drug resistance.	School of Biological and Chemical Sciences, Deakin University, Australia
YONEZAWA, Suguru Human Pathology	Influence of mucin expression control to transformation of pancreatic cancer cells	University of Nebraska Medical Center, USA
	Identification of mucin antigens commonly related with risk factors of human adenocarcinomas	
GOTO, Masamichi Human Pathology	Research on the treatment effect of Buruli ulcer	St George's Hospital Medical School, UK and Komfo Anokye Teaching Hospital, Ghana.
KANEKURA, Takuro Dermatology	The role and mechanism of CD40 ligand escaping from X chromosome inactivation in systemic sclerosis	Xiangya Hospital, Central South University, China
	The role of Basigin/CD147 in development, differentiation, and oncogenesis in the skin.	
MAJIMA, Hideyuki J. Space Environmental Medicine	Cell injury studies in long-term space environment	NASA, and College of Medicine, University of Kentucky, USA
	Studies of apoptosis induced by mitochondrial reactive oxygen species	College of Medicine, University of Kentucky, USA and College of Medicine, National Chang Gung University, Taiwan
KAMEYAMA, Masaki Neuroanatomy	Novel mechanisms of regulation of Ca <sup>2+</sup> channels	China Medical University, China
	Linkage between metabolism and Ca <sup>2+</sup> channel activity	College of Medicine, University of Ulsan, Korea
	Regulation of expression of Ca <sup>2+</sup> channels in nervous system	China Medical University, China
ARITA, Kazunori Neurosurgery	Organization of Asian network for the management of neurosurgical disease.	Diponegoro University, Indonesia
KUWAKI, Tomoyuki Physiology	Physiological functions of orexin	University of Texas, USA
INUI, Akio Psychosomatic Internal Medicine	Feeding-regulatory peptides and development of genetically modified mice	Garvan Institute of Medical Research, Australia and National Cheng Kung University, Taiwan.
	Gene therapy to obesity and cachexia	Garvan Institute of Medical Research, Australia
	Role of feeding-regulatory peptides in obesity and cachexia	University of Cagliari, Italy, Rouen University, France, and National Cheng Kung University, Taiwan
AKIBA, Suminori Epidemiology and Preventive Medicine	Epidemiological study of cancer risk in high radon areas of China	National Institute of Radiological Protection, CDC, China
	The Japan-US collaborative study of risk factors for EBV-associated gastric cancer	National Cancer Institute, USA
	Japan-Vietnam collaborative study of risk factors for EBV-associated gastric cancer	Hanoi Medical University, Vietnam
IZUMO, Shūji Molecular Pathology	Neuropathologic analysis of Neuro AIDS	Institute of Neurology, Medical University of Vienna, Austria
	Immunopathogenesis of HAM/TSP	National Institute of Neurological Disorders and Stroke, National Institutes of Health, USA
HASUI, Kazuhisa Human Pathology	Academic project of oncogenic factors in malignant tumors and the related diseases in northeast China	School of Basic Medicine, China Medical University, China
MATSUGUCHI, Tetsuya Oral Biochemistry	Gene mapping of Monodelphis in Australia.	University of Tasmania, Australia
	The physiological significance of hepatocyte growth factor (HGF) bound on hematopoietic cells	Johns Hopkins University, USA
	The cDNA analysis, expression of recombinant protein, and antibody preparation of fetuin protein of Monodelphis in Australia	University of Melbourne, Australia

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## Education and Research Centre for Marine Resources and Environment Azuma-chō Station

### Education and Research Base Contributing to the Environmental Conservation of the Yatsushiro Sea

Azuma-chō Station, a field office of the Education and Research Centre for Marine Resource and Environment, is located in the town of Nagashima, previously known as Azuma. It uses the facilities of its predecessor, the Faculty of Fisheries Laboratory and sets the Yatsushiro Sea as a stage for their education and research base. The centre was established in 2000 with the aim of providing support for the Faculty of Fisheries' education and research, practical training and field work, as well as being able to contribute to companies working to address the various problems in coastal areas.

Azuma-chō station is equipped with laboratory facilities, a dormitory, small water craft, breeding tanks and other such facilities that are used for long term investigations and practical training. During 2012, a total of 1100 people used the station. The Faculty of Fisheries uses the station to conduct activities such as aqua-farming, marketplace field trips, taking water quality measurements, marine development training, investigations into marine resources and the local ecology and learning how to properly observe nature (Coastal Biology Training). In addition, the station is used as a research and practical training base by students from the Faculty of Science as well as being popular with other universities and research institutes.

Azuma-chō station's research project is

environmentally-friendly fish farming. This project uses the technique of cultivating seaweeds and shellfish around the edges of the fish cages to purify the water and keep the ecosystem in balance. At present, there are an assistant professor and two technical staff who are monitoring coastal environment and developing seaweed seed production techniques, starting with two species of red alga. The station has also, in partnership with the local fisheries cooperative, become the countries' number one supplier of farmed Japanese amberjack. Finally, they continue to conduct environmental research into aquaculture and produce maps indicating water and sediment quality to aid fish farming. In the future they work for developing measures of red-tide and chemical pollution, and holding a series of public lectures in order to increase the number of people who come to use the station even more.





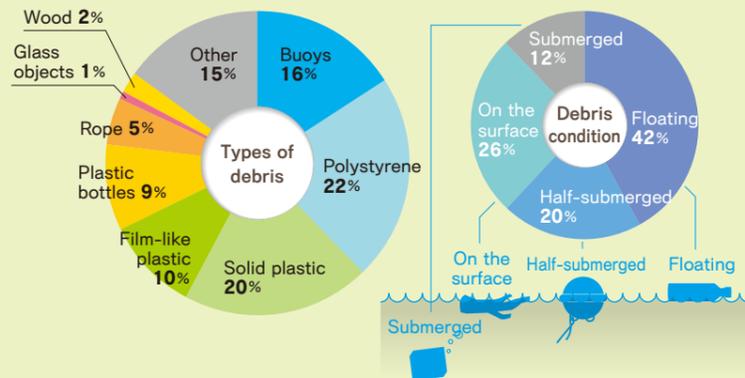
# Studying marine debris prevention and raising awareness

Professor Fujieda Shigeru (Fisheries) is known as one of the few experts on marine debris in the country. Through activities such as organising cleanup campaigns and raising awareness among the citizens as well as examining marine litter itself he endeavours to find a way to control this problem.



Plastic objects collected during the investigation of the earthquake-caused marine debris. Rope and plastic pipes used for oyster farming were found in the stomach of tuna caught by Kagoshima Maru.

Appearance, location and percentage of marine debris examined by Kagoshima Maru



Professor Fujieda studies the problem of marine debris: human-created waste drifting in the seas. What prompted him to start was the fuel oil spill of the tanker Nakhodka near the Oki Islands off the coast of Shimane Prefecture in 1997. At that time, while volunteering along with 16 Fisheries students in the oil-cleanup efforts along the coast of Kiyotango in Kyoto Prefecture, Professor Fujieda noticed plastic products from China and Taiwan among the tide wrack: "Rubbish from China and Taiwan drifts past Kagoshima and washes ashore in Kyoto Prefecture. I was told by the local volunteers that "if Kagoshima's seas are cleaned the seas of Kyoto will benefit too" and that inspired me to start researching the problem of marine debris in earnest."

## Regular investigations of Fukiagehama Beach: "Lighter project"

After returning to Kagoshima, Professor Fujieda began picking up litter along the shores of Kagoshima Bay with his fellow sea-kayak enthusiasts. He also participated in an American environmental NGO's "International Coastal Cleanup" project and, together with volunteers, began the "Kagoshima Cleanup Campaign". Furthermore he holds lectures on marine debris about 20 times a year.

Another one of his projects was started in 1998: once a month he walks a 1.6km section of Fukiagehama Beach and collects items of marine debris with the aim of establishing their origin. In 2003 he started collecting and examining disposable lighters (sold in 100-yen shops), thereby beginning his "Lighter project". With the cooperation of marine debris researchers and collectors, Professor Fujieda has acquired lighters from 1273 coasts in Japan and abroad and continues to analyse them. "The areas where these lighters were distributed are easily established by their shapes and the names of gas containers. When connecting the location of pickup with the point of origin, we can follow the path of the marine debris across the sea" - explains Professor Fujieda. In addition he conducts research on marine debris in the Seto Inland Sea and Ise Bay as well as examining microplastics garbage. Microplastic particles are the result of the fragmentation of Styrofoam floats used in fish farming. Professor Fujieda is endeavouring to construct a float disposal system in cooperation with entities such as the Fisheries Agency and the National

Fishing Cooperation Association.

## Researching the debris caused by the Tōhoku earthquake and tsunami

Since 2012 research on earthquake-caused debris is being conducted. According to government calculations the rubble carried by the tsunami following the Tōhoku earthquake on 11 March 2011 amounted to 5 million tonnes, 1.5 million tonnes of which drifted into the North Pacific. In order to assess the situation of all that debris, the nationwide assistance of fisheries high schools and their training vessels was requested; Professor Fujieda also participated in the investigation aboard the Faculty of Fisheries' training ship - Kagoshima Maru. The results: of the 900 pieces of marine debris he examined 90% were discovered to be plastic: "Plastic flotsam has been around since before the disaster, so I'm not saying that all this debris is caused by the earthquake and tsunami, but we did find fishing gear which had been used in the affected areas."

Plastic is almost non-biodegradable. It breaks into small particles while drifting in the sea and may enter the bodies of living organisms. Professor Fujieda worries that these plastic particles will have a negative impact on the environment and ecosystems:

"I often get the question "Why is rubbish in the sea bad?". I don't yet have an answer that is satisfactory for everyone, but there is a chance that all these pollutants will dissolve in the water. Furthermore, marine debris from overseas drifts to Japan, but in the same way rubbish from Japan turns up somewhere else. People might not eat marine debris but its impact on the ecosystem might affect us as well. What humans produce, use and discard becomes marine litter: and only humans can solve this problem."



Marine debris collected during regular investigations at Fukiagehama Beach



## Fujieda Shigeru, professor

Faculty of Fisheries  
Fishery Teacher Accreditation Programme

Born in 1967 in Osaka Prefecture. Completed BSc in Fishery Studies at the Faculty of Fisheries in Kagoshima University in 1991. Had teaching experience at Kumamoto Prefectural Fisheries high school. Joined Kagoshima University as an assistant in 1992 with additional duties as navigator on the university training vessels: Kagoshima Maru and Keiten Maru. PhD in 1998. Current position since December 2010. Scientific fields: Marine debris studies and navigation. "Clean-up Kagoshima" project representative, JEAN (Japan Environmental Action Network) Institute Board member, Kagoshima Prefectural Nature Preservation Association Board member and head secretary, Vice President and head secretary of the Marine Debris Studies Society. President of the Kagoshima Prefecture Coastal Debris Prevention Committee and a member of the Ministry of Environment's Expert Council for prevention of marine debris.



Disposable lighters collected at Fukiagehama Beach. "Flotsam from China and Taiwan increases in summer", says Professor Fujieda.



# Kagoshima University Walk-Camp Club

Uchida Shunki, President, BSc student, Faculty of Engineering



part of which is a World Natural Heritage Site, has the 7,000 year-old Jōmonsugi tree and many other famous spots. I'm especially fond of Wilson's Stump. It is hollow and when looking up from a certain point inside the stump you can see the shape of a heart. I was quite impressed when I first saw it. In addition you can also have a close look at Yakushima's wild deer and monkeys. I think a lot can be gained from this 3-day mountain trip. After joining the club I went to Yakushima twice (the first one being my first time ever there) and even after the second visit I was still impressed by many things and wanted to go again. Surely everyone who's been there also wants to go back. But anyway, seeing is believing, so I think the best way is to go there yourself and experience everything first hand and see it with your own eyes!

I was able to understand the natural beauty of Kagoshima after joining this club and I think it was good that I did. Kagoshima has many other beautiful places besides Yakushima - I've been living here for 20 years but I think there are many famous places that I don't know about.

In recent years, children spend more time at home with video games and computers and the opportunities for experiencing nature are dwindling. I'd like more people to learn about nature's beauty through outdoor activities like mountain climbing. Also I'd like more people to know about Kagoshima and its wonderful nature. I hope the Kagoshima I grew up in will remain a nature-rich and beautiful place in the future.

Come and join us climb some of Kagoshima's mountains!

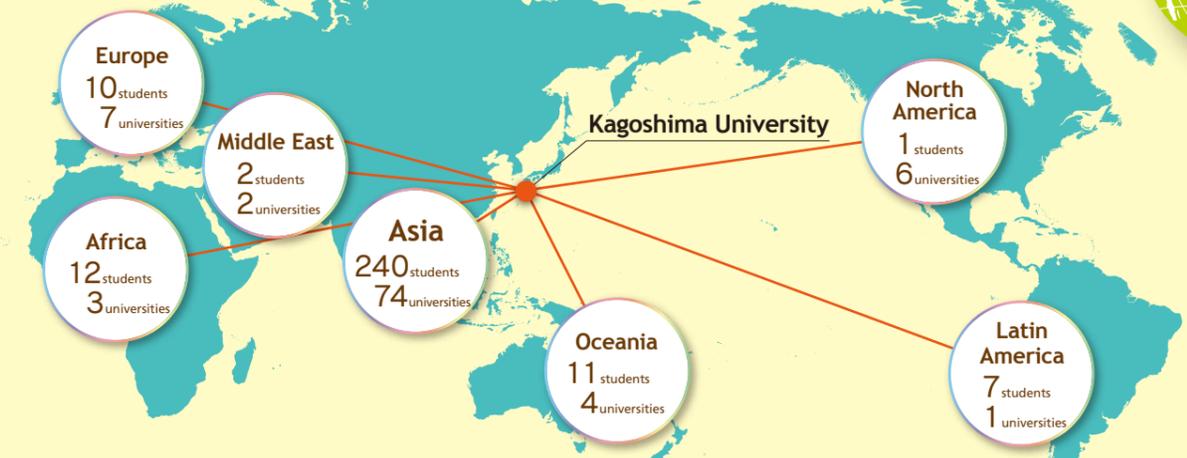


We are the Walk-Camp Club - an outdoor society with a focus on climbing that was founded more than 30 years ago. Mainly we go climbing around the mountains of Kagoshima Prefecture. Kagoshima is surrounded by mountains and seas and its lush nature makes it a very pleasant place to live in.

Have you ever climbed a mountain? It's fantastic! Only people who have actually reached the summit and have experienced the beauty of nature know the feeling! After I joined this club I was able to discover the joy of climbing and the wonders of Kagoshima's nature. After coming to live in Kagoshima, it would be a pity not to try and experience its nature. Mountain climbing might have an image of being hard but there are mountains around Kagoshima which can be climbed by people of all ages and you can begin your mountain climbing efforts by trying easier hills at the beginning. It will certainly become a valuable experience if you haven't tried it before and you can learn things that are not taught at school.

There are many mountains in Kagoshima but the ones I'd be the first to recommend are in Yakushima. Our club traverses Yakushima during summer holidays. A traverse means to climb several mountains during a single trip. We spend the nights on the mountain and climb several peaks like Kuromidake and Miyanoura during our 3-day trip. Traversing a mountain means you have to climb many peaks while carrying a lot of baggage so it's more difficult than ordinary mountain climbing but it can be enjoyed accordingly. Yakushima,

# Number of international students and academic exchange universities



May 2013

Region	Country	Law, Economics and Humanities	Education	Science	Medical and Dental Sciences	Engineering	Agriculture	Fisheries	United Graduate School of Agricultural Sciences	International Student Centre	Total	
Asia	India				1	1					2	
	Indonesia			6	7	2		1	6		22	
	Sri Lanka								7		7	
	Thailand								3		3	
	Nepal					5	1				6	
	Pakistan			2		2	1				5	
	Bangladesh					1			2	4	7	
	Philippines								4	1	5	
	Vietnam			1		2	4	3	1	7	1	19
	Malaysia	2	1	1			12			3	1	20
	Myanmar						1			3	1	5
	Korea	12	8	1	5	5	3	2	1		37	
	Taiwan	1	2			1		1				5
China	26	12	1	7	27	11	8	4			96	
Hong Kong				1							1	
Middle East	Iran				2						2	
Africa	Uganda								1		1	
	Egypt								2		2	
	Eritrea							3			3	
	Gabon									1	1	
	South Sudan		1								1	
	Tanzania								1		1	
	Nigeria					1					1	
	Malawi								1		1	
Mauritania								1		1		
Oceania	Australia	3	1								4	
	Solomon Islands							1			1	
	Tuvalu							1			1	
	Tonga		1						1	1	3	
	Fiji								1		1	
	Marshall Islands							1			1	
North America	United States	1									1	
Latin America	Guatemala			1							1	
	Colombia			1							1	
	Bahamas									1	1	
	Paraguay						1				1	
	Brazil		1								1	
	Peru						1				1	
Bolivia								1		1		
Europe	Germany	2	2								4	
	Hungary									1	1	
	France	2									2	
	Bulgaria	1									1	
	Latvia	1									1	
UK				1							1	
<b>Total</b>		<b>51</b>	<b>30</b>	<b>15</b>	<b>34</b>	<b>55</b>	<b>19</b>	<b>20</b>	<b>51</b>	<b>8</b>	<b>283</b>	



# Connecting Society and the World through Video Production



Students editing their productions. Having learned technical skills from their first year, the students are very adept at this process.



The premiere screening (Crossing Boundaries and the Power of Imagery). The titles of the 7 works were as follows, "Foreigners Reactions ~ Japan's Idol Edition", "Japan's Job Hunting Conditions", "Purikura ~ Students Nowadays", "Bushidō? Contemporary Inheritors of the Soul of the Samurai", "Recollection" (short film), "Marriage Hunting in Japan" (grand prize winner), "Otakore ~ Otaku Collection"



**Takeuchi Katsunori**, professor (Humanities)  
MA in English Language and Literature from Kyushu University  
Research field is 19th century American literature, critical theory and cultural studies.  
Took a lecturing position in Kagoshima University's School of Liberal Arts in 1992.  
Began his current position in 2004.

The Cultural Representation Seminar is for 2nd – 4th year students in the Humanities Department's Media and Contemporary Culture course and is focused on research, discussion and presentations. Over the course of a year, the students learn how to analyse changes in society and aspects of contemporary culture from a global perspective through the study of novels, music and visual aids.

This year's topic is 'From Kagoshima and its culture to the World'. Over the span of the entire year, the students produce a video introducing the culture of Japan and Kagoshima. The students are in control of everything from start to finish, such as choosing a topic, interviews and information gathering, and editing. This class is unique in that, during the making of the video, the students discuss their projects with students overseas and can take on any new ideas. According to Professor Takeuchi Katsunori, who runs the class; "From their 1st year, we have the students learn core skills which we define as self-expression, communication, critical thinking and problem solving. The seminar enhances these skills as well as cultivating global thinking and international understanding".

## Joint class with San Jose State University

In 2012, 41 people participated in this joint seminar. In groups, they produced a 15 minute piece of visual work. The first term, saw the consideration of the theme and composition, then over the summer the students preceded with data gathering and cinematography. During the second term, while the students continued with editing and additional data gathering, a joint class with California's San Jose State University's Japanese Studies Department was also held. The students used Google's free chat programme, Hangouts, to talk with the students from San Jose State and discuss and present the differences between both Japanese and American culture. The groups also showed their visual projects to the San Jose students and listened to their opinions and advice. Both sets of students also exchanged Skype names and email addresses, so that if they wanted to, they could continue their interaction outside of the classroom as well. Professor Takeuchi emphasised the importance of

international-based classes by saying "Today, using the internet for distance education is not uncommon. Most reputable universities have international-based classes using the internet firmly fixed within their curriculum. And continuing with this, I believe the time has come where we should be considering how we can help the students improve to the next level".

## Respecting the student's independence in the visual production

After the joint classes had finished, the students entered into the final stage of editing before the premiere screening in early February. Respecting the student's independence and ideas, Professor Takeuchi, barring some technical guidance, had very little input in the production process.

On the 9th February 2013 the first screening of the group's visual production was held. Seven works were screened, all with varying styles, from documentaries to short films. Whether it was using animation and graphs for displaying practical information, or covering places that you ordinarily

cannot go to, each group's originality and ingenuity shone brightly. After the premier had finished, Mr. Okamoto Yoshihisa, a broadcaster on a local TV channel, gave some feedback and professional advice on the presentations, to which the students listened intently. Then in March, one of the productions was chosen and shown within a programme on another local channel.

This was the second year in a row that the Humanities department 3rd year student Kuroki Ayaka had participated in the seminar. "I have taken many classes in my 3 years here, but the one I want to recommend the most to the younger students is this seminar. You devote a whole year to the project and get to decide on your own theme, compose it yourselves and edit it how you want. It's not without its hardships, however, unlike a normal passive class, this seminar gave me a much larger sense of achievement. The ability to interact with American students without having to go abroad to study is extremely valuable. This seminar opened my eyes to the enjoyment you can receive from communicating with new people and to the fun of making a video. I intend on taking the class again next year".

### New president elected in April 2013

Dr. Maeda Yoshizane, a professor from the Faculty of Agriculture and specialist in livestock science and animal genetics, has been elected as the new president of the university. Since joining Kagoshima University as an undergraduate student in the Faculty of Agriculture in 1963, he has been on campus as a graduate student, an assistant professor, associate professor and professor. In 2002, he became Director of the Research Centre for Life Science Resources Bioscience and in 2006, he was made Dean of the Faculty of Agriculture. Following that, he served as an Executive Vice President in Research from 2009 to 2012. Interestingly, the palm trees lining the campus' main thoroughfare, which have become such a symbol of the university, were planted by him fifty years back when he joined in the university.



### Mobile tool developed for correcting colour vision defect

A research group led by Professor Ōtsuka Sakuichi from the Department of Information Science and Biomedical Engineering in the Graduate School of Sciences and Engineering has developed an image processing technique by which two contrasting colours of green and red are converted into yellow and blue in real-time and displayed on a mobile terminal such as a smart phone.

In Japan it is estimated that 5% of men and 0.2% of women are red-green colour blind. Professor Ōtsuka has made it possible for them to recognize contrasting colours, the same type of colours, and opposing colours by displaying the original image and its processed image alternately. For example, in the original image (Picture 1), you can see the contrast of the green chair and Father Christmas' red clothes. However, in Picture 2, a simulation of colour blindness, you will find the same type of colours with no clear colour contrast. When the hue blending technique developed by Professor Ōtsuka is applied, the simulation image shows a clear contrast of blue and yellow as in Picture 3. It is hoped that the tool will be on the market in a year or so.



### Researcher wins prestigious scientific award

Professor Baba Masanori, Centre for Chronic Viral Diseases, Graduate School of Medical and Dental Sciences, was selected as the recipient of the 2013 Gertrude Elion Memorial Lecture Award.

The award, named in honour of Gertrude Elion, American biochemist and winner of the 1988 Nobel Prize for Medicine, was given to Professor Baba at the 26th International Conference on Antiviral Research (ICAR) held in San Francisco on 12 May 2013. This is one of the most important events in the International Society for Antiviral Research (ISAR), an internationally recognised organization for scientists involved in basic, applied and clinical aspects of antiviral research..

Professor Baba was chosen for his outstanding contributions in the discovery and development of novel anti-HIV-1 agents, such as cenicriviroc (CCR5 antagonist) and festinavir (nucleoside reverse transcriptase inhibitor), and a nanotechnology-based antiviral vaccine adjuvant. Both cenicriviroc and festinavir are currently under phase IIb clinical trials in the United States. Commenting on his selection, Professor Baba expressed his deep gratitude to a number of scientists in academic and industrial institutes for their long-term collaboration with his laboratory.

### Discovery of a working of Nitrated cGMP for guard cell signalling

Stomata, the pores on the surface of leaves, control the diffusion of gasses into and out of plant tissues. They are formed by pairs of guard cells, which sense and rapidly respond to environmental signals such as light, humidity, carbon dioxide. The opening and closing mechanism of guard cells is competitively studied by scientists throughout the world.

Numerous signaling components act in the induction of stomatal closure, including nitric oxide (NO), reactive oxygen species (ROS), and calcium. The research group of Dr. Iwai Sumio, a professor in the Faculty of Agriculture, has found that the nitrated cGMP derivative 8-nitro-cGMP functioned in guard cell signaling. Mass spectrometry and immunocytochemical analyses showed that NO and ROS induced the synthesis of 8-nitro-cGMP in guard cells. 8-Nitro-cGMP triggered stomatal closure but cGMP induced stomatal opening. Thus, cGMP and its nitrated derivative play different roles in guard cell signaling; nitration of cGMP is switch for signaling from opening to closing. This finding opens up the possibility for controlling CO<sub>2</sub> uptake and plant water loss and hence for growing drought resistant crops. Details of the research can be found *Plant Cell* 25(2):558-571 (2013).

### Evolutionary origin of taste buds revealed

The research group of Professor Kiyohara, Department of Chemistry and BioScience in the Graduate School of Sciences and Engineering, revealed the origin of taste buds in vertebrates traced back to lamprey.

Taste buds are the gustatory end organs in vertebrates. They respond to a variety of sapid chemicals, and transmit signals to afferent nerve fibres arising from 3 cranial ganglia: facial, glossopharyngeal and vagus. Taste buds utilize an uncommon purinergic signalling system to transmit information to the afferent gustatory nerve fibres. In mammals, ATP is a crucial neurotransmitter released by the taste cells to activate these nerve fibres. Taste buds in mammals display a characteristic, highly specific ecto-ATPase activity, suggesting a role in inactivation of the neurotransmitter. The research group tested whether the presence of markers of purinergic signalling characterize taste buds in amniote vertebrates and whether similar purinergic systems are employed by other exteroceptive chemosensory systems. The species examined include several teleosts, elasmobranchs, lampreys and hagfish (Fig. 1), the last of which lacks vertebrate-type taste buds. For comparison, the Schreiner organs of hagfish and the solitary chemoreceptor cells (SCCs) of teleosts, both

of which are epidermal chemosensory end organs, were also examined since they might be evolutionarily related to taste buds. Ecto-ATPase activity was evident in elongate cells in all fish taste buds including teleosts, elasmobranchs and lampreys. Neither SCCs nor Schreiner organs show specific ecto-ATPase activity suggesting that purinergic signaling is not crucial in those systems as it is for taste buds. It is concluded that the taste buds did not originate from SCCs but arose independently in early vertebrates, such as lamprey. Details of the study can be found in Kirino et al.2013, *Open Biology* 3. <http://dx.doi.org/10.1098/rsob.130015>.

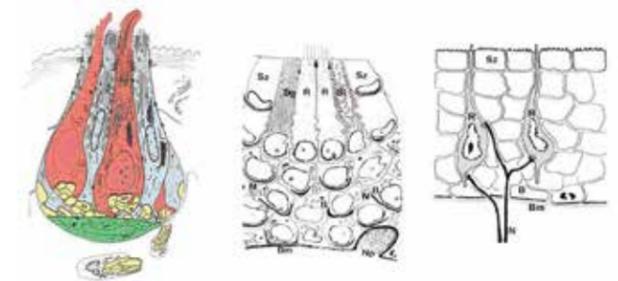


Fig. 1 Taste buds of teleost (left), the Schreiner organ of hagfish (middle) and solitary chemosensory cells (right). R: receptor cells, N: nerve fibres, B: basal cells



# SATSUMA BIWA AND STORYTELLING

薩摩琵琶

Nakatani Sumie, Associate Professor, International Planning Centre

In Kagoshima, story recitals accompanied by the Satsuma biwa are registered as a prefectural intangible cultural property. They were started towards the end of the Muromachi Period (1338-1573) when the daimyō of Satsuma Province Shimazu Tadayoshi composed the poem *Iroha-uta* to boost the morale of his samurai and instill the proper spirit in them. Tadayoshi had a master of the *mōsō-biwa*, traditionally played by blind Buddhist monks who travelled on foot around the country praying for people's salvation, compose a melody to the poem and then made his samurai sing it accompanied by the biwa.

In this way the *Iroha-uta* accompanied by the Satsuma biwa started to be sung as moral instruction in the *gōjū* schools which were used to train samurai boys and came to be well liked by the Satsuma samurai. After that, biwa songs about glory, the samurai's good name and spirit of loyalty were composed and by the late Edo period the main style of what we call the Satsuma biwa today had been established. After the Meiji Restoration in 1868, as the local samurai started going to Tokyo, the Satsuma biwa started to become known throughout Japan. In the end of the Meiji Period biwa songs became more refined and a more musical style was born.

The original Satsuma biwa songs were about samurai morals—that is singing the discipline and philosophy of leaders in line with the song, and were not to be enjoyed for their music. Since it was thought important to inherit the samurai spirit, the songs were not



Shimazu Yoshihide playing Satsuma Biwa

allowed to be arranged and no new ones were made. As a rule the songs had no written music, from early on, beginners went to older boys in the *gōjū* schools and were taught by word of mouth. There was no systematic learning between a master and his pupils and no fees were paid either.

The fortitude and vigour were characteristic of the Satsuma biwa that had developed in Kagoshima, while in the new style which developed in Tokyo the songs were much more flowery. The original Satsuma biwa had 4 strings and 4 frets whereas the newer ones have 5 strings and 5 frets. Compared to the biwa used in court music, the Satsuma biwa has a larger body. The player kneels holding the biwa almost upright, and plays with the eyes half closed. An extremely large plectrum is held in the right hand and is used to strike rather than pluck the strings. This unique style, peculiar to the Satsuma biwa, produces an appealing sound which seems halfway between percussion and string instrument.

While the new styles of Satsuma biwa are well known today and are even played overseas, the number of players in Kagoshima has dropped, leaving the instrument's future in a precarious situation. This is because in Kagoshima the spiritual side was stressed more than the musical and adhering to the old style learning system prevented its popularisation. One of the handful traditional-style Satsuma biwa players, Shimazu Yoshihide, head priest of Kuwashihoko Shrine in Aira, Kagoshima Prefecture and a descendant of the Shimazu clan, says "Satsuma biwa songs have living messages that tell us the importance of self-initiative, leadership and networking." He plays the Satsuma biwa to pass down these messages which just as important for people today in Japan as they were before.

\* Front Cover



## Founding fathers

Bronzes of William Willis (1837-1894), founder of Kagoshima Medical School with his student, Takaki Kanehiro (1849-1920) who went on to establish Jikei University School of Medicine in Tokyo, in front of the site of Tsurumaru Castle in Kagoshima.