

KU Today

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Autumn
2017



学部紹介
特集

Special Issue

Faculty of Science

Graduate School of Science



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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 *KU Today* 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.

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Welcome to the Faculty of Science

<http://www.sci.kagoshima-u.ac.jp/en/index.html>



Dr Kurawaki Junichi, Dean

Originally established as the Seventh Higher School, (Zōshikan) in 1901, today our faculty consists of four departments: Mathematics and Computer Science, Physics, Chemistry and Bioscience and Earth and Environmental Sciences.

Mathematics is a wisdom which has been developed to understand and determine deep truths and disseminate them. In the present day, mathematics is widely utilised in such fields as natural science, social science and engineering. The department of physics is one of the leading institutions in Japan for astronomical research

and is supported by facilities such as a 20m radio telescope. The physics division also researches the electronic structure and electronic and magnetic attributes of superconductors, magnetic materials and semiconductors using both experiments and theory. Moreover, we are investigating the behaviour of complex systems in the natural world using theory and computers. The Nansei-Toko Observatory for Earthquakes and Volcanoes focuses on research on earthquakes and volcanoes in southern Kyūshū and the southwestern islands of Kyūshū. Research on ecosystems in regions ranging from sub-tropical to tropical is another of our focus areas. We have a long history of collaborative research in the field with institutions in Indonesia. My research area is a relatively new chemistry field in nanomaterial science which is attractive and rapidly developing.

Scientific research is an international endeavour performed over a cross-border network and so the Faculty of Science is happy to welcome young researchers and students from all over the world to make use of Kagoshima University's friendly and international atmosphere. I hope you will want to find out more about the Faculty of Science and that you will want to join us in experiencing our academic programmes and interesting research.



Department of Mathematics and Computer Science

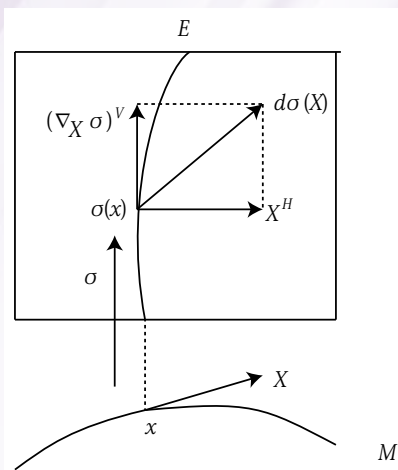
We teach and research fundamental structures in mathematics and their analysis. We also teach and research on mathematical sciences, which have been diversifying due to interactions with many other scientific and cultural areas, their related areas as well as theoretical fundamentals of information/computer science. Our aim is to enable students to understand fundamental theories in mathematics deeply as well as to understand theories of information/computer science and mathematical analysis of various phenomena of nature and society that become a driving force for developments of mathematical

sciences, and to have the ability of applying their knowledge.

Our educational goal is to provide society with professionals having advanced skills in mathematical science and information/computer science, the ability to make comprehensive decisions and a superior sense of ethics based on expertise of mathematics. We welcome those with basic academic ability, who understand these goals, who are eager to study mathematics, mathematical sciences and information/computer sciences in order to deal successfully with advanced topics in these fields.

Aikou Tadashi

Professor of Differential Geometry



My main research interests are in differential geometry of real or complex vector bundles with Finsler metrics.

Finsler metrics are natural generalisations of Riemannian metrics. For example, in Euclidian space,

if we deform the unit ball to a strongly convex domain with a smooth boundary, then its Minkowski functional is nothing but

a Finsler metric with respect to which the deformed domain is the indicatrix.

I became interested in this field at Kagoshima University when I was a graduate student. Since then, I have been studying Finsler geometry. Some completed projects related to Finsler geometry are on the averaging method and its applications. In related works, I have published some papers in joint work with graduate students from Indonesia. Some future research projects are conformal theory in Finsler geometry, Landsberg-Berwald problems and the study of ampleness of holomorphic vector bundles by the methods of differential geometry. Since 1969, we have organised the Symposium on Finsler Geometry in Japan, and in 2015, the 50th memorial symposium at Hiroshima University was successfully held with the participation of many researchers from abroad.

Furusawa Hitoshi

Professor of Computer Science



My scientific interest is the theory of algebraic structures such as allegories, Kleene algebras and variants of them, and their

applications as conceptual and methodological tools in computer science and beyond.

While axiomatically simple, these algebraic structures are able to cover a wide research area. We

often see that some researchers in different domains study and apply similar mathematical concepts independently for their own purposes. In such cases, it is natural that the similarities are completely ignored. As a result, several domain-specific formalisations are introduced in different levels of abstraction and several theories about them are developed from scratch.

I am making an attempt to unify such formalisations and theories by using or modifying one of the algebraic structures mentioned above. Results could be helpful for knowledge sharing and it accelerates development of science and technology based on mathematics.



Itoh Minoru Professor of Representation Theory

My research interest is in invariant theory for noncommutative algebra. One of recent results is a Cayley–Hamilton type theorem for anticommuting variables. Here we say that variables a_1, a_2, \dots are anticommuting, when we have $a_i a_j = -a_j a_i$ for any i and j (this contrasts with the relation $a_i a_j = a_j a_i$ for ordinary (commutative) variables).

For a 2 by 2 matrix $A = \begin{pmatrix} ab & \\ & cd \end{pmatrix}$, the ordinary Cayley–Hamilton theorem is the following formula (this is quite elementary):

$$A^2 - (a+d)A + (ad - bc)I = O.$$

Here the entries $a, b, c,$ and d are ordinary (commutative) variables. It is also worth noting that any conjugationinvariant polynomial in $a, b, c,$ and d can be written as a polynomial in the two coefficients $a+d$ and $ad - bc$.

Recently, the anticommuting version of this formula was found ([Brešar, Procesi, Špenko 2015], [Itoh 2016]).

The 2 by 2 case is as follows:

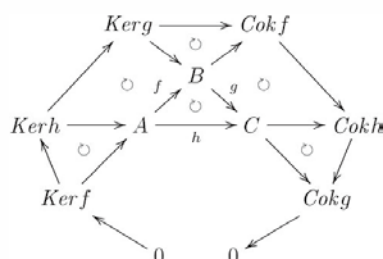
$$2A^3 - (a+d)A^2 - (3abc + 3cbd)I = O.$$

Here $A = \begin{pmatrix} ab & \\ & cd \end{pmatrix}$ is a matrix whose entries are anticommuting variables. The two coefficients $a+d$ and $3abc + 3cbd$ also generate all invariant polynomials in anticommuting variables $a, b, c,$ and d .

Interestingly this anticommuting version of the Cayley–Hamilton theorem has an unexpected relation to the theory of polynomial identities.



Nakaoka Hiroyuki Associate Professor of Category Theory



In the long, long history of mathematics, category theory is a relatively new field, born about 70 years ago. Its essence is abstraction, which

possesses the possibility to unify various fields of mathematics very roughly, in terms of arrows. For example, when we consider mathematical objects such as sets, groups, rings and manifolds, we will investigate

them by using maps, homomorphisms, differentiable maps, and so on. In category theory, we abstract and unify these notions by arrows.

One of the significant influences on the mainstream mathematics was brought by Alexander Grothendieck, who evolved homological algebra to the theory of abelian category, in the study of algebraic geometry. My research is also devoted to construction of frameworks appearing in algebra. It may be special in mathematics, in the sense that I am rather interested in the development of tools and frameworks themselves, than in naive mathematical objects.

Student Voice  Bae Su-Been (Korea), BSc in Mathematics



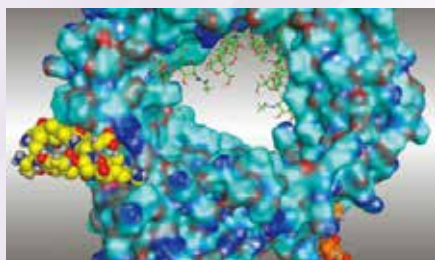
I am visiting Kagoshima University as a junior undergraduate on an exchange programme from Pukyong National University, Republic of Korea. My major is statistics, and I mainly learn mathematical statistics and statistical methods under the supervision of Professor Sugimoto. Mathematics majors

choose an advanced topic in their final year and study it in depth in the tutorial classes. This is the traditional and standard method in Japan. My time in Kagoshima started smoothly especially since Kagoshima University has many support programmes for international students, e.g., airport pick-up service, student tutors, Japanese language programmes, housing etc. Kagoshima is a beautiful city surrounded by the clear air, sky and sea, compared with my hometown. So, relaxing here, I'm enjoying my study abroad life.

Department of Chemistry and Bioscience

Itō Yūji Professor of Biological chemistry

Innovation of biological medicine

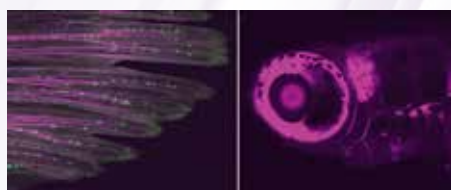


My laboratory focuses on research for designing biological molecules, especially peptides

and antibodies, which could lead to new seeds in biomedicine. Our major technique used is phage display which enables us to select the target-

specific binders from biological molecular libraries. By combining powerful technologies such as flow cytometry, mass-spectrometry and next generation sequencer, the initial molecules can be improved in specificity and affinity to develop new biomedicines. We are now promoting a project to generate innovative biological medicines supported by AMED (<http://www.i-biomed.jp/en/>). We will be happy to work with foreign students/collaborators who are interested in this research area.

Ikenaga Takanori Assistant Professor of Neurobiology



The goal of our research is to understand how the vertebrate brain and

its neural circuits process gustatory information and control feeding behavior. To address these subjects, we investigate the distribution and structure of the taste

bud, which is end organ for gustation, morphology and physiology of the peripheral and central nervous system involving gustatory sense by multiple techniques including fluorescent and X-ray imaging, and molecular genetics. Our experimental animal is fish including sea catfish and goldfish, which have well-developed gustatory systems. We also use zebrafish and medaka, modern model animals for vertebrate research.

Student Voice Choi Da-yeon (Korea), BSc in Chemistry and Bioscience



I am from Seoul and started living in Japan for the first time in April 2017 after entering Kagoshima University. Life in Japan is still new to me. I have been travelling around Japan and I think that Kagoshima is a really attractive area.

When people talk about Kagoshima, many say it is deep in the countryside, but I cannot see any inconvenience to that. I really like the peaceful atmosphere. Sometimes I like going to the sea near the volcano, Mt. Sakurajima, in my free time.

I would like to develop new drugs using natural products. The reason why I wanted to enter this

university was because I have the chance to study in different environments around Kagoshima. I decided to enter a special programme called the Science Club in which students can enter their desired laboratory and conduct research. I have only just begun, but I think it will be of great use when studying and researching later.

The first year curriculum has a lot of general education classes from different fields. It is good that we have opportunities to take not only classes from our major but also meet people from other faculties.

Kagoshima University has a lot of foreign students from all over the world, and I believe it is possible to have a meaningful experience in the present global era. I am certain that my time at Kagoshima University will be beneficial in my life in the future.



Student Voice He Siming (China), BSc in Chemistry and Bioscience



I visited Kagoshima for the first time in February 2017 for Kagoshima University's entrance examination. At that time, the view of Sakurajima, an active volcano, left a deep impression on me. It is a worldwide rarity for a large city to be located so close to an active volcano! Moreover, looking in the direction of Sakurajima from the Central Station or the Tenmonkan area, seeing the ocean and the mountains, and the houses clustered at the foot of the volcano: they represent a beauty that cannot be conveyed by words; this sight greets all the guests arriving in the land of Kagoshima.

So, I decided to study abroad at Kagoshima University where I am blessed with this abundant natural scenery. Compared to cities with large populations and many industries, such as those in

the Kanto region, Kagoshima may be seen rural, but its unique charm lies just under the surface and it is going to be fun to discover it little by little during my life here. In the two months since settling in Kagoshima, I have been eating plenty of locally grown vegetables and meat thanks to the well-developed agriculture, forestry and fisheries here. There probably are many other foreign students who, like myself, make their lifestyle more exciting by cooking for themselves using local ingredients and lots of improvisation.

Being a college student, studying is my main purpose. In my case, since the first grade, I have been very busy with my studies. In addition to that, special classes for international students such as Japanese language and Japanese culture have been set up as the first step towards real study in Japan and can also help future studies and daily life.

Although it seems very difficult, why not try to make yourselves shine in a foreign country while you are still young?

Student Voice Kei Wakamatsu (Malaysia), BSc in Chemistry and Bioscience



Being at Kagoshima University has been a once in a lifetime experience for me. The journey albeit short was not without its challenges. As an international student, Japanese was difficult and this made studying my course (biochemistry)

tougher than I had imagined. There was a time when pools of negative feelings and unrealistic imaginations like 'what if I fail' or 'I should have written better' kept circling in my head like a swarm of bees in a loop and nothing could be done

to dismiss it. All these stemmed from me not being confident enough in myself and that I know better than to let it engulf me. Through perseverance and help from people around me I was able to pull through. Despite all these, the friendships and memories that were formed are irreplaceable. I am very thankful to everyone that was with me throughout this voyage and that everything panned out well. In the near future, I hope to continue my studies in Japan and further diversify and deepen my knowledge. As J.K. Rowling said before, "We do not need magic to change the world, we carry all the power we need inside ourselves already: we have the power to imagine better."

Department of Earth and Environmental Sciences

Tomiyasu Takashi Professor of Environmental Analytical Chemistry

Elucidating the behaviour of mercury released from artisanal and small-scale gold mining activity

The behaviour of mercury discharged into the environment from both natural and anthropogenic sources has become a worldwide concern, owing to its high volatility and toxicity. Mercury discharged into the atmosphere can disperse into a wide area and cause an increase in the mercury concentration in soil surfaces by both wet and dry deposition. The deposited mercury can be taken up by microorganisms and subjected to methylmercury (MeHg) formation. The methylation of deposited mercury may be governed by the characteristic environmental conditions of each region; therefore, the distribution of mercury and its chemical forms should be investigated along with the environmental factors of a region to estimate the impact of discharged mercury.

In recent years, the use of mercury in artisanal and small-scale gold mining (ASGM) has increased in many developing countries and has become one of the primary sources of mercury pollution. The upper Cikaniki River, West Java, Indonesia, is an active ASGM site. The mining work sites for the mining process are located in the villages in this area, where mercury is used in the extraction of gold from ore using traditional methods: metallic mercury is added at the grinding process of the gold ore, and the mining waste is washed with water and discharged into the river system. The

mercury remaining after the process is collected in a cloth. Excess mercury is squeezed out, and the leftover gold amalgam remaining in the cloth is heated with a burner to evaporate the remaining mercury. Paddy fields stretch along the river outside these villages. There is an increase in the population of the villages every year as people have been observed to migrate to the illegal gold mining areas in the region.

We investigated that T-Hg and MeHg in the soil and Hg species in the river water surrounding the ASGM site and obtained the following observations. The dispersion of mercury from the work place, through the atmosphere, to surrounding areas was shown by the vertical variation of mercury in forest soil. Organic matter at the soil surface retained the mercury deposited from the atmosphere. The deposited mercury was subjected to MeHg formation under organic matter-rich conditions. The primary sources of mercury may be suspended particles transported by irrigation water from the river to paddy field soil. The MeHg found in paddy fields is a matter of concern for the health of those living around the village. Continuous study is required to clarify the impact of mercury released from ASGMs in this area, which will be important information to understand the behaviour of mercury at ASGM sites around the world.



The work place of ASGM. Mercury and crushed gold ore are put in the drums and rotated for several days to extract gold into mercury.

Nakao Shigeru Professor of Geodesy

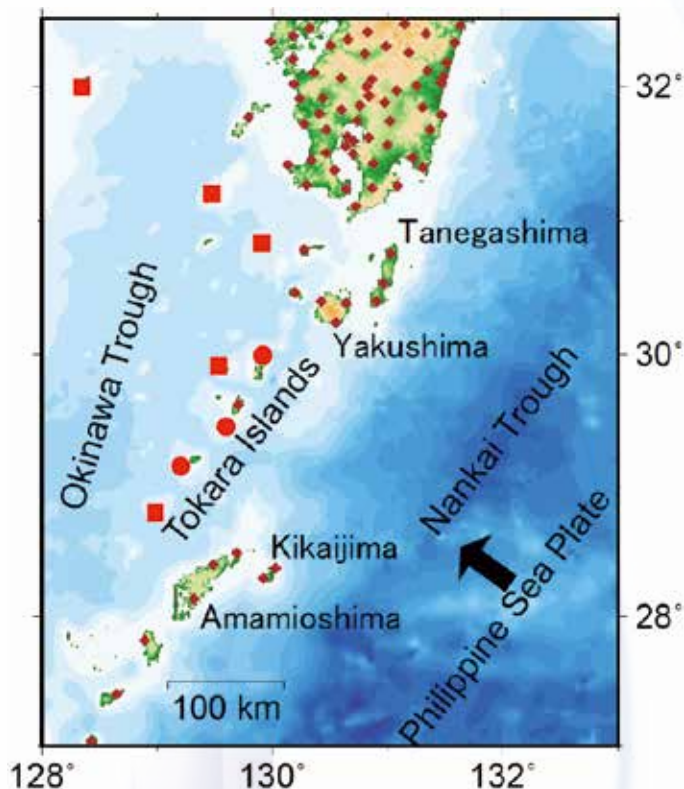
Continuous GNSS observation of crustal deformation in the Satsunan Islands

The Satsunan Islands are located directly south of Kyūshū. They are bordered to the east by the Nankai Trough, where the Philippine Sea Plate subducts under them and to the west by the Okinawa Trough, which is slowly opening. There are many islands in the chain including, Tanegashima, Yakushima, Amami-Ōshima, not all of which are populated.

Recently, the hypocentre of the magnitude 8.0 1911 Kikaijima Earthquake has been relocated by Gotō (2013) who analysed old seismograms. The tsunami generated by this earthquake hit Amami-Ōshima and Kikaijima. He concluded that this was an interplate earthquake, which occurs in an area of plate coupling. Plate coupling generates crustal deformation in subducted plates, whose area and amplitude depend on coupling area and coupling strength. It is very important to observe and study crustal deformation, which may become clear for plate coupling around the Nankai Trough.

The Geospatial Information Authority of Japan (GSI) operates a nationwide continuous GNSS observation

network, called GEONET, whose site interval is about 20 km. However, there are few GEONET sites in the Satsunan Islands, one being in the Tokara Islands. Therefore, crustal deformation is not clear in this region. Continuous GNSS sites were set up in the Satsunan Islands by us with the Nansei-Toko Observatory for Earthquakes and Volcanoes from 2007 to 2014 in order to investigate crustal deformation. Continuous GNSS sites in unpopulated islands constitute a GNSS receiver, GNSS antenna, batteries and solar cell modules. We go there twice a year on a small chartered ship to retrieve the data. The observed site velocities are from 3.1 cm/yr to 4.2 cm/yr in a south-easterly direction with respect to the ITRF2008 reference frame. These velocities are affected by the plate motion of the Satsunan Islands, plate coupling between the Philippine Sea Plate and the plate of the Satsunan Islands, and the opening of the Okinawa Trough. It is expected that plate motion, plate coupling and the opening of the Okinawa Trough will become clear by analysing these site velocities.



Location of observation sites. Red squares and red circles indicate GNSS observation sites. The black arrow shows direction of movement of the Philippine sea plate.

Department of Physics and Astronomy

Hiroi Masahiko Professor of Physics

The physics division researches the electronic structure, and electronic and magnetic attributes of superconductors and magnetic materials using both experiments and theory, and the behaviour of complex systems in the natural world using theory and computers.

The division itself is made up of two courses; theoretical physics and solid state physics. As well as promoting joint research with other academic institutions both in Japan and overseas, we also have tie-ups with industry.

Keywords on the education and research of our courses are Theoretical physics course: physical theory, first-principles calculation, electronic structures of materials, science of complex systems, nonlinear science.

Solid state physics course: experimental physics, low-temperature physics, magnetism and magnetic materials, high magnetic field.

Our facilities are equipped with superconducting magnets and an apparatus to produce -269°C liquid helium.

Shinnaga Hiroko Professor of Astronomy



The astronomy division has 11 professors and several post-doctorate researchers as of June 2017. Two professors major in theoretical astrophysics

and nine professors specialise in observational astronomy. Eight of the observational astronomers use radio wavelengths to study space. This is the biggest university radio astronomy group in Japan. Both undergraduate and graduate students study astronomy and space science, and many of them are involved in studies in radio astronomy and galactic astronomy. Major topics concern star formation, late-type stars,

galactic structure and kinematics, active galactic nuclei (AGN), and the property of interstellar matter (ISM).

We operate one optical/infrared telescope and two radio telescopes. One of them is the telescope that established cosmic radio astronomy in Japan since its first use in 1971. We develop instruments for radio- and infrared astronomy. Together with the National Astronomical Observatory of Japan (NAOJ) we investigate the structure and kinematics of the Milky Way Galaxy (MWG) with VERA (VLBI Exploration of Radio Astrometry) for the purpose of measuring the distance and motion of many radio wave sources in MWG. Theoretical research on relativistic astrophysics and computer simulation on ISM is also carried out.

The Cooperative Graduate School with NAOJ and JAXA (Japan Aerospace eXploration Agency)/ ISAS (Institute of Space and Astronautical Sciences) contributes to our research and education programme.

Student Voice Yang Zi (China), BSc student, in Astronomy

I am now a 4th grade student studying molecular clouds conditions together with my classmates and seniors in the laboratory. We conduct our studies by processing ammonia observation data acquired by using the Nobeyama 45m radio telescope of the National Astronomical Observatory. After beginning the research, I strongly feel that it is not simply data analysis, but also includes learning the basics of using the research equipment as well as various research methods and solutions to the problems we face. In particular, I know how thrilling and rewarding research can be when I have managed to produce a beautiful map through my own efforts using various scientific data.





Student Voice Adline Ngozi Nwodo (Nigeria), PhD in Material Science and Production Engineering



papers in English and participating in international conferences and actively sending their results out into the world.

We are researching the origin of the properties of magnetic substances and controlling the properties of substances by magnetic fields. We conduct experiments not only in the Magnetophysics Laboratory here, but also at some of the world's best arenas at Tohoku University Metal Materials Research Institute and the University of Tokyo Physical Property Research Institute. The graduate students themselves are publishing scientific

I came to Japan in April 2015. When I arrived, I realised that there are so many cultural differences and new things to learn, such as the Japanese language and culture. When starting my PhD, I already knew I wanted to acquire new knowledge for a career in academics. My dreams are fuelled by a passion for research, a drive to extend the frontiers of knowledge and a desire to enthuse the next generation of undergraduates and postgraduates with a love for an academic subject. The competences that I developed most as a doctoral candidate are analytical thinking and self-management. Although the Nigerian economy is reeling from low oil prices, which have led to recession, a plummeting naira and a spike in inflation, I am very proud that I persisted in obtaining my degree and developing myself in many ways. My advice to doctoral candidates is to develop skills like leadership skills and project management skills as much as they can during their PhD.

Unlocking the mysteries of the Universe

Shinnaga Hiroko (Professor of Astronomy)

Awardee of the Young Faculty Fellowship 2016 at Kagoshima University to engage in a research project abroad



with Professor Miller Goss at NRAO

Q. Tell us what led you to Kagoshima University

After I obtained my PhD at Ibaraki University, I was seeking an opportunity to be engaged in observational astronomy in millimeter and submillimeter bands. Millimeter and submillimeter astronomy uses the same technology that cell phones use, namely, receiving and analysing radio-wave bands. It allows us to study the cold universe that includes the sites of star formation. I want to study how stars form and end their lives in the universe.

At the time when I got my PhD, submillimeter astronomy was the cutting edge in the field of

astronomy. There was no working interferometer dedicated for submillimeter wavelength. The submillimeter array (SMA) was the first submillimeter interferometer that allows us to study the details of the sites of star formation and dying evolved stars. The SMA was about to be completed at that time, and I became involved in the project as a postdoc fellow. The SMA project is organised by Harvard-Smithsonian Center for Astrophysics (CfA) in the US and Academia Sinica Institute of Astronomy and Astrophysics (ASIAA) in Taiwan. After spending my first two years at ASIAA and three years at Harvard-Smithsonian CfA as a postdoc, I had a real job opportunity to work for the California Institute of Technology (Caltech) Submillimeter Observatory (CSO) as a resident staff research scientist. I spent most of my career in the US and I am trained in the US as an astronomer. I enjoyed working at these institutes among leading scientists, and I really appreciate that these institutes gave me great opportunities to work intensively in the field of observational astronomy. My first daughter was born while I was working at the CSO. One day, I felt that it would be a good idea for my daughter to grow up in Japan to absorb Japanese culture including reading, writing, and communicating. After we

came to Japan, I first worked at Nobeyama Radio Observatory in Nagano Prefecture for three months, and I moved to the Chile Observatory at Mitaka Tokyo and worked there for one and half years. Both institutes are part of the National Astronomical Observatory of Japan (NAOJ). The Chile Observatory of NAOJ operates the ALMA (Atacama Large Millimeter Array) telescope. I worked as a project associate professor to develop the data analysis pipeline that automatically works as part of the ALMA archive system. I gained unique experiences of a truly international collaboration of this gigantic project that was organised by countries in North America, Europe, East Asia, and Chile, which is the site of ALMA telescopes. I spent a lot of time flying between countries in East Asia, North America, Europe and Chile for many meetings. It became difficult for me to find time to interact with my daughter. I always felt a job as a university professor would be perfect when raising a family, as one can control the schedule of business trips. I applied for a position at Kagoshima University, and luckily I was selected in 2014.

I really appreciate that The University has given me this precious job opportunity to fulfill its university's mission and contribute broadening the community of radio astronomy for the future. The Kagoshima University Astronomy programme is unique because it operates one of the 20m diameter VERA telescopes with NAOJ. The telescope works as one of the Very Large Baseline Interferometer (VLBI) telescopes to synthesise the signals to measure distance to the astronomical objects. The mission of the VERA telescope is to investigate the structure of our Milky Way galaxy by systematically observing astronomical objects near and far. We also operate a 1m telescope at the university's Iriki Station, the biggest optical/infrared telescope on Kyushu. The students get opportunities to operate these telescopes by themselves, and that stimulates future students to come to Kagoshima University. Eleven faculty members and other staff members are here to help students to gain their experiences and pursue their research projects to graduate. There are many unsolved questions in the astronomy field. I hope the students who live outside of Japan will become interested in coming to Kagoshima University to study the cosmos using the various techniques we can offer. We are here to help students fly high in the world in the future.

Q. Tell us about the experiences you gained through the Young Faculty Fellowship to engage in a research project abroad

The ALMA project that I mentioned above celebrated its inauguration in 2013. The current international contract of ALMA will last for 30 years. The next big international project in Japan for observational

astronomy is the Thirty Meter Telescope (TMT) at optical/infrared bands. That would occupy the next several years to start off the project either at the top of Mauna Kea on the Big Island of Hawaii (USA) or on a mountain in the Canary Islands (Spain).

As a faculty member of the biggest radio astronomy group in the universities in Japan, I must think about the next big project to come in radio astronomy. The candidates for the next big radio astronomy projects that Japan must seriously think about being involved in may include the SKA (Square Kilometer Array) project led by UK, Australia, South Africa and the Next Generation Very Large Array (ngVLA) project led by the National Radio Astronomy Observatory (NRAO) in the US. Our astronomy group is already heavily involved in the discussion of the SKA project. We constantly send our staff members to the headquarters of the SKA (Manchester, UK) as representatives from Japan. On the other hand, the ngVLA is aiming to use 300 18m diameter antennas to link up in order to obtain a tremendous collecting area to catch photons coming from the distant cosmos. In order to understand the current status of the ngVLA, it is best to study at the NRAO Socorro campus that operates the current Jansky VLA telescopes. For this reason, I decided to choose the NRAO Socorro to carry out my research project using the VLA. NRAO is one of the world-leading institutes that have been literally in the forefront of the field of radio astronomy for decades, from the very beginning. It was truly a dream-come-true visit for me to study at NRAO. Professor Miller Goss who used to serve as a director of NRAO is at Socorro, and Professor Goss knows Professor Morimoto very well. Professor Morimoto used to be a professor at Kagoshima University, and he passed away in 2011 in Kagoshima. Professor Goss and Professor Morimoto worked together and were good friends at the radio astronomy institute in Australia at CSIRO. For this visit, I took my two daughters (6yrs old and 1yrs old) with me. Professor Goss helped me a lot. He allowed me to borrow his text books for long time. He also invited my whole family to his house for Christmas. One of my daughters went to a local public school in Socorro. I gained deep experiences as a researcher and as a mother of two daughters. My daughters found their best friends in Socorro, and we all really enjoyed the visit in Socorro. I will never forget their professionalism and the hospitality of the NRAO staff members.

I will do my best to contribute to research activities as well as promoting the educational programmes at Kagoshima University by collaborating with staff members in the department of physics and astronomy.



Student Voice

From Shinnaga Lab.

Contribution from Summer Research Assistant, Aidan McGirr (Arizona State University)



I am an undergraduate student visiting Kagoshima University from the United States for one month to work on a research project in the Astronomy department. In my time here, I have been utterly impressed by the hospitality and generosity

of both the staff and students. Everyone has gone above and beyond to ensure that I feel comfortable and have a good time while working. I have also been very impressed by the extent of the university's research facilities and the interconnectedness within the department. All of the faculty work together with the shared goal of furthering the scientific community, and the atmosphere within the university is as if it is one big family. Overall, Kagoshima University has been an excellent place to learn and grow as a student. The faculty encourages asking questions and independent thinking, and there is an entire host of professors and other students who are more than happy to help wrestle with questions or provide their input. It is obvious that the faculties are very passionate about their work, setting Kagoshima University up as a brilliant environment to study.

Scientific English Course

Preparing Budding Scientists to Take on Challenges in the Global Community

Hafiz Ur Rehman (Assistant Professor, Graduate School of Science and Engineering)



The faculty initiated a four-year Intensive Science Education Programme from 2008, sponsored by the Ministry of Education, Culture, Sports, Science and

Technology, but it has continued to date. The purpose of the programme was to turn undergraduate/graduate level students into researchers of an international level, science teachers with excellent leadership skills, and engineers leading the industry. On this programme, undergraduate students in their first three years could take part in a research cum special education programme known as the "Science Club Activities". One of the charming points of this programme was the Intensive Scientific English Course in which a smaller number of students participate in English classes conducted by foreign members of faculty with a scientific education background. The courses are usually conducted in an English-only environment where all the participants have to communicate and write reports in English. Moreover, they have to present science topics of their interests in English at the end of the course. At the beginning of the course, students who are generally unable to introduce themselves in English are trained to speak English with ease and make their final presentations full of high-quality science contents and with good presentation skills. Every semester, a few groups of students or

individuals make their presentation in a way which could be, with no wonder, presentable at any international level scientific conference or symposium.

The task is not easy for the faculty, as the level of students is different each time, however, it is amazing



to say that due to the hard work and effort by the students and the continuous and friendly guidance of the instructors no one is afraid of the foreign language and all accomplish their

projects in nice way and with high-quality presentation. Some presentations contain quite interesting material, with some Japanese cultural touches and a good sense of humor, making the listeners laugh during the presentation. Not to mention, after the presentation, the feeling of achievement and pride is obvious on the faces of the students who have tried their best to reach to that level.

The Scientific English course has been conducted by foreign faculty member, Dr. Hafiz Ur Rehman (PhD in Earth Sciences), since 2008. In 2014, he was joined by two specially appointed faculty members, Dr. Janice Borces Rabor (PhD in chemistry) and Dr. Sylwia Oleszek (PhD in Environmental chemistry) to further promote English education in the faculty. Special training is provided to undergraduate students to prepare them be skillful members of the global community, working in fields of science, education or business industry.



Islands are miniature worlds

Academic approach to understanding the relationship between people and nature on islands

The Kagoshima University Research Centre for the Pacific Islands (KURCPI) is the core of the university's research and educational activities on the islands in Kagoshima Prefecture and the Asia Pacific. Under the slogan "Every island is a single world" experts in the liberal arts and science fields join together, promoting research through an interdisciplinary approach. A graduate school cross-disciplinary educational programme has also been set up with the aim of nurturing human resources with a global perspective. Professor Kawai, director of KURCPI, is conducting his research on the relationship between people and nature in islands" and we asked him about his activities.

Approach to "fusion" research that goes beyond a single discipline

Dr. Kawai, an ecologist specialising in shellfish, has been conducting research on the use of shellfish in the Fiji Islands for over 10 years together with researchers in economics, oceanography and sociology. "The bivalve *Anadara* spp., commonly used for food by the people in Fiji, is the focal point of the research. We study its ecological background as well as rules and practices about its harvesting and consumption by humans, and its natural connection



with the community. We try to analyse from different angles in order to understand it as a system. One of the objectives is to use the research results as feedback for society in the future, with topics such as the influence of shellfish harvesting on the natural environment and developing ideas about resource utilisation.

Professor Kawai says that an important point in this research is to collaborate with experts from both the humanities and sciences and create a "fusion" between the fields. "It is difficult to put different academic disciplines on the same team. I am experimenting with various approaches to combine different academic fields, trying to quantify everything, or to consider it in budget terms, because a fusion research approach is indispensable when trying to understand the unique world that is every island.

Mollusc and human eating habits change island topography

As an example of the research of "people and nature" in Kagoshima Prefecture's islands, Professor Kawai talks about the relationship between Kikaijima islanders and the chiton molluscs (*hizaragai*). "Although they are eaten on other islands as well, they are particularly popular on Kikaijima. Boiled chitons with vinegar miso seem to be a great snack when drinking." Chitons live on rocks and prey on algae and small barnacles attached to the rocks. At night, they crawl out of the cracks and begin scraping the rock face with a tongue-like organ covered with hard plates; that is how they feed. "Kikaijima's coastal area is rising as fast as 2mm every year, and so the areas where chitons live is also slowly decreasing, day after day. There is also the unusual connection with the people catching the chitons and all the small but complicated changes in the terrain that are occurring every day." The professor must be imagining the small molluscs living among the island rocks and the people harvesting them to make a delicious snack as he speaks excitedly about his work. Traditionally, the influence of sea urchins on micro topography has been widely known among researchers, but there is not much information about the impact made by the chitons. Professor Kawai is interested in that complex relationship and continues his research.

Research results from Kagoshima to the world

Four full-time faculty members and about 70 associated members cooperate to advance their research and report results to the world. In 2015, a research compilation in English was published under the title "The Islands of Kagoshima-Culture, Society, Industry and Nature" and that was followed by "The Amami Islands - Culture, Society, Industry and Nature", published in 2016. There are plans to publish English books about the Ōsumi Archipelago, the Tokara Islands



and Koshikijima Islands in the future. "Since the books are available for sale online, the information about the islands can be delivered anywhere in the world." KURCPI also aims to propose solutions to global problems through research about the islands. "On one island, there is administration, there are forests, there is the sea, it is like a condensed version of our living space." That is why it is said that islands are "miniature worlds". "By looking at one island from many different angles, we can clearly see how social systems work and what effect the various factors such as global warming have on the natural and social environment as well as what kind of solutions can be suggested. We want to bring this feedback from our island research to the world. And then there is the delicious beer we like



to drink after finishing an island survey!" From his smiling face, we can feel the warmth of the southern winds.

Professor

Kawai Kei

Director of Kagoshima University International Centre for Island Studies

Graduated from the Faculty of Fisheries, Hokkaido University. PhD (1993)

Member of the Japan Society of Island Studies, The Malacological Society of Japan, The Japanese Association of Benthology, The Ecological Society of Japan

Research fields: Animal ecology / marine biology

Research topics: Relationship between people and nature, ecology of snails, islands, DNA polymorphism



Birdwatching Club

Fujisaki Hiroshi, BSc student

The Birdwatching Club has a long history as a society at Kagoshima University and I would like to take this opportunity to tell you all about the activities we do over the year and fun we have. At present the club has 23 members from all different faculties. Of course, our main activity is bird watching and weather permitting we do this every weekend. If we are not going somewhere special, then we do a route census of the birds on the university's Kōrimoto campus. The arboretum is a good place to see birds as well as the Faculty of Agriculture's fields and rice paddies. If you are lucky you might spot a pretty narcissus flycatcher or a blue-and-white flycatcher.



Birdwatching at Manose River in Kaseda

Moving into autumn, we go to Mt. Kanemi in Miyakonojō to help the Kagoshima branch of the Wild Bird Society of Japan conduct their census of the migrating grey-faced buzzards. We also travel up to Izumi in northern Kagoshima Prefecture to see the cranes. Izumi is famous throughout Japan as one of the major wintering grounds for hooded and white-naped cranes. Thousands of them gather here every year, attracting many tourists as well as bird-watchers. If you are lucky you might spot some rarer species, such as the common crane, in amongst the other cranes.

We also make a trip to northern Kyūshū to see birds such as the black stork, which you cannot see down here in the south.

Finally in the following Golden Week we pack our rucksacks and head down to Tairajima in the Tokara Islands, 9 hours by boat from Kagoshima city. The Tokara Islands are a chain of very small islands between Amami-Ōshima and Tanegashima/Yakushima, and they are a bird-watchers dream. Migrating birds from Taiwan and South-east Asia going to northern Japan and the Korean Peninsula used the islands as pit-stops on their way. Since the islands are so small, the chances are seeing something rare are high. You can also see the Ryūkyū robin and black wood pigeon which live their all year round. On Tairajima, we camp and also enjoy fishing.

As you can see, we are a really active club and even though most of our members have never been bird-watching before they join, but they soon grow to like it. So, if you are interested in going to many different places both in Kagoshima Prefecture and around Kyūshū and doing a spot of birdwatching, come and join us!



A blue and white flycatcher in the university arboretum



A ruddy kingfisher at Lake Miike

But our main activities usually take us away from the city to different parts of the prefecture and beyond seeking out rare birds, so I would like to take you through some of the events on our annual schedule for new members to show you what we do.

We begin in May when we go to Lake Miike just at the foot of the Kirishima mountains in Miyazaki Prefecture for an overnight stay and barbecue. At this time of year the ruddy kingfisher comes to the forest there. It is however really difficult to spot – in fact most members don't manage to see one there until after they graduate!

In summer, we venture to neighbouring Kumamoto prefecture to see the broad-billed rollers which spend the summers in the woodlands near Mt. Aso. We also go to Miyazaki Prefecture to see the common terns, and of course to have the local speciality, *chiken namban* (deep-fried chicken with tartare sauce). Towards the end of the summer semester, we always go on the *nōryōsen*, when one of the Sakurajima ferries becomes a floating beer garden on summer nights, as well as going to stay in one of the cabins in Sarugajō Valley, just across the bay in Tarumizu. Admittedly not much bird-watching is done at either event but it is a great way to have fun!



On exchange at Linköping University

Ishigami Suzu BA student, Faculty of Law, Economic and Humanities

Hashi Eimi BA student, Faculty of Law, Economic and Humanities

Hiyoshi Eri BSc student, Faculty of Agriculture

The three of us on exchange from Kagoshima are mainly taking classes aimed at overseas students. The highlight amongst them is the class in Nordic Culture. For this class, we have spent a couple of nights in the Swedish countryside as well as in Stockholm to experience Swedish culture firsthand. Even in normal classes we have made Swedish food together. It is a really different learning style to what we are used to in Japan. Eimi has been studying English Literature, Swedish History and a course on Business English. The biggest difference she has found between studying at a Japanese university and here, is that all the students in the classes are expected to participate actively. There is a tremendous amount of group work, and we are also expected to often meet up outside of class to work on tasks. The group work really useful in that if there was anything you didn't understand about the class, you could easily get advice from my friends in the group. There was a lot of work to do for each class, and exam time was particularly difficult, but she definitely feels that it has helped her with her studies.

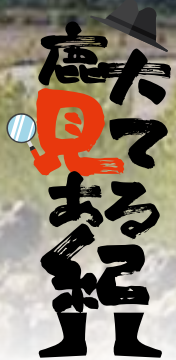
The study environment at Linköping University is excellent. The university library is open 24 hours a day. It has lots of desks and individual study rooms and it's busy throughout the year not just at exam time like in Japan with students studying alone or in groups. We have also spent a lot of time in the library doing homework. There are also study rooms all over

the campus, and students can reserve them easily online. There are even study rooms you can reserve in the university residences so you can study around the clock! There are also many different facilities throughout the university that anybody can use, such as kitchens, microwaves, fridges and coffee makers – in fact everything you need to be able to fika! (Editor's note: Fika is a short break with coffee and cakes and a Swedish institution!)



One of the biggest differences between life in Linköping and in Kagoshima, is that we seem to have more time in Sweden. The shops and restaurants close early so we have spent time having dinner at friends' houses and going to the cinema. The Swedish people live very close with nature and they seem to value time spent with their families very much. In the summer, they go to their summer houses in the countryside with their families, have barbecues, and dance. It really is quite a different way of living to Japan. Winter in Sweden is really long. The cold weather lasted so long, it even snowed in May! Because of that, Swedish people love the sun. Whenever the sun comes out, they all go outside and sit on the grass to eat their lunch or read a book and relax. At the weekends, we have gone out on our bikes to enjoy the countryside – Sweden is really a beautiful country in both winter and summer. The summer has been just the right temperature and we have enjoyed walking in the forests.





Ku-band fast scan Doppler radar

Achieving dynamic observation of large-scale volcanic eruptions

Maki Masayuki, Professor, Research and Education Centre for Natural Hazards

Introduction

After the Great East Japan Earthquake (2011), we face an increased risk for largescale volcanic eruptions. Pyroclastic flows generated by large-scale volcanic eruptions and a falling pyroclastic material can cause immediate damage to the life and property of people in the surrounding areas. A large ash fall would paralyse traffic and communication infrastructure and destroy the daily lives of the local community as well as the economy. In addition if heavy rains occur simultaneously with or around the eruption, they can cause multiple disasters such as floods and landslides. In order to deal with these situations, the pyroclastic material released by volcanic eruptions need to be quantitatively measured and that information used for disaster prevention and reduction measures. Monitoring by surveillance cameras and satellites has been used in conventional observations, but we have found from recent domestic and international studies that meteorological radars are effective for the quantitative evaluation of pyroclastic material.

Based on these findings, the Research and Education Centre for Natural Hazards began outfitting a high-speed scan Doppler radar (KuRAD for short) for use in volcanic observation as part of a research project titled "Creating a Community Resilient to Large Volcanic Eruptions" (2016 – 2021). When large-scale eruptions occur, the distribution of the ash fall will be measured by dynamic radar observation and the information will

be provided to national and local government officials in charge of disaster prevention in order to increase the safety of local evacuees as well as the rescue and reconstruction crews working in the affected areas.

The KuRAD radar

KuRAD is a research Doppler radar intended to dynamically observe and analyse the multiple dangers of volcanic eruptions: the smoke columns, pyroclastic flows and ash clouds. It also observes heavy rainfalls which may cause multiple disasters. Table 1 shows the main specifications of KuRAD. The features of this radar are as follows.

- High speed antenna scan can observe the three-dimensional development of rapidly changing eruption columns at one minute intervals.
- High spatial resolution data at 2m range intervals will reveal the detailed structure of the volcanic plume and pyroclastic flow.
- The radar can easily be relocated to a volcanic area when direct monitoring of the eruption is necessary.
- Flexible observation is possible for seven active volcanos in southern Kyūsyū.
- Remote operation can be conducted from our centre at the university.
- Observation results such as the radar echo and other characteristics of the plume can be broadcast in real time over the web.

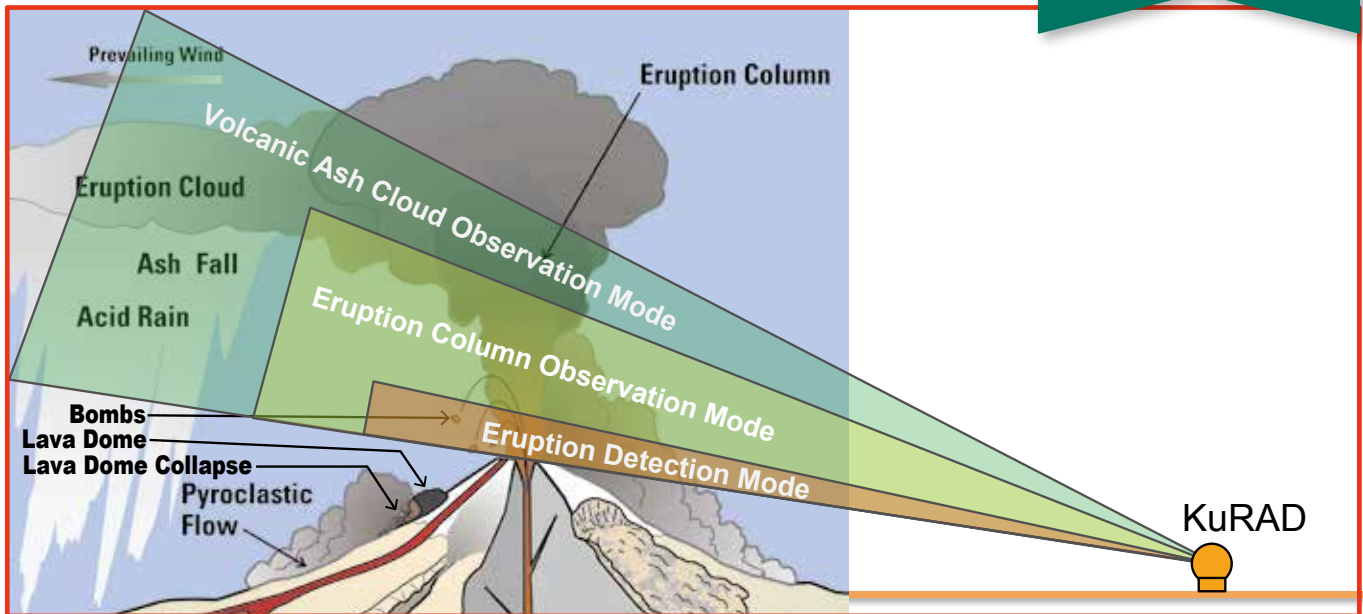


Fig. 1. Diagram of KuRAD observations of a volcanic eruption.

One of the main purposes of KuRAD is to provide information about volcanic eruptions to disaster management authorities. To achieve this, KuRAD can measure the three-dimensional structure of a volcanic eruption column using its high speed antenna scanning. KuRAD is transportable and is authorised to operate at seven active volcanoes in Kyūshū. Diagram drawn based on USGS GIP64 by Meyers & Driedger (2008).

Left: KURAD set up on bank of Kurokami River with Sakurajima in the background (Photo by S. Takahashi)

KuRAD’s observation targets

Figure 1 is a conceptual diagram of a KuRAD observation. In order to efficiently observe eruption phenomena, we use three types of antenna scan modes, eruption detection mode, smoke column observation mode and volcanic ash cloud observation mode. In the eruption detection mode, the azimuth angle and the elevation angle of the antenna are fixed and continuous observation is done directly above the crater with high spatiotemporal resolution. The Doppler velocity of the gas thrust area as well as its radar reflective factor during the eruption are measured in order to monitor the eruption and the smoke plumes, their collapse and possible formation of pyroclastic flows. The eruption column observation mode monitors the gas thrust area of the eruption column and observes the formation process of the smoke column directly above the crater with relatively high spatiotemporal resolution. Low elevation angle SPIRAL scan is the basis for this mode. The ash cloud observation mode is intended to monitor the entire process from the eruption pillar to the formation of volcanic ash cloud. The time resolution

is not adequate for the previous two modes, but in one minute it is possible to observe the whole structure of the eruption column and the volcanic ash cloud in three dimensions.

Finally

In March 2017, we set up KuRAD on the left bank of the Kurokami River on Sakurajima and made observations to confirm its basic performance. Moreover, by comparing its observation data with that of ash fall particle measuring equipment installed on the ground, we are developing a quantitative ash fall estimation method and an ash fall “nowcast” – real-time forecast and prediction. I would like to take this opportunity to thank the Ministry of Education, Culture, Sport, Science and Technology (MEXT), the Ministry of the Environment, The Ministry of Land, Infrastructure and Transport (MLIT), Kagoshima Prefecture, Kagoshima City and the NPO RaiRan, who have all cooperated in developing and setting up KuRAD at Sakurajima experimental site.

Antenna	Type	Luneburg	Transmitter	Frequency	15.75GHz
	Diameter	45cm		Output	40dBm (max)
	Beam width	3°C (AZ/EL)		Modulation	FM CHRP
	Amplification	36dB		Bandwidth	80MHz (max)
	Polarization	Single polarization	duty	0-100%	
	Rotation speed	20-40 rpm	Receiver	MDR	3dBZ@4km
	Scan range	AZ:360° , EL:90°	Noise Figure	3dB (min)	
	Scan Mode	Spiral, PPI, RHI, POS	Signal processing	Range gate	8192
			Output	Zh, Δ Vh, σ h	

Table 1. Main specifications of KuRAD.



Sakura Exchange Programme in Science

Learning environmental conservation from nature and disasters in Kagoshima

Suzuki Eiji, Director, Global Initiative Centre



Farewell party at Kagoshima University.

The Japanese Science and Technology Agency (JST) runs the Sakura Exchange Programme in Science to enhance the exchange of young people in Asian countries and Japan who will play a crucial role in the field of science and technology. As part of this, the university's Global Initiative Centre was able to run a short-term programme in March 2017 on learning environmental conservation from the nature and natural disasters of Kagoshima Prefecture.

Kagoshima Prefecture has beautiful nature with four national parks and two world heritage sites, but there are also many environmental issues such as the volcanic activity of Sakurajima, Minamata Disease, and the overcrowding of 10,000 wild cranes in Izumi. Kagoshima University has tried to solve these issues. Our experiences will give suggestions for young students from Asian countries. From 5 to 11 March 2017, we invited ten students from four universities in Indonesia (Andalas University, Bogor Agricultural University, and Institute Technology Bandung) and Malaysia (Universiti Malaysia Sabah). All students came to Japan for their first time.

After their arrival and welcome party, we had five lectures on our Kōrimoto Campus: Japanese culture, environmental issues of mercury, national park management, vegetation and nature in Kagoshima prefecture, and natural disaster of Sakurajima



Discussion about Japanese culture.



Students in front of the torii shrine gate buried in the 1914 eruption of Sakurajima

On second day we visited Sakurajima on the university bus. Few students had ever seen an active volcano before, so Sakurajima seemed to be very interesting

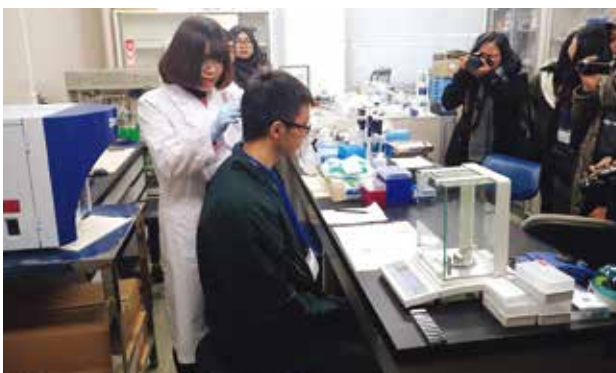
for them. The hot springs, small Sakurajima mandarin oranges, and big Sakurajima daikon radishes also surprised them.

Next we had two days travel to northern part of Kagoshima Prefecture: Minamata, Izumi, and Kirishima. We got the shinkansen to Minamata in Kumamoto Prefecture.



On the shinkansen

We visited the National Institute for Minamata Disease, where we were given a short lecture about Minamata Disease and did an experiment to measure mercury content in human hair. Minamata is a beautiful place now, so it is difficult to imagine that such a terrible disease broke out here.



Sampling hair to measure mercury content.

Izumi adjacent to Minamata is famous for being the wintering ground of wild cranes. Every winter more than 10,000 migrate here. The scene of hundreds of flying cranes is astonishing, but such a concentration of birds has led to an increased risk of an epidemic which could affect them. Izumi also preserves its samurai houses which were built more than 100 years ago. Here we experienced a traditional Japanese life style.



Watching cranes in Izumi

On the second day of our short trip, we visited Tsuruda Dam on the Sendai River, the longest river in Kagoshima Prefecture and one where huge flooding often occurs bringing disaster to the local people. The dam engineers explained how the dam helps to control the flooding.



Monitoring tunnel inside the dam.

After the dam, we visited Ebino in Kirishima National Park to learn about the management of national parks. It was a cold day and the students enjoyed the snow for the first time in their lives.



In the snow at Ebino

On the final day of the programme, we visited Senganen, a World Cultural Heritage site. It is near Kinko Bay, and the sakura cherry blossom welcomed us.



Under the sakura at Senganen

On the last night we had a farewell party and promised to meet again. This programme is very short but makes a great impression on the participants. I hope we will be able to run it again.

UNU President David Malone visits President Maeda and gives lecture on UN initiatives

On 2nd June, the United Nations University (located in Aoyama, Tokyo) President David Malone made a courtesy visit to President Maeda Yoshizane.

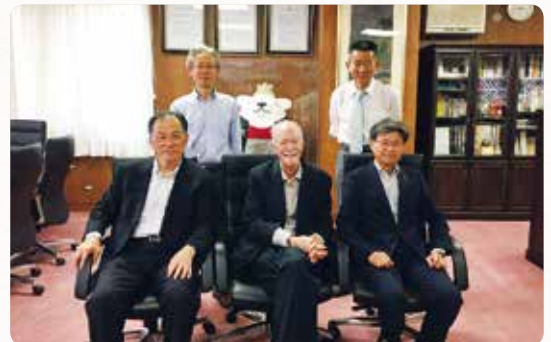
Mr. Malone, who was visiting Kagoshima for the first time, was impressed by the extensive and lush Kagoshima University campus situated in the centre of the city. He stated his hopes that more and more international students not only from East and Southeast Asia but also India would come to Japan and to Kagoshima University to pursue studies about environmental and global issues in a safe and accommodating atmosphere, which is one of the reasons Japan is so attractive to foreign researchers.

Professor Takamatsu Hideaki, vice president and director for research, Professor Suzuki Eiji, director of the Global Initiative Centre, and Professor Hoshino Kazushi from the Kagoshima COC Centre were also present during the meeting and a productive exchange of opinions was held about various topics related to Kagoshima University's international students and different undertakings.

After the meeting, President Malone held a lecture about the possibilities and risks related to the 17 Sustainable Development Goals (SDGs) set by the UN in 2015 and to be achieved by 2030. He spoke in front of 70 people from the university and the public (including foreign students) at a lecture hall in the Faculty of Law, Economics and Humanities.

In the lecture, after explaining the history of development problems since the establishment of the United Nations, he stressed the importance of considering each country's specific circumstances and needs in order to achieve the great global challenge of meeting the 169 targets defined within the 17 SDGs. He also emphasised the importance of education and health, especially for combating poverty in developing countries.

After the lecture, a Q and A session was held, and opinions were exchanged with hearing-impaired members of the audience with the help of sign language interpreters



Assistant professor Hamada Norifumi receives Kagin Cultural Foundation Award



Assistant Professor Hamada Norifumi of the Kagoshima University Hospital received the 2017 Kagin Cultural Foundation Award. It is granted by the charitable organization Kagin

Cultural Foundation for activities that contribute to the development of regional culture and the revitalisation of the region. Usually awarded for cultural activities

such as arts, sports and traditional crafts, since this year it also acknowledges academic and scientific achievements.

Assistant Professor Hamada developed an oral cancer screening method using gargle liquid and released the patent to the public domain. It can be very useful for Kagoshima prefecture with its many outlying islands and remote areas because it offers a quick and easy way to detect oral cancer by examining gargle liquid. The great potential benefits for the community have been recognised through the award.

This screening method is currently under consideration for practical application.

Graduate School of Science and Engineering student receives Student Award of the Society of Chemical Engineers

Danjō Sō, a second-year chemical engineering student in the Graduate School of Science and Engineering received the Student Award (Master's Division) of the 2017 Student Awards Committee of the Society of Chemical Engineers, Japan, held at the West Japan General Exhibition Centre on 1st July 2017.

The panel judged the applicants' ability to think by themselves, to develop their own ideas and expand them into original research as well as how they present and promote their research. Five presentations were selected from each university belonging to the Kyushu branch of the society. Sō was the only participant awarded in his division.

The title of his presentation was "Development of gluconic acid modified chitosan cryogel with autoclave sterilization resistance and its application for wound dressing".



Technology Club participates in local science festival

The Technology Club of the Graduate School of Science and Engineering participated in the 2017 Kagoshima Youth Science Festival held at the Kagoshima City Science Museum on 22nd and 23rd July. It is their fifth participation in the event and the 64th time they have engaged in organised activities with the local community.

The club worked with their usual topic: "Shining rainbow colours, a kaleidoscope of light!" Their activity used spectroscopic sheets that divide light into various colours and create a kaleidoscope that makes the light appear rainbow-coloured. The children who took a look in the kaleidoscope were delighted and impressed.

In addition, the team used the kaleidoscope and some LED lights to provide a brief explanation about light. The children in the audience were surprised and delighted to see how the three basic colours turn into white in the kaleidoscope. The long queues at the club's booth over the two days proved its success.

Many children and adults participated in this event, all the topics covered were well-attended and it was a great success. At the Technology Club booth more than 400 children enjoyed making kaleidoscopes together with their parents and guardians; in all, over 600 local people joined the team during the festival.



The meeting space



Building kaleidoscopes



Explanations using LED lights



Ohara Matsuri, Kagoshima's largest festival

Nikolay Gyulemetov, Lecturer, Global Initiative Centre

Like the rest of Japan, Kagoshima has numerous festivals happening throughout the year. The biggest and one of the most popular festivals to be held in the city is the Ohara Matsuri. Held every year at the beginning of November, it attracts tens of thousands of participants and spectators. It is a relatively recent festival, first held in 1949 to commemorate the 60th anniversary of the foundation of the modern Kagoshima city. Its name, however, has much older origins: it is inspired by the popular folk song, Oharabushi, which was in turn based on an even older

song sung by the samurai of Hyūga (modern Miyazaki Prefecture) during the early Edo period. Samurai from the village of Harara (now part of Kagoshima city) adopted and spread the song all over southern Kyūshū until eventually it became associated with their hometown. It was chosen for the name of the festival in order to connect the old traditions with modern Kagoshima and that is how the Ohara Matsuri festival was born. Large groups of dancers get together to perform to the tunes of Oharabushi, Kagoshima Hanyabushi and other folk songs, wearing colourful



The Ohara Matsuri Festival parade in Tenmonkan © Kagoshima City (used with permission)

outfits and parading along Tenmonkan's largest avenues.

The Ohara festival has achieved popularity around Japan, with people visiting the city to participate or watch the parades. Also, it is one of the few examples of a local festival that is also held in Tokyo! Every year at the beginning of May the Shibuya Kagoshima Ohara Festival is held near Shibuya 109 in the heart of Tokyo. It started in 1998 and also attracts thousands of dancers and spectators, helping to promote Kagoshima to the rest of Japan and the world.

As the festival is open to all who want to sing and dance, many foreign residents and international students join the festivities. There are groups and organisers in place to help even those without any knowledge of Japanese to participate and enjoy a day or two of vigorous dancing, singing and partying. It is yet another opportunity for citizens and visitors to immerse themselves in Kagoshima's rich and diverse traditions, a mixture of old and new.



Foreign participants dancing © Kagoshima International Exchange Foundation (used with permission)



Front Cover: Faculty of Science Buildings

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KU Today



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