

I couldn't have picked a better country than Japan to mark my first time leaving the United States. Since my arrival, I have been treated as a guest at Kochi University. The faculty and students have been extremely welcoming and friendly which has allowed for a much shorter adjustment period than I thought I would have. I have continuously attended events held at Kochi University including festivals and small trips meant for international students, enabling me to meet a variety of different students from all around the world. I want to keep exploring Kochi and the different surrounding prefectures to enhance my global understanding of life outside America. I am very thankful for the opportunities that I have worked to receive and I hope to use my knowledge gained at Kochi University to help the world in any way that I can.



Jalilah Gonsalves
University of Rhode Island
in the United States,
Second-year student

Student Exchanges

University of Rhode Island

Rio Sashida

Tosa Sakigake Programs
International Education Program,
Kochi University, Second-year student



August 27th 2016. I'm sure I'll not forget this day, the day my dream to come and study in the U.S came true. I've liked English since junior high school and studying in the U.S has long been a dream. But while I expected my English skills would dramatically improve, I've learned much more besides.

I'm attending the University of Rhode Island (URI) and, since coming here, I've changed my attitude towards studying. Teachers give students homework almost every week. Also, students state their opinions freely in class, making classes lively and interesting. I've also discovered the many cultural differences between Japan and the US. Here on campus, for example, there is actually a Christian church. Also, among the American students I see white, black, and Asian faces, and exchange students from Asia, Europe, and South America. The atmosphere is very different to Kochi University.

While here I have reflected on and reconsidered my life in Japan, helping me to understand it better. All in all, I have discovered a lot through studying abroad, and my outlook has changed and broadened.

Faculty of Education student places in competition

Preliminary and final selections are held throughout Japan, and the national competition takes place in Tokyo. Competing in the university section, Ryoko Izumi wonderfully captured fourth place.



Faculty of Education,
third-year student
Ryoko Izumi

The 25th Japan Classic Music Competition
Clarinet Section, fourth place

Launch of the Center for Disaster Prevention Promotion, Kochi University

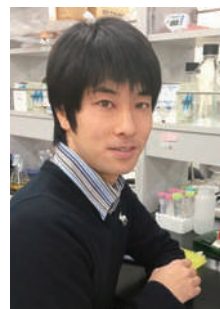
On February 1, 2016, the Center for Disaster Prevention Promotion was launched by upgrading the Section of Disaster Prevention within the Science Research Center. Bringing together researchers in various fields related to disaster prevention, the center aims to not only contribute to the development of cities and local communities resilient to disasters but also to train highly-skilled disaster prevention human resources. In collaboration with industry, academia, and the government, the center conducted a field investigation of damage caused by the earthquake centered in the Kumamoto region in April 2016 immediately after the disaster, and the center held the Kumamoto Earthquake Field Investigation Preliminary Briefing, at which reports were made on numerous issues, including damage to structures, liquefaction, medical care activities by Kochi University's DMAT, and conditions at evacuation centers.



Discovery of Targets for Anticancer Drugs Wins Global Praise as an Important Discovery

A research group consisting of various members including Specially Appointed Assistant Professor Takushi Namba of the Science Research Center discovered a marker for anticancer drugs that will lead to the development of new anticancer drugs with little risk of side effects. The results were published in the U.S. scientific magazine *Oncotarget* as a priority research paper. In addition, the paper was selected as a key scientific article by the Canadian medical and life science information website *Global Medical Discovery*.

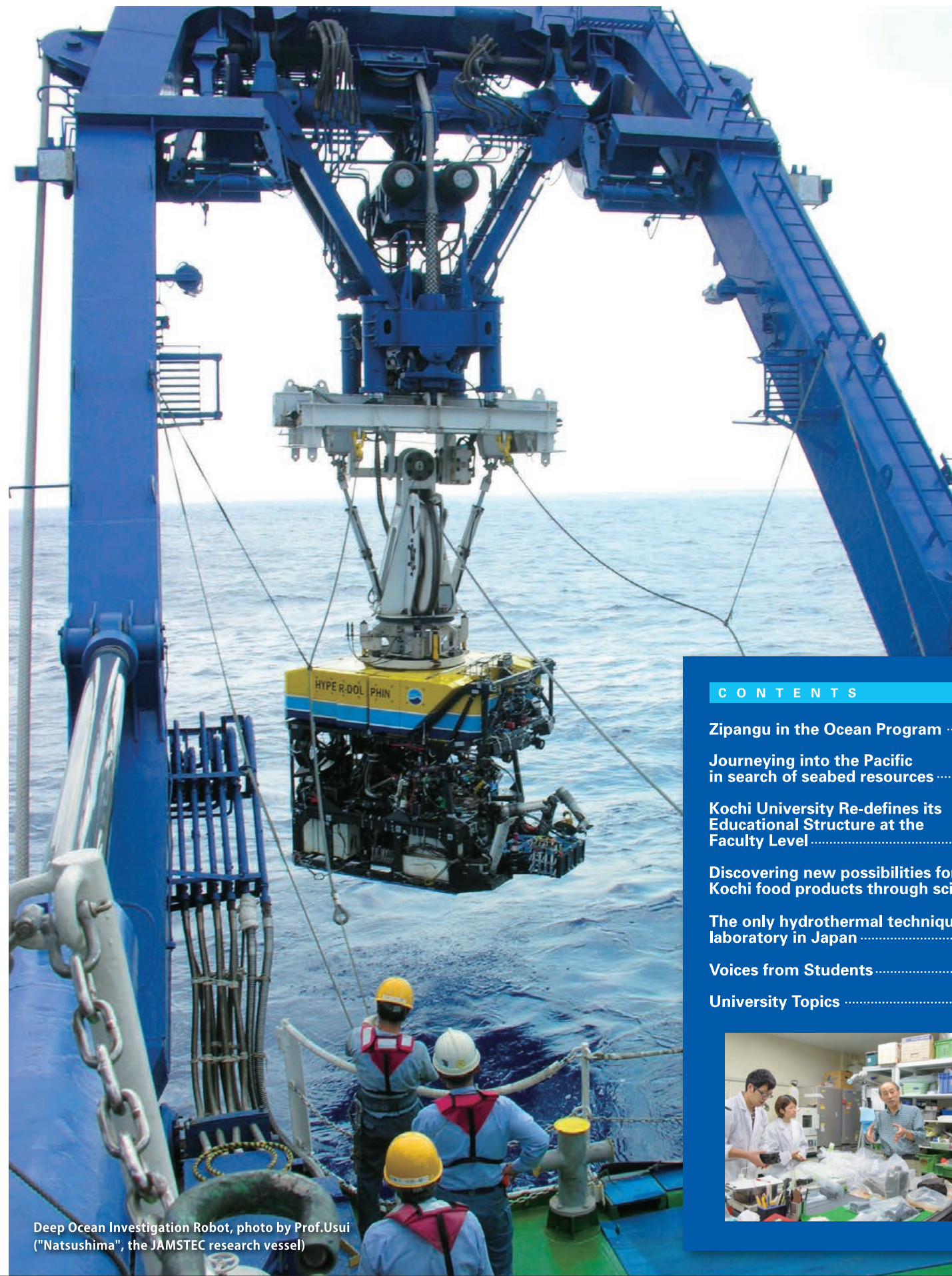
*The website introduces twenty noteworthy papers that the Judging Committee selects every week from the more than 20,000 papers published in international journals in the field of science and medicine. It has won high praise throughout the world.



Specially Appointed
Assistant Professor
Takushi Namba

Event with Volker Finke, a leader in the world of German soccer

Mr. Volker Finke, a leader in the world of German soccer who has served as the coach of J.LEAGUE Urawa Red Diamonds and the Cameroon national team, was invited to take part in various events including the Children's Soccer Clinic and Symposium. Let's Talk about Kochi Sports, which around 400 children took part in. Mr. Finke actively urged on children who were energetically chasing soccer balls and communicated the joy of soccer through his smiles. In addition, during the symposium, Mr. Finke gave a talk on contributing to local communities and raising children through sports and explained the importance of efforts conducted jointly with local communities using some examples in German. The Kochi University Soccer Club, members of whom took part in the Children's Soccer Clinic as coaches, won the Shikoku University Football Tournament Final, capturing the title for the 16th consecutive year and twenty-six times overall.



Deep Ocean Investigation Robot, photo by Prof. Usui
("Natsushima", the JAMSTEC research vessel)

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Seeking the Wealth of Mineral Resources in Our Seas

Council for Science, Technology and Innovation, Cabinet Office
Cross-ministerial Strategic Innovation Promotion Program,
Next-generation Technology for Ocean Resources Exploration

Zipangu^{*} in the Ocean Program

Three of Kochi University's proposals for commissioned research selected

Of the six selected proposals for research being commissioned for the Next-Generation Technology for Ocean Resources Exploration Program, which is being promoted by the Japanese government and commonly referred to as the "Zipangu in the Ocean Program", three were submitted by Kochi University. Only Kochi University achieved the remarkable feat of having three of its proposals selected.

The Zipangu in the Ocean Program project targets seabed mineral resources in the oceans around Japan. It consists of a series of steps that are necessary for seabed development, and is expected to be established by the 2018 fiscal year. There steps are (1) scientifically ascertaining how seabed mineral resources come about and grow, (2) developing technical and research methods required for seabed exploration, and (3) conducting an environmental impact report for seabed resource excavation.

"Having attracted various researchers including Professor Usui, the leading figure in Japan in the field of manganese deposit research, Kochi University is now the leading center for seabed resource research and technology in Japan".

In the 2016 academic year, the Marine Resources and Environmental Course was launched by Kochi University.

"Students who take this course receive education in the leading science involved in seabed resource research.

There is also growing expectation that this will lead to the development of industry in Kochi. Companies within or without Kochi are taking part in the joint development and operation of equipment used for seabed resource exploration.

"The goal is to generate 2.0 billion yen in revenue from the sale and operation of equipment. Furthermore, it is expected that the development of these industries will provide employment opportunities for students."

The research abilities of Kochi University may dramatically transform the future of Japan and Kochi.

*Zipangu is a name for Japan that was used in the accounts of the travels of Marco Polo. It was thought to be fabulously rich in silver and gold and owing the possibility to access precious ores.

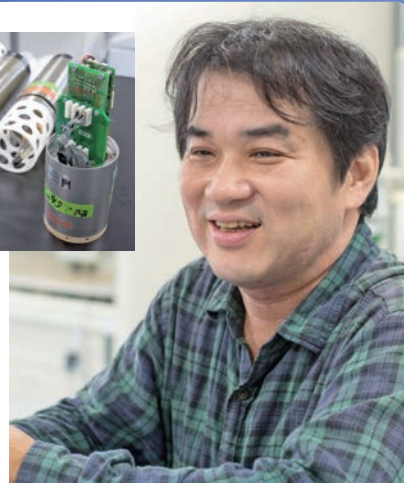
Selected research topic

01

Creating physical science and biological observation technology that contributes to the investigation of the scale and quality of blind hydrothermal mineral deposits

Faculty of Agriculture and Marine Science, **Kei Okamura**
Professor

Hydrothermal mineral deposits are found at locations where there is venting of hot hydrothermal fluids containing minerals such as gold and silver. These minerals then precipitate in the surrounding area. In order to ascertain the size of these deposits, we are developing equipment to measure underground flows in hydrothermal areas. We will be able to install equipment such as sensors and water pressure gauges and make measurements by piercing the seabed.



Selected research topic

02

Earth science research on the diversity of seabed manganese deposits that include rare metals

Center for Advanced Marine Core Research,
Specially Appointed Professor

Akira Usui

Seabed manganese deposits that contain rare earth metals such as cobalt, nickel, and platinum can be found here and there in the ocean around Japan. We are examining how they are distributed by actually going to where they are; and by bringing back samples, we can examine when they formed, how they grow now, and where they are.



Selected research topic

03

Clarifying hydrothermal chemical reactions in order to construct deposit models

Faculty of Agriculture and Marine Science,
Associate Professor

Takuroh Noguchi

This is research on clarifying the physical conditions under which precious metals such as gold and silver contained in hydrothermal fluids precipitate, forming hydrothermal mineral deposits. The research is being conducted jointly with Kyushu University. In fact, we observe fine hot water streams and the environment in the Okinawa Trough, which possess hydrothermal mineral deposits.



Journeying into the Pacific in search of seabed resources

Geology of seabed resources

Professor Usui, your field is the geology of seabed resources. What type of research do you conduct?

Usui: The seabed is drawing attention as a potential future resource, but the resources it contains are not well understood. The main objective of my research is to clarify the environment in which they form and the formation process using a marine geology approach, mineralogy approach, and earth science approach.

How do you conduct that research?

Usui: The research begins when you head out to sea. We submit research proposals to national organizations such as the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) and Japan Oil, Gas and Metals National Corporation (JOGMEC). And if the proposal is selected, we get a place on the marine resource research vessel. We head out into the Pacific, extract rock, which includes rare metals, from the seabed, bring the

rocks back to the lab, look at them under the microscope and analyze their composition, and engage in various other activities.

Mr. Nishi, you are in the doctorate program. What was your motivation for joining the Usui lab?

Nishi: Before entering the university, I took part in an open campus event, and at that time, I learned that a lot of marine research was being conducted, which sparked my interest. The university has incredible facilities and equipment, including the Center for Advanced Marine Core Research. Through my studies after entering the university, I confirmed my strong desire to conduct marine research and so joined the lab. I also had a strong desire to conduct research on the research vessel. I have already done researches on the vessel a total of eight times.

Usui: Sometimes proposals are accepted, and sometimes they are not. During the 2015 financial year, my proposal was selected, and in December three students went on the ship.



'Natsushima',
Photo by Prof.Usui,
the JAMSTEC research
vessel

I truly believe that
it will be useful to
humanity in the
future.

Professor

Science Research Center,
Specially appointed
professor

Akira Usui



I have already traveled
on the marine resource research
vessel eight times.



"Kaiko", Deep Ocean
Investigation Robot,
photo by Prof. Usui

Graduate School of
Integrated Arts and Sciences,
Studies in Applied Science,
Second-year student

Keisuke Nishi
Student

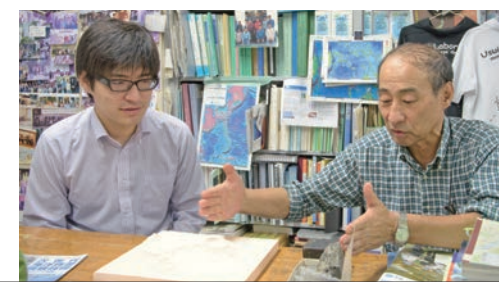


Ocean voyages sound interesting

Nishi: It is really enjoyable because short voyages are about two weeks, and long ones can be about a month. At first, I went off the coast of Shikoku, but I now often travel all the way to the Pacific plate which is located at the most eastern part of Japan, around Minami-torishima.

Usui: The time on the vessel is very stimulating because there are extremely talented researchers in different fields and of various ages on the vessel. Furthermore, overcoming the hurdles to work collaboratively creates a sense of solidarity.

Nishi: I, too, have seen raw samples and had discussions with other researchers on the vessel, which is my favorite aspect of the work.



Usui: As for exchanges with other researchers, there are, in fact, researchers in various fields related to the ocean at Kochi University.

It seems that the marine research being conducted at Kochi University will draw more attention in the future.

Nishi: Kochi University is the only university where it is possible to conduct research on manganese, and I am really glad that I came here. It would be great if I could use what I learn in this lab to find work related to marine exploration in the future.

Usui: I worked at a research institute of the then Ministry of International Trade and Industry for many years, but I always thought that I wanted to conduct marine research. If I such a chance, I wanted to do it at Kochi University, which has the best facilities in Japan. With that idea in mind, my dream came true thirteen years ago. It is still my opinion that just as it was thirteen years ago, Kochi University is the best university for conducting marine research.

Kochi University Re-defines its Educational Structure at the Faculty Level



- Humanities Course
- International Studies Course
- Social Sciences Course

Faculty of Humanities and Social Sciences

Faculty of Humanities and Economics transforms into Faculty of Humanities and Social Sciences

Because of societal changes, such as the spread of globalization, modern society strongly needs people who not only possess general and specialized knowledge but also flexible thinking that is not bound by traditional fields. Therefore, the new Faculty of Humanities and Social Sciences was established to eliminate the barriers between departments and create an integrated educational program based on the new idea of fostering education in the humanities and social sciences. With a single department, consisting of three courses, we can provide students with a new type of education so that they can tackle both global and local problems and flexibly respond to changes in society.



Dean of the Faculty of Humanities and Social Sciences Professor

Hiroshi Yoshio



- Department of Mathematics and Physics
- Department of Information Science
- Department of Biological Sciences
- Department of Chemistry and Biotechnology
- Department of Global Environment and Disaster Prevention

Faculty of Science and Technology

Accomplishment. If you put your mind to it, you can accomplish anything.

Kochi University's Faculty of Science will be reborn as the Faculty of Science and Technology on April 1st 2017. Plans are for the new faculty to be composed of five departments—the Department of Mathematics and Physics, which provides the founding blocks to the natural sciences; the Department of Information Science, which covers a wide range of fields extending from the fundamentals to the application of computer science; the Department of Biological Sciences, which makes use of the rich nature of southern Shikoku, The Department of Chemistry and Biotechnology, at which students add advanced skills to their foundation in chemistry and biological science; and the Department of Global Environment and Disaster Prevention, where students acquire comprehensive skills relating to natural disasters. The faculty's goal is to meld science education that stresses logical thinking and engineering education that stresses actual use. We educate students so that they can make decisions based on science regarding the various problems society faces.



The Chairman of the Preparatory Committee for the Faculty of Science and Technology Professor

Tomohiko Suzuki



- Department of Agriculture, Forestry, Bioresource and Environmental Sciences
- Department of Agricultural Chemistry
- Department of Marine Resource Science

Faculty of Agriculture and Marine Science

Dramatic expansion of covered fields to include everything from land to oceans

This is a new faculty that adds the fields of marine resources and marine bioscience to the traditional Faculty of Agriculture. Although you may think that there is a different orientation for the agricultural and marine sciences, that is not true if you consider it from the perspective of capturing and making use of resources and energy. Searching for and capturing resources and making use of them is essentially the same on land and in the ocean, is it not? Because of that, our faculty was created on the principle of doing these activities together. Kochi University has touted that it is on the front line of marine exploration. Because both mining and agriculture are primary industries, one could probably say that the Faculty of Agriculture and Marine Science is a grand coalition of primary industries.



Dean of the Faculty of Agriculture and Marine Science Professor

Tsuneo Ogata

Searching for greater food functionality

Discovering new possibilities for Kochi food products through science

(Research is conducted throughout Kochi)



Shimanto City

Potential of *suji-aonori* (seaweed) for preventing high blood pressure



Shimanto Town

Potential of *kuri shochu*, a distilled beverage made from chestnuts, for preventing high blood pressure



Yusuhara Town

Potential of *sakura* tea extract to promote antioxidation



Otoyo Town

The functionality of *goishi* tea



Umaji Village, Kitagawa Village

Functional flavonoids in *yuzu* peels



Tosa City

Potential for tomatoes' to promote antioxidation



Kami City, Nankoku City, Konan City

Ginger and Chinese chives' antibacterial activity against *helicobacter pylori*



Kuroshio Town

Potential of bonito to aid recovery from fatigue



We talked to Associate Professor Tomoko Shimamura, who is conducting research to clarify the functionality of foods grown in Kochi

The discovery that Chinese chives can eliminate *helicobacter pylori* was completely unexpected, which is interesting.

What type of research are you conducting?

I mainly research the functionality of foods grown in Kochi. I examine what type of benefits these foods have for the body and what food components give them their functionality. For example, working with Kuroshio Town, which is famous for its pole-and-line caught bonito, I analyzed 2-4 bonito a week for one year in order to examine how the seasons impact on the presence of substances that aid in recovery from fatigue. In my lab, students are studying the active ingredients of ginger, and the amount of a protein that is said to prevent diabetes in tomatoes and eggplants.

What is some extremely interesting research that you have done?

My research on Chinese chives was interesting. Working with the Medical School, we were looking for a product that kills *helicobacter pylori*, bacteria that is a cause of stomach ulcers, and we learned that a compound related to the smell of Chinese chives demonstrates antibacterial activity. Kochi produces the largest volume of Chinese chives in Japan, and it would be nice if this research resulted in greater consumption of it.

How do you conduct your research?

Foods contain numerous components. For example, with Chinese chives, we can create a liquid extract, and separate a particular substance by using a resin that attaches only to that substance, and remove the desired component. We add that component to bacteria and see what happens. Because we examine each of the components in the liquid extract of Chinese chives one at a time, the research takes a lot of patience.

Applying, to modern life, knowledge possessed by ancient peoples that has been scientifically verified

Things that people in the past knew as rules of thumb have led us now to discover food components. You can obtain new scientific knowledge and solve problems by taking a scientific look at ordinary food products, which is interesting. I want not only to continue to conduct research on food functionality that can be learned from the foods in Kochi, which is blessed with numerous food products, but also this to be my life's work and my contribution to the local community.



The faculty of Agriculture and Marine Science, Associate Professor

Tomoko Shimamura



The only hydrothermal technique laboratory in Japan

Research Laboratory of
Hydrothermal Chemistry Attached to the
Faculty of Science

You can do that with just water and heat?

Yanagisawa: There are other distinctive features of the hydrothermal technique. Deep under the earth's crust is another high-temperature, high-pressure environment. Many inorganic substances dissolve in the water under these conditions. When the water rises to the surface of the earth, the temperature and pressure drop, and the substances come out because they cannot remain dissolved. Hydrothermal mineral deposits form through this reaction. We are able to artificially produce deposited minerals by reproducing these conditions in the lab.

Mr. Takita, what was your motivation for joining the Research Laboratory of Hydrothermal Chemistry?

Takita: Even before joining the lab, I wanted my graduate research to be about something that was kind to the environment. When I found out that the lab is creating thermoelectric materials that can transform waste heat that is simply discarded into electricity, I was intrigued.

The hydrothermal technique is a method to synthesize things.

Professor

Head of the Research
Laboratory of Hydrothermal
Chemistry Attached to the
Faculty of Science
Professor

Kazumichi Yanagisawa



I'm really into experiments related to thermoelectric materials.



Faculty of Science,
Department of Applied Science,
Applied Chemistry Course
Fourth-year student

Naoya Takita
Student

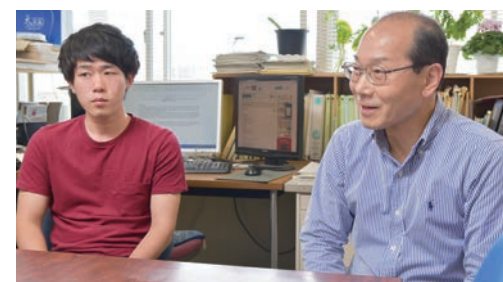
How do you conduct your experiments?

Yanagisawa: We conduct experiments using a device called an autoclave, which is a pressure container for high-temperature and high-pressure water.

Takita: We mix reagent chemicals in a beaker, place the mixture in a small autoclave, seal it, and then warm it with an electric furnace. It works on the same principle as a pressure cooker, and as the temperature increases, the internal pressure goes up. I have created the chemical compounds copper, iron, and sulfur.

Yanagisawa: His experiments are conducted jointly with the National Institute for Materials Science (NIMS). We do this work because our hypothesis is that if we use the hydrothermal

technique to create the materials, it should be possible to obtain better physical data. In addition to our work with NIMS, we are conducting joint research with private companies on various topics such as breaking down CFCs. We would like to conduct research that meets the needs of society using the hydrothermal technique as one technique.



Voices from Students

"A chance to take part in a world championship precisely because of my hearing impairment"

Appearing in an international competition as a member of the Japanese team

In July of this year, on a volleyball court in Washington, U.S., Takuya Kano, who was born with a hearing impairment, stood facing a team of foreign players on the other side of the net. "I was nervous because it was my first international game. All the players on the other side were at least 2 meters tall, and I was looking straight at their chests. I had practiced a lot, but I felt that their power and height would make all that practice futile." The game is known as "deaf volleyball for players with hearing impairments". The rules are the same as those for regular six-person volleyball, but players have to remove their hearing aids during the game and play the game in silence. "In volleyball, voice signals are important, but in deaf volleyball, they are not permitted. So, we practice to learn each other's moves by envisioning the various ways the ball will move."

Kano was selected as the team captain for the world championships this summer, and it is likely he will take part in the Deaflympics,*which will be held in Turkey next year.

A global sports event for people with hearing impairments. Compared to other disabilities, hearing impairment has little other impact on a person's other physical abilities. For this and other reasons, people with hearing impairments are not permitted to take part in the Paralympics.



Medical School,
sixth-year student

Takuya Kano

Work the land and develop fields to grow food for emergency supplies! Bond with the local community

Disaster Assistant Team



Growing sweet potatoes as a disaster prevention activity

In October, members of the student club named *Bosai-Suketto-tai* or "Disaster Assistant Team", held a lively harvest festival with Kochi City residents. Representative Arata Orinaka had the following to say about the impetus for the project, "If a Nankai Earthquake hits, students and local residents will have to help each other. Therefore, we wanted to regularly conduct activities with the local community. So, we came up with the idea of the Cultivation Project."

The Cultivation Project involves growing food in abandoned farmland in residential areas, and then using that food for emergency supplies in the event of a disaster. The project in effect kills two birds with one stone because it also invigorates the community through agricultural work and fosters the development of bonds between people.

The project started with students' agricultural work. Using vegetables they grow, students have cookouts in which local residents are invited to take part. In addition, twice a month, they open a community café where students can interact with local residents. Every month they publish the *Kokatsu Shimibun* (Cultivation Newspaper) that introduces new projects and provides information on events. "We want more residents to take part. Therefore, we do all sorts of things so that people will get interested in it."



Faculty of Science,
Department of Applied Science,
Disaster Prevention Science Course,
fourth-year student

Arata Orinaka

The starry skies in Kochi are unbelievable.

Astronomy Club Hoshi-no-kai

Experiencing the amazing night sky of Kochi

"There are almost no houses around the Muroto Promontory, and the view of the night sky from there is incredible. For some people, this year's spring camp was the first time they had seen that starry sky," enthused Aki Nonomiya. The assistant manager of the club, Kyotaro Tsutsumi, explained the moving experience in another way, "The sky was so full of stars, it almost made me sick (laugh). Amazing is the only word I can use to describe it." The *Hoshi-no-kai* (Astronomy Club) makes it possible to experience an amazing night sky, such as is only visible in Kochi. The club's basic activities consist of club meetings and seminars on Friday evenings. Every year in May, the club also holds the "Katsura Beach Full Walk". Tsutsumi says, "You look up at the stars, sleep on the beach and experience the heavens to your heart's content until morning comes."

Another distinguishing feature of *Hoshi-no-kai* is its efforts to interact with local children. In early August each year, in conjunction with STAR WEEK, they put on various events, such as an exhibition of art work with a night sky motif, night viewing tours, and a star related quiz competition, during which people can get better acquainted with the night sky. In November of every year, working with the Astronomy Club of Kochi University of Technology, the club conducts various events at elementary schools, such as building models of stars and holding planetarium viewings. Through these activities, the club interacts with the local community and local children.



Faculty of Science,
third-year student

Aki Nonomiya

Faculty of Humanities and Social Sciences,
second-year student

Kyotaro Tsutsumi