

President Katsutoshi Sakurai delivers keynote address at USR Expo 2018 in Taiwan

At the University Social Responsibility Expo in Taiwan at the National Taiwan University on July 28 and 29, Kochi University president Katsutoshi Sakurai delivered the keynote address discussing his "super-regional university" vision. The University Social Responsibility Expo, Taiwan's largest event dedicated to promoting regional collaboration between universities, is a joint initiative of the University Social Responsibility Center, the National Cheng Kung University and the National Taiwan University, under the auspices of the Taiwan Ministry of Education. Sakurai was invited by the Taiwan Ministry of Education to deliver the keynote address on the theme of promoting university collaboration at the regional level. In the keynote address, with the title "The Regional Collaboration Towards 'Super Regional University'", Sakurai spoke of the role of universities in promoting innovation and creativity at the regional level, and described specific Kochi University initiatives such as Tosa FBC, University COC and the COC+ project.

Kochi University President Katsutoshi Sakurai (left) after the keynote address



Meeting representatives of participating universities

Four students from the Kendo club to represent the Chugoku-Shikoku region at the national student kendo championships

The combined 65th Chu-Shikoku Student Kendo Championships and 50th Chu-Shikoku Women's Student Kendo Championships were staged by the Chu-Shikoku University Kendo Federation at the Ehime Budokan in Ehime prefecture on May 20. Four students from the Kochi University kendo club, three male and one female, were chosen to represent the region at the upcoming national student kendo championships, the pinnacle competition for university-level kendo enthusiasts, which will be held on July 7 and 8 at Nihon Budokan in Tokyo. The tournament-style championships for the Chu-Shikoku region consist of one-on-one contests between 256 men and 128 women selected from 35 male and 33 female universities in the Federation, and effectively serve as qualifiers for the national championships. After a series of excellent contests, just 16 men and ten women won through to the national championships. This is the first time the Kochi University Kendo Club has had four students at the national championships. The victorious students were (in the male category) Takuma Taniguchi (third year), Kazutoshi Kuroiwa (third year), Kuninari Takizawa (first year), and (in the female category) Riho Miura (second year). Interestingly, all are currently studying at the Faculty of Education.



Happiest memories of *Student Exchanges*



Cecilie Nyhus Johansen
Norway
Inland Norway University of Applied Sciences



The summer course was a great opportunity to learn about Japanese culture and language. It was my first time in Japan and I'm so grateful I got to experience Kochi. Through the summer course I got to see some wonderful attractions; such as a cave, a botanical garden and temples. We also got to visit a primary school. I fell in love with the food and admired the kindness that the locals showed. I met new people and got some new friends, who also taught me some important Japanese phrases and customs. I got to experience the typhoon, the sun and a lot of humidity – all in one week. I left Japan wishing I could have seen more, and with a determination to come back. Arigatou gozaimasu.

Katsuho Kori



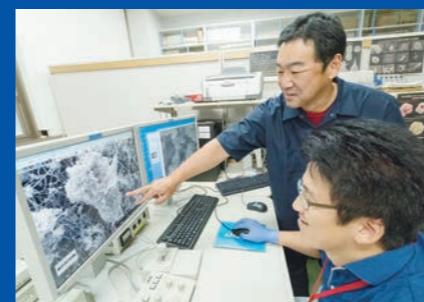
Faculty of Humanities and Social Sciences, Kochi University, Second-Year Student

I studied at Inland Norway University of Applied Sciences for six months. As part of the English course I studied English and American Literature and Culture as well as English language. I also did some classes in Norwegian. It was a heavy workload; I had to do preparation before class and revision afterwards, not to mention group work and discussion during class. But I gradually got used to it, and had some great times staying up late talking with other students. There is an enormous difference in daylight hours between summer and winter in northern Europe. Time seems to pass more slowly, and people are much more laid-back. I was lucky to experience a culture and way of life that is totally different to ours in Japan. Northern Europeans are very friendly and everyone was really supportive. Studying overseas has not only contributed to my education, it's been a learning experience for me personally.



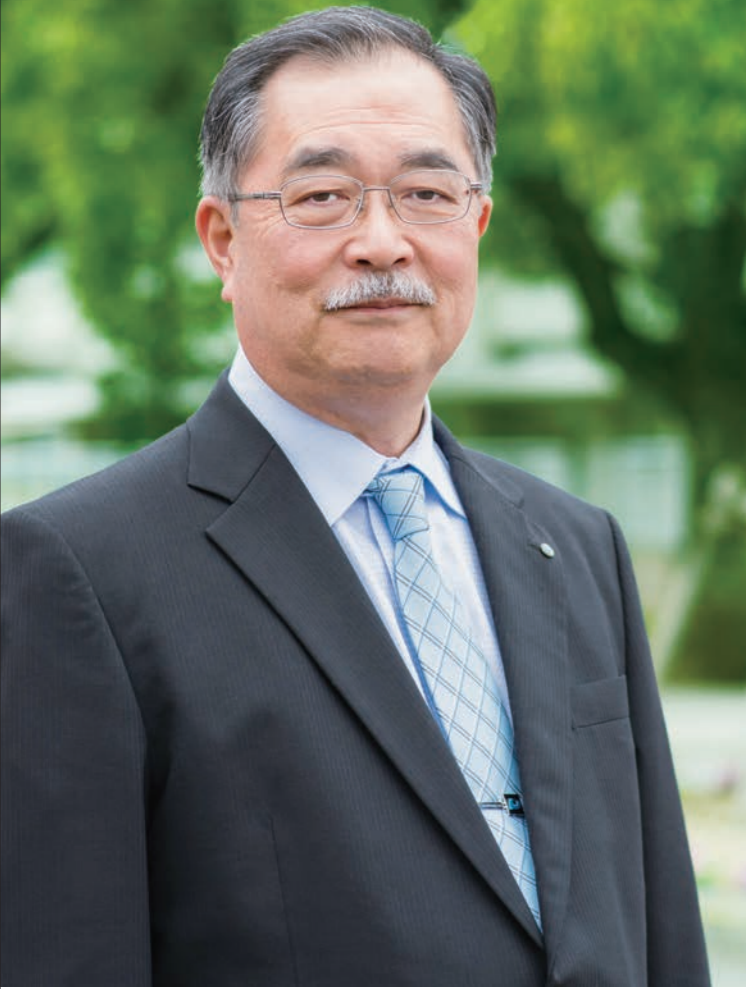
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Professor Nagasaki and senior researcher Akihito Takano monitor images of virus-infected cells with an advanced scanning electron microscope (SEM)

Kochi University the "Super Regional University" for the Future



Asakura Campus



Okoto Campus



Monobe Campus

National University Corporation Kochi University was established on the principle that, 'in accordance with the spirit of the Fundamental Law of Education', we shall contribute to both the local and international communities by promoting the development of opportunities for learning and research and the fostering of human resources.

We believe that the proper functions of the university are education, research, and both regional and international collaboration. We are obliged by our own efforts to constantly pursue the goals of self-reinvigoration and the promotion and expansion of learning on the basis of free creative thinking and on the knowledge that we have inherited from our predecessors. The products of these efforts must always meet the varying needs of society and the times.

Since the National University Corporation system was introduced more than a decade ago, Kochi University has continued to develop its special character. We now aim to

become a Super Regional University, with our main focus set on regional collaboration.

Our guiding principle in education, therefore, is regional collaboration, working with regional communities to help our students learn and grow. Our guiding principle in research is to make use of the great benefits of the Black Current which runs along Kochi's coastline, aiming to tackle natural disasters through interdisciplinary research in all areas of liberal arts and science. Kochi University will produce an even higher standard of practical and academic research and education, while training individuals who can make meaningful contributions to society from local to international levels. Finally, I would like to appeal to you for your heartfelt support and sympathy in the making of our university ever and ever a better one. Thank you.

Doctor of Agriculture
President
National University Corporation
Kochi University



Katsutoshi Sakurai

Born in Osaka prefecture. Graduated in Agricultural Chemistry at Kyoto University Faculty of Agriculture, then completed a Doctorate in Agriculture at the Kyoto University/Graduate School of Agriculture, specializing in soil science and tropical analysis. Joined Kochi University in 1989. "When I was in high school I didn't really know what I wanted to do; I thought I might end up being a diplomat or a musician. Until one day, I discovered the seemingly unexciting world of soil and I was transfixed. And then, before I knew it, I was a soil researcher!"

Practical Studies Seminar Introduction to *International Collaboration*

「How can we get involved in international collaboration?」

What is collaboration?

Each class is led by a leader from a local NGO or NPO, or a student group here at Kochi University. The leaders introduce their work in a local community or overseas and then talk about the wider implications of volunteering and international collaboration initiatives around the world. Students also explore issues closer to home, such as littering or improper bicycle parking on campus, and work together to define the key problems and considerate root causes.

Satoru Ishizutsu teaches Introduction to International Collaboration, a key course component of the Practical Studies Seminar. "When you get to university, there is a distinct shift in emphasis from 'study' to 'research'," he explains. "Your job now is to identify a specific topic or problem and then explore ways to address that. The starting point is of course to identify the topic in the first place. And that's what we teach in the Seminar."

According to Satoru, students are often overawed by the idea of

international collaboration. "They often assume that they have to have good English skills, or that they'll be up against far more experienced researchers, or that international collaboration only happens in other countries. But the reality is quite different. For a start, only a handful of researchers go overseas for joint projects. International collaboration is perfectly achievable right here on the island of Shikoku, in Kochi city. And this is reflected in the subtitle of our program: Developing Global Sustainability Solutions in Shikoku. Students tend to think of international collaboration as a highly specialized exercise, but it is no different to activities and programs that are happening at the local level throughout Japan. If you don't know how to collaborate at the local level, then you won't be any good at international collaboration either. Around 90% of the course content is about the concept of collaboration and the associated principles and techniques."



The importance of on-campus collaboration

Each class is led by a representative from a different local community group active in Japan or overseas, or from one of the student groups here at Kochi University. The representative describes the work of his or her organization and then talks about the wider implications of volunteering and international collaboration initiatives around the world. Students also explore issues closer to home, such as littering and bicycle parking on campus, and work together to define the key problems and consider the root causes.

"Students rightly point out that they shouldn't have to try to address these problems by putting up NO BICYCLE PARKING signs and picking up litter on the campus grounds. And this thought serves as the starting point for

defining the problem. It's a great way to illustrate the importance of collaboration and cooperation in addressing the challenges and issues of everyday life."

In modern society, where the affairs of different nations are more closely intertwined than ever before, Japan needs to be an active participant in the international collaboration community. Satoru is keen to impress this upon his students through his Introduction to International Collaboration course.

"By the end of the course, students should be able to appreciate that we cannot have a sustainable society without constructive collaboration. I hope that I can encourage them to reflect on how they themselves can be good collaborators."

Associate Professor
Faculty of Regional Collaboration,
Pedagogy Section, Science Division,
Faculty of Education and Research

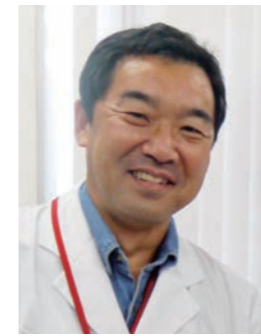
Satoru Ishizutsu



Born in Kanagawa prefecture. Graduated in economics from Nagasaki University before completing a doctorate at the Osaka City University Graduate School of Economics. "My aim is to introduce students to the simple pleasure of putting your mind to something, listening to a range of ideas and learning to accept different opinions and points of view."

The Mystery of Red Tides and Ocean Viruses

Kochi University is part of a major national research project exploring the newly emerging academic discipline of neovirology. Professor Keizo Nagasaki heads the research team on ocean viruses, which is one of the target research topics. We spoke to him about the connection between red tides and viruses.



Professor Science and Technology Department, Natural Sciences Cluster, Faculty of Education and Research

Keizo Nagasaki

Born in Okayama. Received doctorate in agriculture from Kyoto University Faculty of Agriculture. Worked on research into red tides and viruses at the Japan Fisheries Agency Nankai Marine Research Station. Was then moved into a management role but quit soon after to return to his true calling of research, taking up a post at Kochi University. Lists interests and hobbies as tide pools, highballs, Showa retro, arpeggios and drop shots.



A single spoonful of seawater contains hundreds of millions of viruses

A spoonful of water from the ocean may not appear to harbor any obvious life forms. But take a closer look with an electron microscope and what do you see?

"A single milliliter of water taken from a bay area can have anything between ten million and hundreds of millions of viruses held in suspension," notes Professor Keizo Nagasaki, who teaches the Marine Life Sciences program at the Faculty of Agriculture and Marine Sciences. "The oceans of the world are estimated to hold something like 10^{31} viruses. This is a staggering number, beyond our comprehension really. And only a minuscule fraction of them are actually known to us." Nagasaki has spent over 25 years studying the role and significance of marine viruses.

Microorganisms such as bacteria propagate by absorbing nutrients from their surroundings and dividing themselves. Viruses, however, cannot propagate on their own; instead they insert their biological instructions into a suitable host and trick the host cells into producing replicas of the virus. This is how diseases such as influenza and the common cold replicate in the human body.

"We tend to think of viruses as malicious actors, things that cause disease," explains Nagasaki. "Indeed, most virology research to date has focused on correlations with disease and illness. But it turns out that the vast majority of viruses do not impact on humans and have no relation to disease whatsoever. In recent years the main focus of virology research has shifted towards viruses that are unrelated to disease."

2016 saw the launch of a new national research project on neovirology. This involves researchers from all over Japan pursuing a variety of studies looking at the importance of viruses to the global ecosystem and their role in relation to the biogenic activity of organisms and ecosystems. Professor Nagasaki heads a consortium of organizations conducting a joint study of marine viruses that includes Kochi University, Kyoto University, Saga University, the Japan Agency for Marine-Earth Science and Technology (JAMSTEC) and the Japan Fisheries Research and Education Agency (FRA).

Viruses in red tide plankton

Before joining Kochi University in 2016, Nagasaki was working at the Fisheries Research Agency (FRA), studying viruses that can be used to kill off the plankton associated with red tides. Red tides, which are extremely damaging, occur when plankton numbers increase to such an extent that the water appears to change color. There are many species of plankton associated with red tides.

It was back in 1992, while studying red tide plankton in the Seto Inland Sea with a research institute in nearby Hiroshima, that Nagasaki first discovered that viruses could infect plankton. "The world of viruses is full of mystery," he explains, "but also staggeringly beautiful. I was truly taken aback at the discovery."

Soon after, Nagasaki presented his findings to the Japanese Society of Fisheries Science (JSFS). He explained how the viruses enter plankton cells and start propagating exponentially, and showed a number of electron microscope images. This was the first time that many of his audience had seen such images, and the auditorium was abuzz with excitement. After the presentation, the chairperson, clearly impressed by the presentation, invited everyone to stay on for an impromptu discussion of his research findings.

"I was so excited, I had shivers running down my spine," recalls Nagasaki. "I had no idea how wonderful it feels when people take an interest in your research. That moment will live with me forever." His words illustrate the enthusiasm and commitment of the dedicated scientist.

Does the virus completely destroy the host?

Since identifying the all-important link between red tide plankton and viruses, Nagasaki has devoted himself whole-heartedly to research in this field.

"Children who love collecting insects are more than happy to go out in the middle of the hottest summer to see what they can find. I'm the same: I love going out with my team on a mission to find new viruses. And we have to be quick because you only have about two or three days before the virus kills off the host. It's a challenge, but that's part of what makes it so enjoyable."

Nagasaki published a string of papers on the topic to an eager global audience, and soon he and his team became known as the Algal Virus Hunters.

Another key discovery was that the virus does not completely destroy the host plankton as first thought. When a plankton becomes infected, 997 of every 1,000 new cells produced via cell division actually die off; the remaining three form a barrier to fight off the virus, before steadily increasing in number.

"You would assume that the virus and the host would be natural adversaries, but it turns out that they have a more accommodating sort of relationship than that, possibly even allowing the existence of each other to an extent. One of the fascinating parts of virology, something that we don't really understand well at present, is the mechanism by which the virus and host can co-exist."

Uranouchi Bay - Mecca for the red tide research community

Since joining Kochi University, Professor Nagasaki has spent a great deal of his time working at the University's marine biology field station at Uranouchi Bay.

"Uranouchi Bay is a fascinating hunting ground for researchers looking at the phenomenon of red tides. Although the bay area is quite small, every year it has multiple red tide events. Many in the research community are thinking that it might have something to do with a new species of plankton that was discovered a while back that kills off bivalves."

The research team generally collects red tide plankton samples by going out into the bay. An outboard engine typically produces a wake of white foam, except when travelling through a red tide, where the wake is full of brown bubbles. When the team spots the brown bubbles, they stop the boat and start collecting samples using buckets, hoses and plankton nets. This year they also plan to start collecting plankton samples from airborne drones.

Nagasaki is happy to extol the virtues of the marine virus research facilities at Kochi University. "The field station is very close to the university campus, so it's the ideal research set-up for us."

And while relatively few universities in Japan are researching viruses in seawater and fresh water, Kochi University last year installed a brand new next-generation sequencer for high-speed genetic base sequence analysis. The University now boasts a convenient and well-equipped field station together with cutting-edge analysis tools in the lab.

"If you join our team, you'll get to meet a veritable plethora of new viruses," says Nagasaki. "There are still so many questions to be answered in the mysterious world of marine viruses. It's an exciting and challenging field, and we're always looking for fresh new talent to be part of our team."

There's every possibility that the red tides of Uranouchi Bay could yield the next great discovery to rock the research community.



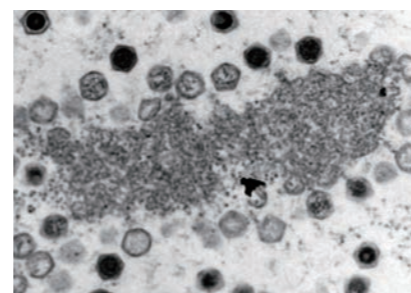
The Neovirology Marine Virus research team at Katsurahama beach



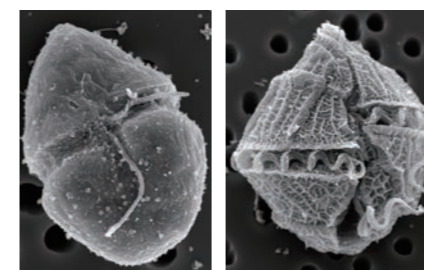
Mentoring program



Mentoring program



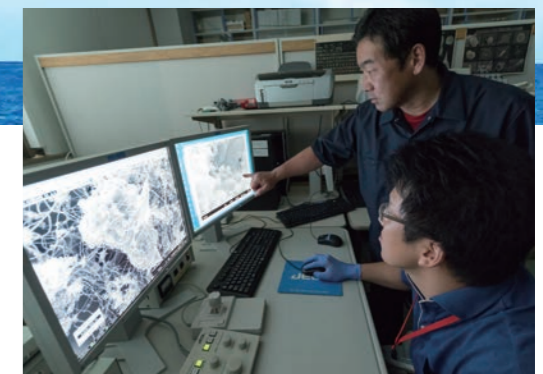
Virus particles propagating within a plankton cell



SEM images of plankton that act as virus hosts



Waterproof drone for collecting red tide samples



Professor Nagasaki and senior researcher Akihito Takano monitor images of virus-infected cells with an advanced scanning electron microscope (SEM)



Common first-year subject: Introduction to Yosakoi

New subject to Kochi University

Introduction to YOSAKOI



Comprehensive study of Yosakoi

The Yosakoi Festival is the highlight of summer in Kochi prefecture, a colorful and energetic event that has attracted an enthusiastic fan base well beyond the prefectural border. Today, the Yosakoi Festival is held in over 200 locations around the country and even outside Japan. The Introduction to Yosakoi subject, introduced just this year, will be taken by Daisuke Kawatake, who boasts a longstanding connection with the Yosakoi tradition, having been part of the push to start up a Yosakoi Soran Festival in Sapporo during his university days.

"Kochi University has more Yosakoi teams than any other university in Japan, but until now there hasn't been any sort of official push to teach the students about the festival - its origins, how it has evolved over the years, and why its popularity has spread far and wide throughout Japan. This course finally addresses this need."

About 170 students took the course this year; about a third of them had never heard of Yosakoi before. So the course curriculum began with the very basic question: what is the Yosakoi Festival?

"Although it was designed as an introductory subject, we were surprised at the level of interest from third and fourth year students," explains Kawatake. "Quite a few of them had been in the Yosakoi Festival in previous years but wanted to know more about it. I guess it must be a topic of interest to students."

In addition to learning about the origins of Yosakoi, students watch videos of the festival and even practice using the distinctive clappers that are a key part of the festivities.

"Even students who were born and raised right here in Kochi prefecture will tell me afterwards that they learned so many things they never knew about the festival," says Kawatake, "such as how it was created during the grim postwar period as way to stimulate economic growth. Every class has a report presentation where the students are bound to learn something new."

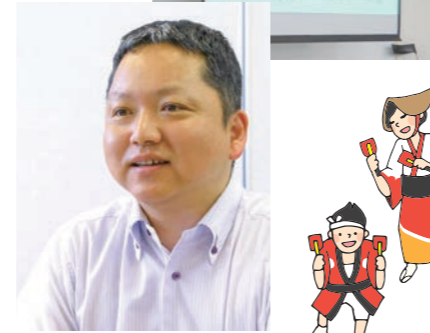
How can students contribute to Yosakoi?

The Introduction to Yosakoi course had a number of guest presenters, including a representative from a very special group that provides support to people who relocate to Kochi after hearing about Yosakoi, and another person who works to promote the unique Seicho Yosakoi Naruko-odori dance that has been used since the very first Yosakoi Festival. "Hearing from people involved at the grassroots level really brings the course to life I think, and illustrates all the challenges, the triumphs and the joys associated with the Yosakoi Festival," says Kawatake.

Next year the course will feature more guest presenters discussing the music and costumes of Yosakoi, as well as sponsors and supporters from local industry.

"Learning about the history, background and unique defining characteristics of the Yosakoi Festival is a great way to introduce students to the idea of in-depth analysis, in this case looking at the dance moves and the meaning behind them. They also gain valuable insights when we study the Yosakoi Soran Festival, for example, and how it was started up by a group of university students who wanted to give back to the local community. We look at the level of commitment from the students and how they worked with the local community to stage the festival at the local sports ground."

Perhaps the Introduction to Yosakoi course will inspire Kochi University students to start their own versions of the Yosakoi Festival. This very special educational initiative is something that is unique to Kochi University.



Center for Regional Sustainability and Innovation (CeRSI)

Daisuke Kawatake

Born in Kochi prefecture. Graduated in cultural anthropology from the University of Tokyo College of Arts and Sciences. Joined Asahi Shim-bun newspaper and served as a local councilor in the city of Tsu before returning to Kochi and serving in a number of roles including special secretary to the Governor of Kochi, administrative assistant at the city of Aki and managing director of the Kochi Association of Small Business Owners. Has been at Kochi University since 2016. "I love that the entire university shuts down on August 9 when the Yosakoi Festival gets underway so that everyone, students and teachers alike, can join in the fun."

Can you tell me about the work you do at the Wood Chemistry Lab?

Ichiura: We're not interested in actual wood but in the key chemical component of wood, called cellulose, as well as one of the most well-known cellulose products: paper. Paper has traditionally three main purposes, denoted by the three Ws: writing (i.e. printing paper), wiping (such as tissue paper) and wrapping (wrapping paper). The Wood Chemistry Lab is exploring other potential value-added uses of paper; what we call functional paper.

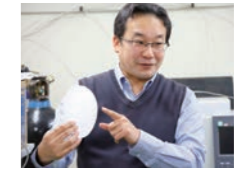
What types of functional paper are you developing?

Ichiura: We are trying to make paper that you can use when it's wet. Paper normally falls apart in water but we've found that if you add enough

wet strength agent for improvement of paper strength in wet, the kind that's already found in ordinary tissue paper, it becomes quite usable. However the problem is that the wet strength agent contains chlorine-based chemicals that are harmful to the environment. So now we're going back to the paper production process to see if there are modifications we could make to improve the functionality of the finished product. We're thinking that an activated carbon or photocatalyst additive might have lower environmental impacts.



Research that produces real-world results. That's one of our key aims!



Associate Professor

Agriculture Section, Natural Sciences Division, Faculty of Education and Research

Hideaki Ichiura



All-new functional paper

What is value-added functional paper?



Are there any other universities working on functional paper?

Ichiura: There aren't many in Japan doing research like ours, no. So when you join the Wood Chemistry Lab, you know you'll be involved in cutting-edge research. And that the work you do will one day be transformed into useful everyday products that benefit us all. We are already working on a number of tie-ups with local paper manufacturers and major diaper suppliers in Kochi prefecture.

Yoshihito, what inspired you to join the Wood Chemistry Lab?

Yamamoto: I grew up in Kochi prefecture surrounded by forests, so the forestry science program at Kochi University was a natural choice, really. Although I didn't have any particular interest in paper at first, I was inspired to learn more about it after hearing Professor Ichiura's lectures on advanced biomass applications.

And what research are you doing at the moment?

Yamamoto: We're working on waterproof paper, as the professor said. We soak sheets of paper in a phosphorylation reagent that is perfectly safe and has minimal environmental impact, to improve the water resistance properties. We study different concentrations of the reagent, then once we find the optimum

concentration, we look at the combination of temperature and soak time that produces maximum strength and rigidity. If the paper sheets can be agitated in water without disintegrating or coming apart, then we're happy.

Ichiura: Yoshihito has managed to complete his experiments much faster than I'd expected. He even got to present his findings to local universities from the Chugoku and Shikoku regions at the Japan Wood Research Society conference last September. You often see postgraduate students presenting their final theses at these conferences, but Yoshihito is the first fourth-year student that I'm aware of who has done it.

That's impressive. So the Wood Chemistry Lab opens up opportunities to present your research to academic conferences.

Ichiura: Of course. Yoshihito will be finishing his graduation thesis soon, which means that he should be presenting to the national conference of the Wood Research Society in Kyoto next March. We're hoping that he might even take out the Poster Prize for outstanding presentations but you'll need to fill out your presentation just a bit more, Yoshihito.

Yamamoto: Yes indeed, I'll need to dig a bit deeper into the key topic of the thesis and make sure that I stay on topic.

It's so great when your carefully designed experiment delivers the results you were expecting!



Student

4th year student (at time of writing) in Forestry Science program as part of major in agriculture at Faculty of Agriculture

Yoshihito Yamamoto

About the Forestry Science program

Forests promote carbon dioxide circulation and supply nutrients to the oceans. Kochi prefecture boasts an incredible diversity of forest vegetation, from subtropical through to subarctic zones, providing the ideal environment to study the positive impacts of forests and their ecosystems and the principles of good forest care and management, and consider better ways to utilize our finite resources in the modern era.