

# Bouquet

Vol. 2  
News Letter

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## Feature

# Let's go out into the world!

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# Let's go out into the world!

## — Let's talk! Student interview (Part 1/ NTT Corporation) —

In this feature, graduate students in the Minor Course of Science and Technology for Global Leaders interview female leaders who work in science-related fields at corporate and other organizations and thereby serve as role models for the students. The interviews cover various topics, such as research, work, and family life. In this issue, the students visited the large research and development center in Kanagawa prefecture owned by NTT and spoke with chief researcher Takako Yasui.



### Takako Yasui's Profile

Ms. Yasui joined Nippon Telegraph and Telephone Corporation (NTT) after earning a master's degree in the field of Graduate School of Material Engineering at Waseda University. She has been involved in numerous research and development efforts, including a project involving an optical semiconductor device that enables the high-speed optical transmission of large volumes of data. Ms. Yasui is currently attached to the Device Innovation Center and is also a co-chair of J-Win's\* technological subcommittee.

\*J-Win: A NPO established in 2007 for the purpose of helping to promote and establish diversity management in companies. The organization has a membership base of 101 companies and operates 10 subcommittees, such as for developing global leaders and promoting diversity in cooperation with managers. The technological subcommittee is comprised of members who work in technology-related fields.

### Acting as a bridge between the research community and society

— It's nice to meet you, and thank you for giving us your time today. Let me start off by asking what you do.

My role is to take the research and development outcomes achieved at NTT and help companies translate them into applications that will be released onto the market. Generally speaking, Japan excels at research and development but is not very good at getting the products of its R&D out into the business (real) world. That is the reason why the country often fails to produce new businesses out of its abundant patents. My job is to act as a bridge to make sure the results of our research get out into society.

— Why did you decide to become a researcher?

My parents were science-oriented researchers, so I always felt an affinity toward the job of research. I also like to think things through in a logical manner, so it was natural for me to decide I wanted to become a researcher.

— You majored in material engineering. Were you interested in this field because it is closely associated with the commercial side of things, such as with the job you have now?

No, within the field of engineering, I leaned more toward basic research rather than the act of making things. I started off at a laboratory that examines and analyzes crystal structures. At the time, I loved doing research, so I couldn't imagine myself in a job where I would be selling things to people, or being in a position that would involve lots of communication.

— So was it after you started working that you felt the desire to work in a role where you would have some connection with society?

Yes. I asked to be transferred to this position. I thought I needed an opportunity to separate myself from research, to distance myself from where I had been and look at things from a different perspective. At the time, I had been doing research work continuously for more than 10 years.

### The importance of teamwork

— What makes you a big difference between being a student and being a working person?

I could not do researching just only for the sake of my personal satisfaction. I needed to think about what made other people happy. I also have a responsibility as a researcher, because my research will go out into the market pass through the hands of different people.

— We created a team and are conducting joint research. Could you advise us what are some important things in working (researching) as part of a team?

I once jointed a work group with people from the private sector and served as its leader. Speaking from my own experience, it is important to get everyone's opinions. Every person likely has some good information, so you won't be able to see the overall picture until all of that information is brought out and laid on the table. You'll also be able to get more enthusiastic work out of people by understanding the characteristics and strengths of each person and putting them in charge of what they are good at. It's the same with J-Win. The members are from different companies, so they all have different perceptions and perspectives. So our basic stance is to show respect for one another and not dismiss another person's opinion.

— The people at J-Win all come together from different backgrounds. Do you have any difficulties in holding discussions?

No, I found it fun! Being a woman working in science fields, I feel I am like a minority in society, so there are not so many opportunities to speak with such people. By getting together, we have realized that we have much to share, despite being in different fields. We also learn different ways of looking at things, so it is stimulating.

### Be flexible

— Is there any particular experience that we should try to gain before starting work in the real world?

Being in the field of science, I think the best thing is to acquire the ability to think things logically and perhaps the ability to concentrate. While you are students, of course you should immerse yourself in the research. And one more thing I recommend you is to acquire ability to be flexible. The world today is moving so fast and is constantly evolving. Yesterday's policies may be modified into the new situation because the world around you is changing rapidly. So I think the flexibility is an ability to be needed with such changes. I could not have this flexibility, so I faced difficulties when I first joined the company.

— By being flexible, do you mean that if we think something should be done in a certain way, we



should stop and think again?

That is also necessary, although I think it is very important to have your own opinions and beliefs. But you cannot bring such beliefs to fruition or follow your endeavors through to the end on the strength of your own efforts alone. So if someone says, "Shouldn't it be this way?" you should listen, accept the opinion, and take the attitude that "maybe that is also possible." Your own perspective is actually very narrow, so in order to broaden your perspective, you need to listen to other people's opinions and try what they suggest—even if you think it might be wrong—and let their perspectives inform your efforts. In my case, J-Win gave me a big opportunity to do this. At times, I felt that my entire history was being negated, so accepting some things was extremely difficult. The older you get, the harder to change your core beliefs. So I think it is the best to nurture the ability to be flexible while you are young.

— I see. Although I think it is difficult to put it into actual practice, but it might be possible to achieve more, rather than just having confrontations with team members if I keep it in mind to be flexible.

Yes, adding to that if you think your team is going in a different direction from where you think it should be going, you might be able to gain a new perspective by just letting the team go where it's heading, instead of trying to stop it. I'm beginning to think that it is sometimes beneficial to take a step back, to take some time away and give yourself some distance.

### Work and life are both important

— What's your view on work-life balance?

I'm not very good at switching "on" and "off" from work. But, there are moments where I feel glad that I have both the work aspect and the life aspect. What I mean by this, usually I need to finish work at around 6 o'clock since my children are waiting, even though my experiment is not going well. If I didn't do child caring, I could continue my experiment very late. But I have to stop my experiment and go home. So what happened is while I do housework—for example, when I was mindlessly chopping the onion, suddenly I could have some new inspiration, and like, "Oh, maybe if I do this, it might work. I'll try that tomorrow." In that sense, when you're pursuing something, it's important to continue pursuing it, but sometimes changing your environment or taking a break from thinking about it could help you hit upon a different approach. It can help to get a chance to look at things from a different perspective. So I think that's really good.

— You also have the experience of taking care of an elderly family member. Is that different from childcare?



Snapshot with researchers of the NTT Research Center

After the interview, we had discussion with women researchers who work at the same research center as Ms. Yasui. We also had the opportunity to visit the laboratory facilities within the research center.

### After interview

Akiko Mito: "I felt awakened by the thought that pursuing a specialized field will help establish my own personal brand."

Kanako Enoyoshi: "I could hardly imagine what it would be like to work at a company, but having heard today's talk, I can now feel it very familiar."

Yes. At that time it was important for me to spend time with my father. I didn't do things like writing my thesis late into the night and I couldn't conduct long, drawn-out experiments. But I stuck to my core priorities and continued with my research over the long term, little by little.

— I hope that being able to take time off for childcare or family care, and being able to return to work afterwards, will become the norm in our society.

I think it will be. But it is important to be sure to communicate with the people in your workplace. Since the people you work with may have to do more work while you are gone, how you conduct yourself with the people around you will also affect the way you are evaluated, as a woman.

### Establish your personal brand

— Please give us some advice to graduate students who want to find a research job in the private sector, as you have done.

If you specialize in a particular field, that will become your strength and will help you establish your personal brand. But if you stick to your area of specialization too closely and do not open yourself up to other possibilities then you will become locked into only doing that one thing. If you can establish your own brand while also adapting to what is needed by the outside world, I think that would be wonderful.

— The "J-Win W-STEM Networking Conference 2014" event will be held at our university on November 15 [please see the bottom of this page]. I hear that you will also be participating.

Yes. I once visited research institutes in the United States as well as attending the SWE (Society of Women Engineers) Conference as a member of J-Win. I was surprised by how strong the network was that tied companies and students and female engineers together. I thought it would be nice if we had something similar in Japan. At this event, I would like to start by creating a network, with the hope that it will become bigger and bigger in the future.

— Finally, could you please give us some advice in your capacity as an active female leader?

You should always make the time to communicate with your colleagues and the people who support you. At J-Win, I have met people who helped raise my spirits when something was troubling me at work or when I have failed at something, without having to explain things in detail. I really treasure the people that I have met at J-Win.

— Thank you for speaking with us. We hope to see you again at the J-Win W-STEM Networking Conference.

Yes, I'll be hosting a workshop, so please come and visit.



# Implementation of "PBTS" laboratory rotation with advanced equipment!

PBTS (project-based team study) advanced equipment laboratory rotation is a "practical learning" course that involves the use of advanced equipment from different fields. One of the features of the Program for Leading Graduate Schools is that it aims to broaden the interdisciplinary perspectives of students, something that this course helps to accomplish. As part of the course, students taking part in the program were put into teams to study and gain experience in five different areas (biology, manufacturing, material measurement of food & environment, material structure & interactions, and physics [inorganic substances]). The course was held between June and September.

## [1] Biology course

(48 sessions: 90 minutes per session)

**Goal:** Technologies used in the life sciences are advancing at a rapid speed. Students majoring in different fields can experience the latest life science technologies as well as other technologies that have been developed by the bringing together of different fields. The aim is to equip students with the knowledge needed to arrive at new insights through the combining of different fields of study so that they can make significant contributions in the future.



### Report (comment from a participating student)

In a programming lecture by Professor Yura from the Center for Informational Biology, we tried creating a script that would design a primer. Afterwards, we created a primer from the script that we developed and another from a script that we found on the web. We then performed a PCR\* to study which had the better PCR efficiency. We found that the script we created was better than the one that was already available, a result that made us really happy!

\* PCR (polymerase chain reaction) is a method of amplifying a DNA by using DNA polymerase to set off a chain reaction.

## [2] Manufacturing course (48 sessions: 90 minutes per session)

### (1) Course work to create an eye movement measurement device

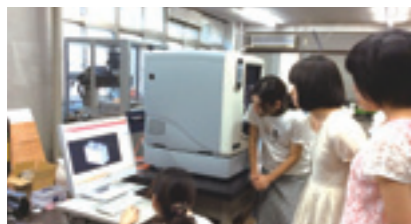
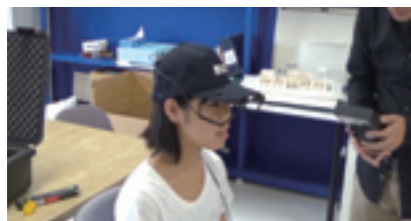
**Goal:** In this course, students learn the principles of the eye movement measurement device and the basic methods of use. They then learn how to put on and take off the device, acquire data, and conduct a simple data analysis.

### (2) Course work on machine tool system (3D printer & NC milling machine)

**Goal:** One of the characteristics that is required of global leaders in the area of science is strong creativity along with the ability to visually communicate their original ideas to the outside world. Innovation can be immediately enhanced not only by developing an idea into a product but also by creating an original experimental device that makes new research methods possible. In this course, students gain experience in manufacturing through hands-on production.

### (3) Course work on humanoid robots

**Goal:** To understand and study the structure of the mechanism behind technology that recognizes and tracks an object as well as the possibilities of its applied technologies.



## [3] Food & environment material measurement course

(64 sessions: 90 minutes per session)

**Goal:** In order to promote research in food, nutritional science, and environmental science, it is important to be able to detect and measure the material components of a targeted item. The basic requirements for conducting such research are to be able to utilize a measurement method that takes advantage of the differences in the characteristics of the materials and to become proficient in utilizing highly sensitive devices that can measure even minuscule amounts of materials. In this course, a test ingredient is used in the field of food science and environmental science to help students acquire theoretical and practical learning on the method of analysis.



## [4] Material structure and interactions

(64 sessions: 90 minutes per session)

**Goal:** The goal is to gain an understanding of the various materials that make up the natural world, as well as its basic characteristics, and to learn the analysis method for material interaction. The following important practices in the study of various materials are performed: precision weighing; separating and refining structures; measurement of thermal and optical materials; and analysis of interactions between biopolymers. Through experiments and analysis, students learn the basic concepts for coming up with new ideas based on the characteristics and functions of the material.



## [5] Physics (inorganic substances) course

(64 sessions: 90 minutes per session)

**Goal:** Students first gain an understanding of the makeup of the material, and the method of developing the research material, whereupon an explanation is provided and hands-on studies are conducted for each of the following: (1) observation of the periodic arrangements of the crystal atom as a method of evaluation; (2) measurement of the fluorescent spectrum; and (3) measurement of magnetic properties. By this, students acquire an understanding and realization of the basic flow of research involving inorganic substances.



## Activity Report

~Report on our visit to the United Kingdom~



### University of Oxford

Negotiation was made to send students for internships in the some science departments in Oxford University. The University has a long history over 750 years, which has been a paradise of leading academics from all over the world. The college system offers place for living and social activities for students, which supports lives of international students who live abroad for the first time.

### University of Bath

University of Bath is included in the top ten universities in the UK, highly rated for student satisfaction. The university is located in historic city of Bath, the only world heritage town in the UK. Department of Chemistry runs Doctoral Training Center, offering business, patent and outreach classes in addition to Chemistry lectures to address "Sustainable Chemistry", which shares similar features to our Leading program. Both University staffs and people in town are warm and kind, providing suitable environment for students who study abroad for the first time.



### Marine Biological Association of the UK (MBA)

Marine Biological Association of the UK (MBA) situates in the town of Plymouth, where Charles Darwin left for a world trip of Challenger Expedition in the 19th century. The MBA is the oldest marine laboratory in the UK, started as a charity organization with aquarium and research laboratory more than a century ago. Nowadays MBA is one of the leading environmental research institute in the UK, addressing impact of global warming in ecology and cell biology by taking advantage of large tank room using natural seawater and integrating state-of-art physics and informatics for monitoring animal behavior.



**Md. Khayrul Bashar**

Birth place: Chittagong, Bangladesh  
Project Associate Professor for Computer Sciences  
Image Analysis and Computer Vision

**What led you to be interested in science?**

Some scientific discoveries and the beauty of universe led me to be interested in choosing science as a major field.

**My fruitful country (Bangladesh)**

My hometown (Kanchan Nagar) is a sub-urban area, which is about 33 km south from the center of the port city "Chittagong" and is famous for guava for their special delicious tastes. It has a number of mountains in the east side and rivers in the south. Those mountains are full of trees and plants having different fruits such as guava, jackfruit, mango, lemon, pomegranate, papaya, litchi, banana etc. During my primary and junior high school period, I used to enjoy many extra-curriculum activities like football, swimming, fishing, Boat-Race, and Bull-Flight etc. There is a popular proverb in Bengali "Mache Bhate Bangali", means the rice and fish is in the core of the Bengali's food habit. Moreover, we have special festival foods such as "Birani" and "Panta-ilish" including a rich set of sweet items such as "Misty-doi". After high school, I moved to the capital city "Dhaka" and later on, to Mumbai, India to study science and engineering.



At Bangladesh University of Engineering and Technology (me, in the middle of the top)



**Simon John Devitt**

Birth place: Bendigo, Australia  
Project Lecturer for Physics  
Quantum Physics

**What led you to be interested in science?**

When I was 14 years old, I saw the movie "Back to the Future". I wanted to be the time travelling scientist and I found out I needed to study physics to learn how to time travel.

**Transitional Aussie town (Bendigo, Australia)**

Bendigo is located approximately 200 km north of Melbourne in Australia, and has a population of about 80,000 people. It was a major producer of Gold during early Australian history. Bendigo has a large Chinese population because of the gold rush, hence much of the food and culture comes from China. The gold rush made Bendigo a very rich city in the 19th and 20th century and much of its architecture comes from the Victorian era in England. It is a very transitional Australian town and in recent years it has become very cosmopolitan, with new theatres, art galleries and museums. Sport is a big part of life, with almost everyone spending their weekends either playing or watching Australian Rules Football or cricket. Now my family no longer lives in Bendigo, my parents now live in Melbourne and my brother now lives in California with his wife.



Messages from the Students

Computer Sciences, the Division of Advanced Sciences **Akiko Eriguchi**



I am majoring in computer science and I am researching data analysis using the computer technology. I am interested in attempting how human behavior like recognizing, understanding, and inferring would be reproduced on computer. Working with students from different research backgrounds through PBTS, I like to work out a new solution on the topic we chose from the social issues.

Human Environmental Sciences, the Division of Life Sciences **Kaori Nishida**



I am majoring in environmental engineering and researching household water consumption by making data from direct measurements of daily life water consumption. In this program, I am taking lectures in various fields for PBTS program. Sometimes I have difficulties with English communications, but I try to study hard with help of the teachers, the staff members and my classmates of this program and I feel very satisfied with this circumstance. I would like to take many chances to broaden my possibilities into many fields.

Human Environmental Sciences, the Division of Life Sciences **Ritsuko Tamura**



My major is biology. I research the mechanism of apoptosis in unfertilized starfish eggs. In this minor course program, I work hard with the friends of other fields. If I did not join this program, I could not have such a precious and significant experience. Although doing research in a different field from my background and having communication in English are not easy for me now, I believe that the bright future will come when I complete this program.

Physics, the Division of Advanced Sciences **Kimiko Yamashita**



My major is studying the high-energy physics. I study reaction of particles in which are fundamental that cannot be divided anymore. By using high-spec computer simulation, I am researching analysis of particles. In this program, we organize teams whose members belong to different field. I am very excited to get various viewpoints from them while doing research together.

Essay

Relay essays by program members

Comments on PBTS

Head of Life Sciences Department, Graduate School of Humanities & Sciences, Ochanomizu University **Prof. Yuji Ohta**



It has been 30 years since I started specializing in research in the field of medical engineering as a student. At that time, we were conducting research and development of artificial internal organs and surgery robots, so my hangouts became the university, the medical office, and the factory. My subject at university was engineering (precision machines), so, naturally, my main studies were on robots and small machines. However, I found that engineering was not enough for conducting research on medical equipment. Because this area was closely related to medical science, I would have to branch out in order to complete my research. So I started visiting various related laboratories. At the beginning, I went to the agriculture department and learned about animal surgeries. Later, I went to hospitals and joined a group performing liver treatments. I also visited immunology classrooms and chemical sensor laboratories. In the class on immunology, the young lecturer was very strict and made me work very hard. The chemical sensor professor, however, treated me to lots of meals out. Since I was young, I was very light-footed and busied myself going about to different places. Thinking back on it now, I was actually already doing what we now call laboratory rotation. Thanks to all the efforts made in the past, medical engineering is now an established field of study and is recognized by many people. It has also established itself in the areas of grants for scientific research but back in those days we did not have any keywords for it. When I think back to the times when we submitted our research in fields like mechanical engineering robots and medical surgery, it feels like something from a different era.

In thinking about the method for proceeding with research, there is something called mode theory. Mode 1 is where you work with your research colleagues to deepen your studies in a particular discipline and practice interdisciplinary studies. Mode 2 is where you take a trans-disciplinary perspective by studying different fields that overlap with the boundaries of your own field in cooperation with researchers from other disciplines. As I mentioned above, I believe that in our research on artificial internal organs, we were groping to find our own method of research in the manner of Mode 2. Recently, it seems to me that the thinking around Mode 2 has increased in the name of innovation and problem-solving for the purpose of enhancing international competitiveness. However, this does not mean that Mode 1 will be replaced by Mode 2, and it does not detract from its importance. The way I understand it, there is a difference in seeds-orientation and needs-orientation, depending on the type of research. In this sense, the students in the Leading Program can understand the significance of this and are able to conduct research from both approaches. For example, for your major, in your basic field of specialization you can conduct research in Mode 1; and for PBTS, you can establish a theme that will broaden your interest and conduct research in Mode 2. I hope you will work on your studies in such a manner. (For more information on mode theory, see the work of Michael Gibbons.)



Professor Ota when he worked as an assistant (left)

Student's life  
A Diary of Student "HANAKO"  
No.2



Friday, Sep.x, 2014

I will have a meeting with my team today. We are at the moment searching for research subject, as Project Based Team Study (PBTS) will begin in October. We started reading about related researches, advanced technologies and actions of government and companies, then discussed many times to decide our project. We also suggested approaches from each member's major and interest. Because the team consists of members who specialize in different studies, the possibility for the PBTS project is infinite depending on combinations of our ideas based on the individual's expertise! It is a good chance to show how we can do it as a project. Leading Program began in April. I am very grateful for the encounter with friends who are great and for support from teachers and staff. This program enriches my life. We will be having presentations about project plans for each team soon. We want to present our project effectively. I hope autumn will be fruitful! By M



Friday, Oct. x, 2014

Today's PBTS coursework was a biological experiment. It was an experiment to amplify a specific piece of DNA by a method called PCR. My major is computer science, so I had never had experiment since I graduated from high school. I put on the white robe I borrowed from a friend. It looked odd on me. Our teacher gave us directions, and then we started. While those who routinely perform experiments in their own research were doing everything smoothly, I was grappling with micropipette. It is a pipette that can measure a small quantity of liquid. It requires physical strength to drain off the contents. After placing the samples in small tubes, we waited for the reaction. The products had to be separated by size using a technique called electrophoresis. Again, we waited for a while. "It takes so much time!" I talked to a student majoring in mathematics. "Now I know why the students who study chemistry or biology often go home very late." Finally, we got the picture of the separated products. There should have been some bands in the picture. However, no band was observed in my picture. The result was undesirable, but I got a taste of a life of an experimentalist. My Y

# Information

## Event information

### Seminar on Career Development; <Ochadai Method> How to lead a bright future for "Rikejo" (science women)

Date & Time: Wednesday, October 29, 15:00-18:00

Venue: Conference Room (No.135), Main Building, Ochanomizu University

Eligibility: General public, students, affiliated persons



### J-Win W-STEM Networking Conference 2014

Date & Time: Saturday, November 15, 10:00-17:30

Venue: Ochanomizu University

Eligibility: University students or above (men also welcome to participate)

Report by students taking the program

(Time: 3:45 p.m. - 4:45 p.m. / Location: Workshop D2)



### Workshop on Product Development Method

Date & Time: Wednesday, November 19, 13:30-17:30

Venue: Room No. 306, Main Building, Ochanomizu University

Eligibility: 3rd & 4th year undergraduate students, 1st year master's students, and women considering entering graduate school)



## Report of activities

June 20, 2014	Start of PBTS laboratory rotation
August 2, 2014	Information session on the Summer Program in English for Overseas Students
September 1, 2014	Selection examination for October term students
September 5-12, 2014	PBTS research presentation
September 30, 2014	End of PBTS laboratory rotation

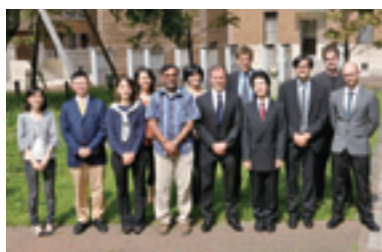
## Scheduled activities

October 29, 2014	Career seminar
November 10, 2014	JAXA (Tsukuba Space Center) Tour: Talk by Chiaki Mukai
November 15, 2014	J-Win W-STEM Networking Conference 2014
November 19, 2014	Mini workshop
The latter part of November, 2014	Information session for applicant students

## Members of the Leading Graduation School Promotion Center



Staff members of Operation Department



Study Commons (teachers)

Eight new faculty members have joined to the Study Commons with the aim of further enriching our international curriculum.

### Editor's notes

Japanese technology was recognized by this year's Nobel Prize in Physics, giving us lots of encouragement toward the future. Among all past Nobel Prize winners, there have been only 10 female winners in the field of natural sciences. Our dream is that in the near future, we will see a graduate of our program being awarded the Nobel Prize!



### About our logo "Bouquet"

The shape of the bouquet of flowers represents the educational system of this program. We place the pink flower in the center representing the major courses. Traditional education at graduate schools were designed to bring growth to only major studies, however we add the flowers around the center to show providing foundational strength and qualities to be a global leader. Our goal is to keep grow students' abilities as flowers are blooming like this logo.

## Ochanomizu University

Fostering long-term creativity and innovation with science and technology disciplines based on Ochanomizu spirit "Migakazuba" in the next generation of global leaders

### Bouquet Vol.2

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