

RIKEN

Pioneers in Science

Interviews with Researchers



Message from the Director

In order to develop as a world-class research and development organization, RIKEN is working to build a richly diverse and vibrant research environment by actively recruiting talented researchers, including young people, women, and non-Japanese.

Capitalizing on our strength as Japan's only comprehensive research institute in the field of natural science, RIKEN regularly holds networking events such as the Summer Programs aimed primarily at postgraduate students and young researchers, as well as the Interdisciplinary Exchange Evenings. By facilitating deeper connections that go beyond specific nationalities and fields of study, we promote flexible thinking and the discovery of new ideas.

In addition, prompted by its selection for inclusion in the Initiative for Realizing Diversity in the Research Environment—a support program for human resource development in science and technology established by the Ministry of Education, Culture, Sports, Science and Technology—in FY 2016 RIKEN set up an Office of Diversity Promotion to promote diversity throughout the organization.

In FY 2018, the third year of its operation, the Office of Diversity Promotion launched the Sechi Kato Program to promote recruitment of female research leaders active internationally. And in the following year, we started the Leadership Development Program for Female Researchers to strengthen leadership and networking among women in research.

Diversity is essential in science and technology and in generating innovation. Regardless of research field, gender, age, nationality, or cultural background, diverse researchers come together at RIKEN to conduct research aimed at achieving even better research and development outcomes.

This collection of interviews features seven scientists with varied experiences and careers. I hope that it helps a broad range of readers engaged in research to better understand the diversity and appeal of RIKEN and the researchers.



Yuko Harayama

RIKEN Executive Director
Director of the Office of Diversity Promotion

March 2021

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Chief Scientist
Surface and Interface Science Laboratory
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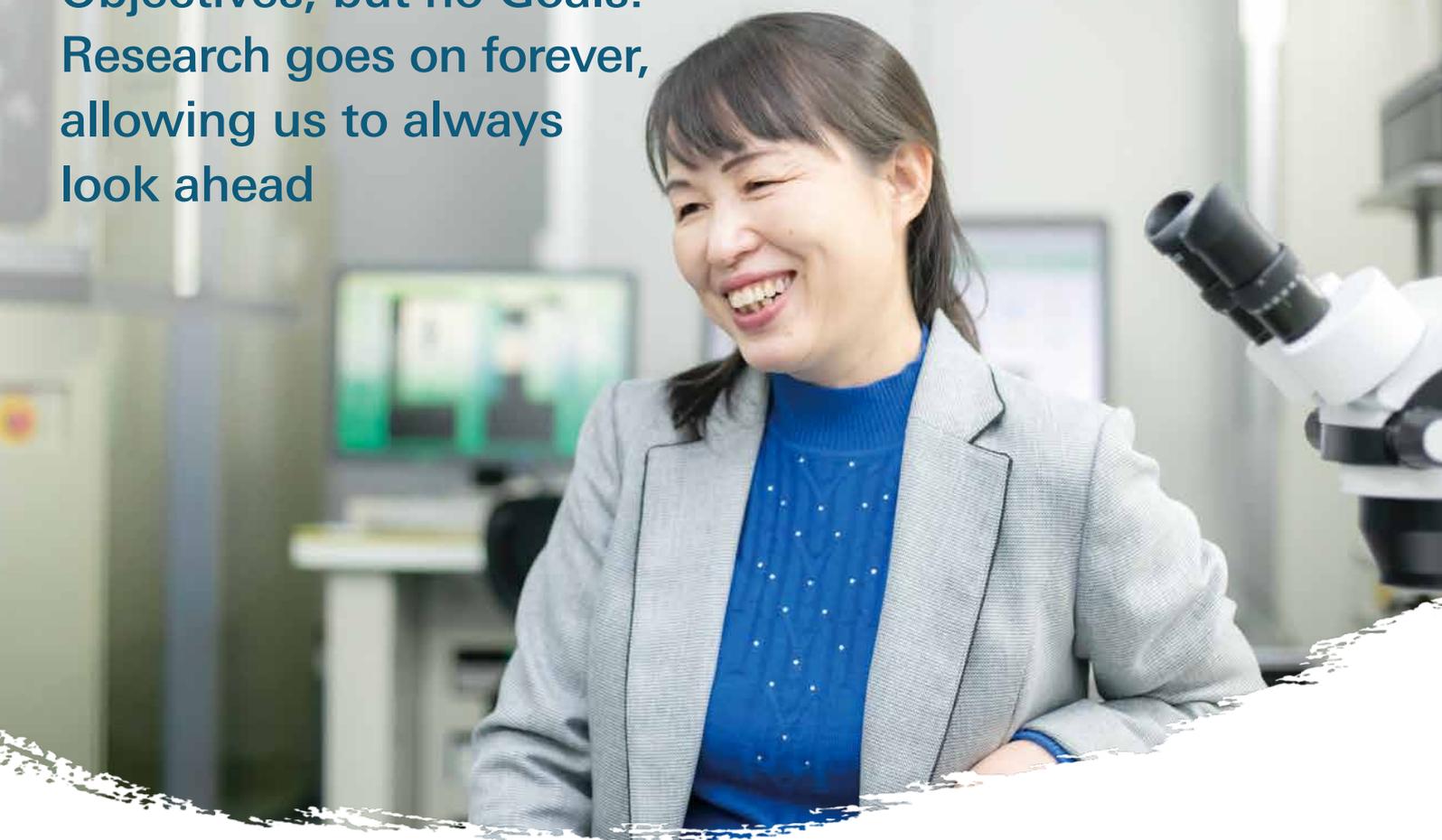
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Objectives, but no Goals: Research goes on forever, allowing us to always look ahead



Team Leader
Electronic States Microscopy Research Team
RIKEN Center for Emergent Matter Science

Xiuzhen Yu

Return to research after 10-year hiatus

When I told my father, a teacher of the Chinese language, that I wanted to study science, we got into a big argument about my future. Eventually, however, I managed to advance to a master's program specializing in semiconductor physics. After much hardship obtaining my master's degree, I came to Japan to be with my husband, who was studying at the University of Tokyo. Around that time I was temporarily fed up with research, so I found work at a programming company, where I could make use of the arithmetic that I had loved ever since my childhood. The job was not very interesting, though, and after a few years I began to wonder if I had made the right choice. I did consider other options, but finally decided that I wanted to return to research focusing on physics. Because of the lengthy blank in my resume, however, I had difficulties finding research work. I was just about to give up when, fortunately, I happened to meet Dr. Yoshinori Tokura (current director of the RIKEN Center for Emergent Matter Science), a world-famous researcher whom I admired and respected enormously. Thanks to that encounter, I realized for the first time that research was the path on which I should focus my efforts.

Condensed matter physics is closely related to electronic states in solids. Our work involves realizing the electronic state using a special tool called a transmission electron microscope. This type of microscope offers extremely high spatial resolution, enabling us to probe electron structures and their dynamics with external stimuli applied to the matters.



If you fail, bear down and continue to persevere rather than simply giving up

Our current efforts are focused particularly on research into nanoscale electron vortex-like structures called "skyrmions." The electric current threshold necessary to drive skyrmions is several orders of magnitude

smaller than with normal information carriers. In other words, they have the potential to help achieve energy-saving electronic devices. We do not know whether such devices are actually feasible, but as a first step we are now trying to understand the properties of skyrmions. At first people told us that we would never be able to see a nanometric-sized skyrmion, but we took up the challenge and eventually succeeded in real-space observation of skyrmions.

The most difficult time in my research was our child-rearing years. Every morning I headed to the lab after packing my child's lunch and preparing the evening meal. I had a lot of support from my family. Sometimes experiments dragged on for hours until we had acquired the data we needed. Once I get interested in something, I tend to work so hard that those around me begin to worry, but I really hate losing. Scientists who are good at experiments are sometimes said to have the "hands of God," but I think the work is not so much a matter of natural talent as one of effort and the accumulation of knowledge. The important question is whether you are putting in the proper effort. If the objective is wrong from the outset, any effort you put into it would be wasted, so I often stress over choosing an objective. And once I have set an objective, I am resolute in devoting myself to the task, even if I fail along the way. Failure is part and parcel of research, and if you give up at that point, all your efforts will go down the drain. In addition to effort, I think real perseverance is important to keeping oneself from giving up too easily. I love that Japanese "never-give-up" spirit!



The best part of being a researcher lies in forever moving forward

Our team has one Japanese member; the rest are all non-Japanese. I struggle quite a bit with the cultural differences, but effort is the key here as well. I take the time to explain things until everyone is convinced, and our team meetings are lengthy and thorough. I try to build good relationships with my team members, sometimes talking with them about our private lives. When everyone gets along well, I believe it has a positive impact on our research results. When I happen to lose sight of my objectives despite these efforts, I work to gather information and interact with the other scientists rather than shutting myself off. That may not get me any direct answers, but it is sure to broaden my perspectives and provide me with some hints.

My husband is a physics researcher as well, studying semiconductor devices. Although our areas of specialization are a little different, we both understand how difficult research is, seek one another's input, and offer each other advice from a fresh perspective. I think having a researcher as a partner is not a bad idea. There is no final goal in research; we may have several small objectives, but the research itself goes on forever. In other words, research is tied to incremental steps forward. That is why research is so wonderful—you are always looking ahead. So, ask yourself whether you enjoy research. And if you really do, I recommend that you abandon any second thoughts and become a researcher. I think scientists can lead exciting, out-of-the-ordinary lives that certainly others cannot experience.



Column

After seeing her older brother's textbook as a child, Dr. Yu became fascinated with arithmetic and treasured her arithmetic flash cards. Now she values a special magnifying glass and tape measure given to her by Dr. Yoshio Matsui, her mentor in electron microscopy.

Identifying Priorities in Life and Enjoying Research in Spain



Group Leader
European Molecular Biology Laboratory,
Barcelona

Miki Ebisuya

Aspiring to become a researcher after being fascinated by the hypothesis testing process

I have loved science since I was a child, and used to enjoy collecting insects and fossils and observing meteors. I had a vague idea that at some point I would like to do something relating to science, but I got involved in research in university and came to enjoy the research process itself. I liked establishing a hypothesis, observing and experimenting on my own through trial and error, and eventually verifying the original proposition. I enjoyed the actual process of coming up with different hypotheses. For the most part my hypotheses may have missed the mark, but sometimes they were right on target, and occasionally I would discover something quite unexpected. I was fascinated by this hypothesis testing process.

I loved discussing research with my mentor, Dr. Eisuke Nishida (current director of the RIKEN Center for Biosystems Dynamics Research), and my fellow scientists. I recall that Dr. Nishida would get as excited as I did when experimental data clearly revealed a hypothesis of mine to be correct, pointing at the graph and exclaiming, "Terrific! Well done!" The consulting work I did as an intern in my junior year in university closely resembled the research process and I also found it attractive, but my favorite area of interest was natural science, so I opted for the path of a researcher.

After earning my doctorate, I had my own laboratory at Kyoto University for a time, but I wanted to study developmental biology, and particularly organoids, so I moved to RIKEN, which at the time was in the vanguard of research in that field. Today, I conduct my research at the European Molecular Biology Laboratory (EMBL) in Barcelona. One of the reasons I moved here was that, at least once in my life, I wanted to live overseas. I think a change



in environment is necessary at times in terms of opportunities to encounter new research, people and ideas. Fortunately, my husband, who works alongside me as a researcher, doesn't care much about where he works as long as he can conduct his research, so there was no obstacle to my moving to Spain.

Hoping to elucidate the advanced cell development mechanism

At present I am conducting research in the field of synthetic developmental biology, which involves attempting to identify the extent to which the mechanism of embryonic development can be recreated artificially. I have two goals at the moment: One is to try as far as possible to artificially produce the developmental mechanism, which in reality clearly takes place on a high level; the other is to unravel differences in time among animal species. For example, the length of times such as lifespans and gestation periods differ among species, but the reasons for these variations remain unknown. The work presents various problems which make investigating these issues difficult, but our research has made some headway using core cells, such as embryonic stem (ES) cells and induced pluripotent stem (iPS) cells. I focus on basic research driven by my own interests, but over the long term, understanding something basic may possibly lead to real-world applications. For instance, if we can understand why time is different among different species of animals, we may be able to gain free control over the time it takes to produce organoids.

Prioritizing life without fear of failure

What I emphasize the most as a scientist is to pursue subjects that interest me. For that purpose, I do not mind engaging in tasks like writing applications for research grants or giving presentations. Writing helps me clarify what I want to do, and giving presentations allows me to receive feedback about my work. In addition, what I am especially mindful of as a principal investigator (PI) is the need to solve problems in my laboratory. While this requires nothing of me when our work is going well, when research suffers a setback or a problem arises, I think my most important job is to support my lab members. I offer weekly one-on-one sessions with each of them and hold regular lab meetings as a way of encouraging them, as much as possible, to speak out about any problems they may be having.

My lab has nine members; most of them are from Europe, and about half are men and half women. Europeans enjoy talking, so there is a lot of communication. One of our female researchers is rearing a small child. It is clearly a challenge to achieve a good balance between research and life events, so I hope to create an environment in which the members of my team can continue their research activities while placing importance on their individual life priorities.

In my case, research is the top priority. I think understanding what you want to do is a great strength not only in research but in everything. And I would add that experiencing failure is indispensable for success. I myself had applied to the EMBL before and was not chosen, but I learned from that failure and tried again, and now here I am conducting research overseas. If you think about what kind of life you want to lead and then act without fear of failure, I am sure you will be able to build an interesting career.



Column

Dr. Ebisuya lives in the old part of Barcelona. Partly for the sake of getting some exercise during the Covid-19 pandemic, she enjoys strolling the alleyways while listening to an audiobook. As Dr. Ebisuya takes photos of the alleys, her husband follows alongside, engrossed in playing Pokemon Go.

Unanticipated Career and Life Events: Striving every day with an emphasis on embodied cognition



Team Leader
Cognitive Behavioral Assistive Technology Team
RIKEN Center for Advanced Intelligence Project

Mihoko Otake

A researcher whose style is closer to that of an artist

As a child I loved making things, and I always looked forward to the arrival of the supplementary science experiment kits that came with a monthly science magazine I subscribed to. I was in senior high school when I began thinking I would like to invent something that used completely novel mechanisms, and I aspired to become a researcher. I have continued to harbor that aspiration consistently right up to the present.



I had also thought of becoming an artist or calligrapher. I especially see similarities between my current work and that of a socially conscious modern artist. Whether researchers or artists, each of us works to embody our inner thoughts and ideas, and the services, workshops, systems, robots, and technologies I create, for example, are just my form of expression. In the sense that our work involves expression, creation, and design, I think the style I have developed as a researcher is close to that of an artist.

My desire to make things, services, and mechanisms that exert a positive impact on society grew stronger after the onset of my grandmother's dementia. As a result, I developed the "Coimagination method," a rule-based conversational assistive technology designed to activate the cognitive functions of episodic memory, divided attention and planning capability, which are said to deteriorate along with aging.



In the Coimagination method, participants start by bringing photos on an assigned theme. As each photo is displayed, the person who brought it talks about it for a predetermined length of time, then takes questions and comments from the other participants, thereby thinking more deeply about their experience. By looking at the photos of others and listening to them speak, the participants also broaden their viewpoints. I am continuing my research to develop a prototype system, assess its use, and ascertain the effect on cognitive function, brain function, and quality of life.

Deepening research with an emphasis on embodied cognition

When I first created the research plan for the project I'm currently involved in four years ago, I was considering developing three applications based on conversational assistive artificial intelligence: conversing in a group, conversing remotely, and conversing with a talking robot. The application for conversing in a group made the most progress, but with the Covid-19 pandemic, the situation changed overnight. Now we are hastily making improvements to the remote conversational assistive system—work which once remained at the experimental stage—testing it and verifying its operation. Fortunately, many who have used the system have told us how delighted they were to have an opportunity to talk. Following preliminary trials, we have also begun experiments to verify the effects of the elderly using talking robots at home. I am hoping to bring us closer to a society in which many people can naturally enjoy this technology, making use of their cognitive functions on a daily basis and maintaining them for a lifetime.

With the rapid spread of social media in today's society, we are surrounded by vast amounts of information. The problem, I feel, is that the world has become overly abstract and virtual, detaching us from our five senses. I came to realize that the Coimagination method offers us an opportunity to use our own bodies to observe our surroundings, act, discover and share topics, and listen to what those around us have to say. This not only benefits the elderly, but can also help young people in building their own sense of values. My own experience with childbirth and child-rearing has given me a keen sense of physical sensation from a first-person perspective, so I value emphasizing embodied cognition and try to reflect it in my research.



Making life exciting by seizing on unexpected opportunities

In my 20s and 30s, I completely immersed myself in research and paid little attention to my own life events. By ignoring my private life in favor of focusing on research aimed at supporting a high quality of life in old age, I was like the proverbial doctor who neglects her own health. I used to excuse my single-mindedness by saying I had no time for anything else, but I was spurred to action when a friend pointed out that nothing would happen unless I did something; I subsequently got married and gave birth to two children. It was after the birth of my older son that I moved from my university position to RIKEN, bringing sudden changes to both my personal and professional lives.

In my previous position I was a tenured associate professor, but looking for an environment in which I could accelerate the pace of my research, I opted for a fixed-term appointment as a principal investigator (PI) at RIKEN. While this may make planning ahead more difficult in some ways, I think it is important to decide on a principle which creates a direction for work and life; we should work to create opportunities and be ready to take advantage of them when they come around. Joining new organizations and new projects, for example, makes for uncertainties in life, but if you spend too much time checking out your surroundings, you are likely to miss the boat.

We can only plan within the scope of our current knowledge. New projects and new organizations can emerge in places beyond our assumptions. In fact, I never would have guessed I would end up tackling my current research subject at RIKEN when I finished graduate school. Even our private lives are full of unexpected events; the actions we take with respect to those events determines their course. I believe my research, my career, and my private life too are much more exciting and enjoyable than I could have ever imagined.



Column

Dr. Otake is the mother of two children, ages five and one. Her older boy loves origami. Not satisfied only with books, he has folded origami of as many as 15 types of beetles, referring to movies he found on the internet. Obviously, he gets this trait of becoming totally engrossed from his mother.

Researchers Are Singer-Songwriters Performing Their Own Science



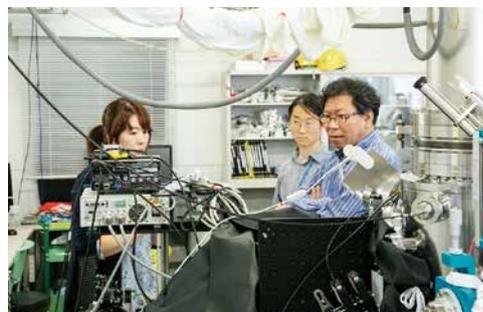
Chief Scientist
Surface and Interface Science Laboratory
RIKEN Cluster for Pioneering Research

Yousoo Kim

A childhood dream, more complicated than imagined

I have a sister who is quite a bit older than me. She was involved as a researcher in inorganic chemistry, which was particularly rare for a woman in Korea back then. She taught me about things like the structure of atoms and the number of atoms and electrons in a way that was extremely easy to understand, and although I was still just in elementary school, I became totally hooked on chemistry; that was when I decided that someday, I too would pursue a career in the field. My sister eventually earned her doctorate in France, and now works as a university professor in Korea. I realize now that having blazed her own trail as a female researcher, she was something of a pioneer. Indeed, although it was quite unusual in Korea at that time, most of my female relatives worked, so I think a sense of diversity came naturally to me.

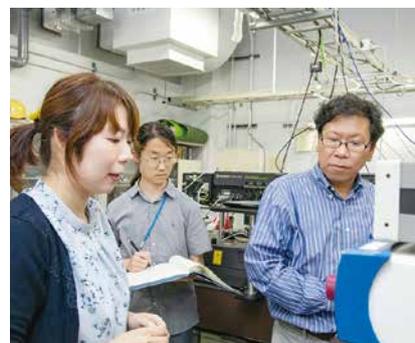
I became a researcher because I liked the work itself, but it turned out to be far more complicated than I had imagined. Almost all areas of research today involve teamwork. In addition to being a researcher, the principal investigator (PI) must fulfill various other roles, including managing the organization and communicating its work to others in an entertaining way. To put it another way, I see the researcher as a kind of singer-songwriter. After studying basic research concepts, we go on to create our own science. Like composing original songs and showcasing them in concert, we write papers and present them at conferences. Researchers are also expected to have a wide range of capabilities, able to think like a business person and possessing leadership, negotiating, and presentation skills. I myself had doubts about my future career before becoming a PI, but after much worrying, I arrived at this theory of the researcher as a singer-songwriter.



Thinking from diverse perspectives opens up new paths

In addition to a curiosity about research, it is important to build the right environment. Ensuring funding for research also requires skills to convince the public and the government of the value of our work. When introducing our research to the general public, we first reexamine what we have done, simplifying the research process and test results, and leaving in only what is most important. This clarifies the overall direction of the research, and through this process, something that at first glance seems completely irrelevant can lead to new revelations that support the work.

While I had a vague sense of being a minority ever since my years as a student, it also gave me the flexibility and respect for diversity that I think are often required for minority researchers. In a sense, I was a minority because I was often told that my research was of no use to society, but now the unique focus of my research is drawing attention, and that has naturally attracted talented young scientists. Each year, the number of those joining our lab has increased, and we now have 26 members. Because we place an emphasis on diverse ideas, our lab consists of members from a variety of fields including non-Japanese and female researchers, of which we have about 10 each.



Pursuit of every possibility leads to the future

Believing that making the box itself is more fun than trying to fit into the box we are given, we have continually developed and improved our lab's scanning tunneling microscope (STM), and today it is equipped with the only function of its kind in the world. We create new methods not by starting from scratch but by making incremental modifications. We have developed techniques for viewing a single molecule under specific environments, including extreme conditions, ultra-low temperatures, and ultra-high vacuum conditions, and we have specialized in examining in detail the properties of a single observable molecule. We are currently making modifications so that the STM can also be used in the analysis of materials and devices of use to society. We have received inquiries from people in a variety of fields and companies, and I now feel sure that we can contribute to developing real applications. In my doctoral program, I was advised that the best approach was to spend half of my time on work I was given, and half on work that I wanted to do. Capitalizing on this lesson, in advancing our efforts I try to keep in mind the goal of splitting our work evenly between basic and applied research.

My coming to Japan was a coincidence. I had originally planned to study in the United States, but during a trip to Japan I met the mentor who was to become my future academic supervisor—someone who so impressed me that I promptly changed my plans and came to study in Japan. Everything in my life has been the product of coincidence, to the extent that I think the word “necessity” might describe it better. I believe that prior to embarking on any new stage, you are doomed to failure the moment you think you could fail. The probability of success increases if you actually take action, even though that action might prove fruitless. I encourage all of you to start by taking action; the first step you take will lead to a new future.



Column

“I don't throw away memories,” says Dr. Kim, who still treasures the diaries he continued to write from the age of five until he came to Japan. As he got busier, Dr. Kim set writing aside for 20 years or so, but resumed his diary when the state of emergency was declared over Covid-19, changing our lives overnight. Writing in his diary, which he made himself, is now a daily routine for Dr. Kim.

Engaging in Decades of Research, While Embracing a Diverse Team and Diverse Lifestyles

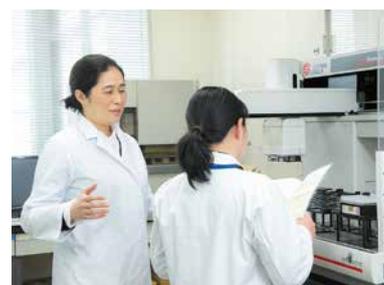


Deputy Team Leader
Laboratory for Autoimmune Diseases
RIKEN Center for Integrative Medical Sciences

Akari Suzuki

Elucidating not only autoimmune diseases but also tumor suppressor genes

When I was a student, it was still rare for women to go on to study in doctoral programs. My research advisor, however, believed that women's representation must become more prominent in academia as well as in other fields. I thus opted to continue my study toward a doctorate and follow the path of a researcher, thinking that I might be able to live in academia.



In the lab, my work centers on autoimmune diseases, primarily in research on rheumatoid arthritis. Although symptoms may appear in various forms in different parts of the body depending on the target, such as rheumatoid arthritis or diabetes, all autoimmune diseases are abnormalities of the immune system in which immune cells disrupt their own system's function for distinguishing normal cells and attack them. There must be reasons why immune cells trigger this abnormality, but the function is not yet fully understood. Researchers are struggling to discover the cause.

My grandmother lived in a mountainous region where many people suffered from rheumatoid arthritis, a disease also common in other rural areas of Japan. Because of the difference in the balance of Th1 cells and Th2 cells found in the people living in rural areas and those in urban areas, there is a hypothesis that many people in rural areas tend to suffer from rheumatoid arthritis while allergies are more prevalent in urban environments. A characteristic of rheumatoid arthritis is the severe pain it causes, though our ability to control that pain has recently improved significantly. I began to study rheumatoid arthritis after seeing how much my grandmother suffered and wondering what I could do to mitigate her pain. Once we learned that a single molecule is involved not only in autoimmune diseases but also cancer, we set about working toward a more comprehensive picture of autoimmune cells to elucidate tumor suppressor genes, through joint research with the University of Tokyo's Institute of Medical Science.

Through mutual recognition and communication

As I looked around for opportunities, I discovered that RIKEN was recruiting and decided to apply. Immediately upon obtaining my Ph.D., I began research with my current supervisor and we have continued to work together ever since. Because he emphasizes the importance of allowing everyone on the team the freedom to pursue their own research, we all contribute ideas and frame own approach to research. In the past I was something of a perfectionist who was never satisfied until every detail had been nailed down, but at some point I realized how uncomfortable that made others feel. There are always multiple ways to reach a goal, and what one considers the shortest or simplest route may well differ depending on one's viewpoint. Learning from my supervisor's management style, I came to accept ways of doing things and ways of thinking that were different from mine. As an approach to research, it is important not to tighten the screws too much on other researchers.

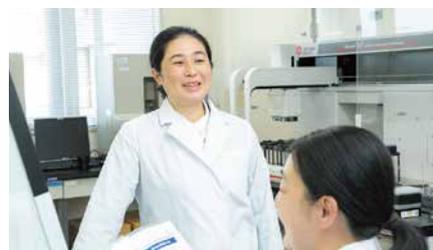
A non-Japanese researcher recently joined our team, and the way we communicate in the lab has changed. When a team consists only of Japanese researchers, many things can be tacitly understood. I realized, though, that with a non-Japanese team member present, even just one, we need to be more explicit in our explanations. I also came to realize that I was going ahead with things on the assumption that everyone understood the details when in fact they did not. Individuals differ in terms of their understanding of new technologies, their personalities, their workstyles, and so forth. Given that, I now try to coordinate the whole team so that in the end, everyone is heading in the same direction, and I take care to communicate in a way that suits each one of them.



Sharing a common vision with a diverse team: A society in which no one suffers from illness

There are doctors in our lab who are engaged in both clinical medicine and basic research. In the past, therefore, we started our team meetings after consultation hours and experiments sometimes went on until late at night. When my child was young, I shared child-rearing responsibilities with my family or I used babysitting services; I suppose it was partly thanks to my youth that I was able to cope. Times have changed, however, and there is now a better understanding of diverse lifestyles. Our meetings these days finish on time. Our team now has a good balance of men and women. After soliciting the opinions of our members, we have now switched to a morning research schedule.

The genome we are born with does not change and itself becomes a cause of disease. If we could know the impact of the genome on the likelihood of a disease before that disease actually develops, that would increase the possibility that people might prevent the disease by ensuring they lead careful yet healthy lives. The genome is structurally simple, but extremely complex in terms of the information it carries. Our research is like groping in the dark to discover what we need to know to uncover the cause of a disease. I hope that future developments in artificial intelligence will enable us to understand more, and I continue my research with a vision of building a society in which no one suffers from illness.



Column

Her parents used to tell Dr. Suzuki that she was a “peculiar child.” She loved collecting things that took her fancy and in her youth had collections of insect eggs and cast-off shells. Once she startled her parents by bringing home a snake's egg. Dr. Suzuki is now into collecting snow globes from around the world and displays them on her windowsill.

Everything Has a Common Essence – Therefore, We Should Dig Deep



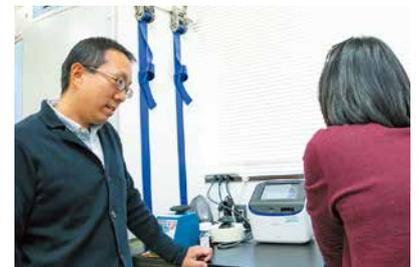
Team Leader
Laboratory for Developmental Epigenetics
RIKEN Center for Biosystems Dynamics Research

Ichiro Hiratani

Fascinated by embryology, a beautiful and an essential process

When I was a teenager, I read a book titled *Seishin to busshitsu* (Spirit and Substance) about the life of the Nobel laureate Susumu Tonegawa, and was fascinated by the career of a researcher active on the international stage. I am not quite sure when it was, but later I began to think that I should pursue a career in research. In part because my parents placed value on research and study, I did not find the idea of working for a company very attractive. During my practical training as an undergraduate, I found embryology quite interesting. Under the microscope, the sight of an embryo growing immediately after fertilization was beautiful, and I felt it was essential and meaningful to clarify the mechanism behind embryonic development. I chose the embryology lab for my undergraduate thesis research and spent my time in graduate school there.

I am currently studying how chromosome shapes are controlled. More precisely, I believe that if we focus on how chromosomes change shapes in the three-dimensional space of the cell nucleus during development in which various cell types emerge from fertilized eggs, we will eventually be able to unravel the mechanism by which cells change their character. Because analyzing chromosome shapes is surprisingly difficult and methods are limited, my research centers around the regulation of DNA replication, which closely reflects chromosome shape control.



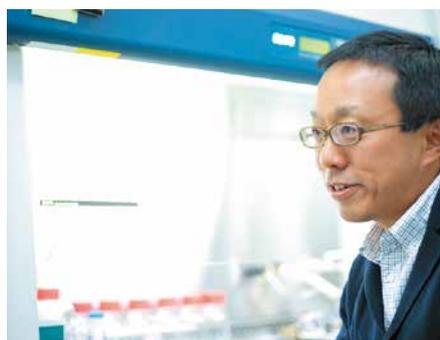
As everything has a common essence, learning opportunities are everywhere

I had the privilege of having two mentors who treated me very well. One was my graduate thesis supervisor, who was calm, intelligent, and very precise. The other was my postdoctoral supervisor, who

was energetic, straightforward, and full of ideas. I now incorporate the best of both management styles in running my own lab. When dealing with my lab members, I try to treat them all equally and approach them with sincerity. However, since I always try to be honest, I am probably fairly straightforward when it comes to criticisms. I do try to praise them when they do well, though. Discoveries in research are a joy, but I also enjoy watching the younger lab members mature as scientists.

The first three years after coming to RIKEN was very challenging as I was confronted with management issues and did not make much progress. Around that time, I happened to begin coaching a children's soccer team on the weekends. I hardly had any experience with soccer but it was fun playing and learning with the kids and I developed an eye for the sport as well. At first glance, soccer and research have nothing to do with each other. However, I learned a lot about how to talk to children, how to treat them, and how to organize a team, all of which were really helpful in running a lab. Thanks to this weekend experience, and by learning many things from my mistakes, my lab management skills gradually improved, and before I knew it, our research was moving forward in the right direction.

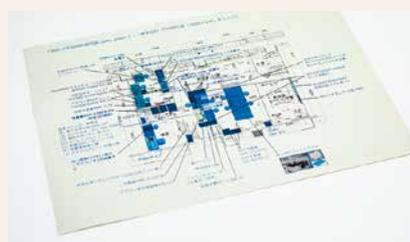
I strongly feel that research is all about people. State-of-the-art technologies and skills are important, but eventually, the key to success boils down to people—that is, the passion of the researchers and the extent to which I can respond to them with passion and empathy. In that sense, revelations often come from the outside world, when listening to those who have excelled in various fields. When you dig deep enough, you arrive at commonalities in the essence of everything. Hints are everywhere.



Solving essential problems will eventually benefit society

Recently, at the request of several female researchers whom I know well, I have been co-organizing the International Symposium for Female Researchers in Chromatin Biology, a gathering aimed to support female scientists in Japan. This also proved to be a treasure trove of learning. In the world of research, new breakthroughs always stem from the clash of diverse ideas. It is crucially important for RIKEN, other Japanese research institutes, and perhaps all organizations in Japan to create environments that are easy to work in and to keep the doors open to talented people with diverse backgrounds, including women and those from outside of Japan. Science is a universal enterprise and I believe that RIKEN has to become a pioneering case in Japan in this area.

Lately, there is a strong tendency to demand that all research be “beneficial.” However, scientific research is like a multi-layered pyramid, from basic research at the bottom to social applications at the top. If the basic research foundation is solid, the pyramid will be higher and more fruits will naturally be produced at the top to benefit society. By solving essential problems, one can build a solid foundation. That is why I always think hard to identify the essential problems in my research. As I mentioned earlier, research is all about people and I strongly believe that nurturing young researchers is also an essential part of research that will eventually benefit society.



Column

Dr. Hiratani drafted the floor plan for his lab and designed it himself to improve the efficiency of research. His attention to detail is evident here and there, for instance, in the width of the aisles that makes it easier for his lab members to pass one another. Although it was not intentional on his part, many female scientists play an active role in his lab.



Resolving to Engage in Research after Carefully Considering My Priorities

Professor
Research Center of Integrative Molecular Systems
Institute for Molecular Science
National Institutes of Natural Sciences

Hiroshi Yamamoto

Discarding the unnecessary to reveal what was truly important

In my master's program where I studied in an organic synthesis lab, many students chose a career working in pharmaceutical companies. As the style specific to the lab was not focused too much on probing what one did not understand and deepening one's research, I sensed a depressing gap with my own ideals.

Rather than advancing to a doctoral program, I thus considered looking for a job. One day, though, one of the associate professors asked me what I intended to do, and encouraged me to study further, saying he thought I should go on to pursue a doctorate. That remark gave me a supportive push, and I began to search for a lab at the doctoral level. At the time, I struggled a lot with the decision, but after I sorted out my priorities and took a hard look at my ambitions, prejudices, and vanity, the thought that I really did enjoy research finally remained at the end of that process. So, accepting that I might have to sacrifice some things, I moved on to a doctoral program, choosing a different lab from my master's program.

Being resolute in choosing a path will help overcome difficulties

After completing my doctorate, I was encouraged by my supervisor to join RIKEN. Having become busy parenting, and hoping to manage my laboratory efficiently—including staff I had hired using external funds that I had obtained—I took the step of studying management on my own. The research environment at RIKEN was very pleasant, but I decided to take my career a step higher and become independent as a principal investigator (PI) in order to establish that the results of my work had come out of my own research and my own original research themes. After applying for various



vacancies, I was eventually accepted as a PI at the Institute for Molecular Science. When recruiting staff for my lab, I try to communicate my values and policies. While respecting others and making sure that everyone feels free to pursue their own research, I offer advice to junior researchers when they seem to have strayed a bit. In other words, my approach is to maintain just the right distance, keeping an eye on everyone without appearing to be overly vigilant.

I continue to take the same approach as I got into while I was studying for my master's degree, prioritizing things, overlooking those that were lower priority and being resolute in identifying and choosing those on which I would not compromise. When I had my hands full parenting, I was easy-going about it, disregarding, to some extent, everything other than safeguarding my children's lives. When you lack the time and energy, you should not have to worry about what others say about things like the "ideal" way to raise a child. Once you understand that if you just stick to your principles you can skip everything else, I think your range of options—both in terms of your career path and other major life events—will expand. If my research had gone on the back burner because of the time I spent on child-rearing, I would have accepted that as my lot. My principles have never wavered.

Pursuing honest research, for myself and for future humankind

One of my research themes, which I have been pursuing ever since my days at RIKEN, is the organic superconductive transistor. Another subject that I have been particularly focused on recently is research to control electron spin using chiral molecules, which can be distinguished as either right-handed or left-handed. It is said that electron spin may also be related to the movement of electrons that occurs in life, which I think this subject connects to a variety of fields. When I change research themes, instead of making a complete switch I try to ensure that only about half of the content is new so that I can make use of the strengths I have gained through previous work. Although I am engaged in research at a national organization, that does not mean that I can immediately produce something that will benefit the public. In the future, however, I hope that some electronic device that I have created will find use in society. To me, my customer is future humankind, and I constantly remind myself that it is for those people that I want to continue pursuing straight-ahead research.

There may be those who are standing now at a crossroads in their lives as researchers. First of all, it is vital that you think about where your own interests and strengths lie. Based on the knowledge and experience you have cultivated thus far, take a good look inside yourself and be flexible in considering your strengths. Then turn your attention to what you will do to capitalize on those strengths—and where you will do it. Making the right choice in what you want to do will go most of the way to determining your research path. Research cannot be conducted based on concepts alone; it is important to anchor it in reality. If you have not decided where you are heading, your work will not go well. I also think it is important to attend academic conferences, read theses and books in fields somewhat outside your own, and take the initiative to proactively seek out people and information.



Hiroshi Yamamoto



Column

When his wife was appointed to work overseas, there were times Professor Yamamoto had to handle parenting and housework himself. His specialty is "no-frills cooking." He enjoys exploring how far he can go in cutting corners, while still ensuring the food tastes at least fairly good. Despite his busy life, Professor Yamamoto enjoys many hobbies, including tea ceremony, shogi (Japanese chess), boating, and others.

Promotion of diversity

At RIKEN, we have various support systems in place to facilitate a research environment that is friendly to everyone, and we proactively promote the participation of female researchers.

URL: <https://www.riken.jp/en/careers/diversity/index.html>

In-house childcare facilities



RIKEN Kids Wako
(Wako Campus in Wako, Saitama)



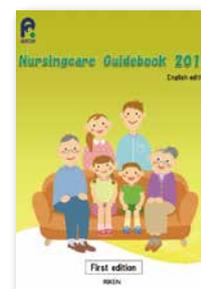
RIKEN Kids Yokohama
(Yokohama Campus in Yokohama, Kanagawa)



PO-I Kids Kobe
(Kobe Campus in Kobe, Hyogo)

Provision of information relating to child-rearing and nursing care

RIKEN publishes the Childcare Guidebook and the Nursing Care Guidebook to promote the utilization of available support systems.



Support for research staff balancing work and life events

● Subsidies to hire support staff for researchers who are pregnant, raising children, or caring for ill/older family members

RIKEN offers subsidies to help cover the cost of a support person (part-timer and temp staff) to assist a research staff member who is pregnant, caring for small children, or engaged in family (long-term/nursing) care, so that the research staff member can continue to conduct research.

● Funding support for researchers returning to work/research from interruption

RIKEN offers research funding to support researchers returning to work/research from interruption due to such life events as child-rearing and caregiving and thereby to maintain and further improve research and development outcomes.

● Providing a better living environment for non-Japanese employees

- Operation of International House
 - Provision of help desk services
 - Publication of monthly English-language in-house newsletter (RIKENETIC)
-

Gender Equality Promotion Committee

At RIKEN, the Gender Equality Promotion Committee and subcommittees established in each campus/center meet regularly to actively promote gender equality.

Initiatives to promote the active participation of female researchers

Improvement of diversity of research environments	<ul style="list-style-type: none"> ● Work and nursing care seminars; individual counseling sessions ● Program to subsidize payment of babysitter fees (sponsored by the Cabinet Office) ● Implementation of surveys
Enhancement of research capabilities of female researchers	<ul style="list-style-type: none"> ● Leadership Development Program for Female Researchers ● Individual counseling at RIKEN Open Day for female junior/senior high school and university students aspiring to the STEM fields ● Networking among female researchers
Facilitation of proactive recruitment/promotion of female researchers	<ul style="list-style-type: none"> ● Launch of Sechi Kato Program ● Development of awareness-raising e-learning materials ● Diversity seminars ● Publication of a guidebook profiling female researchers and their research activities

Diversity Research Environment Implementation Initiative [Distinctive Type], FY 2016 support program for human resources development in science and technology established by the Ministry of Education, Culture, Sports, Science and Technology of Japan (MEXT)

Sechi Kato Program

To facilitate active participation of female researchers and to promote recruitment of talented female researchers, RIKEN launched the Sechi Kato Program in FY 2018. It aims to develop female researchers who have a broad perspective and inquisitive mind, and who are expected to shine in the international arena as world-class female research leaders.

Sechi Kato (1893-1989)

Sechi Kato was a pioneering female scientist in Japan and the first female chief scientist of RIKEN. She contributed to research in chemistry by developing the spectrometric analysis of organic materials.



RIKEN Hakubi Fellows Program (applications limited to female researchers)

[Position name] RIKEN Hakubi research team leader

[Research fields] Natural sciences, including mathematical sciences and the boundary fields with social sciences

[Eligibility] Doctoral degrees are not a prerequisite.

[Recruiting method] International open call

[Term] Up to seven years (Evaluation conducted after three and a half years or later for extension.)

[Salary] 910,000 yen per month

[Research budget] 10–40 million yen per year

Female PI Incentive Fund Program

The program offers additional subsidies for research budgets to newly appointed or promoted female PIs (researchers in managerial positions). We adopt outstanding initiatives taken by each research center, based on recruitment plans to newly appoint/promote female researchers, and proposals to improve the workplace environment to enable female researchers to actively participate in research activities.

[Eligibility]

- In cases when hiring female researchers in managerial positions through an open call for applications limited to female researchers (full-time position)
- In cases when hiring female researchers in managerial positions through a call that all individuals can apply for regardless of sex (full-time position)
- In cases where research activities will be conducted jointly with the prominent female researchers who are affiliated with other research institutes or universities in Japan or internationally (cross-appointment position)

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