

Title	Requisite for pursuit of research are a challenger spirit and the ability to concentrate.: listening to what Associate Professor Junko Hayase has to say
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Requisite for pursuit of research are a challenger spirit and the ability to concentrate.

Ms. Hayase is one of the few female researchers in Japan specializing in quantum-mechanical optoelectronics. Though it is difficult to imagine from her soft and gentle appearance and manners, as a high school student she belonged to her school's rowing club and was powerful enough to place fourth in the national high-school competition. Using her bodily strength and power of concentration nurtured through club activities, Ms. Hayase has forged her own way as a researcher.

How did you spend your childhood? Were you good at science as a young schoolgirl?

Though I have little memory of my childhood, my parents often said that I had been a very inquisitive girl always asking “why?”, but I’m sure I was not particularly good at science.

I was born in Fukushima Prefecture where everything is easy and slow. So I remember that I didn’t study hard as an elementary schoolgirl. In my junior high school days my family moved to Saitama Prefecture and I went on to a prefectural senior high school. An encounter with a physics teacher was inspiring and marked a significant turning point in my life.

He was different from other physics teachers. In our physics class, conducting an experiment was an integral part of study, which made students think about “why.” When it comes to regular examinations, the teacher rarely gave calculation-oriented problems but instead posed questions like “Describe why so.” As a thinking type of student by nature, my encounter with this teacher awakened my interest in physics. That said, becoming a researcher still remained an almost unreachable dream for me back in those days.

This is because as a member of my high

school's rowing club, I had spent most of my time for club activities including participation in the inter-high school rowing competition. Up until September of my third year in high school (when the National Athletic Meet was held), I had literally devoted myself to club activity. So I studied little to prepare for university entrance examinations. Instead, I was admitted via recommendation to the Department of Physics, Sophia University.

But you couldn't be recommended by your high school unless your day-to-day performance was good, could you?

Maybe it was thanks mainly to my increased physical strength and enhanced power of concentration that was developed through my club activities. I used my strength and power of concentration to the fullest to steer through the vital high-school examination. To tell the truth, I had never attended a cram school. And I received a trial university entrance examination only once.

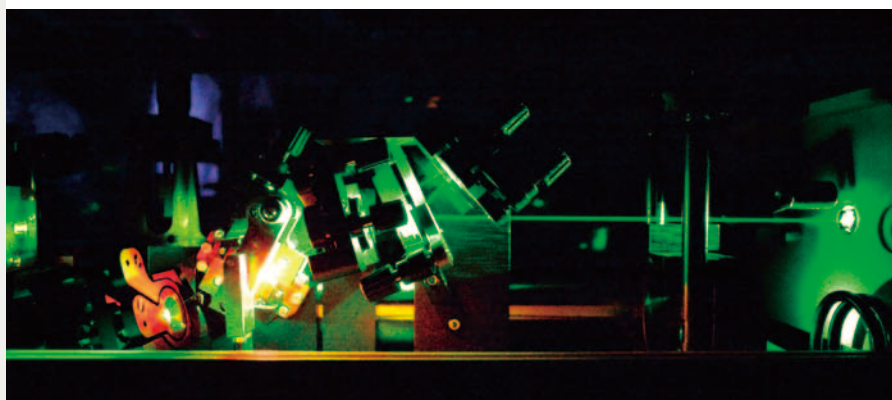
Just about when did you make up your mind to become a researcher?

When I was a senior at my university, I decided to join the lab of Professor

Kazuhiro Ema who was then only in his second year of arrival in his post. The lab was focused on nonlinear spectroscopy using ultrashort light pulses – a forefront field of study leading the world. Until the end of the year as a junior, I had learned theories and experiments the answers of which are known and provided. But at the Ema lab we took up the challenges of experiments no one in the world had ever conducted, and could produce innovative results. My life with the Ema lab was both challenging as well as very fulfilling. We often carried out experiments all night long, but it was not troublesome at all. Once concentrated on something, I’m not satisfied until I carry it out to the very end.

Having put myself in such an environment, my yearning to become a researcher must have grown stronger and stronger. People often say that I appear to be a quiet type at a glance, but I find myself rather stubborn and uncompromising once I’ve decided to do something (laughter). My parents advised me, saying “It’s best to find employment with a company after graduation and marry a suitable young man.” But I gave no ear to their advice and decided to go on to graduate school for a doctoral course.

After earning my doctor’s degree, I joined the RIKEN institute to become an academic research scientist. It was a position as a postdoctoral fellow with a term of three years. I applied for RIKEN by proposing a research theme of my own, which was luckily adopted by the



Ultrashort pulse laser emits light instantaneously for an incredibly short period of 10^{-13} second. This equipment is packed with a plethora of leading-edge optical technologies.



My lab enjoys a fresh and friendly atmosphere, where more than half of its members are undergraduate seniors. After research activities, all of us often go out for dining and drinking together.

institute. The theme is a bit different from my current theme, but had things in common in that it would handle light and nanostructured semiconductors. Following my service with RIKEN, I moved to the National Institute of Information and Communications Technology (NICT), where I encountered quantum dots. It just happened that at NICT there was a research team engaging in the making of characteristic quantum dots, which I found intriguing. I belonged to NICT for about four and a half years. With the NICT as well, I obtained a position for myself through job-seeking activity.

I approached one research institute after another to obtain necessary research funds and secure a stable research environment. During my service with the NICT, I was successfully chosen as an eligible researcher by the Japan Science and Technology Agency's (JST) "PRESTO (Sakigake in Japanese)" competitive research funding system that targets individual research projects, surmounting a highly competitive ratio of one in 15 applicants. What was particularly good about the "PRESTO (Sakigake)" system was that the adopted researchers and advisers on the screening side get together in semiannual boarding sessions to engage in discussions in an unrestricted atmosphere. On these occasions, the participants make presentations on the progress of their respective research projects. Each participant is subjected to unreserved opinions and criticism from others – a coveted opportunity for obtaining an extremely high level of advice, which provided me with nourishment for future growth.

Using participation in the "PRESTO (Sakigake)" system as momentum for stepping up my career, I then became a teacher for the University of Electro-Communications by taking advantage of the tenure-tracking system (a system that encourages young researchers to accumulate experience as independent researchers under employment with a term and obtain stable employment after passing rigid screening). And last year, at last, I could find a permanent position at Keio University. Now I'm in a position to operate my own lab, with six students, undergraduate and graduate, under my care. I feel great responsibility for this duty, which is fulfilling as well.

As a female researcher, have you experienced any particular hardship or benefit?

I'm not particularly conscious of advantage or disadvantage in terms of gender. Most of the time the consciousness as a female didn't come to mind. Naturally, I always see myself as a person and not as a woman. The only good thing about me being a woman is that as a minority I can be easily remembered by others. I may be also benefiting as a woman because of recently introduced systems aimed to support female researchers. But if I'm benefiting from such systems, I feel obliged to return the benefit I received by

producing suitable results. It's my feeling of responsibility not as a female but as a researcher...

What about diversion from your research work?

Since I'm usually leading a restless life, I try to enjoy a relaxed lifestyle when I'm not working, going shopping with my husband, taking trips and so on. Proper rest and relaxation are definitely necessary because research work demands physical strength and energy as well as power of concentration. Likewise, I'd like my lab students to lead a life punctuated with rhythms of hard work and relaxation.

◎ Just a word from . . . ◎

● A student: I'm always impressed with Dr. Hayase's toughness. Whatever trouble occurs, she comes in punctually and proceeds to research work in a concentrated manner. I admire her as a mirror of research scientists. Just as an attempt to follow her pattern, I've begun to develop my physical strength.

(Reporter & text writer: Madoka Tainaka)

For the full text of this interview

<http://www.st.keio.ac.jp/kyurizukai>

YouTube: Keio University channel's research introducing video

<http://www.youtube.com/watch?v=D3wvAgDzPQc>

I'd like to maintain a mindset for always embracing new challenges.

Junko Hayase

(pen name: Junko Ishi-Hayase)

Dr. Hayase's specialty is quantum optoelectronics. Specifically, she engages in studies regarding optical properties of nanostructured semiconductors based on the use of ultrashort light pulses, quantum control, and application of quantum information. Ms. Hayase acquired a doctor's degree (science) at Sophia University. Before being assigned to the current position as an associate professor of Keio University's Faculty of Science and Technology in 2010, Dr. Hayase served as a fellow researcher at RIKEN's basic science laboratory, a fellow researcher at the National Institute of Information and Communications Technology (NICT), a researcher at the Japan Science and Technology Agency's (JST) "PRESTO (Sakigake)" system, and a research associate professor at the University of Electro-Communications' Education and Research Center for Advanced Studies. In 2009, she was awarded the "Young Scientist's Prize" by the Minister of Education, Culture, Sports, Science and Technology.

