Title	I would like to share the excitement of the capsule retrieval campaign during the Hayabusa project with young people : associate professor Genya Ishigami
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Author	平塚, 裕子(Hiratsuka, Yūko)
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I would like to share the excitement of the capsule retrieval campaign during the *Hayabusa* project with young people

Ishigami-san, whose career has included being a JAXA researcher. While he continues today to participate in exploration projects, including one intended for Mars and its satellites, he recounts that his memory of the excitement he tasted during the capsule retrieval campaign for the *Hayabusa* asteroid probe, which he experienced immediately after becoming a JAXA researcher, remains undiminished even today. This was an outstanding deed realized by the passion of the researchers. "I want the next generation to taste the delights and excitement of being a researcher," says Ishigami-san.

Tell me a little about your childhood.

As an elementary school student, I often spent it playing outside. At home, meanwhile, I would pass the time staring intently at the turbulence in the twin-tub washing machine or the waves created in the water as the bathtub emptied. I have fond memories of beating the sand to make the ground solid and using a spirit level to ensure the foundations were fully horizontal when I helped build a storage room with my father.

During junior and senior high school I busied myself with both basketball and my studies. However, in the spring of my third year of senior high school, I severed a ligament in my leg during a training match with university students. This was a real blow, as I had been intent on appearing in the final tournament that June.

You went on to join a space robot lab at university.

I had it in mind to study abroad at the University of California, Los Angeles (UCLA). At the time—the latter half of the 1990s—CG was in its ascendancy there, and I particularly liked movies when I was in senior high school. I put together a fairly detailed plan that also took in scholarships and then spoke to my parents. Unfortunately, as it turned out, there were too many difficulties on the funding end, and this had to be abandoned.

Then, just as I was contemplating university entrance exams, I learned that there was a space robotics lab at Tohoku University in my hometown of Sendai, and decided to set my sights on getting in there. I got into Tohoku University under a designated school recommendation, and succeeded in entering the laboratory of my choice of Professor Kazuya Yoshida as a third year undergraduate.

I was surprised to discover that they had the CG software 3ds Max at the lab. This was a genuine source of delight, as this is a sophisticated piece of software which is actually used by film production companies.

When were you finally set on taking the researcher route?

In April of the second year of my master's, Yoshida-sensei asked me: "Wouldn't you like to do a doctorate?" This proved the turning point, as I was reassured by Yoshida-sensei's faith in my ability. In the first year of my master's, a number of events also reinforced my own sense that I had indeed made substantial progress.

For example, when I did a short-stay study abroad program in Australia at the University of New South Wales during spring break, my research was received more favorably by the professors and students there than I would ever have imagined.

I was motivated by my interest in where it might lead me if I studied even harder for a Ph.D., which decided me on entering the doctorate program.

After getting your doctoral degree you made your way to Massachusetts Institute of Technology (MIT).

This was because MIT's Karl Iagnemma was producing consistently spectacular papers, and I had already aspired to working with him for some time.

It appears that Karl too was aware of my own existence, and he replied to my entreaties by saying: "As it stands, I reckon MIT can cover half your wages." At this point, I set about digging up a scholarship to cover the remaining half of my wages, and succeeded in getting funding from the Murata Overseas Scholarship Foundation. I remember being extremely nervous on finding out that Professor Kazuo Yoshida from Keio University was one of the people in charge for the final interview.

How was life as an MIT researcher?

That period was the skinniest I have ever been in my life (laughter). The first three months were distinctly challenging. The rent and taxes were higher than I had envisaged and I would eat just one bagel for lunch—in essence a subsistence-level existence. In addition, I made light of the need for English proficiency, but I was being naïve...

Nevertheless, while the laboratory as a whole was largely peopled by theoreticians, Karl valued my contribution as a researcher inclined towards practical work and experiments. By the time I got to my second year, I was involved in around four projects, including consulting for corporate entities.

The one that stays with me most was a project related to the United States Defense Advanced Research Projects Agency (DARPA). On one occasion there was an accident involving a bomb exploding as it was being disarmed by a remote-controlled robot in Afghanistan. I was able to participate in the

subsequently-convened DARPA academic conference, where the speech given there by a high ranking officer to the effect that "This robot saved the lives of three soldiers" was greeted by a standing ovation. This was the first time I had encountered a real-world situation in which research outcomes had directly intervened to save lives. I was deeply impressed by the hero's reception afforded to a robot designed to rescue people.

How did you find your work at JAXA after you got back to Japan?

I threw myself into my work at JAXA. I was allowed to present on what I might contribute to the Mars exploration mission at the second meeting in which I participated there. As a result, my membership of the team was approved; and I was also given the chance to present at a mission definition review several years later.

In June 2010, immediately after I assumed my post, I also had the privilege to join the capsule retrieval unit for the *Hayabusa* ("Peregrine Falcon") asteroid probe. The morning after we had successfully found the capsule on a vast desert in Australia, I was greatly moved by the passionate speech given by Professor Hitoshi Kuninaka who both headed up the retrieval campaign and was the developer of *Hayabusa's* ion engine. Having the opportunity to share in the emotion associated with the successful completion of a mission that had spanned some 30 years and generations of researchers at the same time sparked in me a burning desire to help the youngsters of the next generation have similar experiences.

This is partly what led me to turn my sights on Keio University. In fact, I was already being drawn into the gravitational orbit of Keio when I was at JAXA, with one of the researchers to whom I was most indebted in my work then, as today, being an adherent of Professor Kazuo Yoshida.

What do you perceive as the appeals of Keio University?

I feel that the ability of the faculty and staff members to unite and work towards a single goal is wonderful. Even if an undertaking has no particular precedent you would never hear "It can't be done." Instead people join you in looking for solutions saying something like "How about doing it this way?" or "Let's try it like this!"

I also find the relative lack of distance between faculty members and students appealing. Soon after I assumed my post I came across Yukichi Fukuzawa's phrase of *hangaku-hankyou*, or "learning while teaching, teaching while learning," and thought that this was a particularly germane way of describing this dynamic. While I may be in the position of teaching, I get a real sense that this also constitutes a position whereby I am taught and can learn from the students.

What is most important when it comes to research?

I often say to students "don't become passive or complacent." If you are sitting around waiting for someone's permission you will not do good research. As I said when I presented on the Mars exploration mission at JAXA, your work should also assume the attitude of showing off your own particular talents. I want my students to maintain a sense of spontaneity and dynamism in their work.

Another study I am currently tackling requires us to go about our work while keeping in mind "The significance and impact for society at large."

◎ Some words from students . . . ◎

● Ishigami-sensei has an extremely generous sense of humor. He is erudite and talented in many fields, meaning that whatever you choose to research he will offer concise and pointed advice. On the flipside, he plays softball with us and is a teacher with whom you can talk about almost anything (4th year undergraduate).

(Interview and text writer : Yuko Hiratsuka)

For the full text of this interview
http://www.st.keio.ac.jp/kyurizukai

Do not assume a passive demeanor
The secret to research success is seizing opportunities.
To do this maintain spontaneity and dynamism.

Genya Ishigami

Associate Professor at the Department of Mechanical Engineering, Faculty of Science and Technology, Keio University. Ph.D. in Engineering. Specializes in field robotics, space exploration engineering, terramechanics, and autonomous mobility systems. Graduated from the Department of Mechanical and Aerospace Engineering, School of Engineering, Tohoku University in 2003. Completed doctorate majoring in Aerospace Engineering at the Graduate School of Engineering, Tohoku University in 2008. Research Associate at the Japan Aerospace Exploration Agency from 2010 following a Postdoctoral Associate at the Massachusetts Institute of Technology (MIT). Enters the Faculty of Science and Technology, Keio University in 2013 as an assistant professor, assuming current position in 2017. Born in Miyagi Prefecture.