

Title	Everything I've experienced up until now supports the breadth of my research : associate professor Mayu Muramatsu
Sub Title	
Author	池田, 亜希子(Ikeda, Akiko)
Publisher	Faculty of Science and Technology, Keio University
Publication year	2023
Jtitle	New Kyurizukai No.39 (2023. 11) ,p.4- 5
JaLC DOI	
Abstract	
Notes	Computational solid mechanics and information technology from Keio's Faculty of Science and Technology : what is the future of computer aided engineering? Mayu Muramatsu : associate professor, Department of Mechanical Engineering The interview
Genre	Article
URL	<a href="https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=KO50001003-00000039-0004">https://koara.lib.keio.ac.jp/xoonips/modules/xoonips/detail.php?koara_id=KO50001003-00000039-0004</a>

慶應義塾大学学術情報リポジトリ(KOARA)に掲載されているコンテンツの著作権は、それぞれの著作者、学会または出版社/発行者に帰属し、その権利は著作権法によって保護されています。引用にあたっては、著作権法を遵守してご利用ください。

The copyrights of content available on the KeiO Associated Repository of Academic resources (KOARA) belong to the respective authors, academic societies, or publishers/issuers, and these rights are protected by the Japanese Copyright Act. When quoting the content, please follow the Japanese copyright act.



## Everything I've experienced up until now supports the breadth of my research

Ever since Mayu Muramatsu learned about the laws of motion in high school, she has had an insatiable enthusiasm for learning about mechanics. As she continues her work in computational mechanics\*, Muramatsu is constantly working to invest her energy in nurturing future generations and making progress towards new discoveries in the study of mechanics so that it continues to be a societally relevant academic field of knowledge.

\*Computational mechanics is a field of study in which mechanics are understood through computer simulations rather than physical experiments.

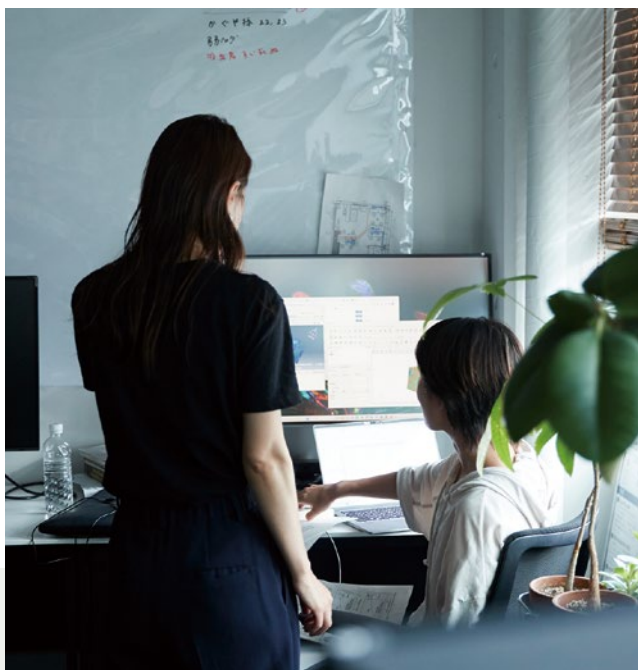
### Did you like math and science when you were a kid?

Not at all. I studied math and science so that I could pass the regular tests, but I didn't like them particularly more than other subjects. In fact, my real interest was reading. In elementary school, while all the other students were playing dodgeball and other games, I was often holed up by myself in the library.

The catalyst which sparked my interest in math and science was my high school physics class. Some people reading this may remember an experiment where you learn how the heavier an object is, the closer it will land when thrown, whereas lighter objects will travel farther. While this might seem obvious, I found it beautiful that you could express this phenomenon using mathematical formulae and the laws of physics. I wanted to know more about who had come up with these laws. This was when I decided to major in mechanical engineering for college.

### You graduated from Keio University's Faculty of Science and Technology, right?

That's right. My parents and two younger sisters were liberal arts majors, but my grandfather had conducted research about soy sauce and other topics in agricultural science, so sometimes he would teach me about chemistry and biology. Even though I told him that I only wanted to learn things that would show up on tests, he was sure to tell me things that wouldn't ever be included [laughs]. My grandfather was very happy for me when I was able to enroll at Keio University's Faculty of Science and Technology.



I think that the draw of physics and mechanics is that you can feel its impact in your daily life, like when you observe how much an airplane wing flexes when force is applied to it. Taking that to the digital realm, you can use formulae and computer simulations to create accurate representations of real physical phenomena. I wanted to keep learning more advanced mechanics, and so this led me to pursuing a career in research after I graduated.

### After graduation, I understand that you gained experience working for a research institute and as a faculty member for a university.

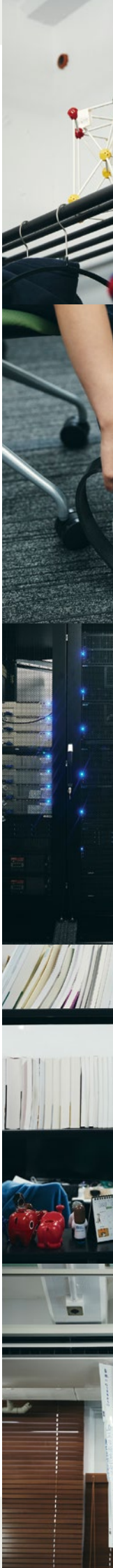
After graduating from Keio, I spent two years at the National Institute of Advanced Industrial Science and Technology in Tsukuba. I then spent four years in Sendai Prefecture working at Tohoku University. I decided to work for AIST because I did not think of myself as the "teacher type," but when I actually started working there it was very lonely and I felt isolated. I realized that I didn't belong in a place where there were no students. As in research institutes you are primarily required to make progress on your own research projects, I didn't have a chance to study with my colleagues either.

That was when Dr. Kenjiro Terada from Tohoku University invited me to work there as a postdoctoral researcher. For someone who had always lived in the Kanto region of Japan, moving up north to Tohoku felt like a complete reset, so it took a lot of resolution to make that decision. However, when I went there, I found it to be a wonderful environment for working on my research. I was given free rein to conduct my numerical simulations and I enjoyed interacting with the students. I also spent plenty of time talking with Dr. Terada. He influenced me quite a bit. Over time, Sendai became my second home.

### Are there significant differences between a research institute and a university?

While my main area of focus is numerical simulations, at AIST I was told to do some experiments using thermal cameras. I was completely ignorant of the research going on in that field, so it took an incredible amount of work before I was familiar enough with the subject matter to find a relevant topic that would work for an academic paper and produce results. By the time I decided to move to Tohoku University, I had already amassed a decent portfolio of work.

Back then, I was so anxious about my future and eager to become an indispensable researcher fast in a specific area. But thanks to the experiences and ideas I gained during my time at AIST, now I am able to carry out a wide array of research projects.





In fact, I am still being allowed to experiment with prosthetic legs and other devices at AIST, and I have continued my thermal camera research.

### Tell us about what it was like coming back to Keio University, your alma mater, in 2018.

The biggest change for me was being put in charge of a laboratory. Up until then, I had never been in a position where I had to speak in front of groups or take on leadership roles. I found the transition to be very difficult, so I read books written by sports coaches. If the “goal” of research is to publish academic papers, then both sports and laboratories are team-based games. Likewise, they both share aspects which are highly individual. Every person on the team needs to be able to express their own abilities and personalities. I think the two worlds are similar in that respect, too.

How can I help students who share my research interests hone their individual skills and how can I help each one of them “brand” themselves to succeed when venturing out into the world? I especially feel this with students who will be going on to do a Ph.D. program because they will become lifelong research colleagues. I want to lay a foundation and pave a path forward for them to thrive in research communities based on their own capabilities.

I feel this way because I truly enjoy my research in computational mechanics and think highly of the field. 300 years from now most people, no matter which path they choose, will be forgotten. I am no exception. My hope is just that I can connect with my students so that they share the same ambition that I have; to advance this field and bring it into the future.

### I also understand that you're quite the entrepreneur?

While my research never seemed to cross paths with the world of business or entrepreneurship, I have always felt that it is important to be able to implement research findings in society for it to be useful. As I was thinking about this issue, one of my students recommended an entrepreneurship seminar that the

graduate school was offering, and I signed up.

Keio students are incredibly independent and, in the best way possible, don't mindlessly listen to what people tell them to do. Instead, I have noticed that they will zero in on and get involved in projects that they genuinely believe in and which align with their personal interests. I know students who bring in their own original ideas to incorporate to our research projects as well as those who want to work on and go into business with the prosthetic limb defect detection technology that I mentioned in my research overview.

I think that successful people have an instinctive ability to get the timing right. This ability can also be acquired, possibly by meeting up with many people. In both entrepreneurship and research, you should do what you need on a daily basis in preparation for the future, while trying to take as many opportunities as you can to meet up with other people. I sincerely hope that my students will make the most of the precious time they have in college.

### ◎ Some words from students . . . ◎

● I have always been interested in “modeling” as a way to simplify the complexities of society. In class, I learned that you can “model” materials and I thought it sounded interesting. When I was deciding which laboratory to join, I told Professor Muramatsu that I was interested in continuing my studies in sociology. Her response was to say that research is fueled by a wealth of experiences, and that was the decisive factor for me in choosing to join the lab. Once the COVID-19 pandemic started to get under control, I was able to meet a lot of different people at the university. I've learned that the world is much wider than I had ever imagined back in high school. Professor Muramatsu is the one always showing me new research and daily happenings that help broaden my horizons. (4th-year undergraduate student)

(Interview and text writer: Akiko Ikeda)

For the full text of this interview

<https://www.st.keio.ac.jp/en/kyurizukai/>

## Passing the baton of my love for computational mechanics to the next generation!

### Mayu Muramatsu

Mayu Muramatsu's academic specialties are in computational mechanics, solid mechanics, and materials engineering. In 2007, she graduated from the Keio University's Department of Mechanical Engineering in the Faculty of Science and Technology. She then completed her doctoral degree (engineering) in 2011 working in the Shizawa Laboratory which is overseen by Dr. Kazuyuki Shizawa, Department of Mechanical Engineering, Faculty of Science and Technology, Keio University. After working as an assistant professor for the Ohmura Laboratory in this same department, in 2012 she became a project researcher for the Institute of Advanced Industrial Science and Technology (AIST). In 2014, she began working as an assistant professor at Tohoku University. In April 2018, Muramatsu returned to Keio University and was appointed as a senior assistant professor in the Department of Mechanical Engineering. She assumed her current position as an Associate Professor as of April 2022.

