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# Logical thinking is essential for persuasive research

## I'd like to address vis-à-vis what I feel is interesting

**Dr. Ohmura has been tackling research on clathrate hydrates ever since he was an undergraduate. While he continues to pursue his career as a researcher, he also devotes his energies to fostering the next generation. When it comes to thermodynamics, his specialty, he smiles and jokingly says, "For students, this must be one of the toughest and 'worst' subjects to deal with." Contrary to his self criticism, his students favorably comment on Dr. Ohmura's lectures as being easy to understand. Some say that the study of physics has become interesting thanks to Dr. Ohmura.**

**What was the impetus for you to choose the science and technology course at a university?**

I'm now a teacher of mechanical engineering at Keio's Faculty of Science and Technology. It may surprise you to say that mathematics and physics were my weakest points as a high school student. My favorites were social-study subjects, such as politics, economics, ethics, and history.

Why did a liberal arts-oriented boy like me choose to study science and technology at a university? It was because of my father's advice. When I was pondering which subjects to choose at university, my father said, "A university can offer great opportunities because you can meet good teachers who are specialists in their respective science and technology fields. Why don't you learn your weak subjects from them?" Fortunately, my scores in entrance exam mathematics and physics tests were passable, so I decided to choose the science and technology course and went on to the Department of Mechanical Engineering of Keio University's Faculty of Science and Technology.

**How did you manage your weak points – scientific subjects?**

Although my perception of mathematics as being my weak point remained unchanged, my impression of physics totally changed immediately after admission to Keio. My teachers in charge of lectures on mechanics and thermodynamics were so professional that I was truly impressed by the fact that those teachers with thorough knowledge could make lectures so exciting.

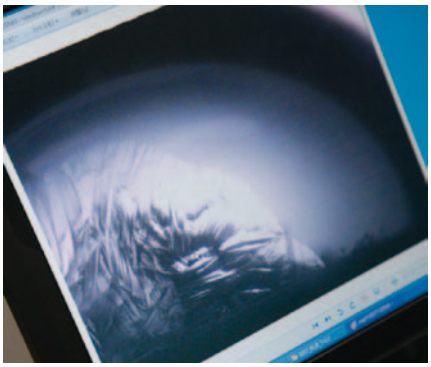
At the university, I could learn everything about physical phenomena and machine functions through lectures and experiments – why is it so and why does it move like that? – from their principles through to mechanisms. These lectures were totally different from my high school physic class where I studied while asking myself "What on earth would this study be useful for?"

**What was the impetus for you to begin studying clathrate hydrates?**

It was when I joined Prof. Yasuhiko Mori's laboratory as a senior. In those days, Dr. Mori focused on research into heat transfer, one of its themes being clathrate hydrates. Although I found clathrate hydrate phenomena intriguing back in those days, I didn't give it much further thought. But my perception of clathrate hydrates changed dramatically when I had an opportunity to meet Prof. E. D. Sloan Jr. of the Colorado School of Mines.

Prof. Sloan is the leading figure in the field of clathrate hydrate study with outstanding achievements in engineering. When I was studying in the master's program, a special course was held in our School of Science and Technology inviting Prof. Sloan. Though the special course lasted only for two months, it was a truly inspiring experience for me as it allowed me to acquire systematic knowledge from Prof. Sloan, whose research activity had focused on clathrate hydrates for years.

When I was thinking of continuing my clathrate hydrate research pursuit after acquisition of a doctor's degree, I happened to know that the National Institute of Advanced Industrial Science and Technology (AIST) was looking for young researchers in the field of hydrates. I was quick to apply for a position there. I belonged to the AIST for four years, during which period I experienced practical aspects of engineering science – the field where I could engage in fundamentals of applied physics while simultaneously observing research targets from the engineering perspective. It was a truly valuable experience as it concerns my current research activity.



Using this equipment which looks like a cylinder placed in a horizontal position, we can observe the crystal growth process of clathrate hydrates under high pressures and low temperatures. The image above shows a hydrate crystal that is growing through a reaction between methane + $CO_2$ mixture gas with water.

Aside from jogging, my regular physical exercises are football and bench press. Currently, the maximum mass I can lift is 95kg. I'm continuing twice-a-week training together with my teacher, Prof. Mori, aiming at 100kg.

**After leaving AIST, you returned to Keio. Was there any special reason for doing so?**

Since my student days, I had thought I'm of the type who encourage others and draw out their potential abilities, which I became strongly aware of during my service with the AIST.

While AIST researchers sometimes work with their subordinates and part-timers, most of them normally devote themselves to their own research tasks. But I came to feel more motivation in thinking and working with students and fostering students who are willing to contribute to society and universities, and to shoulder the future for all. So I chose a career as university teacher, seizing an opportunity of an offer for a post of assistant professor. In my view, I'm a type of teacher who develops students' potentials by encouraging them while maintaining sternness. I know I'm viewed as a stern teacher among students, but think it's okay to some extent.

**Aside from your research work, what are you interested in, or what are your pursuits?**

I like to move my body. Jogging is a longtime pursuit. These days, I make it a rule to run a distance of about 16 kilometers daily, or one hour and 40 minutes. Since my home is in the Tsunashima area, my regular route is heading toward Shin-Yokohama along the Tsurumi River to the Nissan Stadium and back. It's almost a habit rather than a hobby. While running, I can put my thinking in order, whereas being able to refresh myself when I have a problem and waver in my judgment.

**Please tell us what you are doing consciously as a teacher to draw out and develop students' potentials.**

"Always be logical," I would say. I'm convinced that the ability to think logically is essential to make the best use of oneself in a given organization or society. Another point: Make it a rule to think about things by putting yourself in the shoes of others. One tends to be self-assertive when one has a strong message to deliver to others. But it's wise to restrain yourself. I'm trying to experience and prepare such environments through research activities and academic presentations.

From a mechanical engineering point of view, I'd like my students to acquire the practical application ability based on the laws of physics, with which they can judge things correctly. I know that mechanics and thermodynamics are extremely hard to understand, but it's true that these sciences are more useful than any other sciences once you have acquired such knowledge. I'd like to offer lectures in such a way as to make my students become aware that these sciences are indispensable for establishing the structure and systems of society.

◎ **Just a word from . . .** ◎

**● A student : In a single word, Dr. Ohmura is a man of knowledge. Not to mention his lectures, he has a wide range of topics to talk about, from history and culture as well as cooking, food ingredients, and wine. We are totally brought into his world before we know. He is also good at sports. I'm sure his physical strength is greater than ours!**

(Reporter & text writer: Kaoru Watanabe)

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

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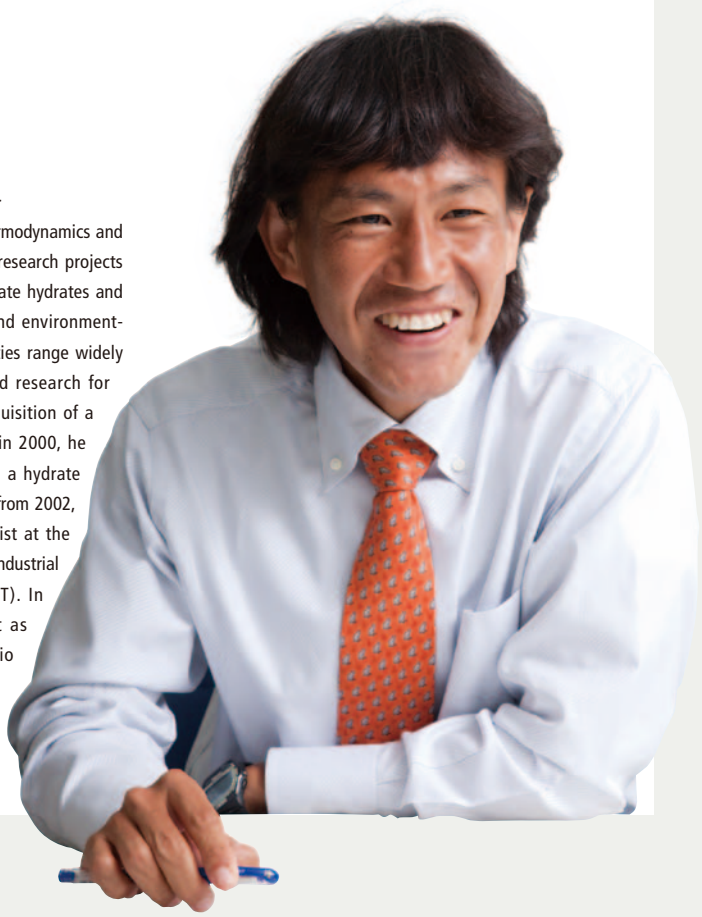

## Ryo Ohmura

Dr. Ohmura's specialties are thermodynamics and physical chemistry. His current research projects are physical chemistry of clathrate hydrates and the development of energy- and environment-related technologies. His activities range widely from basic research to applied research for practical application. After acquisition of a doctor's degree (engineering) in 2000, he visited France to participate in a hydrate research project. For four years from 2002, he served as a research scientist at the National Institute of Advanced Industrial Science and Technology (AIST). In 2006, he arrived at his post as an assistant professor of Keio University Faculty of Science and Technology, and then he was promoted to his current post as an associate professor in 2009.