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Associate Professor Tomoaki Okuda



In studies, basketball and piano . . . my power for persistent, unwavering continuation has produced achievements.

Dr. Okuda took up playing the piano and basketball as pursuits under the influence of his elder brother and sister. Although he took up neither pursuits on his own will, he was able to experience joys that could be appreciated only through continually engaging in them. The power to persistently continue pursuits was nurtured through piano and basketball. This combined with the power to look at things objectively – a capacity developed through constant changes in his environment – led to his worthy achievements.

What was your childhood like?

I was born in Fussa City of Tokyo as the youngest child of three – a brother seven years older and a sister five years older than me. Under the influence of my brother and sister, I began to take lessons on the piano at the age of four and continued the pursuit until 27 years of age when I found employment. Since both my brother and sister had been playing the piano since childhood, I took playing the piano for granted.

After having served as a high school teacher, my father became a university teacher, teaching sociology of education at the faculty of literature of a private university. In his daily life he made it a rule to come back home at 6:00 p.m. He often invited his students for a reading circle or drinking party; he looked really happy.

Watching my father's behavior as an example, I came to make up my mind to become a universithy teacher at some time. In reality, the lifestyle as a science/engineering course faculty member is much different from that of a humanities course. Contrary to my initial expectations, I'm now leading an extremely busy life.

Let me ask you about your school studies.

My parents told me to study mathematics and Japanese closely because both subjects are fundamental. However, I don't remember them forcing me to study too hard. If I remember correctly, I had little difficulty in school studies from elementary through junior high school years. I was admitted to the Tokyo Metropolitan Tachikawa High School. Soon after that I decided to choose the science and engineering course.

When I was a junior in high school, I began to think about what I should do in the future. I wanted to do something useful for people, such as solving environmental problems. So I was inclined to choose the industrial chemistry course at a college. It was when Mr. Ohmachi, my chemistry teacher, advised me, saying "If you want to advance to the applied chemistry course, you should seriously study the basics at your college." Accepting his kind advice, I entered the Department of Chemistry, Faculty of Science, of Tokyo Metropolitan University.



Upon entering the university, I belonged to the basketball team. Basketball was a pursuit I had engaged in from junior high through senior high school. Day after day of hard practice made me so exhausted that I somehow attended classes but was always sleeping at the front row of the classroom.

To tell the truth, I took up basketball also thanks to the influences of my brother and sister. My true interest was in baseball, but I chose basketball after all. Whether playing the piano or basketball, I didn't choose them on my own will. But it was by the power of my will that I have continued the pursuits for years to date, of which I'm a bit proud.

As a member of an adult team, I'm still continuing this sport at a pace of once a week. I also have an experience of teaming up with students of the Department of Applied Chemistry and winning the Keio Gijuku Presidential Cup in a Keio-wide basketball tournament.

As for piano, up until 27 years of age I had performed in a piano concert three times a year. Later I joined a jazz band and a fusion band, where I was responsible for the keyboard part. I continued these activities up to the age of 32 before leaving Japan to study in the United States. Our original band even released two CDs from an indie label. Furthermore, I performed several times on live house stages and on the occasion of our Yagami Campus Festival. Due to my extremely busy work schedule, I'm now suspending these musical activities.

Influences of my brother and sister are extending to my research activities. My elder brother is an X-ray system engineer working for an analytical equipment manufacturer. As such, he once offered a suggestion for my studies. Instead of the conventional acid decomposition/ICP-MS system, I successfully developed an analytical method based on "energy-dispersive X-ray fluorescence (EDXRF) spectroscopy." This is a multi-element simultaneous X-ray spectrometry system to analyze metallic constituents in $PM_{2.5}$, which enables accurate analysis easily and quickly. He suggested the use of this system in my research.

Due to its relatively low sensitivity, this system had been deemed inappropriate for microanalysis until then. To overcome this drawback, I exerted my ingenuity for improvements. The











resultant system was found well capable of dealing with 15-or-so elements, exhibiting the efficiency of analyzing one sample in approximately 15 minutes. Thanks to this research achievement, I was honored with the "Research Paper Award 2014" from the Japan Association of Aerosol Science and Technology and the "Technological Development Award" which is the 4th Steel Foundation for Environmental Protection Technology Award for grant-in-aid research results.

About when did you put research work into full gear?

As a senior I belonged to a lab specializing in environmental and analytical chemistry. But I was an active member of the basketball club up to October the same year. So it was only after I advanced to the master's course that I got down to research work seriously.

However, the theme was not atmospheric research. I began by analyzing pollutants taken from deposits on a lake bottom. By boring cores (cylindrical samples of sediments) and examining them, it was possible to follow changes in contamination in time series. I actually went to a lake at the foot of Mt. Akagi, where I used a rowboat to collect cores.

But I gradually found it somewhat irritating to focus on analyzing contamination that took place in the past. I wish to really contribute to the health of people – this enthusiasm urged me to investigate into what's going on NOW. Because of this motivation, I also took up research into the atmosphere when I was in the second year of the master's course.

Since I was aiming to become a university teacher, I advanced to the doctor's course instead of looking for private employment. It was just about then that my advising teacher was retiring, so for my doctor's course I chose Tokyo University of Agriculture and Technology (TUAT). That said, most of the vitally needed measuring instruments were available only at Tokyo Metropolitan University (TMU). Therefore, I had to shuttle between TUAT and TMU frequently.

The target research theme during my doctor's course was harmful compounds found in the soil and atmosphere, which consist of benzene ring (a hexagonal ring arrangement consisting of six carbon atoms). I worked to identify their sources and pathways, among others.

Why and how did you come to teach at Keio?

I applied for a position in response to Keio University's public recruitment call in 2001 when I was in the third year of my doctor's course. Since I had no relations whatsoever with Keio, I thought I would never be employed.

Then I went over to the United States to study at the University of Wisconsin-Madison from 2007 to 2008. At Wisconsin, I engaged in research relating to purification of diesel engine exhaust gas. As the very first overseas study for me, I had difficulties with English, but studying there was a truly challenging and rewarding experience. At the same time I was able to appreciate good aspects of Japan as a very livable country with highly advanced social systems. It also seems to me that Japanese students are superior when it comes to basic scholastic ability.

Regardless of being a researcher or not, I strongly suggest you to go overseas at least once in order to have another, objective look at our home country. Currently I'm serving as a member of the International Committee at Keio, strongly encouraging our students to study abroad.

What do you think are good points of Keio University?

The philosophy of the Keio founder Yukichi Fukuzawa is thoroughly shared by all teachers, administrative staff and even by senior alumni. This allows Keio as a whole to always keep the proper, desirable direction. For example, Keio has an established system to offer satisfactory support to those who study abroad. I'm especially grateful to our administrative staff for their dedicated support. Keio really has an excellent environment, where all of us can work and learn unrestrictedly and comfortably. As a person who came from outside Keio, I may be able to see these merits clearly more than anyone else. The importance of "looking at things from different viewpoints" comes home to my heart.

◎ Some words from students . . . ◎

● Dr. Okuda is a very earnest teacher. But when we are wrong, he is reasonable enough to criticize us. I think there are few teachers like Dr. Okuda who guide us as to how to speak and how to make presentations – considerations to ensure that we can do well when we go out into the world. On the other hand, when we are OFF, he joins us for a drinking party, enjoying sports and the like. This positive, lively atmosphere is a great asset to all of us.

(Reporter & text writer : Madoka Tainaka)

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

Studies, hobbies . . . no matter what I do, I'll do my best. A breakthrough will come in sight in due time. I'd like to follow my own path, believing in myself and not making compromises.



Tomoaki Okuda

Dr. Okuda specializes in environmental chemistry, atmospheric chemistry and aerosol engineering. He pursues research work by developing new-concept methods of his own to shed light on harmful physico-chemical properties of atmospheric aerosols relative to living bodies. He graduated from the Department of Chemistry, Faculty of Science, of Tokyo Metropolitan University in 1997, and then completed the master's course. In 2002, he obtained a doctor's degree (Dr. Agr.) at the United Graduate School of Agricultural Science, Tokyo University of Agriculture and Technology. The same year saw him become a research associate at Keio University Department of Applied Chemistry, Faculty of Science and Technology, and assistant professor in 2007. From 2007 to 2008, he served as visiting lecturer at University of Wisconsin-Madison. In 2015, he was promoted to the current position as associate professor of Keio University Department of Applied Chemistry, Faculty of Science and Technology. Among the awards he received is the Asian Young Aerosol Scientist Award (June 2015).