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## Enjoying chemistry research to the fullest

In recent years in the world of chemistry, where applied and practical research tend to garner the most attention, Associate Professor Oaki spends his days developing new materials, a pursuit that he finds genuinely rewarding and engaging. “I’m the type who doesn’t do something unless I’m convinced it’s worth it,” he says, revealing his stubborn side, but also the source of stalwart determination that has guided both his life and research. And now, moving forward, he has decided to devote his energy to sharing the joy of chemistry with the next generation.

### What kind of childhood did you have?

I don’t have a strong recollection of when I was little. I remember playing the flute in brass band during junior high school and high school. It may have also been due the influence of my mother who was involved in music, but I became totally absorbed in band. Even though I hated being forced to play piano when I was little, I think I was able to try my best with flute because it was something I chose by myself.

I have such fond memories of grueling practices with my band mates as we tried to get into the Kanto regional championships. In retrospect I think it was a bit of the Showa-era die-hard spirit, but it made me mentally tough. My music teacher was incredibly strict, but I am grateful for the lessons they taught me about etiquette, navigating relationships, and teamwork.

### When did you become interested in chemistry?

All the way until around junior high school I resented my studies, not knowing why I had to do them. The first subject that I actually liked was physics. I was first inspired by a single-sheet printout that my high school physics teacher gave me. The handout organized all of the formulas from our physics textbook and explained their meanings and relationships so that they were easy to understand.

And yet, even though my father specialized in it, I wasn’t very interested in chemistry. It wasn’t until I studied under my preparatory school teacher who taught me that chemistry also held meaning beyond simple memorization that I started to find it interesting. It just goes to show that no matter what you do, you can’t enjoy something until you understand it.

### And from there you decided to major in applied chemistry at Keio University and become a researcher. Would you share some of your thought process?

There were times when I really wasn’t sure about it. Actually, I had trouble deciding between physics, chemistry, and mechanical

engineering when it was time to take the university entrance exams. The reason I chose Keio University was because students weren’t required to declare a major until starting their second year. Before settling on chemistry, I even considered entering the School of Medicine and there was a time during the second year of my master’s program when I thought about joining the corporate workforce. However, when it came time to search for a job, I started to feel like I was leaving my research incomplete. That was the turning point for me when I decided to pursue a PhD.

### What is the environment like in your research laboratory?

When I return to my office I sometimes drop in on the students. They probably find it annoying, but for me to see students conducting experiments and their samples is just as fun as conducting experiments myself.

I consider my students to be colleagues who share in our collective goal of “enjoying the best research in the world.”

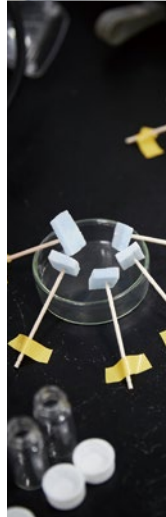
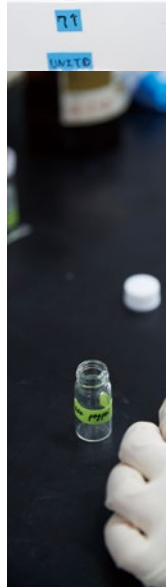
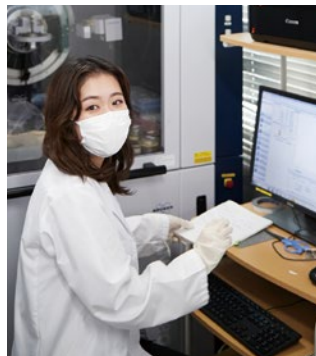
Above all, I want them to personally invest in and enjoy their research. In order to get there, I believe it is a teacher’s role to help students have their “lightbulb moment.” Every student is different in what leads them to that moment, but once they light up, their progress always exceeds my expectations.

### Tell us about what happened 10 years ago that has drastically changed your research.

As I mentioned during my research introduction, I am always learning from my students, and together we have come across quite the variety of “unexpected discoveries.” As a result of these outcomes, I decided about 10 years ago to change my research to focus on such discoveries.

By telling the students of these past happenings, they feel compelled to come and show me samples when something unusual occurs during an experiment. “Unexpected discoveries” are not so common, but we find something interesting in about one in 20 reports. Humans naturally tend to treat things as failures when they don’t go as expected. In those moments, in addition to asking my students to think about what could be done to make the original experiment a success, I want them to consider the possibility that a change of perspective might lead to something new and to challenge the notion of what is “expected” in the first place.

There was another reason I changed my research. It was right around that time when I was told by fellow researchers that there was “nothing of interest in your research lately,” that “you should change your research so that it differs from your PhD,” and other statements along the lines of “you should focus on things that





you're actually capable of." This is what got me to think I actually should pursue an independent course of research, blaze new trails in research based on my own discoveries, synthesize unique materials, and aim to develop special uses for them.

**Even though you have your plate full with your research, you also seem very active in planning academic conferences and engaging in various outreach programs. Why is this?**

I consider nurturing the next generation through promoting interactions between industry, academic, and government institutions to be another important aspect of my work. I want my students to share in this idea. I always tell them, "you've gone through so much effort to learn about chemistry, it would be a waste to not help bring up the generation after you through engagement in multi-discipline outreach." This may just be my way to get them to help me out, but I believe that it is also a worthwhile experience for them.

As I said, I didn't know how interesting chemistry could be until I started attending preparatory school before taking university entrance exams. That was because I was never exposed to an environment where chemistry could be perceived as interesting during elementary and junior high school. Many children would have curiosity in chemistry if they just had the chance. I want to be a part of helping those kids experience the fun of chemistry. I also hope that by being involved in the planning of new lectures and academic journals, chemistry in Japan will flourish and attract more public attention.

**Would you say that Keio University represents a place where, in addition to research, professors are encouraged to invest in and foster the minds of the next generation?**

I would agree, though I haven't done anything special myself. If you are doing research alongside students, it will naturally become an educational experience.

In recent years, interdisciplinary and joint research projects that involve other fields have increased, so solitary research that I do all alone has given away to a more collaborative approach with co-researchers. I first want my students to learn how to interact with researchers from other fields who don't speak in the same technical language, how to enjoy while collaborating to obtain the best results, and how to communicate not only as a researcher but also as a well-rounded human being.



**How do you feel about Keio University as a place to conduct research?**

While you can't say that Keio's faculties are particularly large-scale, I would say that they are appropriately sized. I used to think that the bigger the university, the better, but at some point, after conversing with teachers in the School of Medicine, I realized that what makes it so easy to communicate with teachers in other disciplines is that the university isn't too big. There is also a sense of unity and community at Keio.

I hope that myself and others able to use this great advantage while conducting research here.

◎ **Some words from students** . . . ◎

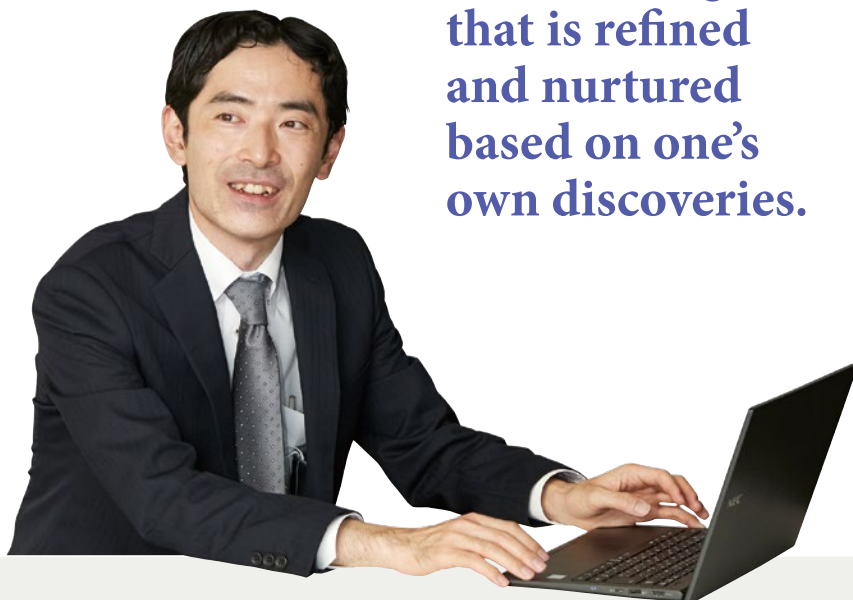
● In a variety of fields there is a growing demand for the development of visual indicators for stimuli such as light, heat, and force. I've taken over research handed down from upperclassmen on materials that change color from external stimuli. The main reason that I chose to study with Professor Oaki was that the research felt very future-oriented, but another decisive factor in choosing his laboratory was the welcoming atmosphere. Here, students from different academic backgrounds share knowledge and push each other while enjoying their research. After completing my Master's degree I plan to enter the work force, but I will cherish the research and communication skills I learned here and intend to use them to expand my horizons. (1st-year master's student)

(Interview and text writer: Akiko Ikeda)

**For the full text of this interview** .....

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

**I realized that research is something that is refined and nurtured based on one's own discoveries.**



**Yuya Oaki**

Department of Applied Chemistry

Specializes in conjugated polymer materials, layered materials, nanosheet materials, and materials informatics. Graduated in 2002 from the Department of Applied Chemistry, Faculty of Science and Technology, Keio University. Completed doctorate program from the same faculty in 2006. Ph.D. (Engineering) After finishing his position as a Research Fellow (PD) of the Japan Society for the Promotion of Science, he has worked as an Assistant Professor in the Department of Applied Chemistry at Keio University since 2009, a Senior Assistant Professor since 2012, and an Associate Professor since 2016. From 2016 to 2020 he was a JST PRESTO researcher, and from 2018 to 2020 he was also a Senior Scientific Research Specialist at the Ministry of Education, Culture, Sports, Science and Technology (MEXT).