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Author	平塚, 裕子(Hiratsuka, Yūko)
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Associate Professor Naoki Yamamoto

Tooth and nail postdoctoral studies
Blazing a trail through new fields with positive thinking

"Where I am today is an unexpected outcome of doing what I enjoyed," says this eternal optimist, who continues: "An abundance of encounters will lead to positive happenstance." Perhaps what this really points to is Yamamoto-sensei's knack for discerning the outstanding qualities of people in any given situation and for perceiving unfolding events as a stroke of good fortune. This is a lesson in never losing sight of that which is most precious; which might hold the key to achieving the freedom to enjoy giving 120% to both one's studies and one's pleasures without self-imposed restraints.

Tell me a little about your childhood.

I was by no means raised in an environment in which science was in the air. As a child I was preoccupied with a range of pursuits with friends be it baseball, computer games, or comics. Then at junior-high school I took up tennis. I wanted to keep this up through high school, but faced with the twin powerhouses of tennis and my studies I chose to study (laughter). I renewed my relationship with tennis after entering university and remained firmly enamored through to the first year of my master's.

When did you begin to aspire to becoming a researcher?

The desire to become a researcher in areas such as control theory and optimization theory was always bubbling away. At this point, the specifics of "what I would actually research" became imperative, and I was also interested in developments relating to quantum computers. Subsequently, I suddenly found myself researching quantum informatics during my doctorate studies. My professors also told me "You can do what you want."

While it was risky to be engaging with a field which fell outside the specializations of the faculty members who were instructing me, I was hoping to use my expertise in mathematical engineering. My doctorate produced three major outcomes, but subsequently enjoyed some renown, for example in being cited in a paper by Peter Shaw of Massachusetts Institute of Technology, who is a big name in the quantum computer field. This was why I decided, after getting my doctorate and honing in on quantum control, to attend the California Institute of Technology (Caltech) which was then top in that field.

How did you take to Californian life?

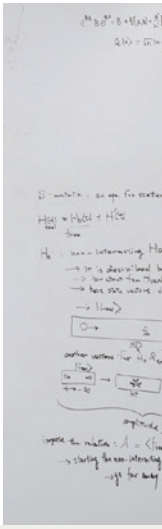
I was already married by the time I made my way to California, and I was conscious of the need to bolster my list of achievements while remaining dedicated to research. It is safe to say that I managed to get my papers out there as a result of sheer grit.

As Caltech is an institute at the very pinnacle of research worldwide, both the faculty and my peers at the institution were a source of endless stimulation. What remains with me now is how blessed I was to be surrounded by good friends. Lucas Bouten (Luc) was a Dutchman of my age. Important papers on quantum measurement already existed at this time, but for the most part they were rather obtuse and little-understood. However, Luc had already unraveled their secrets and he directly taught these to me. This gave me a grounding in the latest theory and allowed me to successfully publish a number of papers.

The fact that these things which I did in my 20s live on in my work today, speaks to the vital importance of my experiences at Caltech. They opened the way to my securing employment both at the Australian National University and at Keio University. I am particularly grateful to Luc. During my final year in the United States I had a son, and with Luc's blessing gave him the middle name "Lucas."

What was your first impression of Keio University?

This year marks my 10th at Keio, surpassing my nine years at the University of Tokyo, and making Keio the place at which I have spent the longest time in my life. Most of the students are cooperative and worldly. Others ask me astute questions after classes. All the faculty and administrative staff are courteous and I am on good terms with them. I get a real sense of "Keio-ism." My father was acquainted with Keio having graduated from the Faculty of Business and Commerce, which perhaps accounts for his initial delight on news of my appointment.



Would it be true to say that the challenges of the IBM Q Project differ from those you have encountered during your research career?

I never once imagined that I would find myself Center Director and initially took this on somewhat casually.

With researchers from the project corporations stationed at the university, I encounter stimulating discussions every day across diverse fields which include finance, AI, and chemistry. What I am actually doing within the project isn't hugely different from what I normally do. However, this is the first time my research has engaged with the perspective of attempting to "facilitate future links with business." As you probably know, the involvement of

business concerns changes the profile of any undertaking.

The center's overarching modus operandi is innovative design is it not?

Indeed. People on the business development side in the United States and the IBM Institute in Tokyo were looking forward to the weekly dialogue with designers in London. I put forward a number of ideas but they failed to catch on (laughs). However, I am not impartial to design myself so nevertheless enjoyed this experience.

In fact, my grandfather on my mother's side was a painter and I come from an artistic family, with my mother, grandmother, and grandfather all having attended art college. I also got awards for sketching every year from my first to my third year of junior high school. While mathematics and painting would appear to be completely unrelated, in fact mathematics at its most interesting is elegantly constructed and consequently inspiring. Perhaps there is a similar sense for wanting to create something beautiful.

Please offer a few words of encouragement to students who are currently devoting themselves to their research in the labs.

In my case, doing what made me happy was what led me to where I am today, so I cannot realistically offer any advice as to "what you should do." However, even if you do not act purely in your own self-interest and are sincere and dedicated in your thinking and behavior wherever you may find yourself, I believe that the path forward will in time reveal itself to you.

I myself did not go about things with any particular strategy in mind. I looked around me to find that I was surrounded by extraordinary people, and put these types of people to service as my role models. While their fine research was naturally inspiring, I also found many people whose attitudes on how one should live life left a profound impression. Find a good role model in your immediate surroundings is perhaps the one piece of advice I can offer.

What kind of teacher do you yourself aspire to be?

I think it is important to look like you are enjoying yourself. Rather than saying "do this and do that" to students, you should offer words of praise and encouragement. Certainly there are times when you should input with good ideas. When a student says, "I went about the calculation in this particular way which yielded the following result. What are your thoughts?!" I am particularly effusive in my praise.

Keio students are almost without exception quick on the uptake, meaning that it is enough to offer minor adjustments to their course once they have begun to think and act for themselves. They will grow as long as you engage them in debate.

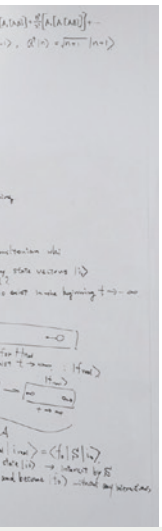
◎ Some words from students . . . ◎

- In many ways Yamamoto-sensei resembles a student rather than the stern image suggested by "sensei." He is approachable and open to any ideas, and his students appreciate his emphasis on autonomy. (4th year undergraduate)
- It is great not to be bombarded with "do this, do that" pronouncements. Generally, there are various rules in the labs, and it is decided on your behalf what you will be in charge of—but with Yamamoto-sensei this is something that never happens. It is no lie to say that each and every person is free to follow their muse. You make and live by your own rules. (1st year master's student)

(Interview and text writer : Yuko Hiratsuka)

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

If one is sincere in one's thoughts and actions and does not become a person who acts in their own self-interests the way forward will eventually reveal itself. Find a good role model.



Naoki Yamamoto

Associate Professor, Department of Applied Physics and Physico-Informatics, Faculty of Science and Technology, Keio University. Ph.D. in Information Science and Technology. Specializes in quantum control theory and quantum information theory. Graduates Department of Mathematical Engineering and Information Physics, University of Tokyo, 1999. In 2004 completes doctorate course at the Graduate School of Information Science and Technology, University of Tokyo. Postdoctoral Fellow in Physics and Control & Dynamical Systems, California Institute of Technology, USA from 2004 to 2006. Postdoctoral Fellow in Department of Engineering, Australian National University, Australia, from 2007 to 2008. Associate/ Assistant Professor in Applied Physics and Physico-Informatics, Keio University, Japan since 2008. Dual appointment as Center Director, Quantum Computing Center in 2018.