

President's Address at the 2016 Saitama University Graduation Ceremony

As the President of Saitama University, I would like to extend my sincere congratulations on your graduation on this pleasant spring day well colored every rainy day on our campus. In addition, I express much respect and warm congratulations to your families who have given support to you until today.

The numbers of graduates who earned doctoral and master's degrees today are 23 and 476, respectively, and 81 of them are from 10 overseas countries. Furthermore, there are 27 re-educated people in the working world. It is a distinctive commencement that is full of diversity only in "Saitama University All in One Campus at Metropolitan Area Saitama".

In the entrance ceremony three years ago, I addressed the two points to some of the doctoral students. The first is that research has two standpoints of *Science for Knowledge* and *Science for Society*, and the second is that it is important to rethink about the meaning of research through your experiences for having your awareness of its contact with society. In the address of entrance ceremony for most of you two years ago, in addition, I pointed out that research is an act of repeating challenges and failures aiming at "higher things", which cannot be done without passion. I mentioned also on the immense values in making your way of thinking more flexible and more diverse through discussions with others, especially at the time of failure in your research. Furthermore, I explained that serendipity, meaning occasional events and experiences, requires vigorous curiosity, strong desire, observation power and insight.

Each of you must have got various, sometimes fusional, experiences in the study process at SU. Moreover, all of you must have achieved the act of research repeating challenge and failure with passion, while the outcome and serendipity in your study are different in level. I do hope you to feel confident about this, to rethink about the meaning of your research once again, and to be active even after graduation.

In this context, let me introduce you the success story of discovering the 113th new element nihonium. A commemorative ceremony for the naming of nihonium was held in Tokyo a week ago, and I was invited to attend it as the SU president, because 4 SU researchers, including former graduate students, are members of the RIKEN discovering team, managed by Prof. Kosuke Morita. One of them is Dr. Sayaka Yamaki here, who was responsible for coordinating detectors and analyzing data in the research team. She said "Events of the third synthetic observation and the acquisition of naming right occurred during my enrollment. It was very fortunate for me to encounter a historical moment."

Nihonium of element 113 was detected by accelerating zinc of element 30, bombarding and fusing with bismuth of element 83. The difficulties are the facts that the zinc atomic size of one trillionth centimeters is too small to bombard, the probability of fusion is very small as one over one hundred trillion, and the nihonium lifetime of 2 thousandths of a second is too short to detect. The experiment started in 2003. Continuing to apply the zinc beam, the team achieved its first and second successes in 2004 and 2005, and finally in

2012, the third synthesis of element 113 was confirmed with the conclusive evidence of 6 observations of alpha decay without fission. *3 events in 9 years with 400 trillion trials!* Indeed, it is a great achievement that could not be done without repeating challenges and failures aiming for height and without keeping passion. This is a kind of serendipity.

The research team has 48 members in total, and was awarded the Best Team of the Year 2016. Japanese has long been said to be a cooperative citizen, but recently there are cases that "atmosphere sensed team" cultivated by members' silent conversation does not work. One example is globalization and opportunities to work with not only Japanese but also overseas people are increasing. What is more needed in this context is not *a person*, but *a team*-based perspective. It is said that, as outputs of teamwork, there are not only "effect" and "efficiency" of team, but also "satisfaction" and "learning" of person working in a good team, and the selection of Best Team Award is done with attention to these four outputs.

As for a person in a team, Dr. Tamaki Saito, a psychiatrist, says, "The psychological conditions that adults should clear are *Wait* and *Tell*. *Wait* is to withhold your self-assertion and own desire for sticking to yourself as *a part of the world*. *Tell* is an attitude to respect yourself as *a center of the world* by properly releasing your desire." Dr. Saito's comment can be closely related to the previous four outputs of teamwork.

Nevertheless, as Mr. Akira Tachibana, a writer, mentions in his essay entitled "Choice of Adults", to solve social problems with a community is troublesome and time consuming, while it is ideal in a healthy community. Therefore, it is a reality that we are losing interest in it. Furthermore, a major incident, which we could not anticipate, occasionally happens and rewrites the structure of society.

According to Prof. Satoshi Sakai of Kyoto University specializing in geo-hydrodynamics, the world is chaos, its future ahead is totally unpredictable, and therefore the story becomes desperate. However, there is a key to live in the chaotic world. The key could be a scale-free network based on very simple local rule, such as neural circuit and human relationship. This network type seems deregulated and wasted, but is strong and flexible against sudden accident and unexpected change. Even in a team of incomplete human beings, flexibility to deal with continuously occurred outrageous matters could come out of composing society with a loose relationship. If we try to live with strict rules, we cannot deal with unexpected situations. What we are missing might be this looseness.

In the present knowledge society, cooperation and teamwork of diverse experts are indispensable to find solutions to *problems without answers*, which are crosscutting. As a graduate of SU from now on, you will take on this role as an individual in the team, keeping in mind the importance of looseness. I do wish you a great success in your future.

March 22, 2017

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