

**Report of the 6<sup>th</sup> Japanese-French Frontiers of Science (JFFoS) Symposium**  
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The 6<sup>th</sup> Japanese-French Frontiers of Science Symposium was held from 19-22 January 2012 at Nice, a central city in the Cote D'Azur region, the south-eastern part of France. It was still chilly in the end of January and there were not many tourists. Yet, this beautiful city facing the deep blue Mediterranean Sea has been known as one of the best resorts in Europe.

In the East and the West, the sea has always attracted people. Do you know that the front cover of the full score first published in 1905 of the French composer Debussy's masterpiece, "La Mer (The Sea)," has printed on it Katsushika Hokusai's woodblock print "Kanagawa oki nami ura (Behind the Great Wave at Kanagawa)," one of the "Thirty-six Views of Mount Fuji?" It is known that this was requested by the composer himself. From this episode, we can picture the French artists and intellectuals of those days longing for a country far away in the East. A hundred years from then, if Debussy found that Japanese and French young researchers would engage in free discussion and friendly interaction with glasses of wine, I think he would be envious.

At this symposium, 40 researchers each from Japan and France participate and everyone attends all 8 sessions, transcending the barriers among disciplines. The Planning Group Members (PGMs), who represent each session, are the key persons in the Frontiers of Science Symposium. Prior to the symposium, the 16 PGMs deliberate and select the session topics through thorough discussion on the universality of each topic and how each is on the "Frontier of Science." The success of the symposium depends on the selection of appropriate session topics.

At the symposium, a full two hours are allocated to each session. The chair first breaks the ice, and speakers representing France and Japan introduce research at the forefront. The whole last hour in the session is devoted to questions and answers. It must not be assumed that an hour is long. It is not unusual that comment after comment emerges from the hall that makes specialists wince, and discussion heats up in a way that the microphone is not easily passed on to you. The time allocated passes away so quickly.

The 6<sup>th</sup> JFFoS started with the Theoretical and Applied Mathematics / Informatics

Session on the topic “Statistics for large-dimensional data.” Depending on the topic, the mathematics and informatics session may get very difficult and hard to tackle; however, this year, there was no need for such apprehension. The recent overwhelming increase in research data is a common issue in many research fields. When it came to time for discussion, questions were raised one after another, reflecting the pressing needs in each participant’s research background.

After lunch, we moved on to the Chemistry / Biochemistry Session on the “Ultracold molecules.” The Japanese chair, Shin Inoue, took out a 5 yen coin out of his pocket connected to a string, and rocked it back and forth like a hypnotherapist, thoroughly explaining the theory of thermal motion and fascinating the audience. Discussion expanded from the mystery of ultracold temperature, in which the particular nature of quantum statistical mechanics becomes increasingly apparent, to the philosophical theme of what is “temperature.”

In the latter half of the afternoon, the Medical / Neuroscience Session on “Synthetic biology” took place. Research at the “Frontier of Science”—simulating with a computer or at a laboratory the mechanism of life at various levels such as the gene, amino acids, and living tissue—was reported. In the Questions and Answers Session, there were some satirical comments in looking at artificial tissue resembling a finger—“That has nothing to do with life; it is something else that just looks like it.” However, overall, it was an exciting session finding a new possibility in solving the mystery of life—a dream of humanity.

On the morning of the second day of the symposium, in the Materials / Biomaterial Science Session on the “New concept in photovoltaic energy,” technological development at the forefront challenging to discover new materials for solar power panels was introduced. As expectation for renewable energy rapidly expands in the wake of the accident at the nuclear power plant, I think that it has become a timely topic, more than the PGMs have intended. Incidentally, the session topics for this symposium had been determined four days before the Great East Japan Earthquake occurred. Socially-oriented discussion heated up, transcending technological discussion in material science, on themes such as alternative energy and the concern about environmental contamination by used resources.

In the afternoon, first the Biology / Life Science Session was held on “Epigenetics.” It

was argued that genetic information etched on DNA is not necessarily a final blueprint and a posteriori chemical action gives unexpected reversibility to the genetic mechanism. There were questions from the floor such as, “But isn’t the chemical substance itself created from information written somewhere on DNA?” and as discussion continued, what sometimes became apparent was the difficulty for researchers from various fields to share common issues.

In the succeeding Physics including High-energy and Astrophysics Session on “Gravitational waves,” the theme changed entirely from the micro to the macro level, introducing the audience into the ripples of time and space that come from far away in the universe. This is a long-term project to build large-scale and super-precise measuring equipment and wait many years for gravitational waves emitted by rarely emerging celestial objects. How countries such as Japan, the US, and those in Europe have firmly maintained close international cooperation while being rivals to each other in advancing projects on gravitational waves—it is interesting that this shows how science could be in the twenty-first century.

On the morning of the last day, we started with the Social Sciences / Humanities Session on the “Social and cultural meaning of networks.” Stimulated by diverse topics, active discussion took place on various issues concerning the Internet, which is now indispensable to our lives, to the abstraction model of networks. Questions included those on the power of social networking services that triggered the “Arab Spring” and the fragility of the mobile phone network that was revealed after the great earthquake. I think there were many participants who raised questions as human beings living in a modern society.

The last session of the symposium was the Earth Science / Environment Session on “Venus atmosphere.” Venus—known as the evening star and daystar from ancient times in Japan, while as a jewel in the sky being likened to the goddess of beauty in Western society—is in fact a grotesque planet where clouds of sulfuric acid cover the sky above the inferno over a temperature of 400 degrees Celsius. This makes us consider anew the mystery of earth, full of various living beings, and its unique destiny—how it was formed in the solar system as the origin of our existence.

It is often pointed out that modern science has become too complicated and specialized. However, the desire to return to the original question that humanity has asked since

ancient times will become all the more intensified due to advances in technology. The development of large-scale computers has enabled us to analyze vast amounts of genetic data, and progress in nanotechnology and laser technology has broken a new ground in quantum mechanics and the theory of general relativity. Although the areas of specialty may vary, I suppose the landing point of scientific interest that drives each researcher is ultimately the desire to know the origin of the universe, life, and society, and create a better world—a desire shared among humanity. There must be many participants who, during their stay in Nice, rediscovered the simple curiosity that shone when they were dreaming about becoming scientists. That is what I realized through participation at the symposium.

Finally, I extend my deep appreciation to the staff at the CNRS, JSPS, and other sponsors for all the efforts they have devoted to the symposium. Thank you Prof. Shigeo Koyasu, Prof. Masayuki Numao, Prof. Yuko Fujigaki and all the professors of the JSPS FoS Advisory Board, for the warm and consistent support you offered from the preparatory meetings and throughout the symposium. Finally, session chairs and speakers of France and Japan, general participants, and PGMs who have shared your joys and hardships with me—I am very happy and proud that we were able to create together the 6<sup>th</sup> JFFoS Symposium and lead it to success.



Dr. MASUNAGA, PGM Co-Chair  
of Japan



Dr. LE BRAS, PGM Co-Chair of  
France



Scene from a Session



Scene from Poster Session



Group Photo