

Report of the 2nd UK-Japan Frontiers of Science (UK-Japan FoS 2016) Symposium

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It cooled down clearly and the trees were already attired in the late autumn look in Britain in November. When I passed through the poplar trees colored with barely leaving yellow leaves, an elegant brick building hall stood up in front.

The Chicheley Hall, a venue for the symposium, was a historical building dating back to the early 18th century and was currently operated mainly as a conference hall and accommodation facility by the Royal Society of the United Kingdom. Surrounded by idyllic countryside landscapes and beautiful English gardens, it was a facility in noble appearance that reminded us of the tradition and glory unique to this country.

The UK - Japan Frontiers of Science Symposium (UK - Japan FoS) was held for the second time in 8 years, following the first symposium in Japan in October 2008. Unlike the well-established other FoS Symposiums that are assumed to be held as continuing events, such as Japanese-American or Japanese-German, UK - Japan FoS (so far) is a symposium of a single year project.

The UK side seemed to continue hosting the FoS annually by changing the partner country each year, including Canada and Russia. Rather than deepening the special ties with particular countries, it might imply the essence of British way of making advantage in the world that forms a balanced relationship with the countries around the world while maintaining a proper distance to them.

The most distinctive character of FoS lies in the unique style adopted. Actually, participants from various fields attend each session set up by each research area, and thus they are encouraged to join a discussion beyond specialized fields, based on the topics presented by speakers. The topics of sessions were preliminarily selected, but it is no exaggeration to say that the degree of excitement the topics hold the key to the success of the symposium.

Two planning group members (PGMs) had to be appointed in each of six sessions from both countries to select topics. All topics would be decided after the discussion among 12 PGMs. The PG meeting of this symposium was held rather lately on 3 June as it seemed that the selection of the British PGMs unexpectedly took a time. It had already been less than six months away until the symposium was to be held.

Although it was a strict schedule that could affect in finding available speakers and participants, it turned out that each session was filled with exactly the ideal talented persons. I was greatly relieved as a member of PGMs at this unexpected good luck.

On the evening of Sunday, 6 November, the reception was held in a rigid but intimate atmosphere. There may be few people remembering Britain as a gastronomic country, but the food served at the Chicheley Hall, the Royal Society of the U.K., was far beyond expectation.

However, because of the limitation of the number of bedrooms, a certain number of participants had to come to the Chicheley Hall every morning from a neighboring hotel. There must have been a lot who reluctantly rounded up a good conversation and left the venue soon after dinner as it was the departure time of the pick-up car.

After the opening day, on Monday, 7 November, the opening remarks were followed by a Physics/ Astrophysics session with “Einstein’s Physics” as the theme. It goes without saying that Einstein was a genius of the century that brought wide-ranging innovation in the field of physics, but he was also a solitary scientist who did not accept the uncertainty of quantum mechanics until his death.

The session covered the topic related to the observations of the gravitational wave that represent the Einstein’s original insight and the “quantum entanglement” he brought out as a refutation to quantum mechanics. The latter thought experiment, rejected by Einstein as absurd, eventually obtained a proof of its legitimacy, contrary to his intention. The lively discussions were generated thanks to the excellent session planning that highlighted the struggle within the genius.

On the same afternoon, the subject shifted to the “Mechanisms of learning and relearning in the brain” of the Biology/ Life Science session. How do our brains possess memory and how to revive a sleeping memory? In mouse experiments exploring the mechanism of spatial information storage, the existence of ‘treasure map’ residing in a corner of the brain became clear by effectively utilizing the obsession of mouse who wanted to arrive quickly at the place where chocolate was hidden.

Subsequently, the research results exploring the functions of the human brain using the state-of-the-art fMRI technology were introduced. The participants were fascinated by a number of innovative approaches of biology to explore the long-standing mystery that humanity had kept asking.

On Tuesday, 8 November, the second day of the symposium started with the Medical and Neuroscience session. The theme chosen intentionally to connect the sessions before and after was “Characterising mechanisms of sensory perception: basic science and psychiatric treatment implications”. Our perceptual system had achieved amazing development through the history of long evolution, but the sophisticated system of five senses sometimes fell into an unexpected malfunction and manifested itself as various mental and physical malfunctions.

From the basic research that detected the process, by using the sophisticated experimental techniques, of treating the skin sensation of animal in the brain to the clinical research which revealed that the antidepressants begun affecting under the subconscious mind of patients immediately after the start of its administration, the presentations made us fully appreciate the complexity and depth of how our brain knew and worked on the outside world.

“The Mathematics of data science” of Math/ Applied Math/ Informatics session began with a short break. These days, when the word like big data was frequently uttered, it was an urgent matter to develop technology to efficiently and accurately extract the useful information from enormous data.

In the session, I was dizzying at the magnitude of the mathematical theory that supported its method, and I hold my breath on the pattern recognition technology of computers that was now even exceeding human abilities. Meanwhile, the deep groove that separated the art of deep learning that forcibly resolved difficult problems and the inherent quality of natural scientists who continued questioning “why” was highlighted. The interesting and heated discussion took place where the engineering mind and the science mind collided with each other.

On the afternoon of the same day, we left the enthusiasm of the symposium venue behind for a while and headed towards the Bletchley Park, which was close to the Chicheley Hall, as a Cultural Tour. This was the site of an intelligence facility used by the UK government agency for secretly pursuing the decryption of enemy countries during the Second World War and was now open to the public as a museum.

As screened in the movie “The Imitation Game”, the facility was known as the place where Alan Turing and other mathematicians had succeeded in decoding German military Enigma ciphers. The offices where the scientist worked at the time of the war were reconstructed, and when peeking inside, many of them were surprisingly narrow and dim like a prison, for their work kept hidden.

When thinking of the past, Japan and the U.K. were enemy countries during the war. But now, the young Japanese and British scientists were freely and intimately talking with each other. The dark shadow of the glooming era engraved on the Bletchley Park seemed to quietly speak the depth of peace that our generation enjoys as a matter of course.

On Wednesday, 9 November, the morning of the final day of the symposium was started with the Earth Science and Environment session. The topic was the “Space weather: mysterious storms looming far above us” that meant the storm in space blowing far above our heads.

The modulation of the solar wind that created a mysteriously beautiful aurora sometimes broke the substation equipment and brought about a large blackout. In

addition, the Earth's magnetic field that protected the terrestrial lives from harmful cosmic rays simultaneously confined the high-energy particles around the Earth and endangered the astronauts and the satellite onboard equipment.

While the theme of “Space weather” was accompanied by the double-edged swords consequences that soared high, it covered from the Earth’s history of the magnetic pole inversion stamped in the stratum to the magnetosphere of other planets. The presentation inspired the imagination of the audience and led them to a magnificent story beyond the space time.

The topic that concluded the symposium was on the “Energy conversion and storage” in the Chemistry/ Materials science session.

In the natural world, the use and fixation of natural energy that was being practiced everywhere (photosynthesis and nitrogen fixation, etc., for instance,) still had many problems if it was to put into practical use industrially.

Now that the expectations for renewable energy were increasing, the researchers, who were actively investigating at the forefront of the artificial photosynthesis and the solar energy storage technology, introduced the latest attempts for the efficient utilization of natural energy.

In the era when a global warming and the existing energy strategies, such as nuclear power plants, faced serious problems, the audience got excited at a novel research topic that paved the way for the new technologies of hope towards the future.

Speaking of the UK, the news that shook the world by the decision made from the result of referendum to withdraw from the EU was fresh in our memory. Moreover, the election of the new president of the United States was reported during the symposium.

As symbolized by these events, it is said that the world was now facing the inward and exclusive trends. Such condition in the world that was psychologically and economically colored by the unfathomable anxiety dropped various shadows throughout the whole society.

The policy on science is no exception. As the trend of seeking hasty results has been reinforced rather than having the prospects with steadfastness, voices that fear the tendency for avoiding the long term basic research projects are heard everywhere. In a society that is losing margin, people are more likely to prefer conservative and compliant choices than necessary.

However, there is a need for strategic skills developed from a diverse and bold perspective and human resources to support the planning just because the future is uncertain and full of anxiety.

There may be people who ask whether the FoS is useful or not. Certainly, the “useful” research results are not produced in a year as the FoS is neither essentially nor necessarily oriented toward the immediate effect. Nevertheless, the three days of the symposium, in which the young researchers were showered with the torrent of various ideas that emerged from a variety of research culture exchanges, will quietly put a deep root in them as an intellectual experience of the kind that is difficult to be obtained in academic societies separated by specialized fields.

The root of FoS grows steadily into a tremendous tree in the researchers who will become the prominent veteran researchers over the next ten or twenty years, and eventually builds a rich branch overlooking the world’s scientific community without distinctions.

As sometimes a single book that touched a heart of a child eventually leads to a lifetime aspiration, sometimes an once-in-a-lifetime opportunity to meet the research colleagues from different fields and countries will be a source for developing outstanding leadership. It is only after 20 years that the Japan’s first FoS began, and from now on, it is going to be the time for its results to bloom.

Lastly, I would like to extend my gratitude for the staff of the Japan Society for the Promotion of Science and the Royal Society of the U.K. who offered support in organizing the symposium, the FoS Symposium Advisory Board Members who gave a number of advices and encouragement since we had begun the planning, all the colleagues of PGMs who worked hard on their unknown efforts through the session planning, and above all, the speakers and participants who were cooperative so as to bring success in the sessions. I am really pleased that I was given the opportunity to participate in hosting this wonderful symposium as a PGM co-chair.



<Session Coordination Meeting>



<Welcome Reception>



<Session>



<Session>



<Poster Session>



<Cultural Tour>



<Group Photo -PGM->



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