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JSPP Core-to-Core Program

Advances Particle Handling Science

Our “Advanced Particle Handling Science” proposal was accepted as a Core-to-Core program promoted by the International Program Department of the Japan Society for the Promotion of Science (JSPP). This JSPP program started in 2003 as a program for the purpose of building and expanding a cooperative international framework in “leading-edge fields of science” among universities and research institutions in Japan and 15 selected western countries with advanced sciences. This program is implemented by JSPP as follows: the program is given two implementation components “Strategic Research Networks” and “Integrated Action Initiative.” The objective of the first is to expand and strengthen research networks with a relatively long-term perspective, and sustain and advance cooperative relations between researchers and research institutions in Japan and in other scientifically advanced nations. The second component is provided to support short-term collaborations among such researchers that will lay the foundations for establishing cooperative research networks.

We were surprised that our proposal was accepted as one of the Integrated Action Initiatives for 2 years, not only because this program is quite competitive with only 20% of proposals being accepted, but also because all research fields are considered from the natural to social sciences, with most of the accepted projects being somehow related to recent and sensational problems, such as global problems, very fundamental sciences, medical and human health problems, etc. It seems that exploring problems are not included in the scope of this project, despite its real-world importance. We would like to show our respect to the judgment of the board members in accepting our proposal.

Many advanced materials, such as electric, magnetic, ceramic, pharmaceutical materials, etc., are produced through nonmonocyclic or microstructural colloidal dispersions, and it is well known that the kinetic processes of these particulate materials are extremely important in obtaining final products with high performance. However, particle handling has been classified into the category of “knowledge,” because of the complexity of the particle behavior in production processes. The late Dr. Koichi I. Shima, Professor Emeritus of our department, realized the importance of the particulate problem more than 50 years ago. He not only produced many distinguished researchers, but also established several organizations in Japan and also in the world, as shown in the figure. Hence he was called the father of particle technology in Japan. This is the reason why the Japanese research activities of particle science and technology, especially those in Kyushu University and the alliances, are at the top of our field internationally.

In 1984, a research manager of one of the biggest chemical companies in the US made a survey on the production process, and found that about 80% of chemical products are produced through particle stage, and that particle handling does influence the performance of their final products greatly. Since then, various institutes of particle science and technology were established by the leading researchers of particle technology around the world. The Particle Engineering Research Center was founded in the University of Florida, US in 1995, the Institute of Particle Science and Technology in the University of Leeds, UK in 2001, and the Particle-Related Processes Center in the University of Middles, Australia in 2003. Those institutes were established under the strong financial support of their government and companies, and became the leading research centers in their fields.

I and Dr. Hidemasa Maitani, Professor of Chemical Engineering, Kyushu University, who is now the President of The Society of Powder Technology Japan, believe that the following are extremely important to promote the further development of particle technology: (1) “knowhow” of particle handling becoming much more scientific and (2) tight networks and collaborations forming among distinguished Japanese researchers, and researchers around the world. The other motivation of mine is to encourage young Japanese researchers to be more vigorous and outgoing such that they can compete with East Asian research researchers who are originally educated in the US and are rapidly catching up with us. We chose these active institutes described above as our counter partners of this project, as illustrated in the figure. Fortunately, the leaders there have more or less similar ideas to ours, and networks between those institutions were established almost instantaneously. The Japanese group is composed of Kyushu University and the alliance universities of Toyo, Doshisha, Kobe Gakuin, and a few other individual researchers.

The spirit of this program is based on equal partnership, which means that mutual exchange must be performed under the condition that each partner must make an equal contribution in an organization’s own core members, and not on partner members. This is a rather strict condition for the Japanese side, because this implies that the Japanese programs must be attractive enough for partners to travel a long distance to attend seminars at
From Cultural Heritage to Advanced Technology: A three-day journey

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On the third day of the tour, the participants were divided into smaller groups to visit different sites related to cultural heritage and advanced technology. The day began with a visit to the Kyoto Imperial Palace, where they learned about the history and architecture of one of Japan's most important cultural sites. Later in the day, the group visited the National Museum of Modern Art, where they were able to see a wide range of contemporary art from Japan and around the world.

A highlight of the day was a visit to the Tokyo Science Museum, which houses one of the largest collections of scientific exhibits in Japan. The museum includes interactive exhibits and hands-on activities for visitors to explore scientific concepts firsthand. The group had the opportunity to participate in several of these activities, which helped to reinforce their understanding of the scientific principles being presented.

The day ended with a visit to the Tokyo Tower, a famous landmark in Tokyo. The group ascended to the observation deck, which offers panoramic views of the city. The experience was both educational and memorable, providing a glimpse into the rich cultural heritage and advanced technology that characterize modern Japan.