

Kakenhi Gave Me the Chance to Engage in a Life of Research

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Sensing of Nano and Microscale Thermal Transport and Phonon

Spectroscopy (Grant-in-Aid for Scientific Research [A])



■Kakenhi has always been a reliable support of research

In writing this essay, many things came to mind as I reviewed a list I received from the administrative office recording Kakenhi where I was principal researcher. First, in the 40 years between fiscal 1980 and fiscal 2019 (plan basis), my Kakenhi applications were adopted in succession nearly without exception. This period corresponds to my years of working at the university. When I include co-investigation research, the only period I did not receive Kakenhi was in 1981 and 1982 when I was living abroad. This was an extremely fortunate and happy environment where I was supported by Kakenhi as a researcher. Thanks to Kakenhi's sustained support over many years, I am proud to have created the new area of nano and microscale thermophysical properties sensing engineering and to be the first worldwide to indicate the potential for widespread engineering applications by developing equipment realizing such sensing engineering. While not a major discovery or invention, I am convinced that it will spread worldwide over time as the basic concept for transport properties sensing. It is no exaggeration to say that my research would not have existed without Kakenhi.

While Kakenhi is a competitive research fund for academic research, I believe it also contributes indirectly to the appearance of high-quality students (prospective researchers). Research is essentially performed by researchers affiliated with research institutions—that is to say, research professionals. With Kakenhi as well, research can be promoted not just by university faculty but by employing capable researchers such as postdocs, which is often the case when large research budgets are adopted. Reflecting on my case, in view of the speed and characteristics of research, I achieved research results not by employing postdocs but by fostering students through research only possible at the university. While the situation will likely differ greatly by research area and environment, I have recently begun to think that this is one of the realistic solutions for

the research environment where Japanese universities are placed. In the case of engineering research requiring experimentation, world-class research will require a certain levels of funds. Through real research made possible by the generous financial support of Kakenhi, I was able to secondarily foster outstanding students. More than 300 students benefited greatly even if indirectly from Kakenhi at my research laboratory, and many are currently active as outstanding engineers with a solid foundation in basic science. I believe this is one of the major positive effects of Kakenhi.

■Kakenhi at the start of my career

When I reflect on my relationship with Kakenhi, I can clearly recall how I went about completing application forms when I was a young researcher. In the 1980s, I believe Kakenhi offered a Grant-in-Aid for Encouragement of Scientists (A) with a maximum application amount of around ¥1 million for young researchers up to the age of 35. The application form was to be filled out by hand, copied, and pasted together, an unthinkable process for today. I heard from the administrative office of the university that reviewers read enough applications to fill a truck, which seemed entirely plausible. Imagining that applications in poor handwriting would not get their attention, I scanned the application form, transferred it to PageMaker, the leading DTP program at the time, and filled the form with text to create a readable and attractive application. Since there were no stated requirements about the paper to be used, I selected a heavier weight, white, premium paper for my applications. A rumor spread within the department that I was having applications adopted in succession by using some kind of special paper, and some people even asked me for this special paper (Kakenhi passing paper). This is a laughable matter when I think about it today. To simplify the identification of application categories, the top of the application form was to be colored in such predetermined colors as red, blue, or orange. The color for Grant-in-Aid for Encouragement of Young Scientists (A) was purple. I worked to apply this color as beautifully as I could by selecting the right marking pen and by craftsman-like effort. Later, when I became a Senior Program Officer of the Research Center for Science Systems, I learned that the Kakenhi logo was in purple and the reason why, making me feel somewhat nostalgic for the color.

Recently, a flood of books have been published on know-how for obtaining Kakenhi, and universities appear to be providing extensive support. My own efforts may have been no different. What is truly important, however, is the content of applications and

how that is communicated. I repeatedly polished the text of the application presented in an attractive and readable form in an effort to inject it with spirit or power. That was the expression I used at the time, but I believe what I was really doing was working to convey as best I could to the reviewer my real desire to engage in research.

■Kakenhi following my experience as Senior Program Officer

After my time of giving thought only to my research, I became a Senior Program Officer in engineering at the Research Center for Science Systems for three years from fiscal 2012. This experience was extremely important for me, and greatly expanded the way I think about Kakenhi. Since I have discussed this in *Gakujutsu Shisutemu Kenkyu Senta junen no ayumi* (A 10-year history of the Research Center for Science Systems) (2013), I will not repeat myself here, but as a university researcher who frantically submitted applications, my frank view is that it is actually very hard for applications to be adopted, and I wonder at and am even spooked by how my applications were successively adopted. The difference I felt was like that between just participating in and speaking at an international conference and experiencing the planning and management of such a conference with the responsibility of a sponsor. Having concluded this important three-year period, I became able to view and evaluate academic research from a perspective transcending research areas and to restructure the approach I take to my research. I feel I have grown somewhat as a researcher.

Given the current difficult circumstances for academic research in Japan, it will be indispensable not only to protect this wonderful Kakenhi but to persevere in developing Kakenhi with a clear vision regarding the future of academic research in Japan.