



*Prof. Akihisa Inoue, President, Tohoku University*

Grants-in-Aid for Scientific Research support research driven by the researcher's free ideas and curiosity. Not limited to researchers working in Japan's national, public and private universities, recently eligibility for these grants has been extended to researchers affiliated with independent administrative institutions and other research organizations. Applications are screened via a peer review process, which is highly appraised as being the fairest among all of Japan's grant systems. The grant categories and amount of funding awarded along with project results under the Grant-in-Aid program provide criteria for appraising not only researchers but also universities and research institutions. Accordingly, these grants are Japan's most representative mode of competitive funding. Recently, Grants-in-Aid have also been applied to covering indirect overhead expenses as well as direct research costs. The operational budgets of Japan's universities are being cut incrementally year by year, raising all the more the importance of Grants-in-Aid. In response to demands by university researchers and efforts by the Ministry of Education, Culture, Sports, Science and Technology, I am pleased to say that the budget for Grants-in-Aid has been augmented in each of recent years.

In 1976, I was hired as a research associate in the Institute for Materials Research (IMR) at Tohoku University, where I began my career as a researcher and educator. From 1977 through 1981, as a young researcher I was awarded two Grants-in-Aid under the category "Encouragement of Scientists." Using the first grant, I did research on the influence of hydrogen embrittlement on steel fracture, and with second on the conductive properties of ultra-rapidly cooled nonequilibrium crystalline alloys. Though the amount of these grants was modest, they did cover the cost of repairing and improving measurement instruments and purchasing consumable supplies. I still remember the delight I felt at being able to spend at my own discretion that funding in carrying out my research. Experiencing the process of applying for a grant, being selected, carrying out the research project and reporting the results taught me about the meaning and importance of Grants-in-Aid, while lighting a path to future possibilities for a yet-anxious young researcher.

Following that, I am very appreciative to have been selected for Grants-in-Aid on over ten more occasions. I acquired a strong interest in the Grant-in-Aid program when becoming an associate professor at IMR in the mid-1980s because of the relatively free environment it facilitates in doing research based on one's own ideas. From 1986 through 1994, I was awarded the somewhat larger-funded "Scientific Research (A)" and "Exploratory Research" grants. With the first grant, I developed a hyper-rapid cooling process for metallic supercooled liquid, which I used to produce for the first time nonequilibrium crystalline alloys and to elucidate their properties. The results yielded a more in-depth understanding of supercooled liquid. I used the next grant to trial produce a two-stage cooling apparatus for hyper-rapidly cooled liquid. I still vividly recall how excited I was when successfully achieving the target material through this experiment. It gave me a feeling of fulfillment as an independent researcher coupled with sense of attendant responsibility.

In 1990, I was promoted to a full professor, which I felt to be a big step upward as a researcher. I received a "Specially Promoted Research" Grant-in-Aid for my work during the period from 1994 through 1997. For several years from around 1990, multi-component alloys comprising special metallic components. The stability of the alloys when liquid-cooled down to melting temperature against crystallization increased dramatically, resulting in liquid solidification in the absence of crystallites even when using slowly cooled casting processes. As a result, I found that metallic alloys with disordered structures could be obtained in bulk and massive forms.

I surmise that I was selected for this top-tier grant because of the high evaluation given this research, which would break concepts considered orthodox in metallurgy at the time while pioneering the new material science and engineering field of bulk metallic glass. Research in this field is currently being actively pursued by more than 500 researchers around the world. Significant advances are being made and year by year while the number of specialized researchers is increasing as is the number of research papers published. The merits of my research were not it turned out limited to the first fabrication of bulk metallic glass, but subsequent progress has contributed greatly to Japan by elevating its international stature as a driving force in advancing this field. This owes much to support derived from the Grant-in-Aid awarded for implementing the initial project.

Conducting research on high-functioning new materials requires the acquisition of various kinds of equipment such as manufacturing tools, structural analysis instruments and measuring devices as well as consumable supplies. Given these costs, it would be very difficult to achieve world-leading research results with only basic funding at one's disposal.

Grant-in-Aid support is indispensable for advancing research at this level. At the same time, an objective-oriented research-support system that mitigates inherent risks is needed to maintain a secure base for advancing basic science.

Being selected for a Grant-in-Aid gives scientists conducting internationally top-level research with accompanying experimentation a chance to flap their wings and excel in their work. The Grant also imbues fledgling scientists with a perception of him/herself as an independent researcher, while giving them opportunities to play active roles on science's leading edge. I look forward to the continuous enhancement of the Grants-in-Aid for Scientific Research program in its mission to foster a great many researchers capable of performing at a high world level of excellence and in further developing Japan as a country undergirded by S&T creativity, which enjoys the esteem and trust of partners worldwide.