
1 Special Issue on Kansai Advanced Research Center

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This special issue brings you the latest information on the research activities undertaken by the Kansai Advanced Research Center. Since its establishment 15 years ago, the Kansai Advanced Research Center has been carrying out research into information & communications with a consistent focus on basic research. During the so-called “bubble economy” period, an emphasis was placed on the importance of basic research throughout Japan, and conducting basic research was thought of as one of Japan’s responsibilities as an advanced nation. Later topics of discussion included the importance of shifting from basic research to applied research and then to practical application of technology as a means of vitalizing the national economy. Amid the rapidly changing social conditions of the time, it would not have been possible to continue this research without the enthusiasm and passion of the researchers themselves and the support and understanding of all who were involved with the Center. Has basic research taken root? Has it developed a presence of its own? Is basic research serving as a basis for future research? There are no easy answers to these questions. We can only extrapolate by combining objective views with imaginative and creative minds. This special issue reports on the results of representative research projects undertaken by the Kansai Advanced Research Center. These reports were prepared by the respective researchers themselves and can be considered direct messages from specialists whose vision is focused on the future of technology.

The Nobel Prize is significant in that it

seeks out and recognizes those who have given birth to concepts and technologies, rather than those who have achieved prominence at the time the concepts or technologies received acceptance many years from their inception. Basic, original, fundamental, elemental, inventive...these and many other words are available to evaluate the significance. The advanced technologies (“high tech”) we encounter in our daily lives are not singular innovations but rather are combinations of technologies developed in various fields, each one of which had to be created by someone. Steady and unrelenting activities applied to the exploration of untapped technological knowledge increase the possibility that new technologies will be created in the near future. Ambitious challenges in a variety of fields are essential. Living things are the results of the rational and complex development of genes achieved through grand “experiments” conducted in the vast and limitless environment that surrounds us all. Unfolding the mysteries of our intellectual assets and finding means of utilizing them is a rational desire of human beings. Substances and light (electromagnetic waves) are the ultimate and in fact the only materials available for us with which to make tangible the intellectual activities performed by humans in the realm of the universe in which we exist. Taking these ideas to their logical conclusion, full utilization of all possibilities represents rational human action as well. This is also part of the responsibility of the National Institute of Information and Communications Technology (NICT), charged as it is with the missions of

creating a new system of values based on original viewpoints and managing information and communications technologies from a comprehensive perspective.

This publication summarizes the latest achievements of research activities that have been ongoing for more than a decade. Following a message from the Director of the Kansai Advanced Research Center, the results of key research performed in the fields of biophysics, brain information, and nanotechnology will be introduced. These are the seeds for the development of future technologies and mark the

start of the development and advancement of activities in these fields. It is our hope that this issue can convey to you a sense of these intellectual achievements commensurate with the time and effort invested by the researchers. We would like you to also read about the results of research on optical application technologies introduced in the previously published *COE Special Issue*. Needless to say, there are numerous other research activities whose results could not be included in this issue due to space limitations.



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