



## **Preface**

# **Special Issue on Analysis Technologies for Robust Fujitsu Products**

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The Fujitsu Group is continuously striving to develop new technological innovations that contribute to the creation of a comfortable and secure network society and will provide people throughout the world with a prosperous and dream-inspiring future as part of its corporate policy. To this end, the Fujitsu Group promotes the development of diverse technologies ranging from materials and devices to systems and solutions that sustain information and communications technology (ICT). The development of ICT products through the use of these advanced technologies plays an important role in providing top value to Fujitsu Group customers.

Evaluation and analysis using existing analytical technologies are indispensable to the development of the state-of-the-art products. In this regard, the Fujitsu Group has greatly contributed to high product performance by being actively involved in developing analytical technologies, providing manufacturing technology support, and performing failure analysis.

IC fine fabrication technology is a major driving force that brought us the present high product performance. As is clear from cutting-edge LSIs, the minimum dimension has entered the sub-50-nm region, and many people believe that we have already reached the practical dimensional limit. This progress in fine fabrication has significantly improved product value, but the potential that nanotechnology holds promises to lead to further advancement in this field, though such methods are yet to be explored. For instance, even the types of atoms and the way in which they are arranged can drastically affect product performance and reliability. Therefore, better manipulation of atomic arrangements is becoming a prime requirement. Consequently, nano-level visualization is coming to occupy an extremely important

position in product development, and we are entering an era in which differentiation in visualization technologies is coming to play an even bigger role in product differentiation.

Given this background, at the Fujitsu Group, we have been working to introduce and enhance advanced analytical and interpretation technologies. This special issue presents some of our work on enhancing such technologies, which has been applied to our products and has achieved nano-level visualization, including the application of spectroscopic techniques that use various types of electron microscopy and synchrotron radiation. Visualization techniques, in particular, go beyond actual analysis as they can be combined with various property evaluation techniques, simulations, and databases to predict optimal product structures in advance. This issue also introduces some of our achievements using these techniques to make design and manufacturing more efficient and reliable.

Moreover, analytical technologies are not only essential in enhancing product performance and reliability, but also attracting much attention for their role in radiation measurement and environmental monitoring. These technologies are not just for supporting product enhancement, but also play an important role as basic technologies in the quest to make our planet a safe and secure place. In particular, they will play an important role in environmental load reduction, which is considered to be a major corporate issue in the 21st century.

The technologies introduced in this special issue represent only a few of those being developed in the Fujitsu Group, but it would give me great pleasure if the reader comes away from these articles with a better understanding of how analytical technologies can be used to enhance the performance and reliability of Fujitsu Group products.