



This Annual Review 2010 is a summary of research activities performed in the Institute for Molecular Science (IMS) during September 2009–August 2010. IMS is one of the world's core research facilities for molecular science and is a center for inter-university joint research in Japan, as well. It sets an extremely wide range of research goals, from understanding the behavior of individual molecules to that of collective molecular processes on the scale of life forms and in space. Currently, the IMS is engaged in four areas of research: theoretical and computational molecular science, photo-molecular science, materials molecular science and life and coordination-complex molecular science. It operates seven research facilities, including the UVSOR Facility.

The staff at IMS are making steady progress in basic research on molecular structures, reactions and functions demonstrating “novel molecular capabilities,” as reported in this Review. In addition to these individual research activities, IMS conducts the six special programs in the institute basis; (i) Nano-science simulation for the “Grand Challenge Applications” of the next generation supercomputer projects, (ii) Nano-network project, including the joint research initiative using 920MHz NMR, (iii) Extreme photonics in collaboration with RIKEN, (iv) COE of molecular and materials simulations as a joint program of NINS, (v) Quantum Beam Development Program in collaboration with Kyoto University and Nagoya University, and (vi) Networked Laboratories for the Frontiers of Photon Science and Technology in collaboration with Japan Atomic Energy Research Institute, Osaka University and Kyoto University. With two international programs for Asia, namely, Asian Core program and JENESYS (Japan-East Asia Network of Exchange for Students and Youths) program, IMS has invited active young scientists from various East Asian countries to carry out collaborative researches.

Dr. Takao Fuji, an expert of laser chemistry in the ultra-violet region, has joined to our faculty as an Associate Professor of the Laser Research Center for Molecular Science. Associate Professor Hishikawa has moved to Chemistry Department of Nagoya University as a full professor, after his serving in our Department of Photo-Molecular Science for 6 years.

IMS is now going into a new era. Since its foundation, for 35 years, IMS has conducted many groundbreaking researches and fostered the development of many young scientists, who are now widely known in the fields of physics and chemistry. The research objects originally proposed in the foundation of the institute have been well-explored. Besides, seven senior professors out of 18 professors are going to retire within three years. It is, therefore, time to search for a novel direction. We do expect your advice and support for initiating the new era of molecular science. Among many possibilities, as one trial, we will employ a new scientific perspective in order to examine the boundary between “micro” and “macro” phenomena, the so-called “post-nano” world, which is regarded as being “an intrinsic arena for the generation of life” and for the evolution of functioning molecular materials.

September, 2010

A handwritten signature in black ink, appearing to read 'Iwao Ohmine', written in a cursive style.

OHMINE, Iwao  
Director-General, Institute for Molecular Science