



The Institute for Molecular Science (IMS) is one of the world's core research facilities for molecular science and is also a center for inter-university joint research in Japan. 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 five (four plus one) areas of research: Theoretical and computational molecular science, Photo-molecular science, Materials molecular science, and Life and coordination-complex molecular science. A new research Center of Integrated MOlecular Systems (CIMOS), the fifth research division of IMS, has started from April, 2013 to develop the highly functional molecular systems such as molecular rhythms, sensing and response, and even self-repair. In addition to these research divisions, IMS has six Research facilities and centers; UVSOR Facility, Laser Research Center for Molecular Science, Instrument Center facilitated with various molecular detectors, for example, 920MHz and 800MHz NMR, and Equipment Development Center. IMS also operates the Research Center for Computational Science and Okazaki Institute for Integrative Bioscience (OIIB), jointly with National Institute for Physiological Sciences and National Institute for Basic Biology in the same campus.

This Annual Review 2014 is a summary of research activities during September 2013–August 2014. The individual research groups 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 activities, IMS conducts the five special programs in the institute basis; (i) a computational chemistry program of TCCI (Theoretical and Computational Chemistry Initiative) as a part of CMSI (Computational Materials Science Initiative) in HPCI (High Performance Computational Infrastructure), (ii) Nano science project, called Nanotechnology Platform from July 2012. (iii) Extreme photonics in collaboration with RIKEN, (iv) COE of molecular and materials simulations as a joint program of NINS, and (v) Photon Frontier Network Consortium for Photon Science and Technology in collaboration with Japan Atomic Energy Research Institute, Osaka University and Kyoto University. With two IMS own international programs for Asia, namely, EXODASS (EXchange prOgram for the Development of Asian Scientific Society) and Asian Core, IMS has invited active young scientists from various East Asian countries to carry out collaborative researches. EXODASS Program is the post-JENESYS starting from 2011, and aims to provide the opportunity of internship for young researchers (*e.g.*, master's and doctoral students and postdoctoral researchers) from Asian countries to stay in IMS laboratories related to the basic research for environmental and energy problems. Asian Core program also has now become IMS's own project, continuing to strengthen the tie among the four key institutes of Chemical Physics in Asia, namely, KAIST in Korea, IAMS in Taiwan, ICCAS in China and IMS in Japan.

Many new faculty members have joined the IMS faculty in the period of September 2013–August 2014. Dr. Satoshi Kera from Chiba University, an expert of photoelectron spectroscopy and developing functional organic materials, has started his new position as a full professor of Photo-Molecular Science III section. Dr. Ryota Iino from the University of Tokyo, an expert on the single-molecule biophysics, especially, on molecular machines and molecular motors, is now a full professor of Okazaki Institute for Integrative Bioscience and also of Life and Coordination-Complex Molecular Science division. Three new associate professors have also joined our faculty in the same period; both Dr. Nobuyasu Koga from Washington University and Dr. Genki Kobayashi from Kanagawa University become members of Research Center of Integrative Molecular Systems, and Dr. Norie Momiyama from Tohoku University a member of Life and Coordination-Complex Molecular Science division. Professor Koga conducts the protein design by using computational and experimental approaches. Professor Kobayashi is developing effective synthesis methods of oxyhydrides, and to find a new functional materials providing hydride conductivity and novel electronic property. Professor Momiyama is exploring novel synthetic methods to develop highly functional chiral organic molecules.

IMS is continuing to employ a new scientific perspective with the newly founded CIMoS research center, mentioned above, and by trying to establish a new center (“precision multiscale measurement and analysis center”) to develop the precision measurement and analysis methods to explore the spatiotemporal (time and spatial) development of multiscale molecular systems. We do expect your advice and support for creating this new era of molecular science.

September, 2014

OHMINE, Iwao
Director-General, Institute for Molecular Science