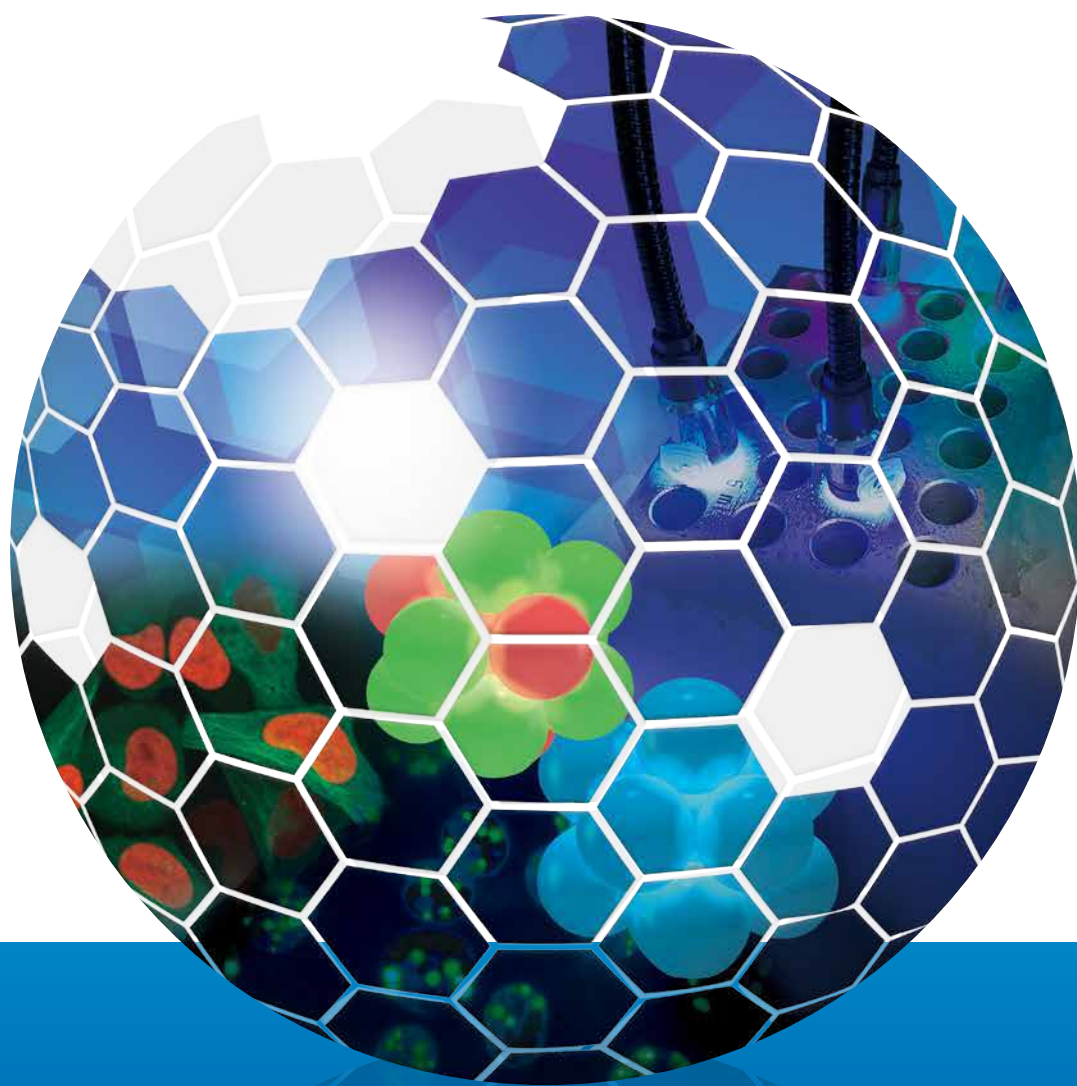


CLS

Laboratory for Chemistry and Life Science



Institute of
SCIENCE TOKYO

Message from the Director

The Laboratory for Chemistry and Life Science (CLS) was originally established in February 1939 as the Chemical Resource Laboratory (CRL), Tokyo Institute of Technology. In April 2016, as a part of the University's reorganization, it was reformed as the Laboratory for Chemistry and Life Science (CLS), Institute of Innovative Research. In October 2024, it has become the Laboratory for Chemistry and Life Science (CLS), Institute of Integrated Research, Institute of Science Tokyo due to the university merger with Tokyo Medical and Dental University.

CLS focuses on the creation of new academic concepts and next-generation science and technology, aiming at the improvement of highly-advanced systems and the realization of affluent and sustainable social development. We aspire to contribute to the development of chemistry and life science in Japan. Therefore, under the research initiative by the Network Joint Research Center for Materials and Devices (NJRC), CLS is actively collaborating with research institutes of four other universities: IMCE at Kyushu University, SANKEN at Osaka University, IMRAM at Tohoku University, and RIES at the Hokkaido University.



Our Mission

CLS concentrates on four major disciplines, namely, "Molecular Synthesis," "Molecular Materials Design," "Molecular engineering that covers not only fundamental and applied chemistry but also life science. By combining domestic and international research activities, CLS formulates new principles in molecular-based chemistry and bioscience aiming at breakthroughs in next-generation science and technology. The professors at CLS are also faculty at the Tokyo Institute of Technology (Tokyo Tech). They educate and train both undergraduate and graduate students to nurture next-generation researchers. The students currently account for 65% of the 320 CLS members, making them a significant core source of CLS activities. The final goal of CLS is to contribute to the realization of sustainable social development through cutting-edge chemical research and the fostering of responsible human resources.

Facts

300+ Colleagues

55 Faculty Members (include associate and assistant prof.)

200+ Students

60 +Staffs

62 International students and researchers



\$6.5 m

annual grant and commissioned research expenditure



42

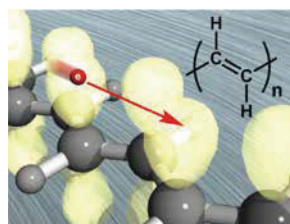
research projects supported by national grants



58

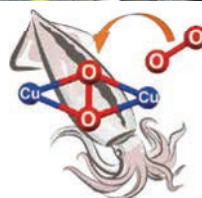
projects for collaboration with industries and universities

Scientific Discoveries



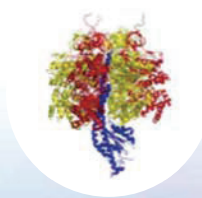
1976

Dr. Hideki Shirakawa discovered a conducting polymer (Nobel prize in chemistry at 2000)



1989

Dr. Y. Moro-oka and Dr. N. Kitajima elucidated the structure of copper complexes, which is the key of blue blood in crustacea.



1997

Dr. M. Yoshida directly observed a molecular motor in ATPase.



Professor



Kan
TANAKA

Associate Professor



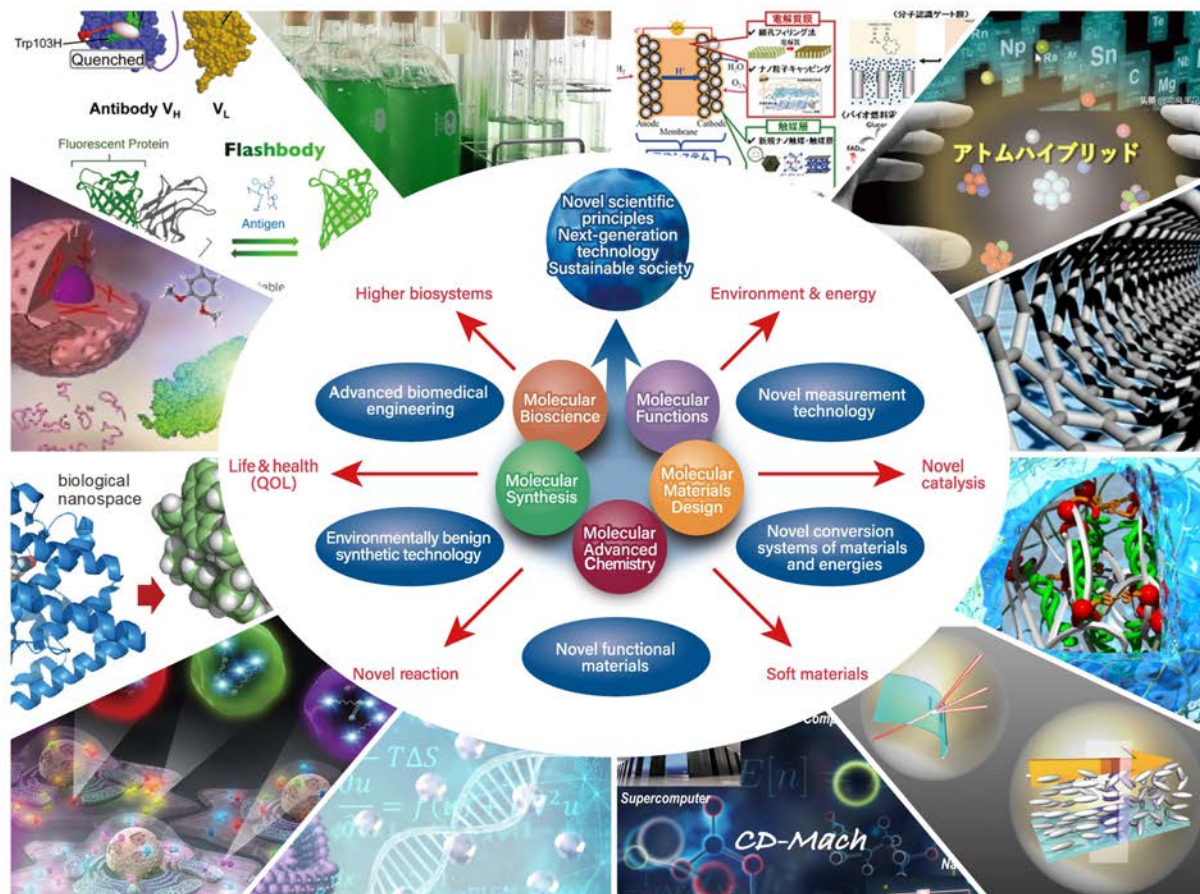
Tetsuya
KITAGUCHI



Keisuke
YOSHIDA

Molecular Bioscience

The human body works as a combination of diverse chemical reactions involving molecules with elaborate structures whose complexity and methods of regulation can be scarcely fathomed by humans. In this discipline, we aim to understand the molecular and regulatory mechanisms involved in various reactions that occur in living bodies, such as production and storage of energy, molecular recognition, and molecular motion using chemical terminologies. By integrating the obtained findings, we develop new technologies, such as clean energy and new disease diagnostic tools, to contribute to humanity.



Molecular Synthesis

Molecules are fundamental components of a substance, and they could express infinite functions based on their diverse structures and sizes (e.g., molecular weight). In this discipline, we use our unique principles and methods to synthesize novel molecules and cement the foundation required to develop the expression of molecular functions. We target all organics, inorganics, metal complexes, and macro- and supra-molecules to ultimately build a new molecular world by combining elements, bonds, and secondary structures.

Molecular Advanced Chemistry

Rapid developments in data science, significant improvements in measurement and computational techniques, and the automation of synthetic experiments have given rise to unprecedented new trends in the field of materials and molecular science. In this division, we will develop such pioneering approaches to realize transformations in the development of new materials and new functions, leading to the solution of various social issues.

Molecular Functions

The research interest of this group focuses on the synthesis of functional molecules and polymers and the new methodology that enables controlled assembly of molecular building blocks into a desired structure at various levels from the nanoscale to the macroscopic scale. Deep understanding of the molecular behaviors regarding static and dynamic aspects allows us to design new soft materials that contribute to diverse scientific and technological fields.

Molecular Material Design

The properties of organic materials are determined by molecular arrangement and orientation, along with the fundamental chemical structures of the constituent molecules. The research interest of this group focuses not only on the synthesis of functional molecules and polymers but also on the new methodology that enables controlled assembly of molecular building blocks into a desired structure at various levels from the nanoscale to the macroscopic scale. Deep understanding of the molecular behaviors regarding static and dynamic aspects allows us to design new soft materials exhibiting superb electrical, optical, thermal, mechanical, or biological functions that contribute to diverse scientific and technological fields for the realization of sustainable society.

Professor



Takeo
YAMAGUCHI



Kimihisa
YAMAMOTO

Associate Professor



Takane
IMAOKA



Hidenori
KUROIKI



Shoji
MIYANISHI *

Assistant Professor



T. MORIAI



S. NARAYANARU *



H. OKUYAMA



Y. SUGAWARA



M. YOSHIDA



Q. ZOU *

Professor



Takanori
FUKUSHIMA



Nobuhiro
NISHIYAMA



Atsushi
SHISHIDO

Associate Professor



Shoichi
KUBO



Yutaka
MIURA



Yoshiaki
SHOJI

Assistant Professor



M. AIZAWA



T. FUKUI



K. HISANO



Y. HONDA



C. J. MARTIN *



K. MUGURUMA



R. TAKEHARA

* Specially Appointed Associate Professor
 ** Specially Appointed Assistant Professor

Assistant Professor



K. MAEDA



N. OSAKA



T. YASUDA



B. ZHU

Professor



Hiroyuki
NAKAMURA



Michito
YOSHIZAWA



Satoshi
OKADA



Tomohisa
SAWADA

Assistant Professor



L. CATTI



R. KAKIUCHI



K. MIURA



Y. TANAKA

Professor



Mako
KAMIYA



Masahiro
TAKINOUE



Yoshitaka
TATEYAMA

Associate Professor



Yasunobu
ANDO



Daisuke
ASANUMA

Assistant Professor



R. J. ARCHER



H. FUJIOKA



M. KAWATANI



H. D. LUONG *



T. NARUYAMA *



T. NAKASHIMA



R. SASAKI



T. TOGO *



H. UDONO *

Networking and Cooperation

The technological knowledge and experimental techniques in CLS, cultivated through cutting-edge scientific research, are widely utilized in both comprehensive joint projects and individual collaborative research. CLS is always open for collaborations with external researchers under NJRC, which is based on the Five-Star alliance project involving five university-affiliated research institutes in Japan. Numerous interdisciplinary collaborative research with other global research institutes and industries are currently underway.



Specially Appointed Professor
Kohtarō OSAKADA



CORE Lab

To strengthen the NJRC network based on the Five-Star alliance project, CLS has introduced “CORE lab,” wherein young researchers from other organizations conduct joint research with their host supervisors. The principal investigators, selected through open recruitment, directly supervise, organize, and conduct long-term integrated collaborative research.

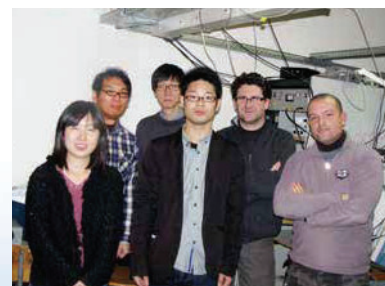
Facilities

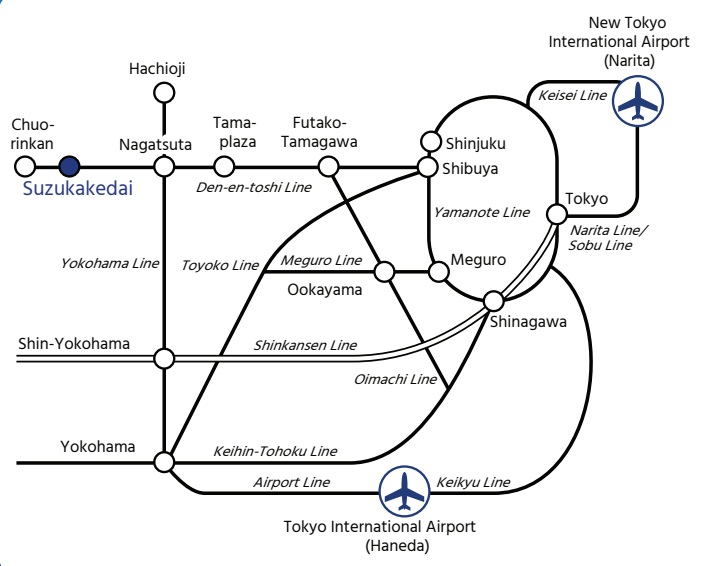
As a comprehensive laboratory for chemistry and life science, CLS is equipped with facilities for a wide range of experiments, such as organic and inorganic synthesis, structural analysis, microanalysis, dynamic analysis of biomolecules, and animal testing. Many of these facilities are also open to external users through NJRC.



International Academic Activities

The professors at CLS are also faculty at Science Tokyo, teaching both undergraduate and graduate students. Science Tokyo’s International Graduate Program (IGP) admits numerous international applicants, many of whom are then enrolled in CLS. Furthermore, Science Tokyo’s World Research Hub Program (WRH) supports faculty recruitment and long-term stay of international researchers, and is the driving force for achieving an interdisciplinary network of leading researchers in the world.





Chem. & Life Sci.
since 1939

Laboratory for Chemistry
and Life Science

Laboratory for Chemistry and Life Science
Institute of Integrated Research
Institute of Science Tokyo

4259 Nagatsutacho, Midori-ku,
Yokohama, 226-8501, Japan

Official site
<http://www.res.titech.ac.jp/english/>

