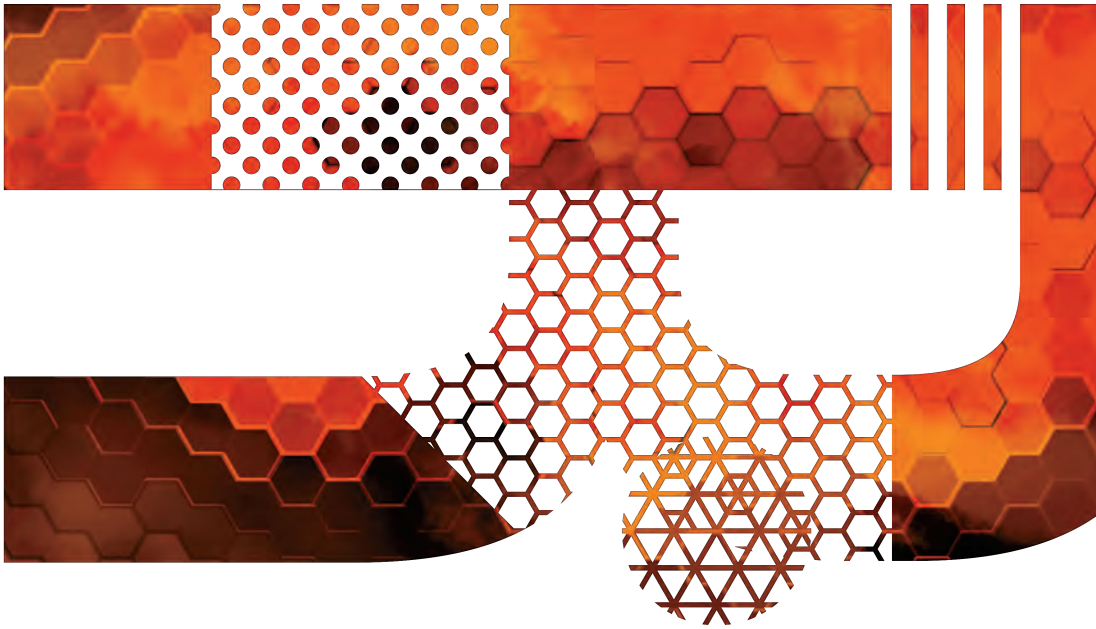
ICR2023



INSTITUTE FOR CHEMICAL RESEARCH KYOTO UNIVERSITY

2023

DIVISION OF SYNTHETIC CHEMISTRY

DIVISION OF MATERIALS CHEMISTRY

DIVISION OF BIOCHEMISTRY

DIVISION OF ENVIRONMENTAL CHEMISTRY

DIVISION OF MULTIDISCIPLINARY CHEMISTRY

ADVANCED RESEARCH CENTER FOR BEAM SCIENCE

INTERNATIONAL RESEARCH CENTER FOR ELEMENTS SCIENCE

BIOINFORMATICS CENTER

Preface

Director

AOYAMA, Takashi

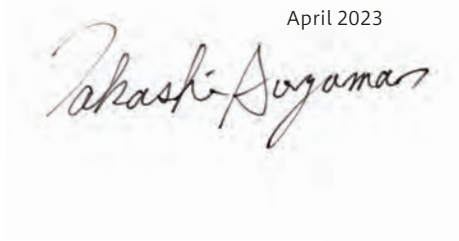
The Institute for Chemical Research (ICR) was founded in 1926 as the first research institute of Kyoto University. Our founding vision is to "excel in the investigation of the basic principles of chemistry and their applications." ICR has promoted pioneering studies with a focus on basic sciences ever since, branching out to include research in physics, biology, and informatics as well as chemistry. Our staff include 120 faculty members, 200 graduate students including 60 from foreign countries, and 60 researchers. These scientists are grouped into 30 laboratories divided into five research divisions—Synthetic Chemistry, Materials Chemistry, Biochemistry, Environmental Chemistry, and Multidisciplinary Chemistry—and three research centers—Advanced Research Center for Beam Science, International Research Center for Elements Science, and Bioinformatics Center. The laboratories are diversely affiliated with the graduate schools of science, engineering, agriculture, pharmaceutical sciences, medicine, and informatics.

ICR collaborates with other research institutions as a key member of MEXT Inter-University Collaborative Project "Integrated Consortium on Chemical Synthesis", MEXT Large-scale Scientific Research Project "Spintronics Research Network of Japan", MEXT Project "Advanced Research Infrastructure for Materials and Nanotechnology in Japan", and the Kyoto University Research Coordination Alliance. We have also been engaged in over 60 international collaborations with overseas universities and research institutions. In 2018, based on our strong global activity in chemistry-oriented fields, ICR was certified by MEXT as an International Joint Usage/Research Center. The following year, in 2019, we established an On-site Laboratory, the "Kyoto University Shanghai Lab" in Shanghai, China under the MEXT's Designated National University program. To foster and secure young researchers we have initiated several programs to support research and graduate education, including an in-house annual grant system, "ICR Grant for Promoting Integrated Research." These collaborative achievements highlight our commitment to promoting ICR as a global research core in chemistry-oriented fields.

Our institute maintains a high level of social awareness. The environment surrounding us is now experiencing a wave of changes. Worldwide problems including global warming and economic polarization have become evident, while COVID-19 has entered the stage of coexistence with the virus. For a sustainable and just society, science and technology must become a credible beacon of light. ICR contributes towards this goal by providing leadership and expertise in scientific research, promoting multidisciplinary, chemistry-related communities, and developing new and technologically important innovations.

Thank you for your interest in ICR and our ongoing efforts to future science and technology at Kyoto University and around the world. We appreciate your continued encouragement and support.

April 2023



History

For almost a century, ICR has been striving to unlock the mystery of chemistry and its related disciplines.

1926 ICR founded to "excel in the investigation of the basic principles of chemistry and their applications."

1929 Main Building of ICR completed in Takatsuki, Osaka.

1949 ICR affiliated to Kyoto University.

1962 Started to accept graduate school students.

1964 ICR divided into 19 research divisions.

Nuclear Science Research Facility founded in Awataguchi, Sakyo-ku, Kyoto.

1968 High-Voltage Electron Microscopy Building completed in Gokasho.

ICR relocated to Gokasho, the present location of the institute.

1971 Low-Temperature Laboratory completed.

1975 Biotechnology Laboratory and Central Computer Facility completed.

1981 Research Facility of Nucleic Acids completed.

1983 Nucleic Acid Research Building completed.

1985 Biotechnology Laboratory completed.

High-Voltage High-resolution Electron Spectromicroscope completed.

1988 Nuclear Science Research Facility relocated to Gokasho.

Accelerator Laboratory and Research Building completed.

1989 Supercomputer Laboratory completed.

1992 ICR reorganized into 9 research divisions and 2 satellite facilities.

1999 Joint Research Laboratory Building completed.

Our Mission

The founding philosophy of the ICR is to “excel in the investigation of the basic principles of chemistry and their applications,” and the core values of its research lie both in independence and integration. Following this philosophy and core values, the ICR is dedicated to solving global chemical challenges to benefit society.

Research

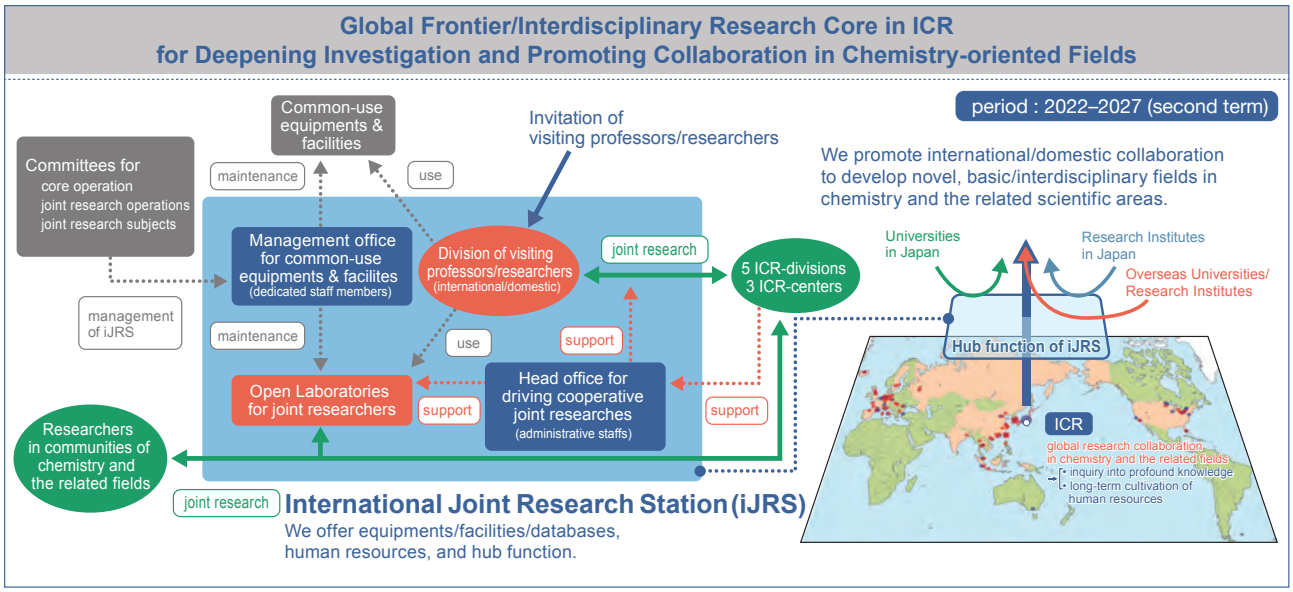
Our research is based on examining fundamental questions about the wide field of chemistry with a viewpoint that considers how answering these questions will contribute to solving ever-changing global challenges.

Education

Providing excellent research opportunities in a world-class environment, we train our people to have high-level problem solving skills and leadership skills to globally push forward the field of chemistry. Our success comes from the success of our students becoming top scientists in chemistry.

Outreach

As researchers and educators of chemistry, we endeavor to deepen our exchanges with local communities and Japan as a whole. At the same time, we actively work with international researchers and institutions to solve global problems. By joining the ICR, researchers have the accountability to the public and the opportunity to work closely with leading scientists around the world.



2000 ICR Administration Department merged with Uji Administration Office.

2001 Bioinformatics Center founded.

2002 Endowed Research Section of Proteome Informatics (SGI Japan) established. (Closed in March, 2005.)

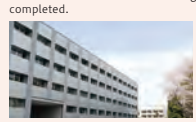
2003 ICR reorganized into 9 research divisions and 3 satellite facilities.
International Research Center for Elements Science founded.

2004 ICR reorganized into 5 research divisions and 3 centers.
Advanced Research Center for Beam Science established.
Uji Research Building completed.

2005 Laser Science Laboratory completed.

2007 Established ICR alumni association named “Hekisuikai.”

2009 Endowed Research Section of Water Chemistry Energy (AGC) established. (Closed in March, 2012.)
First term of a Joint Usage / Research Center started.
Seismic retrofit of the main building completed.



2010 Endowed Research Section of Nano-Interface Photonics (SEI group CSR Foundation) established. (closed in March, 2015.)
Bioinformatics Center reorganized.

2011 Monochromated Atomic Resolution Analytical Electron Microscope introduced.

2013 Second term of a Joint Usage / Research Center started.
International Research Center for Elements Science reorganized.

2016 Dynamic Nuclear Polarization-enhanced NMR (DNP-NMR) Systems introduced.

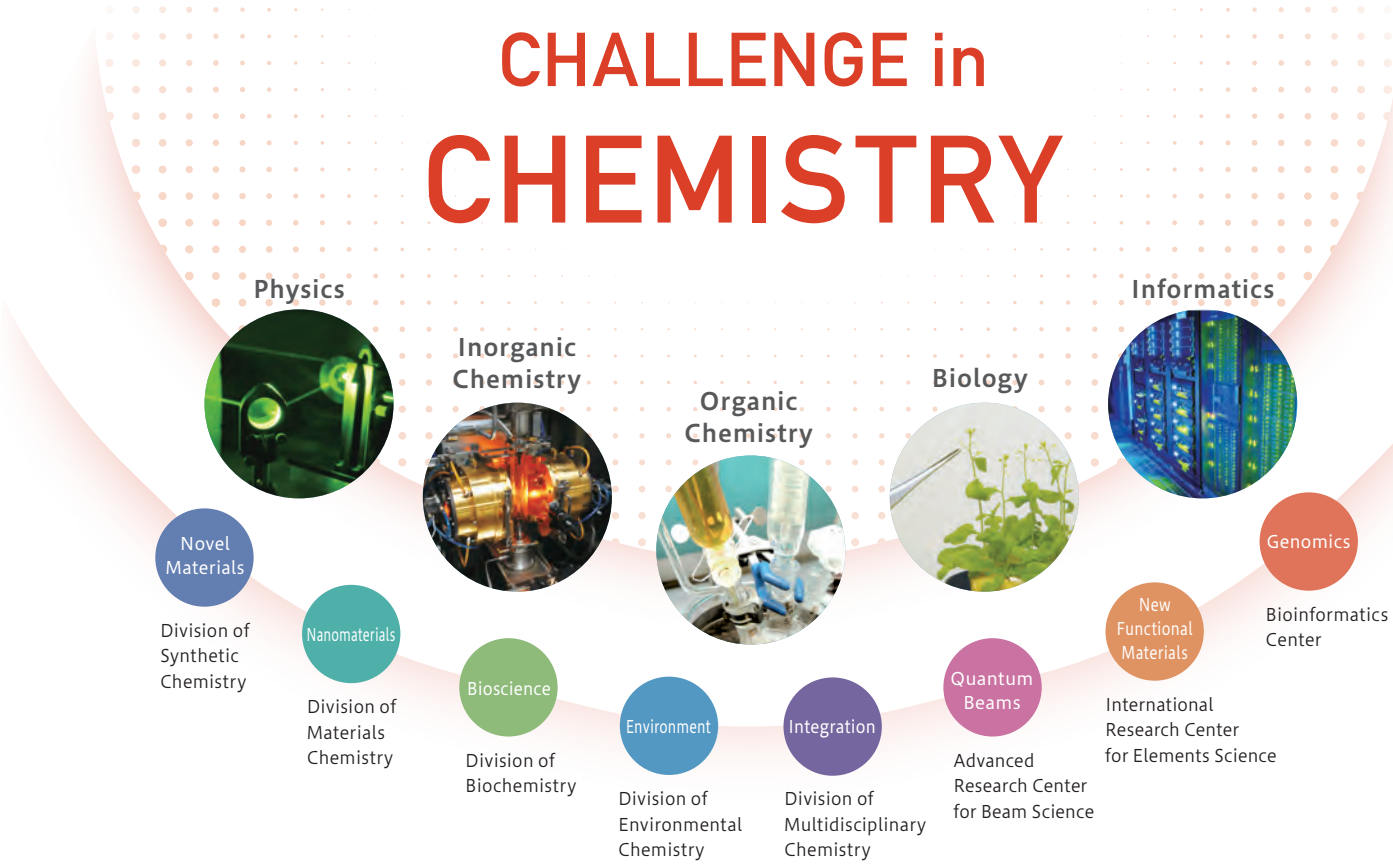
2017 First term of an International Joint Usage / Research Center started.

2018 Second term of an International Joint Usage / Research Center started.

2022

Research

Research at the ICR spans the entire breadth of chemistry and includes organic chemistry, inorganic chemistry, biological chemistry, physical chemistry, analytical chemistry, and computational chemistry. The ICR is organized into five research divisions and three research centers and has over 100 faculty members leading independent research programs in 30 laboratories.



Education

Students who join the ICR will enter through one of the following six graduate schools at Kyoto University: Science, Engineering, Agriculture, Pharmaceutical Sciences, Medicine, and Informatics. Regardless of the school, the ICR offers exceptional teaching and research programs across a wide range of disciplines to all of its students.

Novel Materials

Division of Synthetic Chemistry

Exploring beyond traditional concepts, we use inorganic and organic chemistry to synthesize new functional molecules and materials, and investigate their structures, properties, and applications.

Graduate School of Science
Organoelement Chemistry

Prof.
YAMADA, Hiroko (D.Sc.)
Assoc. Prof.
MIZUHATA, Yoshiyuki (D. Sc.)
Assist. Prof.
YUKIMOTO, Mariko (D. Sc.)
Assist. Prof.
MATSUO, Kyohei (D. Sc.)
Program-Specific Assist. Prof.
YAMAUCHI, Mitsuaki (D.Eng.)
Techn. Staff
HIRANO, Toshiko

Graduate School of Engineering
Structural Organic Chemistry

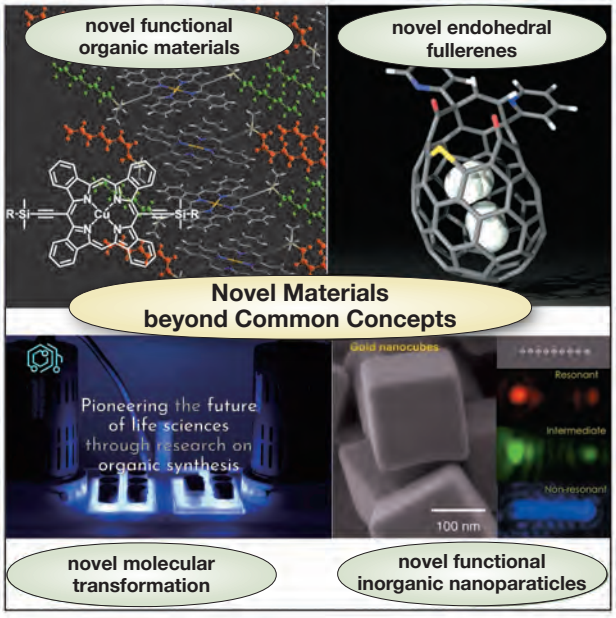
Prof.
MURATA, Yasujiro (D. Eng.)
Assoc. Prof.
HIROSE, Takashi (D. Eng.)
Assist. Prof.
HASHIKAWA, Yoshifumi (D. Eng.)

Graduate School of Pharmaceutical Science
Synthetic Organic Chemistry

Prof.
OHMIYA, Hirohisa (D. Eng.)
Assist. Prof.
NAGAO, Kazunori (D.Sc.)

Graduate School of Science
Advanced Inorganic Synthesis

Prof.
TERANISHI, Toshiharu (D.Eng.)
Assoc. Prof.
SAKAMOTO, Masanori (D. Eng.)
Assist. Prof.
TAKAHATA, Ryo (D. Sc.)
Assist. Prof.
TAKEKUMA, Haruka (D.Sc.)
Program-Specific Assoc. Prof.
SARUYAMA, Masaki (D. Sc.)
Program-Specific Assist. Prof.
SATO, Ryota (D. Sc.)
Program-Specific Assist. Prof.
MATSUMOTO, Kenshi (D. Sc.)



Nanomaterials

Division of Materials Chemistry

We focus on the creation and development of next-generation nano-sized functional materials by controlling electronic, photonic, and spin states as well as fabrication methods.

Graduate School of Engineering
Chemistry of Polymer Materials

Prof.
TSUJII, Yoshinobu (D. Eng.)
Assist. Prof.
KINOSE, Yuji (D. Eng.)

Graduate School of Engineering
Polymer Controlled Synthesis

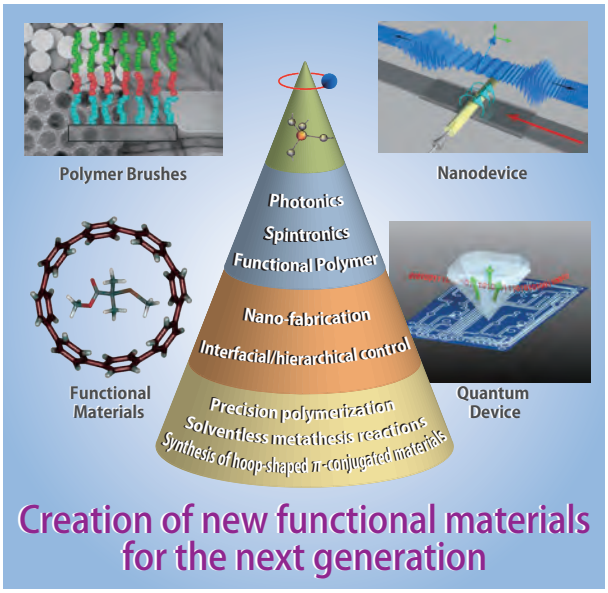
Prof.
YAMAGO, Shigeru (D. Sc.)
Assoc. Prof.
TOSAKA, Masatoshi (D. Eng.)
Assist. Prof.
KAYAHARA, Eiichi (D. Eng.)
Techn. Staff
FUJIHASHI, Akiko

Graduate School of Engineering
Inorganic Photonics Materials

Prof.
MIZUOCHI, Norikazu (D. Sc.)
Assist. Prof.
MORIOKA, Naoya (Ph. D.)
Assist. Prof.
SHIGEMATSU, Ei (Ph.D.)
Program-Specific Assist. Prof.
HERBSCHLEB, David Ernst (Ph. D.)

Graduate School of Science
Nanospintronics

Prof.
ONO, Teruo (D. Sc.)
Assoc. Prof.
SHIOTA, Yoichi (D. Eng.)
Assist. Prof.
HISATOMI, Ryusuke (D. Eng.)
Program-Specific Assoc. Prof.
KARUBE, Shutaro (D.Sc.)
Program-Specific Assist. Prof.
NARITA, Hideki (Ph. D.)



Bioscience

Division of Biochemistry

We develop new applied biomaterials by investigating biological processes such as recognition and sensing from a chemical perspective.

Graduate School of Pharmaceutical Science
Biofunctional Design-Chemistry

Prof.
FUTAKI, Shiroh (D. Pharm. Sc.)
Assoc. Prof.
IMANISHI, Miki (D. Pharm. Sc.)
Assist. Prof.
KAWAGUCHI, Yoshimasa (D. Pharm. Sc.)
Program-Specific Assoc. Prof.
HIROSE, Hisaaki (D. Pharm. Sc.)
Program-Specific Assist. Prof.
KIMURA, Seigo (D. Pharm. Sc.)

Graduate School of Agriculture
Chemistry of Molecular Biocatalysts

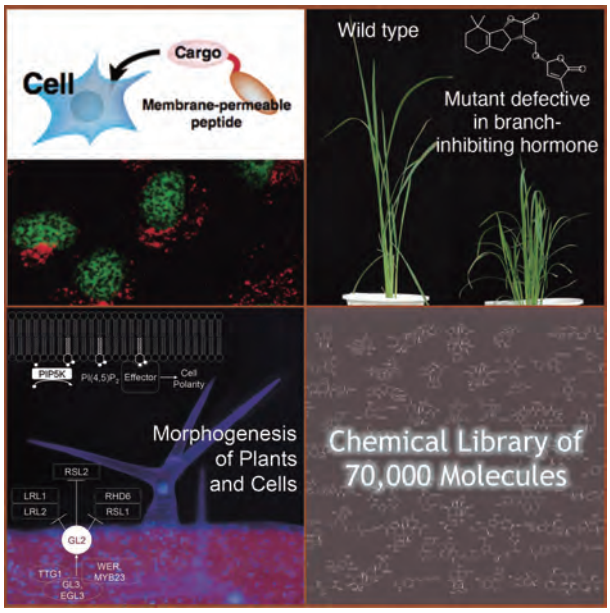
Prof.
YAMAGUCHI, Shinjiro (D. Agr.)
Assist. Prof.
MASHIGUCHI, Kiyoshi (D. Agr.)

Graduate School of Science
Molecular Biology

Prof.
AOYAMA, Takashi (D. Sc.)
Assoc. Prof.
TSUGE, Tomohiko (D. Sc.)
Assist. Prof.
KATO, Mariko (D. Agr.)

Graduate School of Pharmaceutical Science/Medicine
Chemical Biology

Prof.
UESUGI, Motonari (D. Pharm. Sc.)
Assoc. Prof.
SATO, Shinichi (D. Eng.)
Senior Lect.
PERRON, Amelie (Ph. D.)
Assist. Prof.
ABO, Masahiro (D. Pharm. Sc.)



Environment

Division of Environmental Chemistry

We contribute to solving environmental problems through research on environment-friendly organic device design, enzyme/microorganism-based biotechnology, and hydrospheric biogeochemistry.

Graduate School of Engineering
Molecular Materials Chemistry

Prof.
KAJI, Hironori (D. Eng.)
Assist. Prof.
SHIZU, Katsuyuki (D. Eng.)
Assist. Prof.
SUZUKI, Katsuaki
(D. Human & Envirnmtl. Studies)
Program-Specific Assoc. Prof.
TANAKA, Hiroyuki (D. Eng.)
Techn. Staff
MAENO, Ayaka
Techn. Staff
NAKAJIMA, Yuuki

Graduate School of Science
Hydrospheric Environment Analytical Chemistry

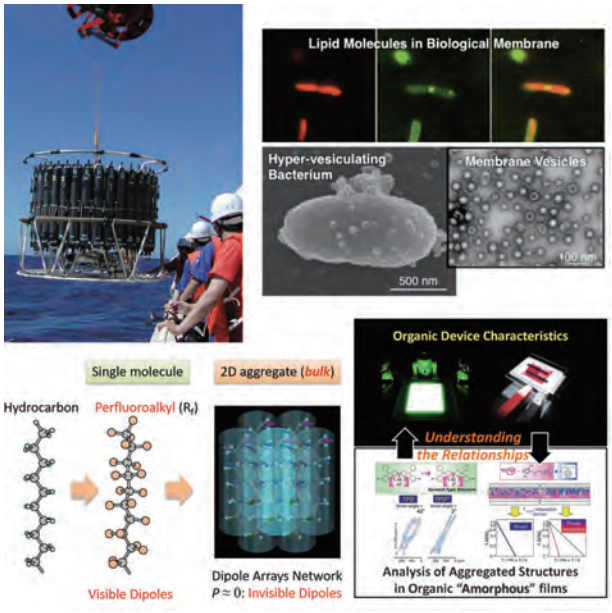
Prof.
SOHRIN, Yoshiki (D. Sc.)
Assoc. Prof.
TAKANO, Shotaro (D. Sc.)
Assist. Prof.
ZHENG, Linjie (D. Sc.)
Techn. Staff
IWASE, Misato

Graduate School of Science
Chemistry for Functionalized Surfaces

Prof.
HASEGAWA, Takeshi (D. Sc.)
Assist. Prof.
SHIOYA, Nobutaka (D. Sc.)

Graduate School of Agriculture
Molecular Microbial Science

Prof.
KURIHARA, Tatsuo (D. Eng.)
Assoc. Prof.
KAWAMOTO, Jun (D. Agr.)
Assist. Prof.
OGAWA, Takuya (D. Agr.)



Integration

Division of Multidisciplinary Chemistry

We flourish in the intersection of chemistry and physics, carrying out fundamental research in cooperation with the other divisions to enhance the scientific value of materials development.

Graduate School of Engineering
Polymer Materials Science

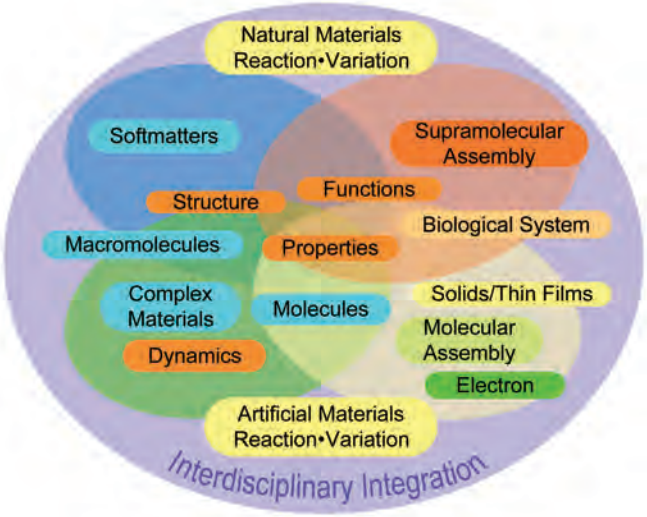
Prof.
TAKENAKA, Mikihito (D. Eng.)
Assoc. Prof.
OGAWA, Hiroki (D. Eng.)
Assist. Prof.
NAKANISHI, Yohei (D. Eng.)

Graduate School of Engineering
Molecular Rheology

Assoc. Prof.
MATSUMIYA, Yumi (D. Eng.)
Assist. Prof.
SATO, Takeshi (D. Eng.)

Graduate School of Science
Molecular Aggregation Analysis

Prof.
WAKAMIYA, Atsushi (D. Eng.)
Senior Lect.
MURDEY, Richard (Ph. D.)
Assist. Prof.
NAKAMURA, Tomoya (D. Eng.)
Assist. Prof.
TRUONG, Minh Anh (D. Eng.)



Quantum Beams

Advanced Research Center for Beam Science

We promote the development of quantum beams and ultimate space-time analysis and their applications to physics of nuclei, materials and plasmas.

Graduate School of Science
Particle Beam Science

Prof.
WAKASUGI, Masanori (D. Sc.)
Assoc. Prof.
TSUKADA, Kyo (D. Sc.)
Assist. Prof.
OGAWARA, Ryo (D. Med. Sc.)
Techn. Staff
TONGU, Hiromu

Graduate School of Science
Laser Matter Interaction Science

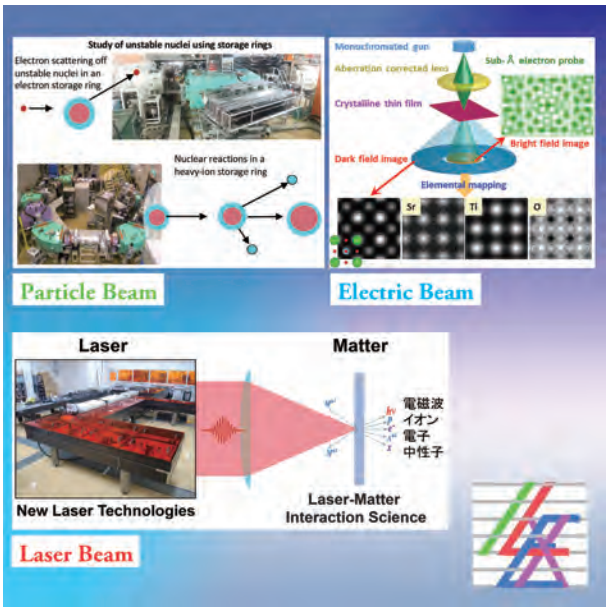
Prof.
TOKITA, Shigeki (D. Eng.)
Assist. Prof.
OKAZAKI, Daiki (D.Eng.)

Graduate School of Science
Electron Microscopy and Crystal Chemistry

Assoc. Prof.
HARUTA, Mitsutaka (D. Sc.)
Assist. Prof.
NEMOTO, Takashi (D. Sc.)

Graduate School of Science
Atomic and Molecular Structures

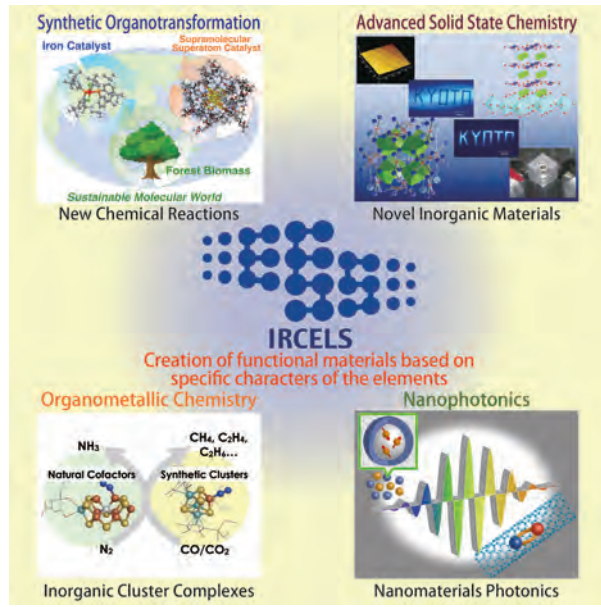
Assist. Prof.
FUJII, Tomomi (D. Sc.)



New Functional Materials

International Research Center for Elements Science

With the concept of “elemental science” as a base, we create ground-breaking functional materials with element-derived characteristic properties. This center has two joint laboratories in other divisions.



Graduate School of Engineering
Synthetic Organotransformation

Prof. **NAKAMURA, Masaharu** (D. Sc.)
Assoc. Prof. ISOZAKI, Katsuhiro (D.Eng.)
Senior Lect. PINCELLA, Francesca (Ph. D.)
Assist. Prof. DOBA, Takahiro (D.Sc.)
Program-Specific Assist. Prof. NAKAGAWA, Yuka (D. Sc.)
Program-Specific Assist. Prof. MINEO, Keito (D. Agr.)

Graduate School of Science
Advanced Solid State Chemistry

Prof. **SHIMAKAWA, Yuichi** (D. Sc.)
Assoc. Prof. KAN, Daisuke (D. Sc.)
Assist. Prof. GOTO, Masato (D. Sc.)
Techn. Staff ICHIKAWA, Noriya (D. Eng.)

Graduate School of Engineering
Organometallic Chemistry

Prof. **OHKI, Yasuhiro** (D. Eng.)
Assist. Prof. TANIFUJI, Kazuki (D. Sc.)
Assist. Prof. HIGAKI, Tatsuya (Ph. D.)

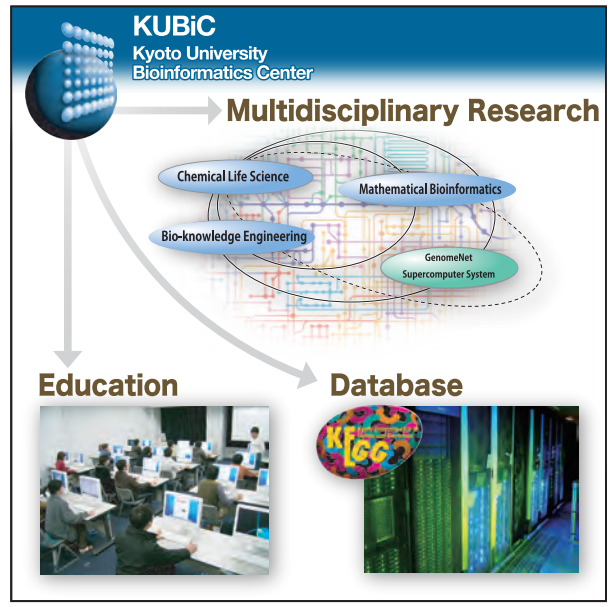
Graduate School of Science
Nanophotonics

Prof. **KANEMITSU, Yoshihiko** (D. Eng.)
Assoc. Prof. HIRORI, Hideki (D. Sc.)
Assist. Prof. YUMOTO, Go (D. Sc.)
Program-Specific Assist. Prof. SEKIGUCHI, Fumiya (D. Sc.)
Program-Specific Assist. Prof. YAMADA, Takumi (D. Sc.)

Genomics

Bioinformatics Center

We develop bioinformatics tools and resources to understand a wide variety of aspects of life sciences, from molecules to ecosystems.



Graduate School of Science/Pharmaceutical Science
Chemical Life Science

Prof. **OGATA, Hiroyuki** (D. Sc.)
Assoc. Prof. ENDO, Hisashi (D. Environmental Science)
Assist. Prof. OKAZAKI, Yusuke (D. Sc.)
Assist. Prof. HIKIDA, Hiroyuki (D. Agr.)
Program-Specific Assist. Prof. NECHES, Russell Young (Ph.D.)

Graduate School of Informatics
Mathematical Bioinformatics

Prof. **AKUTSU, Tatsuya** (D. Eng.)
Assoc. Prof. TAMURA, Takeyuki (D. Inf.)
Assist. Prof. MORI, Tomoya (D. Inf.)

Graduate School of Pharmaceutical Science
Bio-knowledge Engineering

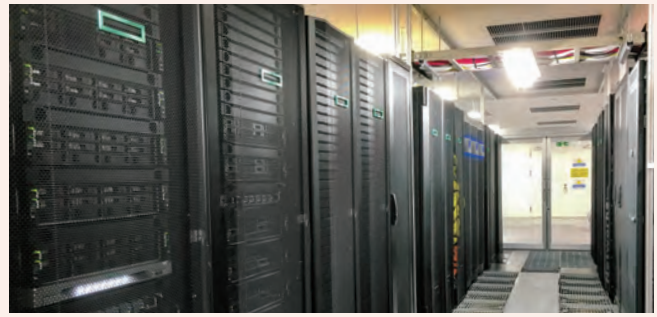
Prof. **MAMITSUKA, Hiroshi** (D. Sc.)
Senior Lect. NGUYEN, Hao Canh (D. Knowledge Science)

GenomeNet Project Management Office

Prof. **MAMITSUKA, Hiroshi** (D.Sc.)

Facilities and Equipment

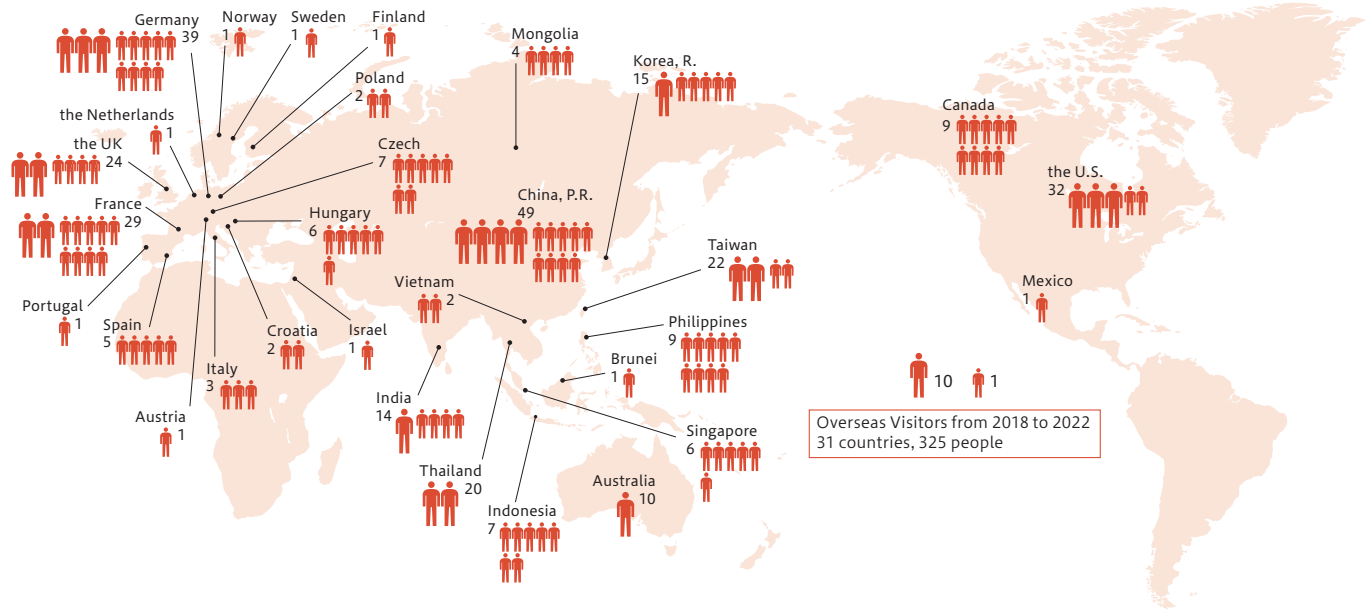
Dynamic Nuclear Polarization-enhanced NMR (DNP-NMR) System achieves great sensitivity enhancements. ICR also runs other solution/solid NMR machines including an 800 MHz one.



ICR Supercomputer System, equipped with HPE Superdome Flex (2×24 TB memory, 1,152 cores) and Apollo 2000 (5,680 cores), serves to accelerate researches in computational biology and chemistry.

A collection of state-of-the-art equipment is accessible in ICR, including mass spectrometers with a quadrupole ICP mass spectrometer, high functionality electron microscopes, a nano-scale dynamic structural analysis X-ray system, and an electron accumulation ring.

Cumulative Total of Overseas Visitors from 2018 to 2022



Human Resource in ICR

Faculty

Numbers in ( ) Represent Visiting Professors.

Professor	Associate Professor	** Senior Lecturer	** Assistant Professor	Technical Staff	PS* Associate Professor	PS* ** Assistant Professor	PS* ** Researcher	Sub-total	Researcher**	Other Staff	Sub-total	Total
27	18	4	35	7	4	10	15	120	31	39	70	190
(4)	(4)							(8)				(8)

* PS : Program Specific ** Including Researchers from Abroad As of May 1, 2023

Guest Researchers from Abroad

China, P.R.	5	India	1	Korea	1	the U.S.	3	Total	10

As of May 1, 2023

Research Students, Fellows, and Associates

Research Student	Research Fellow	Postdoctoral Fellow of JSPS	Research Associate	Total
3	0	4	27	34

As of May 1, 2023

Graduate Students

Numbers in ( ) Represent Students from Abroad.

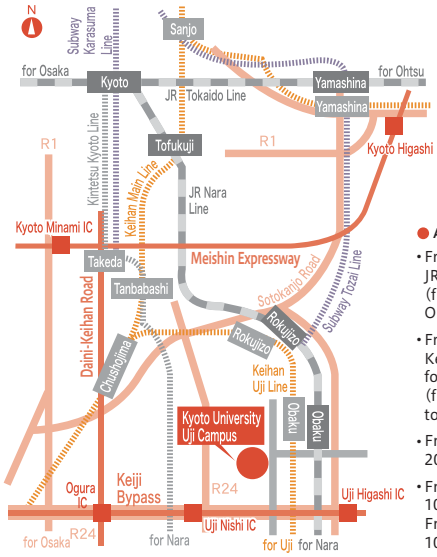
	Science	Engineering	Agriculture	Pharmaceutical Science	Medicine	Informatics	Total
Master's Course	46 (9)	42 (4)	8 (2)	10 (0)	4 (4)	2 (1)	112 (20)
Doctoral Course	43 (20)	24 (12)	3 (1)	17 (0)	4 (3)	10 (5)	101 (41)
Total	89 (29)	66 (16)	11 (3)	27 (0)	8 (7)	12 (6)	213 (61)

As of May 1, 2023

Graduate Students from Abroad

China, P.R.	46	Egypt	1	India	1	Total	61
Iran	1	Korea, R.	3	Mongolia	1		
Pakistan	2	Taiwan	3	the U.S.	1		
the UK	1	Vietnam	1				

As of May 1, 2023



Access

- From Obaku Station on the JR Nara Line: 7 min on foot (from Kyoto Station to Obaku Station: 20 min)
- From Obaku Station on the Keihan Uji Line: 10 min on foot (from Chushojima Station to Obaku Station: 10 min)
- From Kyoto-Minami IC: 20 min by car
- From Uji-Higashi IC: 10 min by car / From Uji-Nishi IC: 10 min by car

ICR Institute for Chemical Research

Institute for Chemical Research
Kyoto University

Gokasho, Uji, Kyoto 611-0011, Japan
E-mail: koho@scl.kyoto-u.ac.jp
Tel: +81-774-38-3344 Fax: +81-774-38-3014
https://www.kuicr.kyoto-u.ac.jp/sites/icr/

Web Twitter YouTube