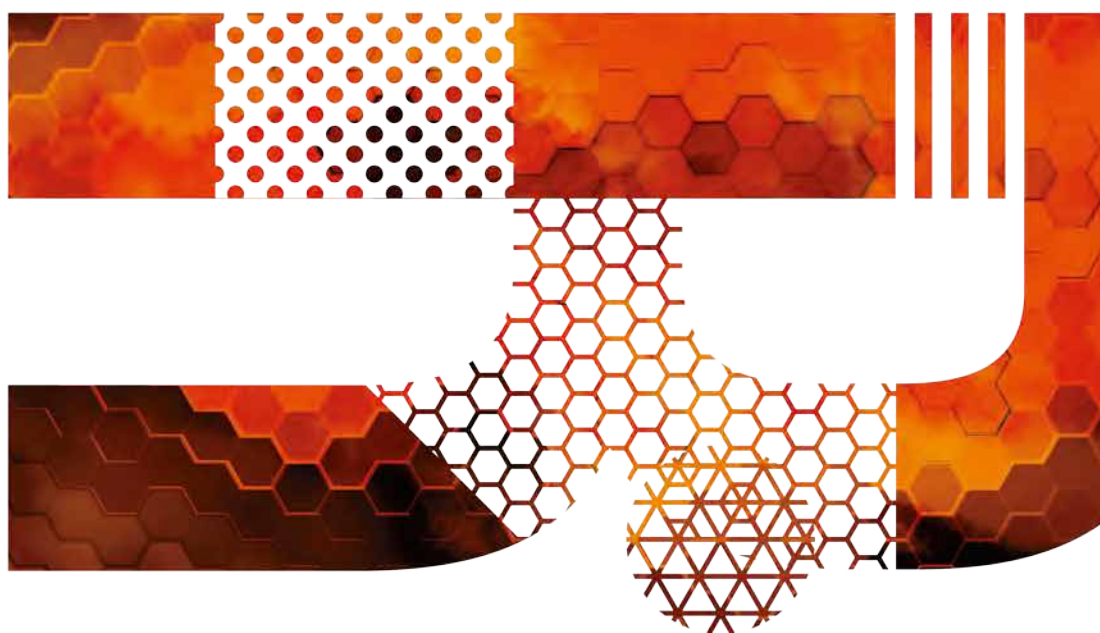




ICR2022



INSTITUTE FOR CHEMICAL RESEARCH KYOTO UNIVERSITY

2022

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”, 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.

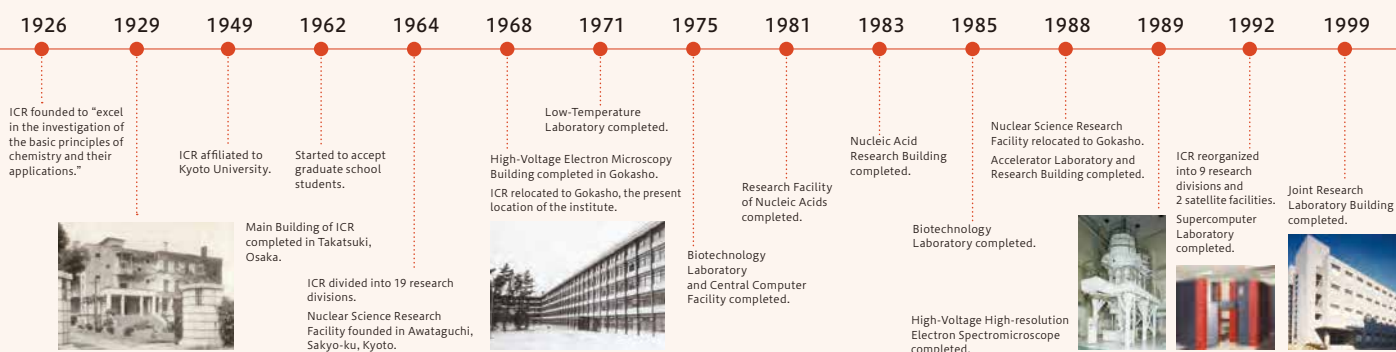
Our institute maintains a high level of social awareness. The environment surrounding us is now experiencing a wave of changes. The growing economy has exposed various worldwide problems including global warming and growing social inequity, while COVID-19 has taken millions of lives. For a sustainable 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 further science and technology at Kyoto University and around the world. We appreciate your continued encouragement and support.

April 2022

History

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

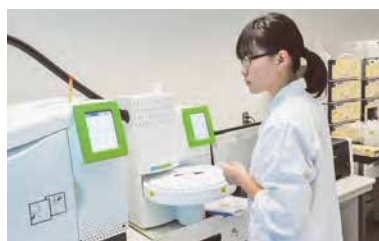


Our Mission

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.

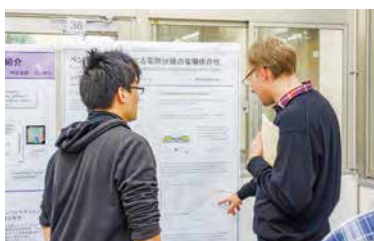
Research

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.



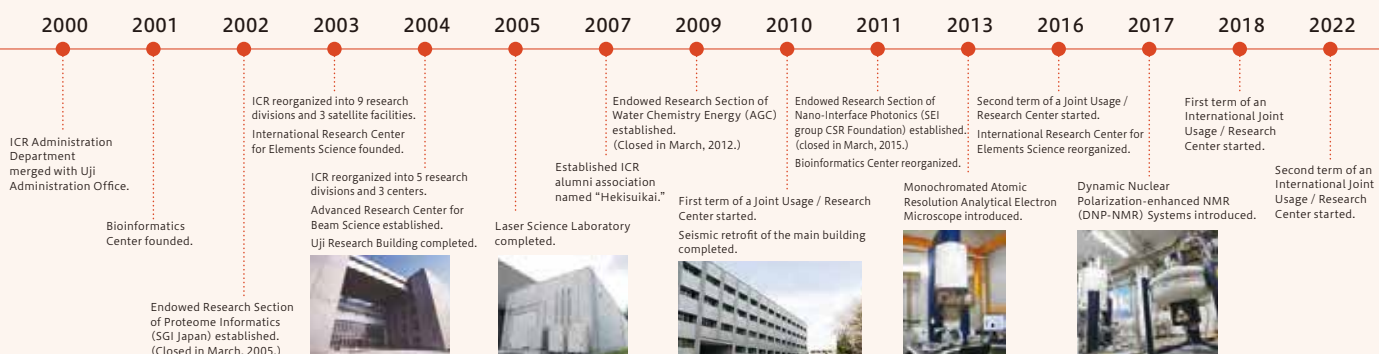
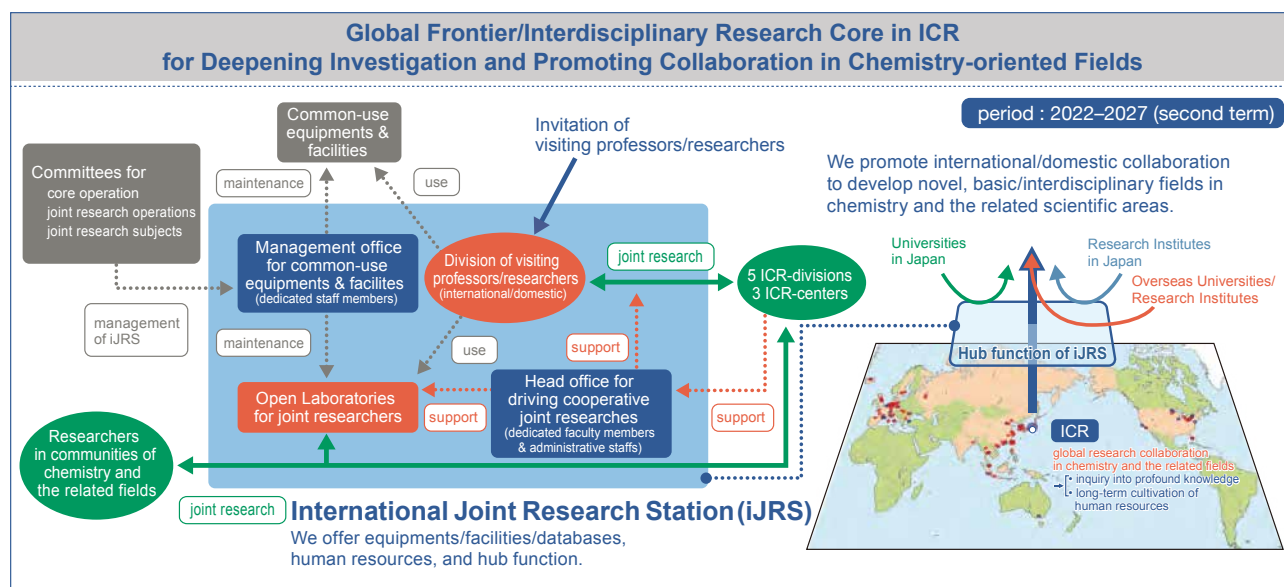
Education

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

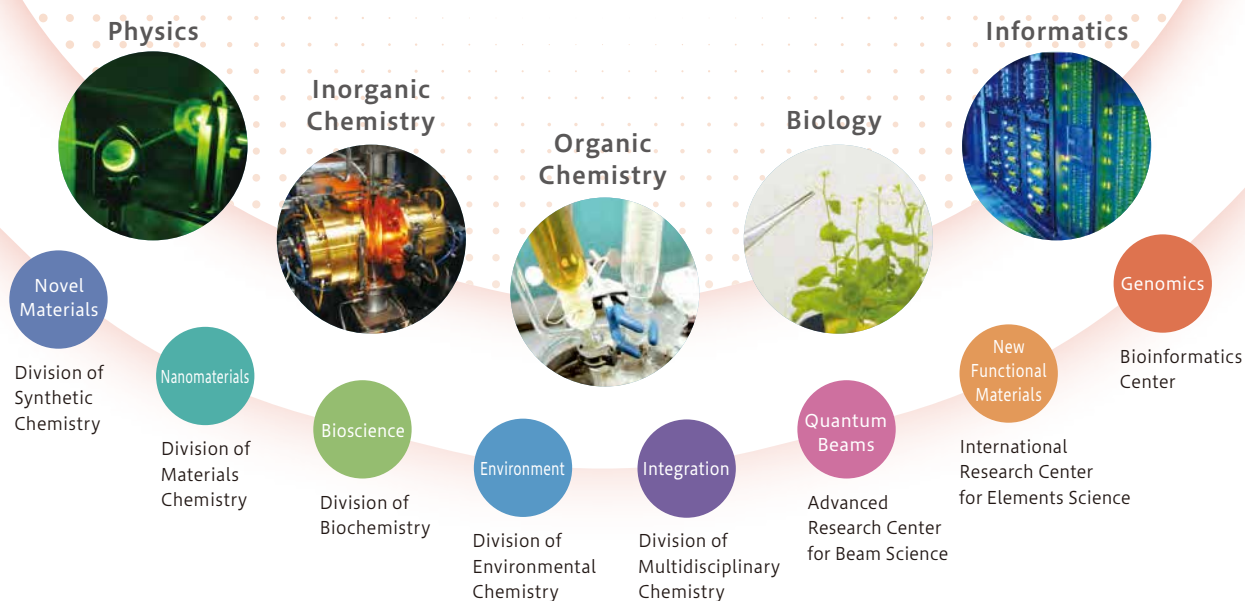
As researchers and educators of chemistry, we endeavor to deepen our exchanges with local communities and Japan as a whole. At the same time, we actively work with international researchers and institutions to solve global problems. By joining the ICR, researchers have the accountability to the public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



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.

CHALLENGE in CHEMISTRY



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

Assoc. Prof.
MIZUHATA, Yoshiyuki (D.Sc.)
Assist. Prof.
YUKIMOTO, Mariko (D.Sc.)
Techn. Staff
HIRANO, Toshiko

Graduate School of Pharmaceutical Science

Synthetic Organic Chemistry

Prof.
OHMIYA, Hirohisa (D.Eng.)
Assist. Prof.
UEDA, Yoshihiro (D. Pharm. Sc.)



Graduate School of Engineering

Structural Organic Chemistry

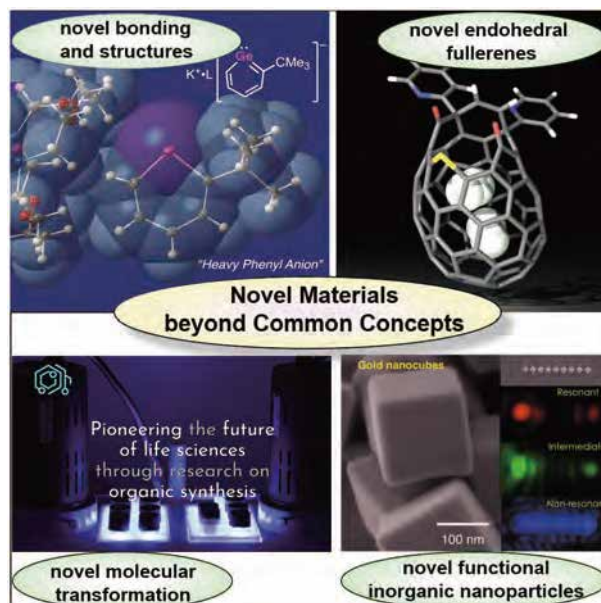
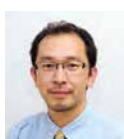
Prof.
MURATA, Yasujiro (D.Eng.)
Assoc. Prof.
HIROSE, Takashi (D.Eng.)
Assist. Prof.
HASHIKAWA, Yoshifumi (D.Eng.)



Graduate School of Science

Advanced Inorganic Synthesis

Prof.
TERANISHI, Toshiharu (D.Eng.)
Assoc. Prof.
SAKAMOTO, Masanori (D.Eng.)
Assist. Prof.
TAKAHATA, Ryo (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
FUJIIHASHI, Akiko



Graduate School of Engineering

Inorganic Photonics Materials

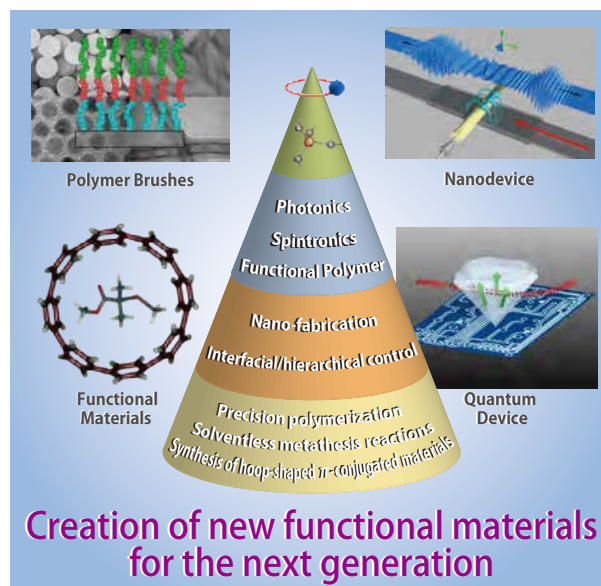
Prof.
MIZUOCHI, Norikazu (D.Sc.)
Assist. Prof.
MORISHITA, Hiroki (D.Eng.)
Assist. Prof.
MORIOKA, Naoya (Ph.D.)
Program-Specific Assist. Prof.
HERBSCHLEB, David Ernst (Ph.D.)



Graduate School of Science

Nanospintronics

Prof.
ONO, Teruo (D.Sc.)
Assoc. Prof.
MORIYAMA, Takahiro (Ph.D.)
Assist. Prof.
SHIOTA, Yoichi (D.Eng.)
Assist. Prof.
HISATOMI, Ryusuke (D.Eng.)
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.)



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

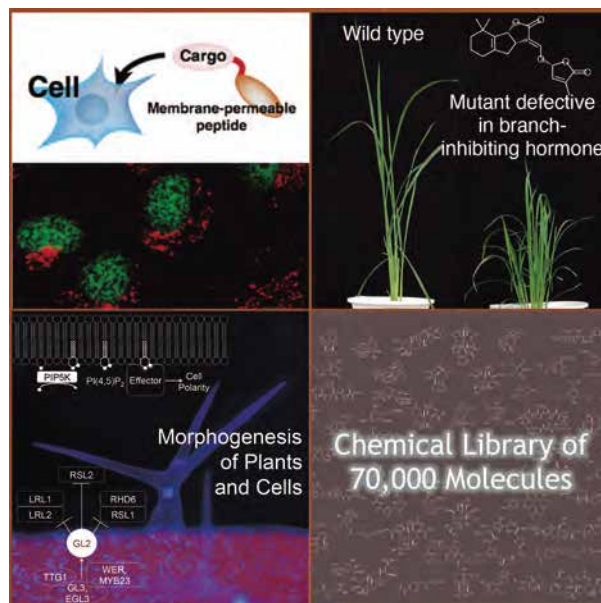
Prof.
AOYAMA, Takashi (D.Sc.)
Assoc. Prof.
TSUGE, Tomohiko (D.Sc.)
Assist. Prof.
KATO, Mariko (D. Agr.)



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.
TAKEMOTO, Yasushi (D.Eng.)
Program-Specific 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 & Environmtl. Studies)
Program-Specific Assoc. Prof.
TANAKA, Hiroyuki (D. Eng.)
Techn. Staff
OHMINE, Kyoko
Techn. Staff
MAENO, Ayaka



Graduate School of Science Chemistry for Functionalized Surfaces

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



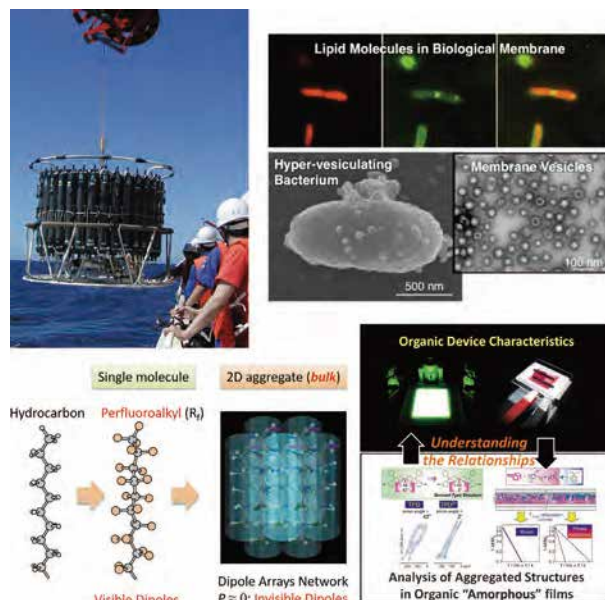
Graduate School of Science Hydrospheric Environment Analytical Chemistry

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



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



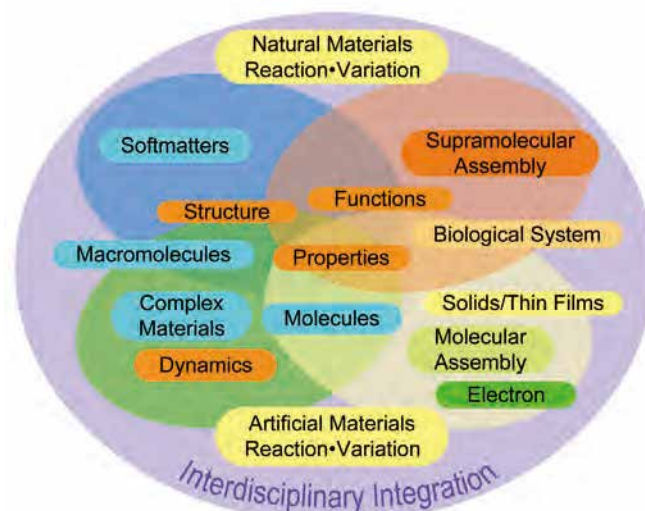
Graduate School of Science Molecular Aggregation Analysis

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



Graduate School of Engineering Molecular Rheology

Assoc. Prof.
MATSUMIYA, Yumi (D. Eng.)
Assist. Prof.
SATO, Takeshi (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 Electron Microscopy and Crystal Chemistry

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



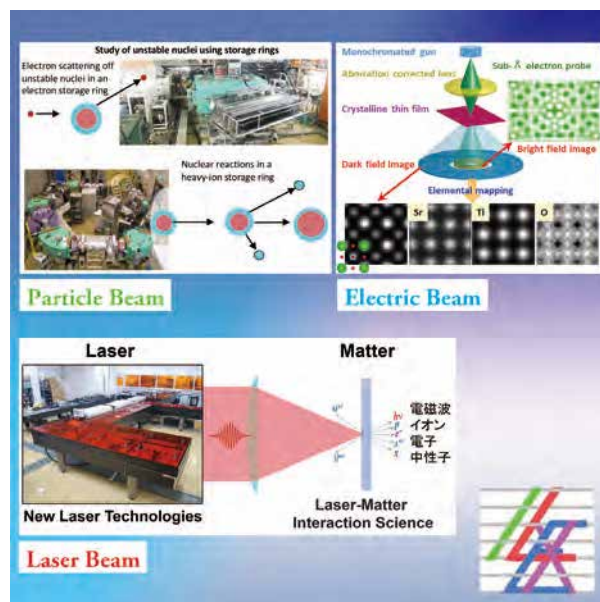
Graduate School of Science Laser Matter Interaction Science

Prof.
TOKITA, Shigeki (D. Eng.)



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.)
Senior Lect.
PINCELLA, Francesca (Ph.D.)
Assist. Prof.
ISOZAKI, Katsuhiro (D.Eng.)
Program-Specific Assist. Prof.
NAKAGAWA, Yuka (D.Sc.)



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, Noriyo (D.Eng.)



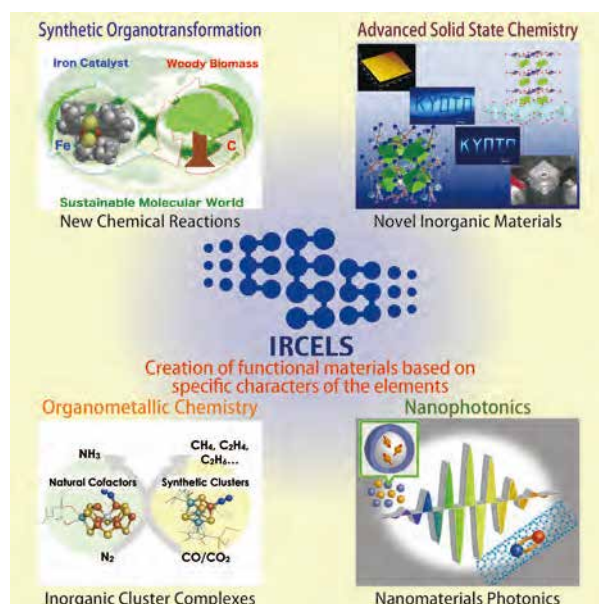
Graduate School of Engineering Organometallic Chemistry

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.)
Program-Specific Assist. Prof.
HAYASHI, Kan (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.)
Assist. Prof.
ENDO, Hisashi (D. Environmental Science)
Assist. Prof.
OKAZAKI, Yusuke (D.Sc.)
Assist. Prof.
HIKIDA, Hiroyuki (D. Agr.)



Graduate School of Informatics Mathematical Bioinformatics

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



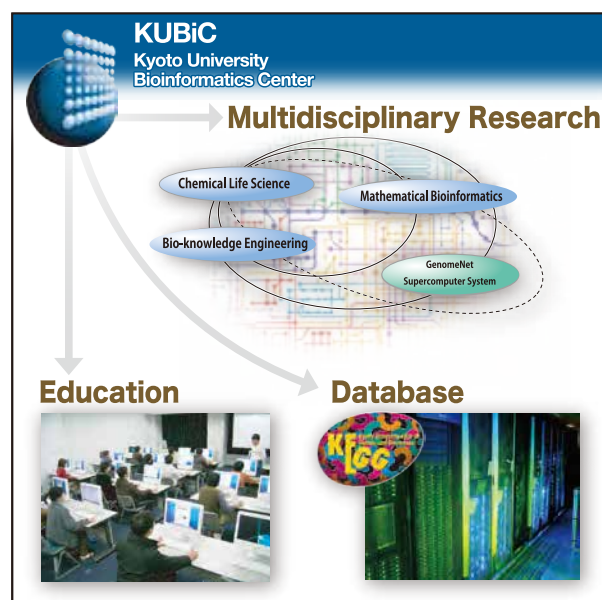
Graduate School of Pharmaceutical Science Bio-knowledge Engineering

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



GenomeNet Project Management Office

Prof.
OGATA, Hiroyuki (D.Sc.)



Facilities and Equipment



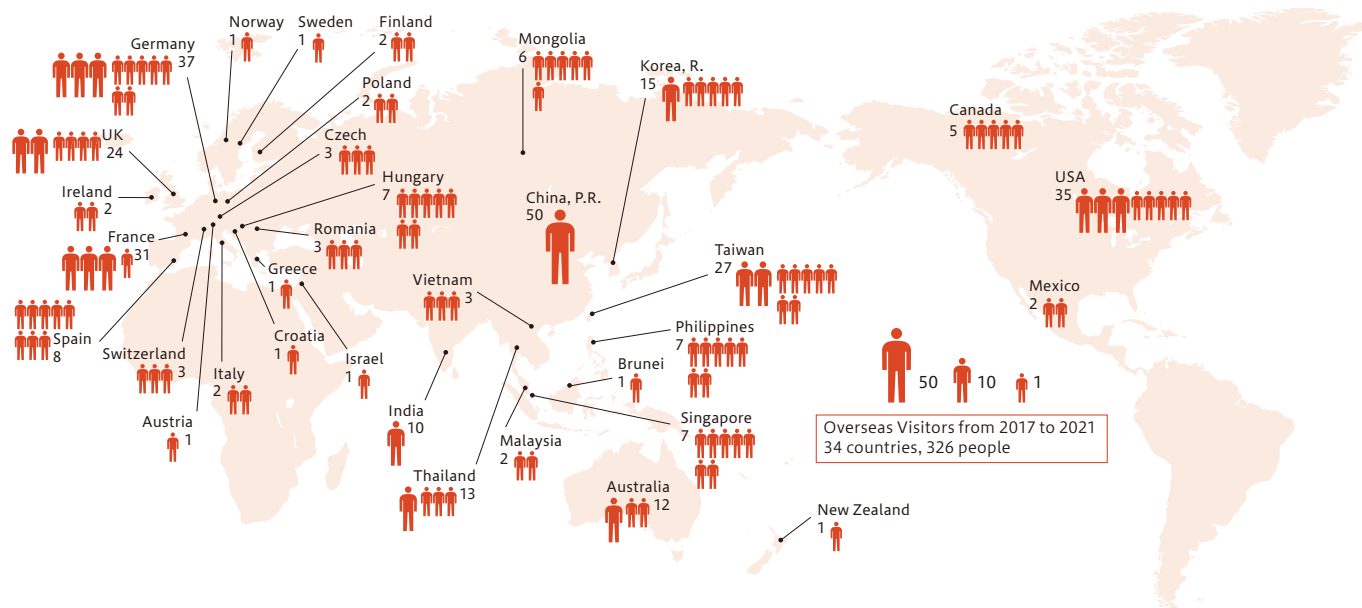
Dynamic Nuclear Polarization-enhanced NMR (DNP-NMR) System achieves great sensitivity enhancements. ICR also runs other solution/solid NMR machines including an 800 MHz one.



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 2017 to 2021



Human Resource in ICR

Faculty

Numbers in () Represent Visiting Professors.

Professor	Associate Professor	Senior Lecturer	Assistant Professor	Technical Staff	P5* Associate Professor	P5** Assistant Professor	P5*** Researcher	Sub-total	Researcher	Other Staff	Sub-total	Total
27	16	4	37	7	3	10	12	116	26	44	70	186
(4)	(4)							(8)				(8)

* P5 : Program Specific ** Including Researchers from Abroad As of May 1, 2022

Guest Researchers from Abroad

Country	1	Germany	4	Hungary	1	Taiwan	1	Total	7
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As of May 1, 2022

Research Students, Fellows, and Associates

Research Student	Research Fellow	Postdoctoral Fellow of JSPS	Research Associate	Total
7	0	1	18	26

As of May 1, 2022

Graduate Students

Numbers in () Represent Students from Abroad.

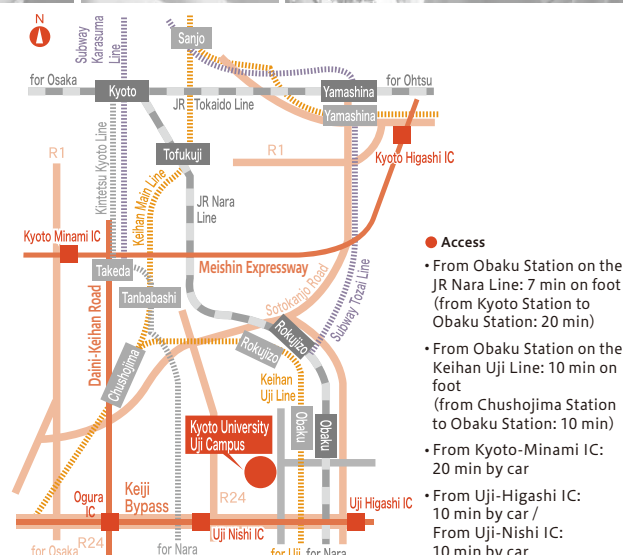
	Science	Engineering	Agriculture	Pharmaceutical Science	Medicine	Informatics	Total
Master's Course	45 (8)	49 (9)	7 (1)	8	5 (4)	0	114 (22)
Doctoral Course	36 (16)	18 (9)	4 (3)	9 (1)	5 (3)	9 (5)	81 (37)
Total	81 (24)	67 (18)	11 (4)	17 (1)	10 (7)	9 (5)	195 (59)

As of May 1, 2022

Graduate Students from Abroad

China, P.R.	46	Egypt	1	India	1	Total	59
Iran	1	Korea, R.	2	Mongolia	1		
Philippines	1	Taiwan	2	Thailand	1		
UK	1	Vietnam	2				

As of May 1, 2022



ICR Institute for Chemical Research
Kyoto University

Gokasho, Uji, Kyoto 611-0011, Japan
E-mail: koho@sci.kyoto-u.ac.jp

Tel: +81-774-38-3344 Fax: +81-774-38-3014
https://www.kuicr.kyoto-u.ac.jp/sites/icr/

