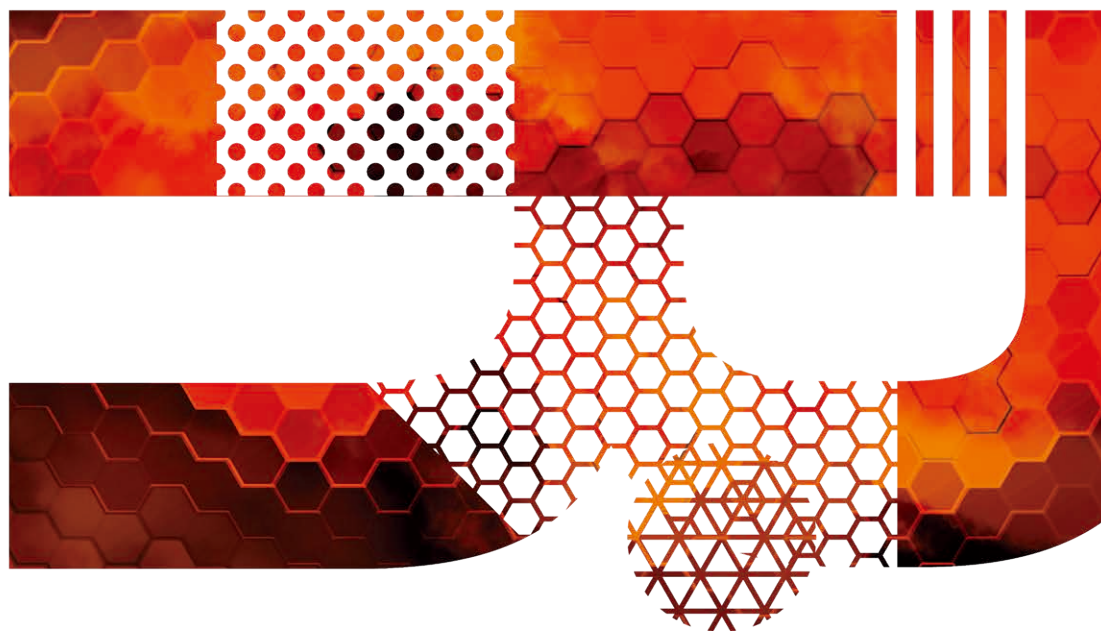




ICR2021



INSTITUTE FOR CHEMICAL RESEARCH KYOTO UNIVERSITY

2021

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

TSUJII, Yoshinobu



The Institute for Chemical Research (ICR) was founded in 1926 as the first research institute of Kyoto University. Its founding vision was to “excel in the investigation of the basic principles of chemistry and their applications.” Based on this vision, our institute has encompassed a wide range of scientific disciplines, including physics, biology, and informatics, as well as chemistry, and flourished as a large-scale organization. We have 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). Currently, almost 120 faculty members, 210 graduate students, and 60 researchers are engaged in 30 laboratories directed by fulltime professors and 5 laboratories supervised by visiting professors. These laboratories are affiliated with graduate schools covering a broad range of fields such as science, engineering, agriculture, pharmaceutical sciences, medicine, and informatics. ICR members are spearheading cutting-edge research in their special fields and are actively involved in interdisciplinary research projects, creating new knowledge and contributing to the future of materials-related fields. One of our major new challenges is the design of ecologically sustainable smart materials.

Our institute is collaborating with other research institutions inside and outside Kyoto University as a key member of the following projects/organizations: *MEXT Inter-University Collaborative Project “Integrated Consortium on Chemical Synthesis”* including four core research institutions, *Kyoto University Research Coordination Alliance* including 19 research institutes/centers of Kyoto

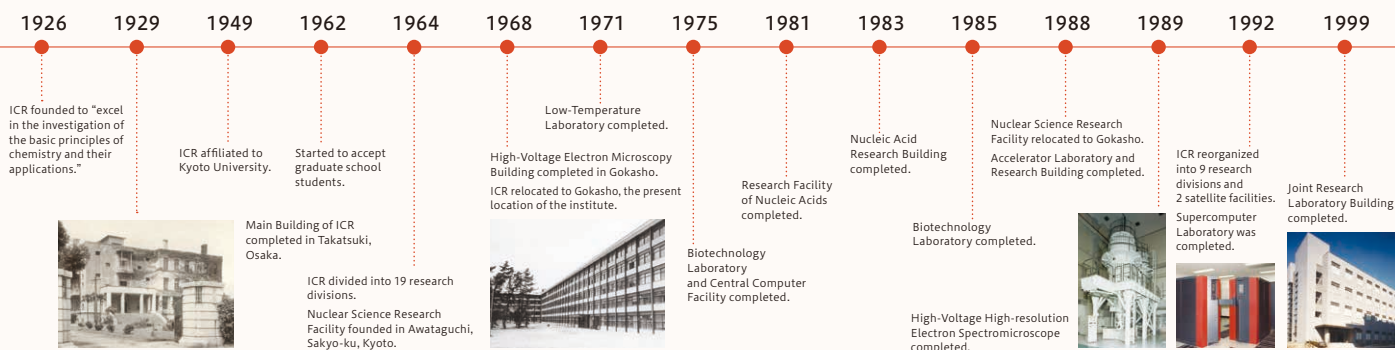
University, and *Uji-Campus Base of Equipment Support* for reinforcing research infrastructure. We also promote international collaboration with overseas universities/institutions (with 68 official international collaboration agreements). On the basis of our strong global activity in chemistry-oriented fields, ICR was newly certified as an *International Joint Usage/Research Center* by MEXT in 2018 and approved by Kyoto University in 2019 to establish an *On-site Laboratory*, the “*Kyoto University Shanghai Lab*” in Shanghai, China under the Designated National University program (MEXT). To foster and secure young researchers through these activities, we have initiated diverse research and graduate education programs, including an in-house annual grant system, “*ICR Grant for Promoting Integrated Research*.” These collaborative achievements ensure that our institute serves as a global research core in chemistry-oriented fields.

In recent years, many global-scale problems have become apparent. Science and technology must play a large role to help society mitigate and overcome disasters such as the new coronavirus as well as longer term issues such as climate change and environmental pollution. With keywords of “Diversity” and “One Team” together with the founding vision, the Institute for Chemical Research continues to strive to answer those challenges, promoting a multidisciplinary, chemistry-related community, and deepening science and technology for a sustainable society. We appreciate your continued encouragement and support.

Y. Tsujii

History

For over 90 years, ICR has been striving to uncover the truth of chemistry and answer frontier quests.



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.

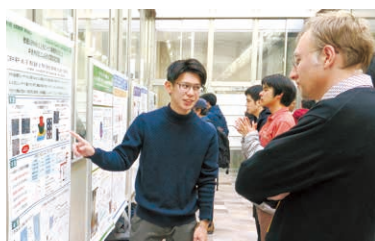
Research

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.



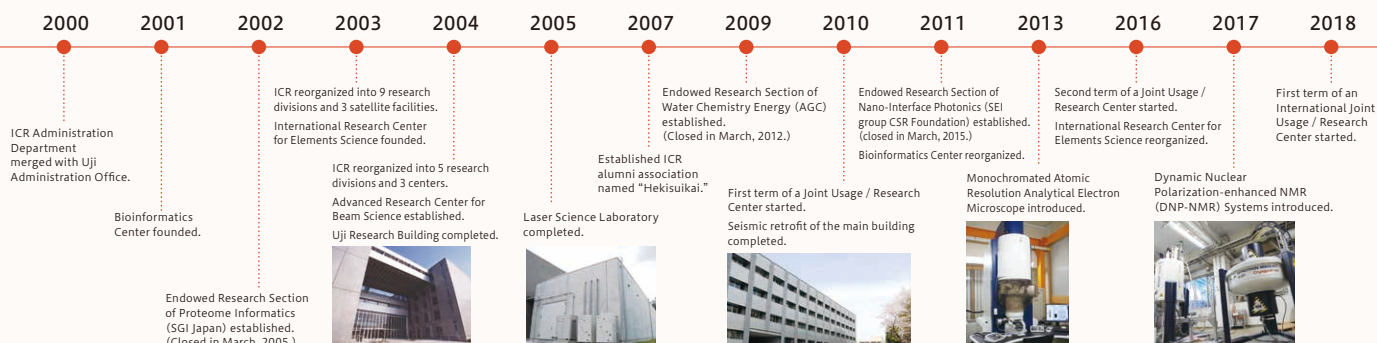
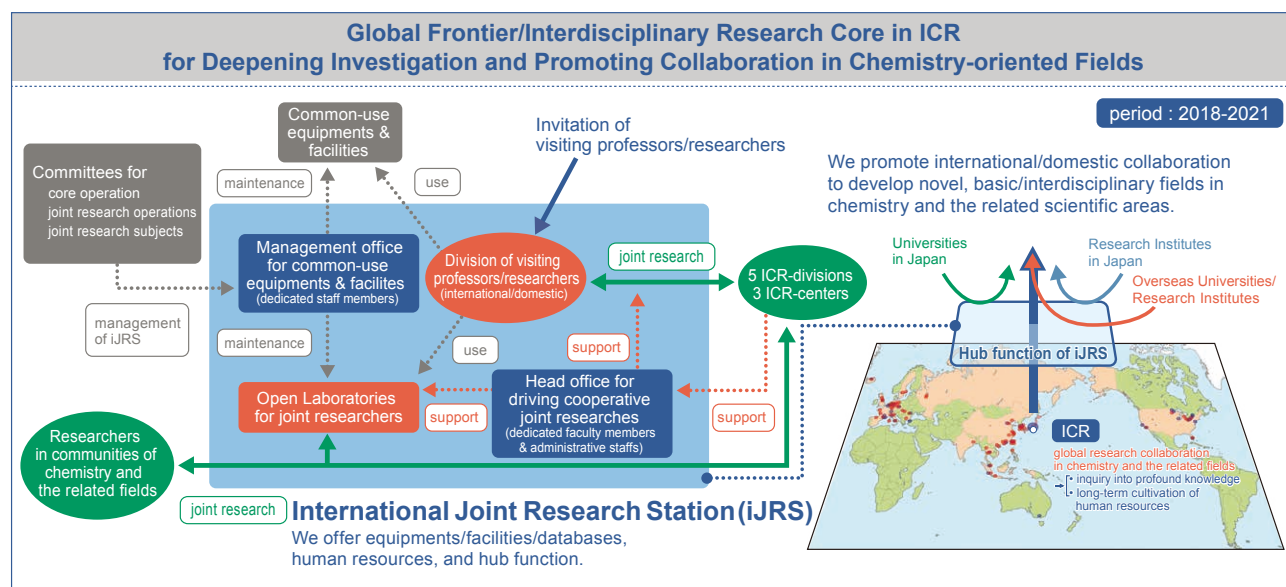
Education

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

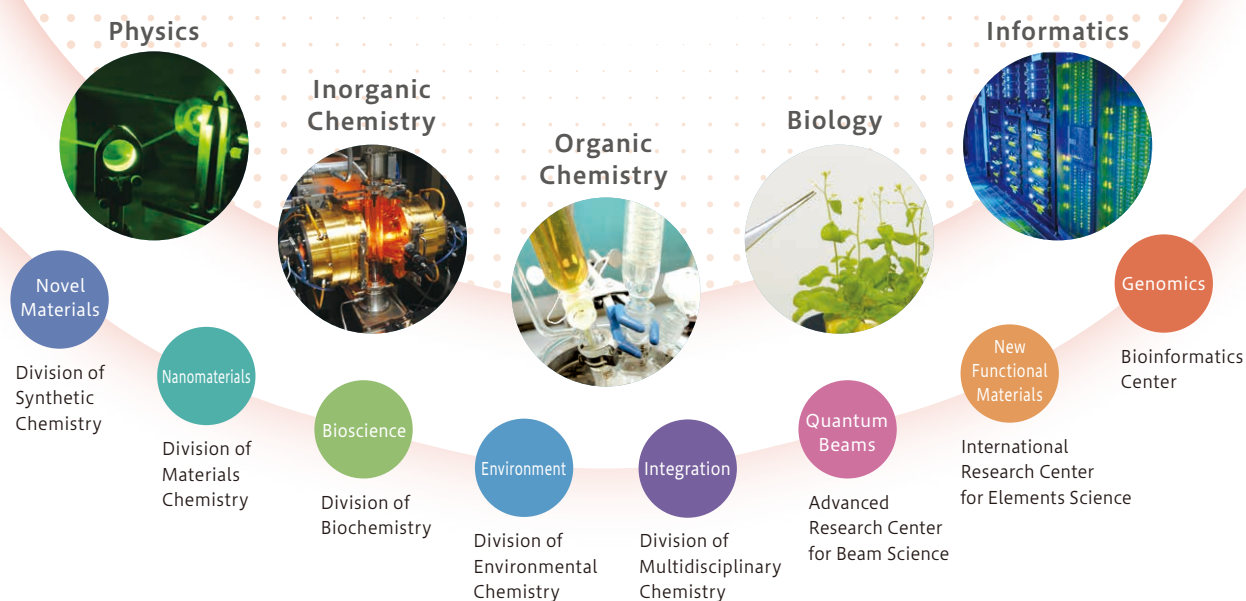
As researchers and educators of chemistry, we endeavor to deepen our exchanges with local communities and Japan as a whole. At the same time, we actively work with international researchers and institutions to solve global problems. By joining the ICR, researchers have the accountability to the public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

Prof.
TOKITOH, Norihiro (D. Sc.)
Assoc. Prof.
MIZUHATA, Yoshiyuki (D. Sc.)
Assist. Prof.
YUKIMOTO, Mariko (D. Sc.)
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.)

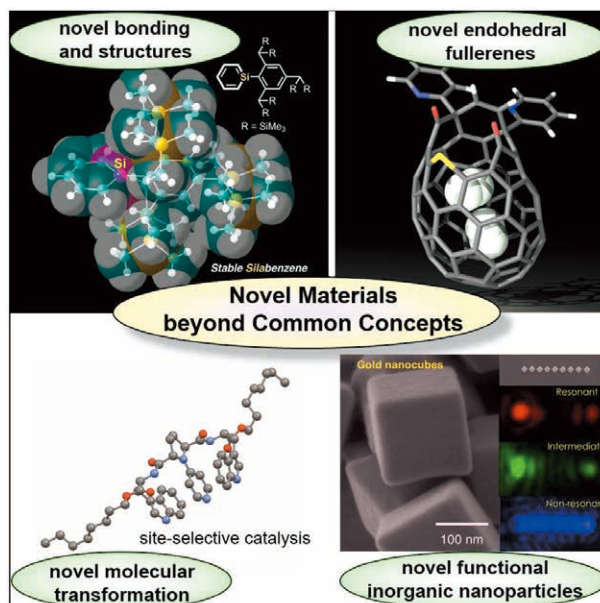


Graduate School of Pharmaceutical Science Synthetic Organic Chemistry

Assist. Prof.
UEDA, Yoshihiro (D. Pharm. Sc.)

Graduate School of Science Advanced Inorganic Synthesis

Prof.
TERANISHI, Toshiharu (D. Eng.)
Assoc. Prof.
SAKAMOTO, Masanori (D. Eng.)
Assist. Prof.
SATO, Ryota (D. Sc.)
Assist. Prof.
TAKAHATA, Ryo (D. Sc.)
Program-Specific Assist. Prof.
SARUYAMA, Masaki (D. Sc.)
Program-Specific Assist. Prof.
TRINH, Thang Thuy (D. Materials Science)
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.)
Assoc. Prof.
OHNO, Kohji (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.)
Assist. Prof.
LU, Yangtian (D. Eng.)
Techn. Staff
FUJIIHASHI, Akiko



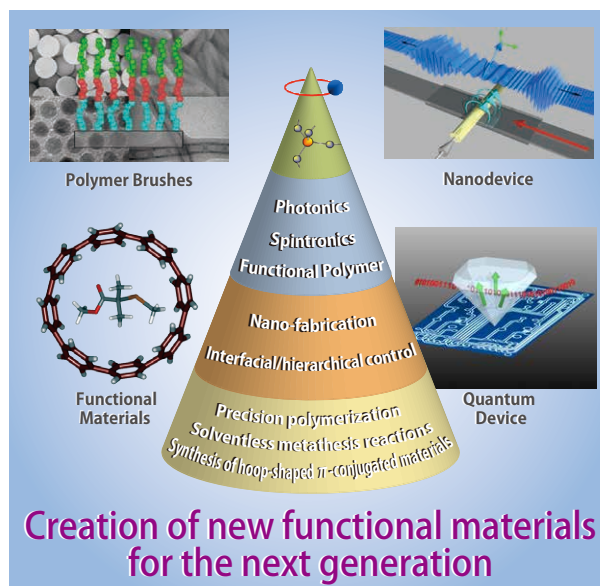
Graduate School of Engineering Inorganic Photonics Materials

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.)
Program-Specific Assoc. Prof.
HIROSE, Hisaaki (D. Pharm. Sc.)



Graduate School of Agriculture Chemistry of Molecular Biocatalysts

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



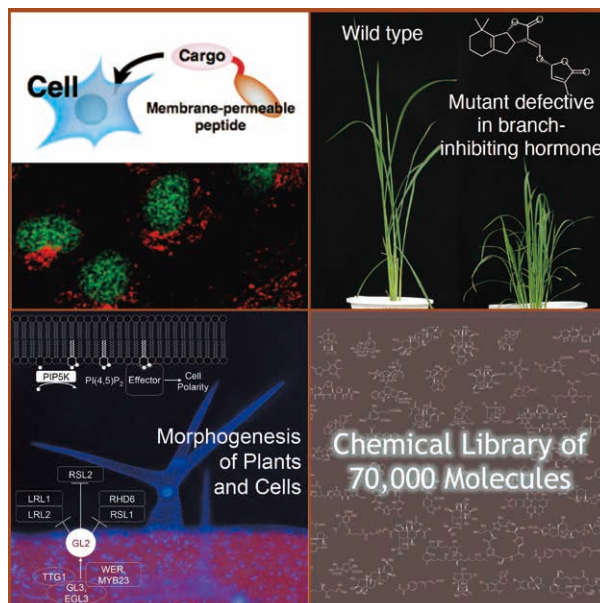
Graduate School of Science Molecular Biology

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



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)
Techn. Staff
OHMINE, Kyoko
Techn. Staff
MAENO, Ayaka



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



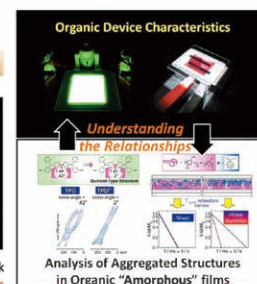
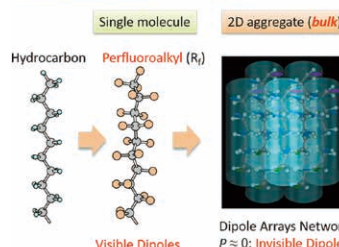
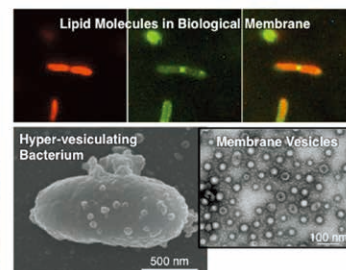
Graduate School of Science Chemistry for Functionalized Surfaces

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



Graduate School of 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.)



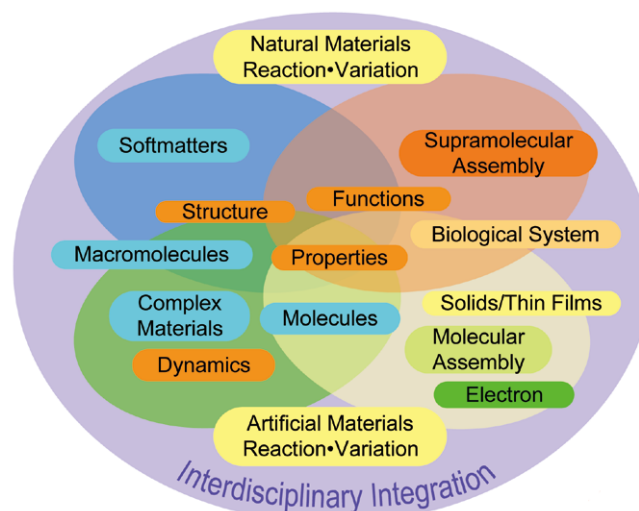
Graduate School of Engineering Molecular Rheology

Prof.
WATANABE, Hiroshi (D. Sc.)
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.)
Program-Specific Assist. Prof.
KANEKO, Ryuji (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

Assist. Prof.
INOUE, Shunsuke (D. Sc.)
Program-Specific Assoc. Prof.
HASHIDA, Masaki (D. Eng.) (Incubation Support Laboratory)

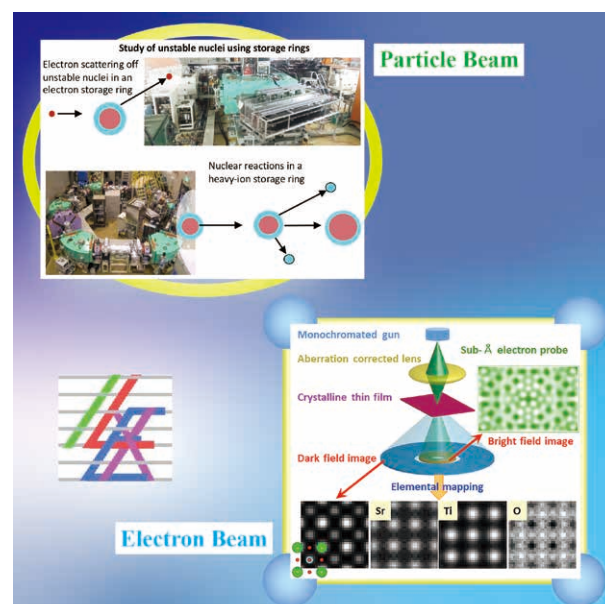
Graduate School of Science Electron Microscopy and Crystal Chemistry

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



Graduate School of Science 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.
TAKAYA, Hikaru (D. Eng.)
Senior Lect.
PINCELLA, Francesca (Ph.D.)
Assist. Prof.
ISOZAKI, Katsuhiro (D. Eng.)



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.)
Program-Specific Assist. Prof.
AMANO PATINO, Midori Estefani (Ph.D.)



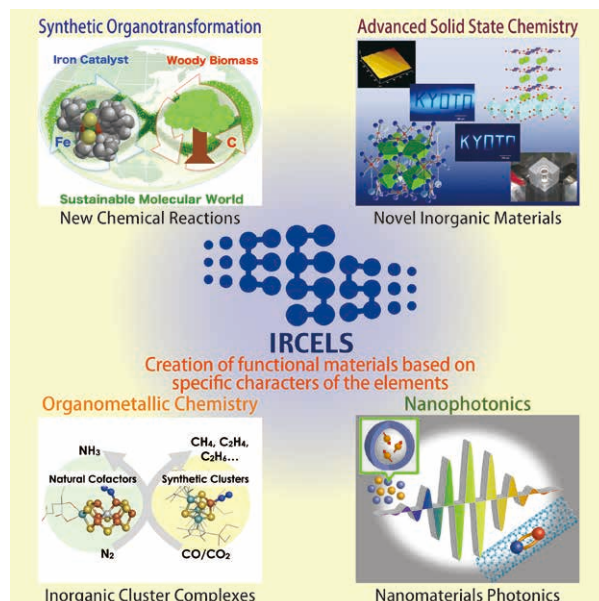
Graduate School of Engineering Organometallic Chemistry

Prof.
OHKI, Yasuhiro (D. Eng.)
Assist. Prof.
WAKIOKA, Masayuki (D. Eng.)
Assist. Prof.
TANIFUJI, Kazuki (D. Sc.)



Graduate School of Science Nanophotonics

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



Graduate School of Informatics Mathematical Bioinformatics

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



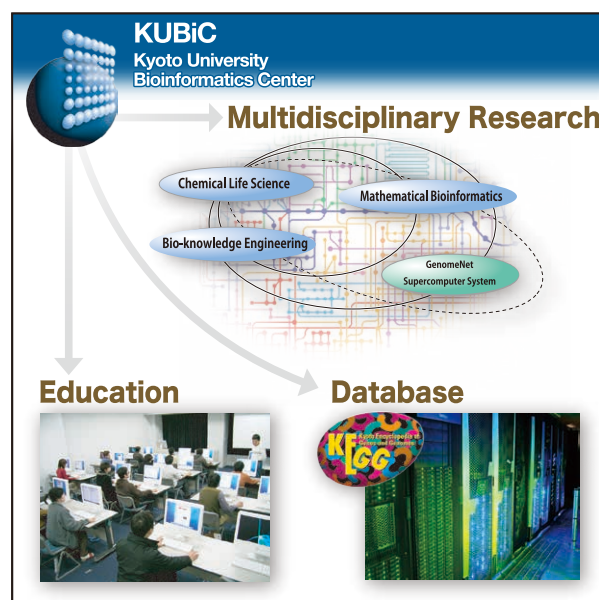
Graduate School of Pharmaceutical Science Bio-knowledge Engineering

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



GenomeNet Project Management Office

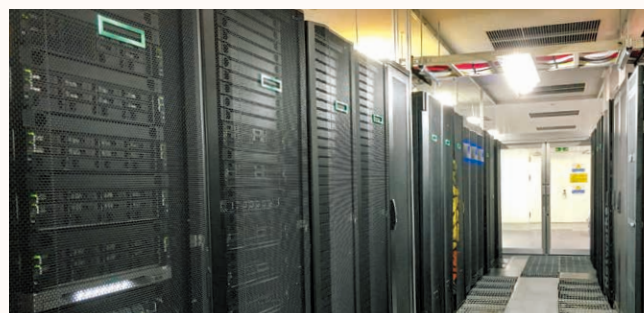
Prof.
OGATA, Hiroyuki (D. Sc.)



Facilities and Equipment



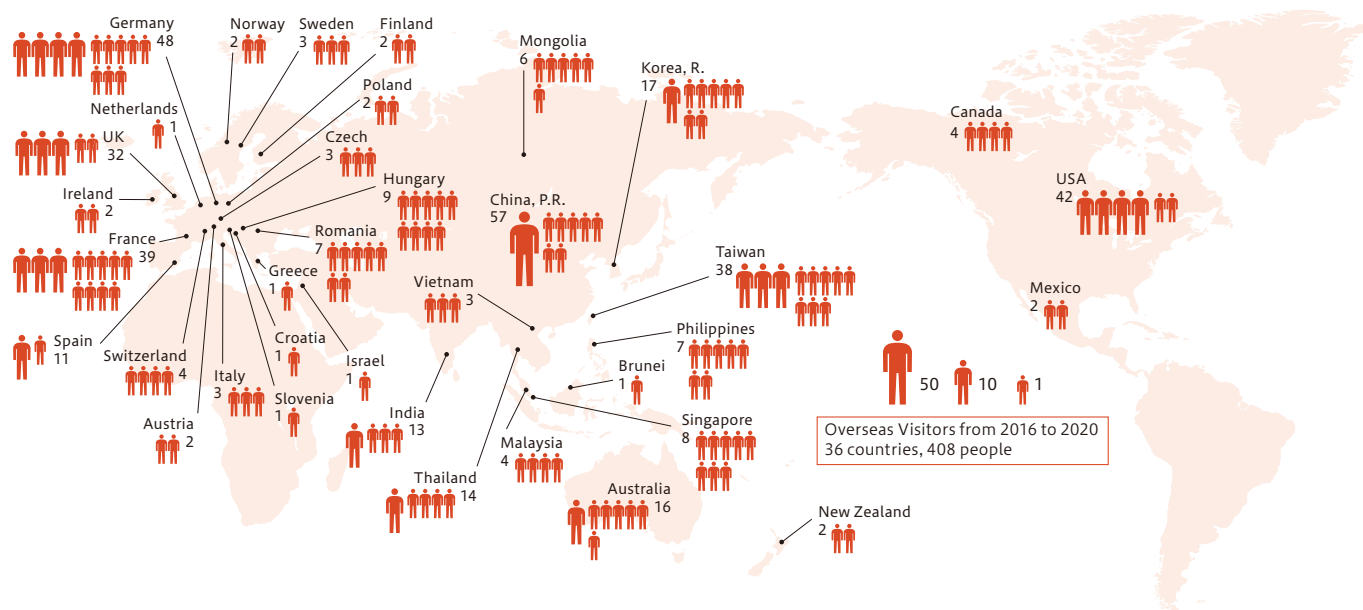
Dynamic Nuclear Polarization-enhanced NMR (DNP-NMR) System achieves great sensitivity enhancements. ICR also runs other solution/solid NMR machines including an 800 MHz one.



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.

State-of-the-art equipment is accessible in ICR including a group of 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 2016 to 2020



CHALLENGE in CHEMISTRY

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	38	8	2	12	13	122	22	52	74	196
(4)	(4)							(8)				(8)

* PS : Program Specific ** Including Researchers from Abroad As of May 1, 2021

Researchers (PD) from Abroad

China, P.R.	2	Hungary	1	Korea, R.	1	Philippines	1	Total	8
Taiwan	1	UK		Vietnam	1				

As of May 1, 2021

Research Students, Fellows, and Associates

Research Student	Research Fellow	Postdoctoral Fellow of JSPS	Research Associate	Total
9	0	2	15	26

As of May 1, 2021

Graduate Students

Numbers in () Represent Students from Abroad.

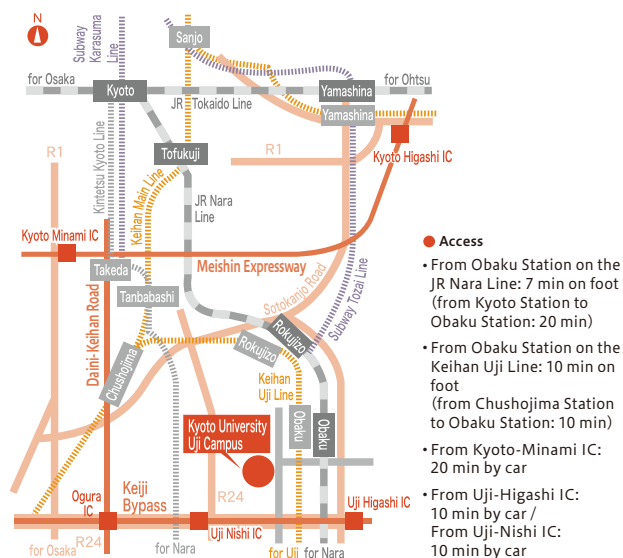
	Science	Engineering	Agriculture	Pharmaceutical Science	Medicine	Informatics	Total
Master's Course	49 (9)	40 (10)	10 (1)	11	3 (2)	1 (1)	114 (23)
Doctoral Course	31 (12)	16 (9)	3 (1)	5 (1)	6 (3)	8 (5)	69 (31)
Total	80 (21)	56 (19)	13 (2)	16 (2)	9 (5)	9 (6)	183 (54)

As of May 1, 2021

Graduate Students from Abroad

Austria	1	China, P.R.	39	India	2	Total	54
Korea, R.	1	Mongolia	1	Philippines	3		
Taiwan	4	Thailand	1	UK	1		
Vietnam	1						

As of May 1, 2021



Institute for Chemical Research Kyoto University

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Tel: +81-774-38-3344 Fax: +81-774-38-3014
E-mail: koho@scl.kyoto-u.ac.jp

The latest information of ICR is on the web
<https://www.kuicr.kyoto-u.ac.jp/sites/icr/>

