Kyoto University Research Center San Diego

General Information

- Approved in FY 2018
- Established in September 2019
- Established by the Graduate School of Medicine
- Partner institution: The University of California San Diego (UCSD), USA
- Location: The University of California San Diego (UCSD), San Diego, USA (outbound)
- Purposes: Acceleration of research collaboration, industry-academia collaboration, education collaboration, and global human resource development through sharing space in the Center for Novel Therapeutics with UCSD's top researchers.
- Functions: Joint research in the field of medicine, recruitment of international students, and expansion of collaboration with industrial partners.

Ripple effect on the university's activities

- Development of human resources through overseas training of early-career doctors and others
- Support for study abroad and global exchange by students and faculty and staff members
- Promotion of international joint research
- Development of laboratory for cross-bound exchange
- Recruitment of international talented students
- Support for KU ventures

【FY 2022】

- Many internationally renowned researchers in the field of cancer immunology are affiliated with UCSD/MCC, where KURC-SD is located. The implementation of a joint research program in cancer immunology with MCC as a counterpart, taking advantage of each other's strengths, will become an important factor in the development and sustainability of KURC-SD. Furthermore, research collaboration in cancer immunology with UCSD, which has been highly evaluated internationally, is anticipated to lead to cutting-edge research, contribute to society through medical treatment, and raise Kyoto University's international profile.
- The facility will function as an "open-space" research environment that provides KU researchers with a convenient environment in which to launch projects with lower costs.

Activity Overview

京都大学 KYOTO UNIVERSITY

INNOVATION HUB KYOTO

- **Promotion of advanced joint research with researchers from UCSD and other institutions**
- **Provide early-career PIs with management experience opportunities at an overseas laboratory**
- **Orientation for study abroad at KU**
- **Promotion of relationships among researchers, undergraduate, and graduate students**
- **Development of human resources through special programs for graduate students, credit exchange, etc.**
- **Development of human resources through overseas training of early-career doctors, researchers, and administrative staff**
- **Support for KU Ventures**

UC San Diego HEALTH SYSTEM

Center for Novel Therapeutics

Graduate School of Medicine, etc. ⟷ School of Medicine, etc.

On-site Laboratory

Joint Research Program

Entrepreneurship

Application

Visiting Class

Orientation for Entrance Examination

Inquiry about examination

Local Companies in San Diego

Sustainability
Ripple effect on the university activities

KU Ventures

Ripple effect on the university activities

International Grants in USA

Sustainability

Local High Schools Japanese Supplementary Schools

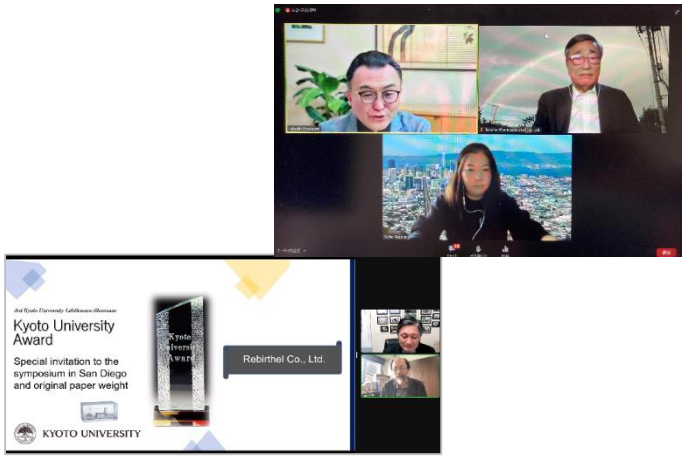
Ripple effect on the university's activities

Kyoto University Research Center San Diego

Main Activities in FY 2021

❶ 3rd Kyoto University LifeScience Showcase @ San Diego 2022

- KULS2022 was held online with the aim of promoting the international dissemination of innovations in medical fields by Kyoto University and other Japanese universities.
- Enthusiastic presentations were delivered by sixteen venture companies from Japan and abroad, which were divided into four sessions, Approximately 300 participants from around the world viewed the presentations.
- The presentations were followed by feedback from commentators familiar with US venture companies and discussions with the participating companies.
- Awards were given to five venture companies, which were selected by the commentators and audience.



❷ KU-UCSD/CNT Seminar Series

- With the aim of encouraging research collaboration between Kyoto University and UCSD, regular online seminars were held with one guest speaker invited alternately from the two universities.
- The first seminar was delivered by Prof. Tasuku Honjo of Kyoto University in 2020. Since then, six distinguished professors from Japan and abroad have been invited as guest speakers.
- The seminar series has been a success, with over 100 participants attending each seminar and a total of 1,644 attendees for all twelve seminars.

Opening Ceremony

The 1st Seminar

The 7th to 12th Seminars

IFOM-KU Joint Research Laboratory

General Information

- Approved in FY 2018
- Established in April 2020
- Established by the Graduate school of Medicine
- Partner institution: The AIRC Institute of Molecular Oncology (IFOM ETS), Italy
- Location: Kyoto University, Kyoto, Japan (inbound)
- Purposes: Promotion of international research collaboration through the establishment of an international joint laboratory on the campus of the KU Graduate School of Medicine, co-funded by IFOM ETS and Kyoto University.
- Functions: Advanced cancer biology research and training of graduate students and early-career researchers.

Ripple effect on the university's activities

- Boost research activity by bringing together the knowledge and expertise of both institutions.
- Foster global human resources by internationalizing the research environment
- Create innovation through interdisciplinary academic collaboration

【FY 2022】

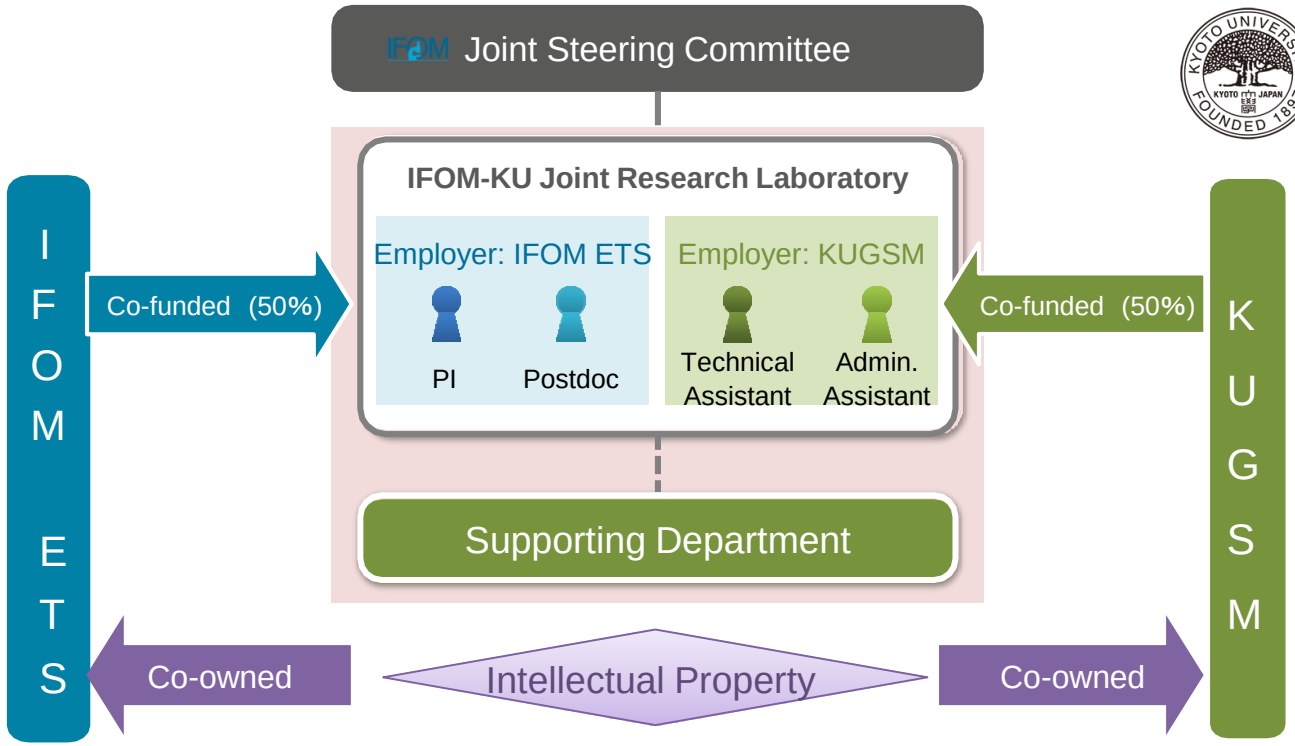
- Promotion of research collaboration in Japan and overseas (Dr. Anthony Cesare [co-authored paper in 2019], Dr. Katsushi Kagaya [Grants-in-Aid for Scientific Research (B)]), and submission of internationally co-authored academic papers.
- Hosting a short-term international student through the AMGEN Scholar Program to contribute to the university's internationalization efforts.
- Inviting the director and a member of the Joint Steering Committee from IFOM ETS to Kyoto University in November to foster our international relationship.

Activity Overview

About IFOM

IFOM ETS is an institution dedicated to the study of the molecular processes of cancer. It was established by the Italian Foundation for Cancer Research (FIRC) and boasts the largest-scale and best facilities in Europe. Numerous high-quality research projects are being conducted there.

KU's Graduate School of Medicine has an ongoing relationship with IFOM ETS. Since the conclusion of departmental academic and student exchange agreements in 2010, the two institutions have been implementing research and student exchange actively through holding joint symposiums, etc.

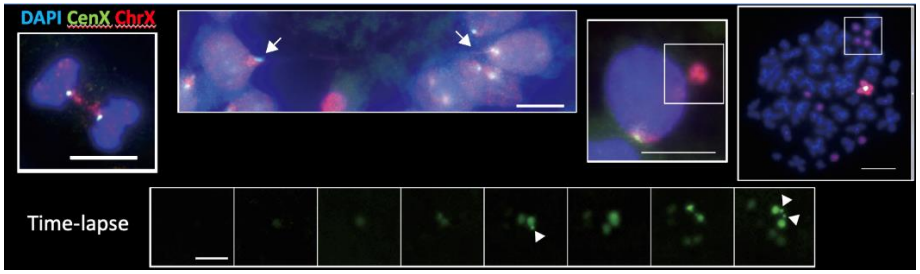


IFOM-KU Joint Research Laboratory

Main Activities in FY 2021

❶ Research outcomes

- Review article
  Makoto Hayashi, "RECQ family helicases and telomere regulation," Journal of the Japan Foundation for Applied Enzymology (56: 11-19, 2021)
- Conference presentations
  - **Makoto Hayashi**, Katsushi Kagaya, "Analysis of the fate of single defined sister chromatid fusion by the chromatid fusion visualization system," at the 93rd Annual Meeting of the Genetics Society of Japan (held online on September 8–10, 2021)
  - Diana Romero, Sam Rogers, Fuyuki Ishikawa, Anthony J. Cesare, **Makoto Hayashi**, "Analysis of molecular mechanisms of mitotic telomere deprotection," the 9th Chromosome Workshop and the 20th Nuclear Dynamics Meeting (held online on December 21–22, 2021.)
- Acquisition of external funding
  Grants-in-Aid for Scientific Research (B)



Analysis of the fate of X chromosome fusion by the chromatid fusion visualization system (FuVis)

❷ Education, internationalization, and outreach

- The laboratory hosted:
  IFOM ETS post-doc: 1 (Nigerian)
  Research assistants: 4 (1 Mexican, 1 Chinese, 2 Japanese)
  Researcher/doctoral students: 2 (1 Mexican, 1 Japanese)
- Online meeting with IFOM ETS
  Brainstorming meeting (PI meeting) (once per month)
  Scientific Advisory Board review (once per five years)
- Education and outreach
  Short-term lecture: Integrative Biology I, Kyushu University, June 2021
  Bilingual News Podcast: Episode 455, April 2021
  Sahlgrenska Academy Science Seminar, April 2021

The IFOM-KU Joint Research Laboratory

Kyoto University-Tsinghua University Cooperative Research and Education Center for Environmental Technology

on-SITE Laboratory

General Information

- Approved in FY 2018
- Established in December 2018
- Established by the Graduate School of Engineering and Graduate School of Global Environmental Studies (GSGES)
- Partner institution: Tsinghua Shenzhen International Graduate School, Tsinghua University, Shenzhen, China
- Location: Tsinghua Shenzhen International Graduate School, Tsinghua University, Shenzhen, China (outbound)
- Functions: Research and education in environmental engineering fields, and international double degree program

Ripple effect on the university's activities

- Recruitment of talented international students in environment-related fields.
- Expansion of internship education to fields other than environmental engineering.
- Expansion of international double degree programs to other fields, and implementation of diverse degree programs.
- Development of international industry-government-academia collaboration in other fields and in collaboration with other universities, local governments, and companies in Japan and China, building on the research collaboration in environmental engineering between Kyoto University and Tsinghua University.

【FY 2022】

➢ Launched a double master's degree program at the Graduate School of Engineering in 2022. Conducting an online training program to attract talented students from Tsinghua University and Kyoto University to the program. Further advancement of ongoing international research collaboration.

Activity Overview

Kyoto University

Graduate School of Engineering

Graduate School of Global Environmental Studies

CRECET

Cooperative Research and Education Center for Environmental Technology

Foundation: October 2005

Tsinghua Shenzhen International Graduate School

Founded in 1911, one of the top universities in China
Established the Shenzhen Campus in 2001
QS World Univ. Ranking: 14th@2022

Tsinghua University

University Town of Shenzhen in Guangdong Province, China

Companies & Government Bodies in Japan

- Study and experiments by Kyoto University faculty members and students
- Joint research with Tsinghua University and Chinese research institutes
- Joint Research with Japanese companies and Chinese research institutes
- Student internship program
- Double degree program

Joint Laboratory

Liaison Office

Collaborative Education

Companies & Government Bodies in China

- Facilities for Tsinghua University faculty members and students
- Joint research with Kyoto University and related companies
- Cooperation with Japanese and Chinese companies, and Chinese research institutes
- Student internship program
- Double degree program

The on-site laboratory will facilitate interaction with various fields other than environmental engineering.

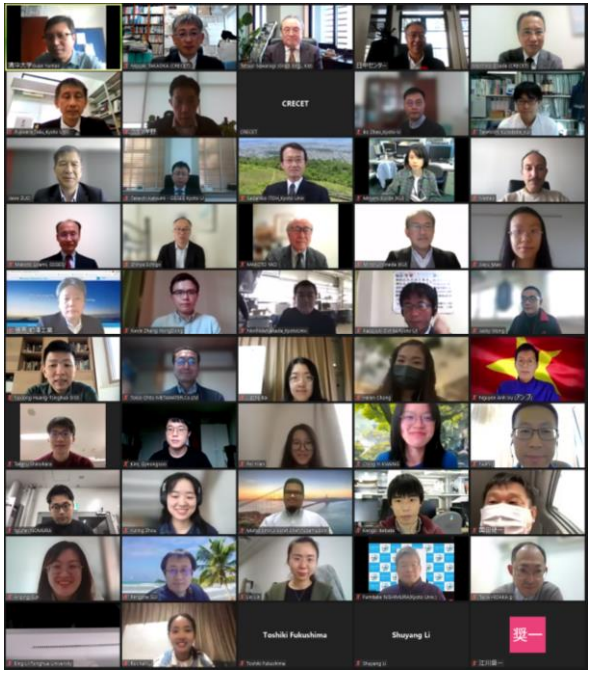
Kyoto University-Tsinghua University Cooperative Research and Education Center for Environmental Technology

an-SITE Laboratory

Main Activities in FY 2021

❶ Kyoto University-Tsinghua University Symposium 2021 on Research and Education of Environmental Engineering

- The Kyoto University-Tsinghua University Symposium 2021 on Research and Education of Environmental Engineering (hereinafter “the symposium”) was held online.
- The symposium featured lively discussions among its 86 participants, which included students, faculty, and staff members of the two universities, and delegates from environment-related companies in Japan and China.
- A signing ceremony for the agreement on the establishment of the center was held concurrently, and the two universities agreed to continue operating the center for the next three years.
- The symposium included a report on the situation regarding education and international exchange during the COVID-19 pandemic, research presentations by researchers from the two universities, overviews of the latest technologies by environment-related companies in Japan and China, and reports by students from the two universities about their experience on the Wild & Wise Collaborative Learning Programs.
- One new collaborative research project has commenced, and researchers from Tsinghua University have been invited to Kyoto University.



Online symposium participants

❷ Education Program for Human Resources with Global Views in Environmental Science and Technology

- The Education Program for Human Resources with Global Views in Environmental Science and Technology was provided online from Oct. 1–Dec. 18, 2021, as part of the Wild & Wise Collaborative Learning Programs.
- 6 students from Tsinghua University (China), 4 students from the University of Malaya (Malaysia), and 13 students from Kyoto University participated in the program.
- Program contents: opening ceremony, group work (6 sessions), lectures (3 sessions), cultural exchange event (tea ceremony), virtual facility tour, workshop, and symposium participation and presentation.
- Online seminars for supporting companies were held in October 2021 and March 2022.


Cultural exchange event (tea ceremony)

Kyoto University On-site Laboratory at Mahidol University for Educational and Research Collaboration in Environmental Studies

General Information

- **Approval Year**: FY 2018
- **Establishment**: March, 2019 (upgraded from the Mahidol University base established in January 2016); Opening ceremony was held.
- **Implementing School**: the Graduate School (GS) of Global Environmental Studies (GSGES); jointly implemented by GS of Engineering, GS of Agriculture, and GS of Medicine after FY 2020.
- **Partner institution**: Mahidol University, Thailand
- **Location**: Mahidol University, Bangkok, Thailand (outbound)
- **Activities**: Joint education and research activities on environmental studies, recruitment of talented international students, and development of international joint programs

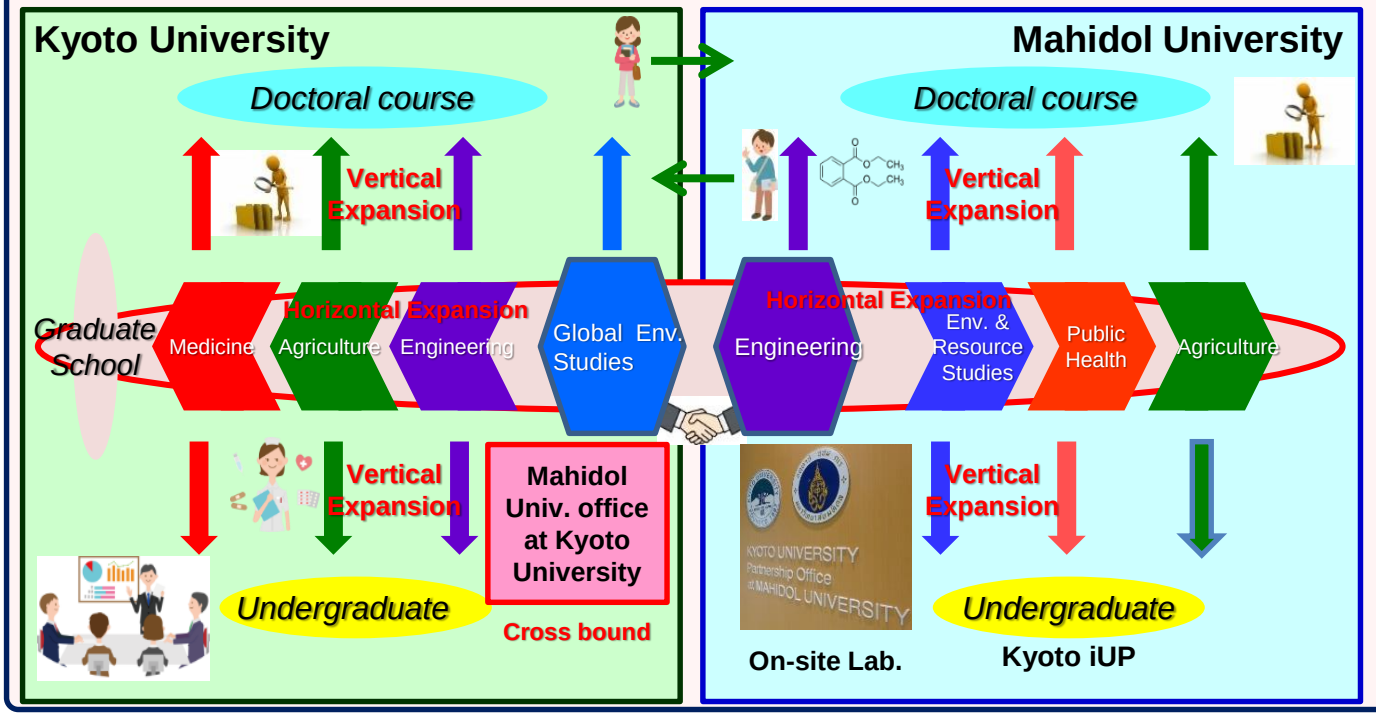
Ripple effect on the university's activities

- Research collaboration with local companies
- Recruitment of talented international students
- Education and training for local students
- Extension of joint/double degree programs
- Fusion of the humanities and sciences
- Expansion to cross-bound type

【FY 2018–2021】

- **On-site Laboratory Workshops**: 1st Workshop (Mahidol University, March 8, 2019, 155 participants), 2nd Workshop (Kyoto University, November 25, 2019, 44 participants), 3rd Workshop (On-line, March 11, 2020, 51 participants), 4th Workshop (On-line, November 27, 2020, 88 participants), 5th Workshop (On-line, March 11, 2022, 118 participants). In addition, the International Symposium was co-hosted (on-lines, November 30–December 1, 2020, 279 participants).
- **Double master's degree programs**: the Graduate School (GS) of Global Environmental Studies (GSGES), the School of Public Health, GS of Medicine, and GS of Agriculture were concluded in 2016, 2019, and 2021, respectively. As of the end of March 2022, 1 KU student and 9 Mahidol students have enrolled/will enroll in the GSGES program, and 1 Mahidol student in the Public Health program.
- **Exchange of students & faculty members**: In 2018–2019, 52 of 17 groups from Mahidol and 57 of 15 groups from KU visited each. In 2020–2021, only 5 students of 4 groups visited KU due to the COVID-19 pandemic.
- **Others**: Joint lectures, joint research, co-authored research presentations, internships, etc., were conducted.

Activity Overview



Expansion in Thailand

- Khon Kaen Univ.
- AIT
- Kasetsart Univ.
- Thammasat Univ.
- Chulalongkorn Univ.

- Collaborative Research and Innovation
- Faculty and Student Mobility
- Joint Distance Lectures
- Double/Joint Degrees
- Symposium & Study Fair
- Collaborative Projects

Kyoto University On-site Laboratory at Mahidol University for Educational and Research Collaboration in Environmental Studies

Main Activities in FY 2021

❶ Symposium/workshops (held online)

- International Workshop on Chemical Engineering, November 12, 2021: Prof. Noriaki Sano of Kyoto University, Asst. Prof. Sakhon Ratchahat and Assoc. Prof. Chularat Sakdoronnarong of Mahidol University were invited as speakers.
- Kyoto University Symposium, November 29–30, 2021: Held by the Graduate School of Global Environmental Studies, with 338 participants from 61 institutions (52 universities and 9 organizations) in 21 countries. Six faculty members/researchers and 34 students from Mahidol University actively participated. Symposium contents: special lecture (by Assoc. Prof. Yodchanan Wongsawat, vice dean of the Faculty of Engineering), research presentations (1 oral presentation and 6 poster presentations, two of which are joint research projects between the two universities).
- 5th Kyoto University-Mahidol University On-Site Laboratory Workshop, March 11, 2022: 118 participants (57 from Kyoto University, 54 from Mahidol University, and 5 from other institutions). The workshop began with opening remarks by Vice President Kono and Mahaisavariya, President of Mahidol University, followed by a plenary session, four subcommittees on "Environmental Science and Engineering," "Chemical Engineering," "Agricultural Science and Ecosystems," and "Public Health," and plenary wrap-up session, etc.
- JASTIP-WP2 Annual Workshop on March 25, 2022: Twenty eight participants from four organizations (Kyoto University, Mahidol University, Chulalongkorn University, and NSTDA), and six research presentations were made by Mahidol University.

❷ Student exchange/degree programs

- In addition to the Graduate School of Global Environmental Studies (2016) and the School of Public Health (2019), the Graduate School of Agriculture signed an agreement for the establishment of a master's double degree program with Mahidol University Kanchanaburi Campus in 2021. The program will commence from 2022.
- One student on the double degree program (who entered Mahidol University in 2017, came to Japan in 2018, and received a master's degree from Kyoto University in March 2020 and from Mahidol University in May 2020) was selected as a recipient of the MEXT Scholarship for International Priority Graduate Programs and enrolled in a doctoral program in environmental engineering at the Graduate School of Engineering in April 2021 (postponed for six months due to the COVID-19 pandemic).
- One of the two students on the double degree program (who entered Mahidol University in 2018, came to Japan in 2019, and received a master's degree from Kyoto University in March 2021 and from Mahidol University in May/June) was selected as a recipient of the MEXT Scholarship for International Priority Graduate Programs, and enrolled in a doctoral program in environmental engineering at the Graduate School of Engineering in October 2021.
- One student on the double degree program (who entered Mahidol University in 2019, came to Japan in November [postponed for seven months], and received a master's degree from Kyoto University in March 2022) is continuing to study on the program at Mahidol University.
- Two students who entered Mahidol University in 2020 have been enrolled at Kyoto University as double degree students since April 2021. They came to Japan in March 2022 (postponed for 11 months) and will stay until September 2022.
- Three students who entered Mahidol University in 2021 (two enrolled in the Graduate School of Engineering and one in the School of Public Health, the Graduate School of Medicine) have been selected as double degree students, and will be enrolled in the program in April 2022.
- One student, who was scheduled to be invited from Mahidol University as a special audit student in 2021, but was unable to come to Japan due to the COVID-19 pandemic, completed the program online in March 2022.
- Three undergraduate and two graduate students of Mahidol University will participate in an online international exchange program planned by the Graduate School of Agriculture (9-days on weekends between December 18, 2021 and February 6, 2022).

❸ Publication of collaborative research results in internationally co-authored academic papers

- Research results produced through collaboration between the two universities have been presented at 11 international conferences, and published in 10 peer-reviewed co-authored papers.

Smart Materials Research Center

General Information

- Approved in FY 2018
- Established in August 2018
- Established by the Institute for Integrated Cell-Material Sciences (iCeMS) and Kyoto University Institute for Advanced Study (KUIAS)
- Partner institution: Vidyasirimedhi Institute of Science and Technology (VISTEC), Thailand
- Location: Vidyasirimedhi Institute of Science and Technology (VISTEC), Rayong, Thailand (outbound)
- Functions: Research in materials science fields, and training of graduate students and early-career researchers for active roles in international academia

Ripple effect on the university's activity

- Development of international joint research including research with local companies
- Student recruitment
- Provision of education for local students and summer schools
- Development into international joint program (JD/DD）
- Establishment of venture companies

- Recruitment of talented undergraduate students from top universities throughout Thailand through in-person visits or online recruitment activities.
- Utilize VISTEC's one- and two-year study abroad programs for PhD students, and strengthen collaboration and develop joint research with relevant top laboratories around the world through using VISTEC as a hub.
- Continue to develop the research using the Thai research grants, and establish a new research consortium consisting of multiple research organizations.

Activity Overview

- **Instructing PhD students and cultivating human resources for industry, government, and academia**
- **Establishment and management of a sustainable laboratory**
- **Launching projects and obtaining external funding**

Smart Materials Research Center

on-SITE Laboratory

Main Activities in FY 2021

❶ Promoting materials science and chemistry research through collaboration between local lab members and others

- Presenting the results of collaborative research with VISTEC research groups. Focusing on publishing papers with a high Impact Factor (IF) and/or Nature Index, and contributing to the establishment of a top school in Thailand.
- A paper reported by the on-site laboratory's first PhD student was selected for the cover of the RSC Chemical Communications. The student is expected to become the on-site laboratory's first graduate.
- Utilizing VISTEC's study abroad programs to have opportunities for students to join research groups in Europe and the US and enhance collaborative research capability.

Cover of the ChemComm journal

❷ Efforts to establish sustainable laboratory/launching new projects and acquiring external funding

- The researcher stationed in the laboratory is affiliated with the School of Molecular Science & Engineering, VISTEC, provide lectures to students, and participates in the admission process at VISTEC. Those efforts contribute to the recruitment of talented students to the lab every year.
- Application for a supercomputer project (Fugaku General Access Projects) submitted and accepted. "Reversible phase transition in coordination polymers and metal-organic frameworks."
- Application for Thai Program Management Unit (PMU-B) grant submitted. "Frontier technology for direct conversion of CO_2 from industry to metal-organic framework" in 1 year (total 5M THB)

VISTEC
VIDYASIRIMEDHI INSTITUTE OF SCIENCE AND TECHNOLOGY
NANOTEC a member of NSTDA
SYNCHROTRON THAILAND CENTRAL LAB

Participating institutions for the PMU-B project.

Kyoto University Shanghai Lab

General Information

- Approved in FY 2019
- Established in September 2019
- Established by the Institute for Chemical Research
- Partner institution: Fudan University, China
- Purposes: Cutting-edge collaborative research and promotion of personnel exchange in the field of chemistry
- Location: Fudan University, Shanghai, China (outbound)
- Functions: Promotion of cutting-edge chemical research, expansion of international collaboration and equipment sharing, and exchange of human resources with partner institutions

Ripple effect on the university's activities

- Promotion of activities as an international joint-usage/research center.
- Efficient research through sharing research resources and equipment.
- Recruitment of talented students through using the lab as a contact point.

【During FY 2022】

- Successfully matched talented Chinese students with faculty members through holding online and face-to-face lectures and interview sessions. Face-to-face interview sessions were scheduled to be held in Shanghai and Beijing during FY 2022. However, due to travel restrictions in China, the sessions were postponed for one year.
- Negotiations have begun to conduct graduate school admissions in Shanghai as a future strategy.

Activity Overview

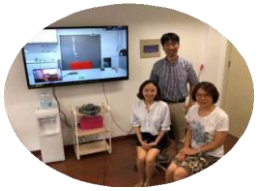
- Research collaboration in advanced chemistry (porous materials and other new materials, energy conversion, chemical biology, etc.)
- Shared use of state-of-art research equipment available at Fudan University, Shanghai Jiao Tong University, ShanghaiTech University, and Kyoto University
- Shared use of the National Compound Library of the Chinese Academy of Sciences (two million compounds)
- Utilize Kyoto University's edX online courses and short-term study abroad programs to attract talented students from top Chinese universities
- Obtain research funds by inviting visiting professors, and promote early-career researcher exchange

*Proactive applications for external funding
*Collaborative research with companies

Secure funding for self-sufficient management

Office of the Institute for Chemical Research (ICR)

Fudan University Zhangjiang Campus



(Rear) Assoc. Prof. Lu, School of Pharmacy, Fudan University (concurrent post)
(Left) Secretary

Shanghai-Kyoto Chemistry Forum, October 2019 (Shanghai)

Kyoto University Shanghai Lab

Main activities in FY 2021

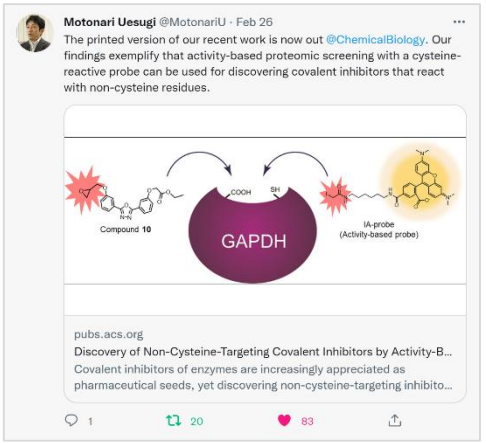
❶ Online event

An online event titled Kyoto University Chemistry Talent-Spot 2021 China, was held on November 27 and December 4, 2021. The event was attended by 11 students from Peking University and other top universities in China who were seeking to study at the Institute for Chemical Research (ICR). During the event, 13 professors from the ICR provided brief lectures and conducted individual matching interviews with the students. One of the students aims to enroll at Kyoto University and will take a graduate school entrance examination in FY 2022.

Kyoto University Chemistry Talent-Spot 2021 China **(online event)**

❷ Presentation and dissemination of collaborative research results

Since the establishment of the Kyoto University Shanghai Lab in 2019, Kyoto University has held the Shanghai-Kyoto Chemistry Forum three times to explore the potential for collaborative research and shared use with leading universities in Shanghai. As a result, five internationally co-authored papers were published in 2021. A research project conducted in collaboration with Fudan University has developed a method to discover enzyme inhibitors that react with non-cysteine residues by proteomic screening using chemical biology probes. A paper detailing their research results titled “Discovery of Non-Cysteine-Targeting Covalent Inhibitors by Activity-Based Proteomic Screening with a Cysteine-Reactive Probe” was published in the ***ACS Chemical Biology*** journal. These international collaborative research results have been proactively disseminated through the ICR website and Twitter, including the Twitter accounts of the individual laboratories and professors.



Dissemination of research results via Twitter

Center for Advanced Genomic Field Science

on-SITE Laboratory

General Information

- Approved in FY 2019
- Established in September 2019
- Established by the Primate Research Institute
- Partner institutions: Makerere University, Uganda
- Locations: Department of Zoology, Entomology and Fisheries Sciences, Makerere University, Kampala, Uganda, (outbound)
- Purposes: Storing field samples and conducting genetic and physiological analysis
- Functions: Promoting advanced research combining field research with genetic science, and expanding collaboration with research institutions in Europe and the US through the laboratory's activities

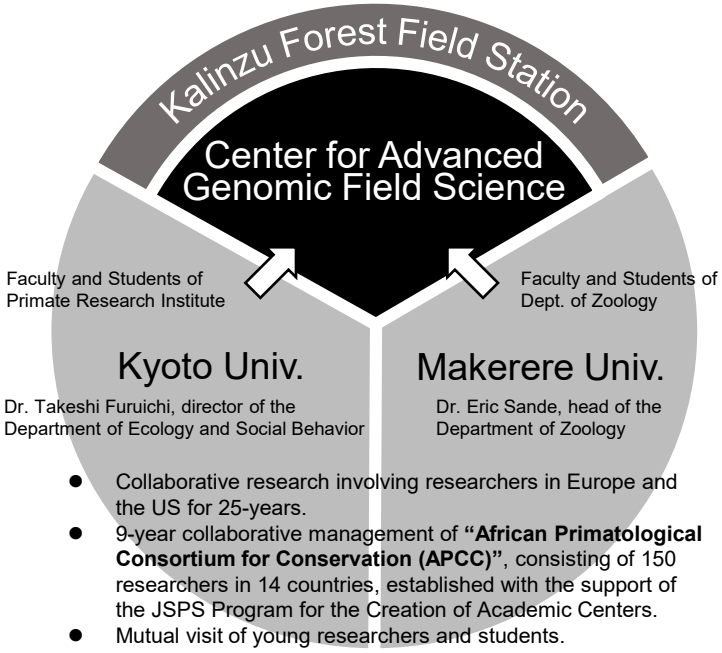
Ripple effect on the university's activities

- Developing advanced research collaboration combining field research with genetic science.
- Recruiting talented students through research collaboration among Japan, Europe, the US, and Africa.
- Shared use of the laboratory by multiple departments of the university.
- Fostering graduate students with international awareness through advanced international research collaboration.

[FY 2021]

- Expanding research collaboration with other departments, including the Institute for Life and Medical Sciences, Graduate School of Asian and African Area Studies (ASAFAS), and Center for Ecological Research.
- Fostering Japanese graduate students and early-career researchers with international awareness by holding seminars for them in Uganda.
- Hosting talented international students and early-career researchers at Kyoto University through research collaboration with Africa, Europe, and the US.

Activity Overview



- Collaborative research involving researchers in Europe and the US for 25-years.
- 9-year collaborative management of **"African Primatological Consortium for Conservation (APCC)"**, consisting of 150 researchers in 14 countries, established with the support of the JSPS Program for the Creation of Academic Centers.
- Mutual visit of young researchers and students.

● Advanced research combining field research with genetic science

・Establishment of a system for sample analysis in the country of origin, and promotion of advanced research combining field research and genetic and physiological research in preparation for the new era, in which biological and genetic samples are not permitted to be taken out of the country.

● Sustainable system of operation

・A system of research collaboration among Japan, Europe, the US, and Africa has been established through collaborative research projects and the joint operation of the African Primatological Consortium for Conservation (APCC) over many years.

・Employing and dispatching a program-specific assistant professor to be stationed at the on-site laboratory until 2027 using the university's budget for special project implementation, facilitating the dispatch of faculty and graduate students at any time.

・Joint applications for new external funds (SATREPS) and international funds (USAID, IJCN, Arcus Foundation, etc.) based on the lab's track-record of having continuously obtained large-scale external funding (Global Environment Research Fund, JSPS Program for Creation of Academic Center, Grants-in-Aid for Scientific Research, etc.).

● Promotion of international research and education activities at Kyoto University

・Recruiting talented international students and early-career researchers in Europe, the US, and Africa through APCC member institutions.

・Increase in the number of internationally co-authored papers.

・Shared use by multiple departments, including the Graduate School of Asian and African Area Studies (ASAFAS) (soil bacteria), the Graduate School of Agriculture (breed and strain), Institute for Life and Medical Sciences (zoonotic infection), etc.

・Fostering graduate students with international awareness by involving them in advanced collaborative research with international researchers from the University of St. Andrews (UK), Emory University (US), University of Zurich (Switzerland), Czech Academy of Sciences, etc.

・Utilization as a training center for field and laboratory research for undergraduate students.

Center for Advanced Genomic Field Science

on-SITE Laboratory

Main Activities in FY 2021

❶ Development of the laboratory

- Preliminary experiments were conducted to extract DNA from guenon feces collected in the Kalinzu Forest to prepare for full-scale research.
- Laboratory equipment for hormone analysis was purchased and installed in the laboratory.

❷ Dispatch of a program-specific assistant professor

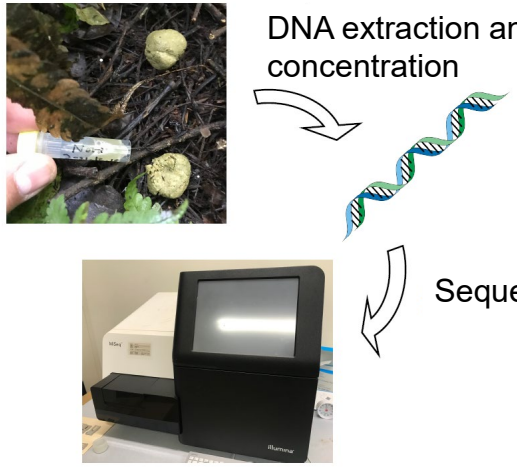
- Asst. Prof. Hiroyuki Takemoto was stationed at the on-site laboratory. Prof. Takemoto has organized the laboratory and conducted preliminary experiments, observations, and sample collection at the Kalinzu Forest Field Station.

❸ Guenon DNA analysis

- As COVID-19 fears subside in Uganda, faculty and graduate students conducted field research, and began collecting guenon feces for DNA analysis.

- In collaboration with Hokkaido University, KU's Primate Research Institute has conducted DNA sequence analyses of guenon fecal samples collected in the Kalinzu Forest. This research yielded important information about when and how genetic infiltration occurred in mixed-species flocks in the past.

Mixed flocks of red-tailed monkeys (left) and blue monkeys (right)



Collection of fecal samples and DNA sequencing

iPS Cell Research Center at Gladstone Institutes

General Information

- Approved in FY 2019
- Established in September 2019
- Established by the Center for iPS Cell Research and Application (CiRA)
- Partner institution: Gladstone Institutes, USA
- Purposes: Further development of world-leading iPS cell research, and fostering globally competent early-career researchers
- Location: Gladstone Institutes, San Francisco, USA (outbound)
- Functions: Advanced research on iPS cells, training of early-career researchers, and recruitment of international students

Ripple effect on the university's activities

- Advancement of researchers and students through participation in cutting-edge research
- Establishment of new programs beyond the departmental level, including international collaborative research between KU and UCSF

【FY 2022】

- Promotion of academic exchange through joint symposium with partner institution, and building a basis for the promotion of personnel exchange and research collaboration, which will lead to the development of international research collaboration between departments, universities, and/or between industry and academia.
- Fostering early-career researchers and recruiting talented international students through research exchange and internship education.

Activity Overview

Shinya Yamanaka (PI)

Collaborative Research
Collaborative Management

Dr. Shinya Yamanaka (PI)

VISION:

- Development of global human resources and acceleration of cross-border innovation

OUTLINE:

- Collaborative research on the mechanisms of protein translation regulation in the proliferation and differentiation of pluripotent stem cells.
- International exchange of researchers and students
- International exchange programs (symposiums, postdoc training programs)

MANAGEMENT STRUCTURE:

- Associate professor employed by CiRA stationed at the on-site laboratory through a cross-appointment
- Researchers employed by CiRA stationed at the on-site laboratory

iPS Cell Research Center at Gladstone Institutes

Main activities in FY 2021

❶ Building of a foundation for research collaboration with local companies

The laboratory aims to implement research collaboration with a local company to obtain the technological cooperation necessary for the development of pathological research on COVID-19 using iPS cells and research on cellular aging mechanisms and cellular rejuvenation, which began in FY 2020. In FY 2021, the laboratory proceeded with the necessary arrangements and procedures to build a foundation for the initiation of such research collaboration in early FY 2022.

The laboratory is also considering the launch of new research collaboration projects with partner institution's laboratories and local companies to deepen its understanding of the functions related to pluripotent stem cells, and to create positive ripple effects on iPS cell technologies in industry and academia. To this end, the laboratory has been proactively collecting information and building relationships with relevant parties.

❷ Increase of research staff and enhancement of researcher training and education

In addition to a graduate student from a local university, doctoral researchers from Japan were employed this fiscal year, which increased the lab's research staff (1 faculty member, 3 doctoral researchers, 1 graduate student of the University of California, San Francisco [who received their PhD in spring 2022], and 6 research assistants). The increase of research staff has contributed to significant progress in research on the mechanisms of protein translation regulation in the proliferation and differentiation of pluripotent stem cells. It has also activated academic exchange between research centers, and improved the environment for researcher training and education.

Laboratory Members

Center for Integrated Biosystems

General Information

- Approved in FY 2019
- Established in December 2019
- Established by: the Institute for Integrated Cell-Material Sciences (iCeMS), Kyoto University Institute for Advanced Study (KUIAS)
- Partner institution: Academia Sinica, Taiwan
- Location: Academia Sinica, Taipei, Taiwan (outbound)
- Functions: Advanced research in biomedical science fields, expansion of interdisciplinary collaboration, and recruitment of international researchers and students

Ripple effect on the university's activities

- The center serves as Kyoto University's point of contact in Taiwan
- The center serves as a hub for exchange with universities and research institutes in Taiwan
- Kyoto University students are motivated by international students from Taiwan and other countries.
- Promotion of internationalization for Kyoto University students

➢ The following benefits are anticipated: Promotion of international research collaboration between the Kyoto University Institute for Advanced Study (KUIAS) and IBMS, Academia Sinica (acquiring research funding), recruitment of talented international students through National Taiwan University (NTU), exchange between local students and Kyoto University students, development of international joint/double degree programs using TIGP, and research collaboration with local and Japanese companies.

➢ As Academia Sinica has many research laboratories in the social sciences, developments in the fusion of the humanities and sciences and cross-bound exchange involving other departments are anticipated. The research networks established in Taiwan are expected to be further expanded and effectively utilized for the university as a whole (such as the clinical trial network). During FY 2022, efforts will be made to strengthen relationships with NTU, a strategic partner of Kyoto University.

Activity Overview

Identification and functional analysis of genes involved in molecular sensing through interdisciplinary research

Biomedical phenomenon → **Gene identification** → **Functional analysis** → **Application**

Cell molecular sensing function

Functional screening

State-of-the art equipment
Rapid research collaboration

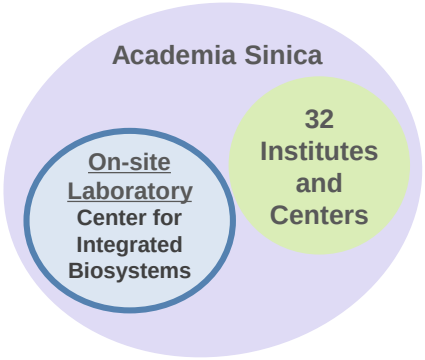
Rapid application

Academia Sinica

Cell molecular sensing functions of interest to individual PIs

Kyoto University

Screening technology to identify genes involved in biomedical phenomenon



Why Taiwan?

- Education in Europe and the US
- High English proficiency
- High research standards
- Concentration of research institutions
- Physical distance

Center for Integrated Biosystems

on-SITE Laboratory

Main activities in FY 2021

❶ Visit from Taipei Economic and Cultural Representative Office

- A delegation from the Taipei Economic and Cultural Representative Office in Japan, headed by H.E. Representative Hsieh Chang-ting, visited Kyoto University on June 29, 2021. In a seminar room on the 2nd floor of the iCeMS Building, they met with Kyoto University executive staff and professors to discuss academic exchange through the on-site laboratory between iCeMS and Academia Sinica in Taiwan and the iCeMS Taiwan Office (which serves as a hub for collaboration between Taiwan and Kyoto University), and other possible collaboration between Kyoto University and partner institutions in Taiwan.

❷ 2021 JAPAN-TAIWAN SYMPOSIUM

- The 2021 Japan-Taiwan Symposium was organized by the Taiwan Ministry of Science and Technology (MOST) on November 21, 2021. Prof. Jun Suzuki, deputy director of iCeMS, participated in the symposium as a moderator and speaker. During the symposium, Taiwanese and Japanese researchers discussed possible approaches to the future of medicine, mainly in the field of precision health.

Quantum Nano Medicine Research Center

General Information

- Approved in FY 2019
- Established in October 2019
- Established by the Institute for Integrated Cell-Material Sciences (iCeMS), Kyoto University Institute for Advanced Study (KUIAS)
- Partner institution: The University of California Los Angeles (UCLA), USA
- Location: Kyoto University, Kyoto, Japan (inbound)
- Functions: Quantum nano-medicine research with a focus on cancer treatment applications, development of new research fields, and expansion of collaboration with UCLA and industrial partners

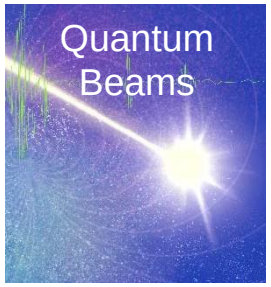
Ripple effect on the university's activities

- Establishment of new academic fields
- Ripple effects on particle physics and radiation medicine research
- Collaboration with the Institute for Integrated Radiation and Nuclear Science and SPring-8
- Collaboration with research centers in California
- Ripple effects on industries in California and Japan

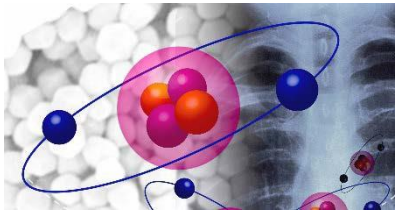
➢ Advancements in quantum nano medicine research have influenced research at Kyoto University, including the development of new radiation therapies. The center promotes interdisciplinary research that transcends disciplinary boundaries at the university

➢ The center provides opportunities for the university's researchers and world-class researchers in the US to interact by engaging in its activities

Activity Overview



Nano Medicine



Quantum Nano Medicine Research

iCeMS, KUIAS,
Kyoto University

Dept. of MIMG/UCLA

UCI collaboration
Dept. of Physics
and Astronomy

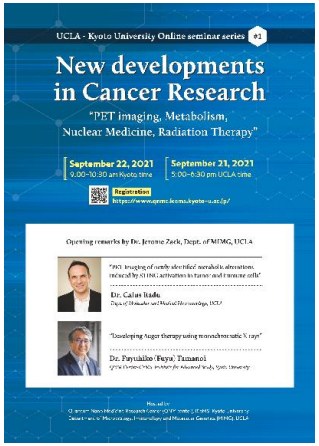
Collaboration: Institute for Integrated Radiation and Nuclear Science and SPring-8

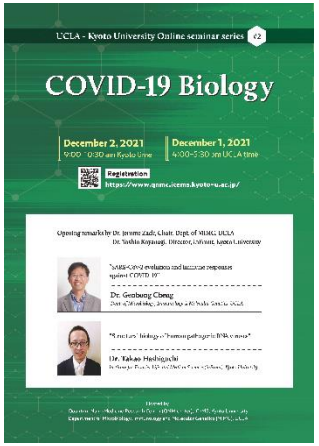
Quantum Nano Medicine Research Center

Main activities in FY 2021

❶ UCLA-Kyoto University Online seminar series, and publication of the KAWARABAN Newsletter

- Facilitated by the academic exchange agreement concluded with UCLA last year, the UCLA-Kyoto University Online seminar series was launched for the purposes of promoting dialogue between world-class researchers in the US and researchers in Japan and activating research exchange.
- Dates: #1 held on September 22, 2021, #2 on December 2, 2021, and #3 on March 23, 2022.
- Speakers: One each from Kyoto University and UCLA.
- Participants: A total of 185 participants from Japan and abroad.





- To disseminate information about the QNM Center and its activities, Vol. 3 of the KAWARABAN newsletter was published in April 2021, and Vol. 4 in November 2021.

❷ Launch of the UCLA-Kyoto University Alliance Program

- As a result of discussions with Prof. Jerry Zack of UCLA in 2021, the two universities have decided to commence student and researcher exchange. The exchange program is named the UCLA-Kyoto University Alliance Program.

Laboratory for Green Porous Materials

General Information

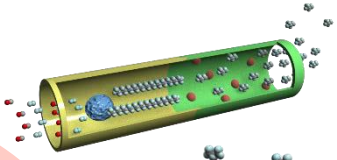
- Approved in FY 2020
- Established in FY 2020
- Established by the Institute for Integrated Cell-Material Sciences (iCeMS), Kyoto University Institute for Advanced Study (KUIAS)
- Partner institution: The Institute of Materials Research and Engineering (IMRE), Agency for Science, Technology and Research (A*STAR), Singapore
- Location: IMRE, Singapore (outbound)
- Functions:
  - Research on environmental catalysis using porous materials, development of new fields of study that contribute to the environment, and promotion of cutting-edge interdisciplinary research.
  - Development of hybrid materials consisting of porous materials and biocompatible polymers for medical and healthcare applications.

Ripple effect on the university's activities

- Serves as Kyoto University's point of contact at A*Star in Singapore.
- Acts as a bridge between Kyoto University and Singaporean universities and research institutes in material science research.
- Kyoto University early-career researchers and students are motivated by international students.
- Helps Kyoto university students develop international awareness.

- Expansion and development of joint research topics between KUIAS and IMRE.
- Research guidance for talented students at the National University of Singapore, etc.
- Exchange between Kyoto University researchers and local researchers and students through holding seminars.
- Exploring the potential of porous materials development in cooperation with local companies.

Activity Overview



Institute of Materials Research and Engineering
IMRE

Institutes
Centers

iCeMS
KYOTO UNIVERSITY
WPI Research Center

Graduate
School

On-Site Lab.
Laboratory for Green Porous Materials

Research grants
Research space
Staffing

Institutes
Centers

Students

Universities
(NUS, NTU)

Laboratory for Green Porous Materials

Main activities in FY 2021

❶ Research on design and synthesis of green porous materials

1. Online meetings on the following research topics were held in 2021, as researchers were not able to travel between Kyoto and Singapore due to the COVID-19 pandemic.
   - Theme 1: MOF catalysts for sustainable applications
   - Theme 2: MOF-mixed matrix membranes
   - Theme 3: MOF defect engineering
   - Theme 4: MOF/Biocompatible polymer hybrids
2. The researchers listed on the right engaged in research on synthesis of green porous materials.
   Prof. Susumu Kitagawa and Asst. Prof. Kenichi Otake of iCeMS developed the measurement equipments, and evaluated the structures and properties of the materials. They co-wrote and submitted a paper based on the results of the collaborative research on Theme 3.

Research collaboration with the IMRE / Soft Materials Laboratory
(PI: Prof. Loh Xian Jun, director of IMRE)

Onsite laboratory researchers (concurrent posts)

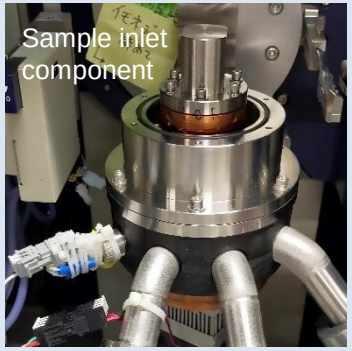
Assistant Professor Jason Lim
Dr. Shermin Goh
Dr. Tristan Tan
Ms. Li Xin

❷ Prof. Susumu Kitagawa participated in the A*Star 30th anniversary conference in Singapore

Distinguished Professor Susumu Kitagawa, director of iCeMS, participated in the A*Star Scientific Conference 2021, which was held in Singapore on November 29, 2021, to commemorate the 30th anniversary of A*Star. Prof. Kitagawa served as a keynote speaker, and engaged in discussions with researchers in Singapore.

❸ Development of a special sample cell for powder X-ray diffraction to enable the evaluation of structural properties of green porous materials under real operating conditions

The sample cell enables measurements with wide a temperature range (50–473 K) and pressure range (low pressure: 1 x 10^{-7}–990 kPa), and in a variety of gas and vapor environments. The equipment is anticipated to accelerate research on green porous materials.



Sample cell for measurement in special environments to evaluate green porous materials

Center for Integrated Data-Material Sciences (iDM)

on-SITE Laboratory

General Information

- Approved in FY 2021
- Established in January 2022
- Established by the Institute for Integrated Cell-Material Sciences (iCeMS), Kyoto University Institute for Advanced Study (KUIAS)
- Partner institution: The MacDiarmid Institute for Advanced Materials and Nanotechnology, New Zealand
- Location: Wellington University, Wellington, New Zealand (outbound)
- Functions: Deepen research on material sciences using computational science and data science, and internationalize Kyoto University's research and education activities by enhancing collaboration with industry and local research institutions.

Ripple effect on the university's activities

- Development of interdisciplinary fields combining data science and material science.
- International industrial application of materials developed at Kyoto University
- Cultivating the perspective of contributing to the international community through basic research among students and early-career researchers.
- Raising the profile of the Kyoto University brand in Oceania.

- Expanding local research networks and enhancing the brand recognition of Kyoto University and KUIAS through establishing a policy for research on hydrogen conductor materials and porous materials with local research institutions, which is anticipated to contribute to the achievement of a decarbonized society.
- Creating networks with local companies and Japanese companies, which can lead to research collaboration.
- Encouraging exchanges among early-career researchers and international students.
- Promoting the fusion of the humanities and sciences through research plans that fully respect the beliefs and customs of the Maori (indigenous people of New Zealand).

Activity Overview

京都大学 KYOTO UNIVERSITY

iCeMS KYOTO UNIVERSITY WPI Research Center

Center for Integrated Data-Material Sciences (iDM)

Research funds → **New Zealand Companies**

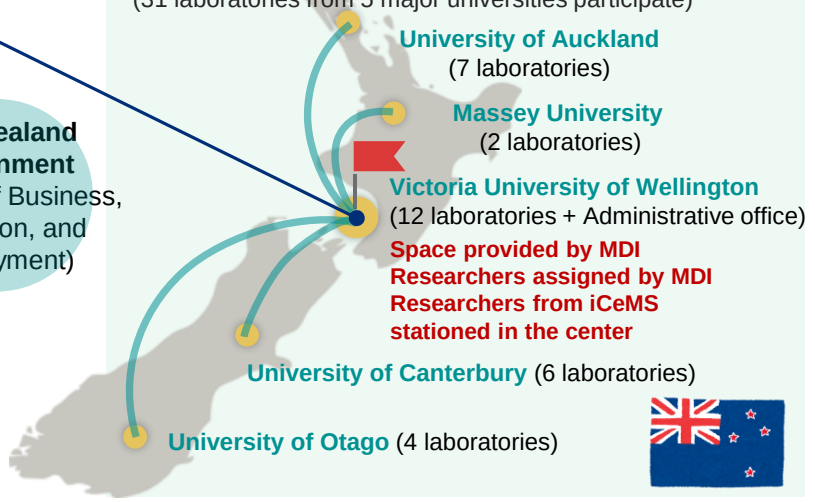
Grant → **New Zealand Royal Society**

Grant → **New Zealand Government** (Ministry of Business, Innovation, and Employment)

The MacDiarmid Institute for Advanced Materials and Nanotechnology (MDI), New Zealand

The MacDiarmid Institute for Advanced Materials and Nanotechnology

New Zealand's largest-scale and highest-level virtual research institute in material science
(31 laboratories from 5 major universities participate)



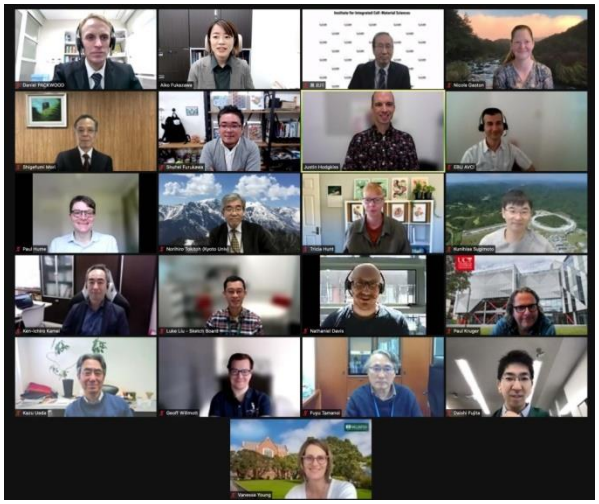
- Accelerating research collaboration in **computing and data science**, with a focus on **material science**, which is a strength of both Kyoto University and MDI.
- Promoting research exchange and brain circulation as a hub of the Kyoto University-MDI network.

Center for Integrated Data-Material Sciences (iDM)

Main activities in FY 2021

❶ Opening ceremony

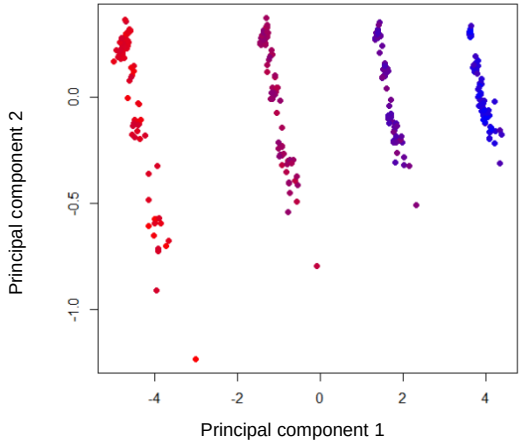
- iDM Opening Ceremony held online on 26 November 2021 with attendance of around 30 PIs from iCeMS and the MacDiarmid Institute.
- Opening remarks given by Prof. Norihiro Tokitoh (Executive Vice-President for Research, Kyoto University), Prof. Shigefumi Mori (Director-General, Kyoto University Institute for Advanced Study), and Prof. Ehsan Mesbahi (Pro-Vice Chancellor, Victoria University of Wellington).
- Presentations by Profs. Susumu Kitagawa, Shuhei Furukawa, Daniel Packwood, Aiko Fukazawa (iCeMS), Nicola Gaston, and Justin Hodgkiss (MacDiarmid Institute) outlined the expectations and vision for the iDM.



Screenshot of the iDM Opening Ceremony (26 November 2021)

❷ Five Kyoto-NZ collaborative projects started

- Following a joint workshop between iCeMS and the MacDiarmid Institute on 15 April 2021, five collaborative projects between Kyoto and New Zealand were started with strong support from the MacDiarmid Institute.
- Projects include porous materials for CO2 capture, 3D tissue engineering, AI for organic photovoltaics, microcrystal analysis, and exciton fission in organic materials.
- Projects utilize complementary strengths of iCeMS (materials synthesis and computation) and the MacDiarmid Institute (materials fabrication)



Plot of a data set of molecular dimers, successfully separated according to strength of exciton coupling.