Kyoto University Research Center San Diego

on-SITE Laboratory

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.

Positive ripple effects to 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 2024】

- 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

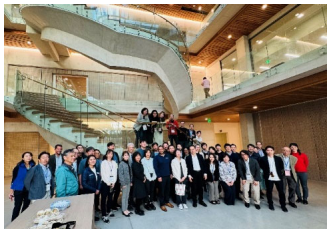
Kyoto University Research Center San Diego

on-SITE Laboratory

Main Activities in FY 2023

❶ 5th Kyoto University LifeScience Showcase (KULS) @ San Diego 2024（February 26–27, 2024）

- KULS2024 was held in San Diego with the aim of promoting the international dissemination of innovations in medical fields by Kyoto University and other Japanese universities.
- Presentations were delivered by eleven venture companies from Japan and other countries, which were viewed by 101 participants around the world.
- The showcase included a pitch event, which was attended by venture capitalists, investors, and pharmaceutical company representatives, including 14 commentators with knowledge of entrepreneurship in the US. The reception, held after the event, featured a lively exchange of information and preliminary negotiations.
- During the educational seminar/tour held on February 27, seven companies from Japan and two from Taiwan received advice from lawyers, accountants, and investors living in San Diego about tax considerations when launching a business in the US, immigration status, the handling of intellectual property, and fundraising, and were given a tour of an incubator facility.



❷ Other notable achievements

- Clinical trials to transplant nerve cells created from human iPS cells into the brains of Parkinson's disease patients have begun in the US.
- A Kyoto University-originated venture that participated in KULS was selected for the AMED Strengthening Program for Pharmaceutical Startup Ecosystem program. It expanded its operations to San Diego and began preparations for US clinical trials of a product that it developed.

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.

Positive ripple effects to 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 2024】

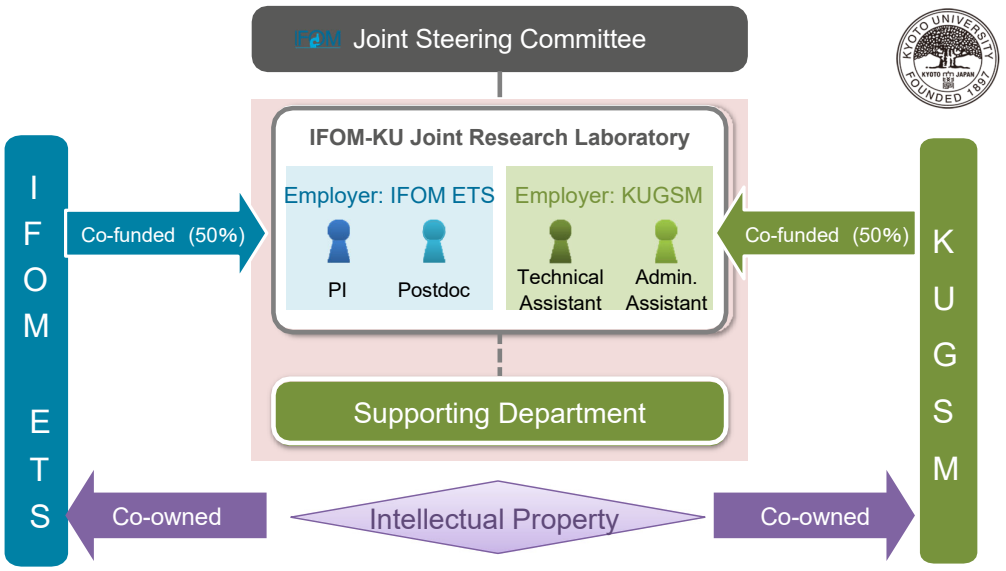
- Promotion of research collaboration in Japan and overseas [(Dr. Anthony Cesare) co-authored a paper in 2019], and publication of internationally co-authored academic papers.
- Hosting short-term students through the AMGEN Scholar Program and the JSPS summer program to contribute to the university's internationalization efforts.
- Short-term stay in IFOM ETS in May and October 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 2023

❶ Research outcomes

- Articles

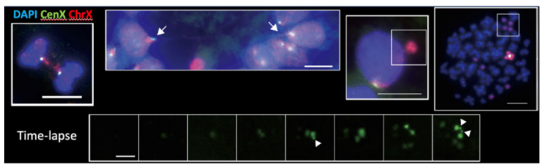
Yuki Sato and **Makoto T. Hayashi**,* Micronucleus is not a potent inducer of cGAS-STING pathway, Life Science Alliance, Feb 2, 2024; 7(4), DOI: 10.26508/lsa.202302424;
Diana Romero-Zamora,* Samuel Rogers,* Ronnie Ren Jie Low, Andrew B. Robinson, Scott G. Page, Blake JE Lane, Noa Lamm, Fuyuki Ishikawa, **Makoto T. Hayashi**** and Anthony J. Cesare,** A CPC-shelterin-BTR axis regulates mitotic telomere deprotection, bioRxiv, Jan 10, 2024 doi.org/10.1101/2024.01.09.574754

- Conference presentations

Diana Romero-Zamora,* Samuel Rogers,* Ronnie Ren Jie Low, Alexander Sobinoff, Scott G. Page, Fuyuki Ishikawa, Hilda Pickett, Anthony J. Cesare,** and oMakoto T. Hayashi,** AURKB-TRF1-BTR Axis Promotes Mitotic Telomere Deprotection by Counteracting the TRF2 Basic Domain (Invited), CSHL Meeting Telomere & Telomerase 2023, NY, USA, May 2–6, 2023
Diana Romero-Zamora,* Samuel Rogers,* Ronnie Ren Jie Low, Alexander Sobinoff, Scott G. Page, Fuyuki Ishikawa, Hilda Pickett, Anthony J. Cesare,** and oMakoto T. Hayashi,** Elucidation of the molecular mechanism of M-phase telomere deprotection, the 46th Annual Meeting of the Molecular Biology Society of Japan, Kobe, December 6–8, 2023

- Acquisition of external funding

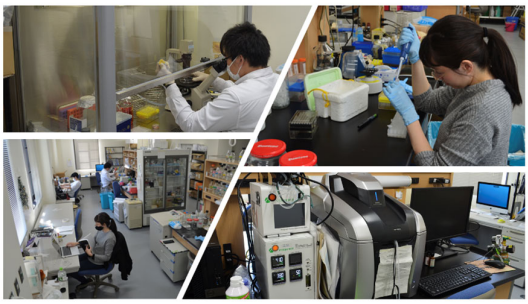
Grant-in-Aid for Scientific Research-Basic Research (B), Challenging research (beginnings), SGH Cancer Research Grant, MSD Research Grant (Cancer Category), Enzyme Research Grant



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-docs: 1 (Nigerian)
  Research assistants: 3 (1 Mexican, 2 Japanese)
  Researchers/master's/doctoral students: 4 (1 Mexican, 1 Chilean, 2 Japanese)
  Short-term international students (AMGEN Scholars Program): 1 (Indonesian)
- Meetings with IFOM ETS
  PI chalk-talk meetings (online, once per month), PI meetings (online, once per month), PI retreat (Italy, October 10–12, 2023), SAB meeting (Italy, September 7, 2023)
- Education and outreach
  3rd IFOM-KU Joint Mini-Symposium (Milan, Italy, October 5, 2023)
  Special intensive lecture on genetics and biochemistry by PI Dr. Makoto Hayashi for the postgraduate intensive course of the Graduate School of Science, Nagoya University (November 1–2, 2023)



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

Positive ripple effects to 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 2023】

- A Japanese student was dispatched as part of the Master's DD program. Conducting international training programs to attract talented students from Tsinghua University and to cultivate the international mindset of Kyoto University students.
- Symposiums and seminars were held to develop ongoing international joint research.

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		Companies & Government Bodies in China
Study and experiments by Kyoto University faculty members and students	Joint Laboratory	Facilities for Tsinghua University faculty members and students
Joint research with Tsinghua University and Chinese research institutes	Liaison Office	Joint research with Kyoto University and related companies
Joint Research with Japanese companies and Chinese research institutes	Collaborative Education	Cooperation with Japanese and Chinese companies, and Chinese research institutes
Student internship program		Student internship program
Double degree 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

on-SITE Laboratory

Main Activities in FY 2023

❶ Kyoto University-Tsinghua University Symposium 2023 on Research and Education of Environmental Engineering

- The Kyoto University-Tsinghua University Symposium 2023 on Research and Education of Environmental Engineering (hereinafter "the symposium") was held in person.
- The symposium featured lively discussions among more than 50 participants, which included students, faculty, and staff members of the two universities, and delegates from environment-related companies in Japan and China.
- The symposium included a report on the situation regarding education and international exchange, 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 outputs on JST Sakura Science Exchange Program.
- As a result on collaborative research, 3 peer reviewed papers have been published in international journals. International Symposium on Management of Emerging Pollutants in Water and Waste was held in Kyoto University on Sept. 13, 2023.

Symposium group photo at Tsinghua Shenzhen International Graduate School (TSIGS)

❷ Dispatch of a Japanese Student as the Master's DD program and Implementation of Global Environmental Human Resource Development Programs

- A Japanese student was dispatched as part of the Master's DD program.
- The JST Sakura Science Exchange Program "Learning in Kyoto about cutting-edge environmental technology aimed at creating a sustainable society" was implemented in Kyoto from Oct. 29–Nov.4, 2023. Five students from Tsinghua University (China), 2 students from the University of Malaya (Malaysia), and 11 students from Kyoto University participated in the program.
- The short internship program was implemented in Shenzhen from Mar. 10–16, 2024. Eleven students from Kyoto University interacted with TSIGS students in the program including group works, lecture, cultural exchange event facility tour and workshop.
- Online seminars for supporting companies were held in July 2023 and January 2024.

JST Sakura Science Exchange Program Participants

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

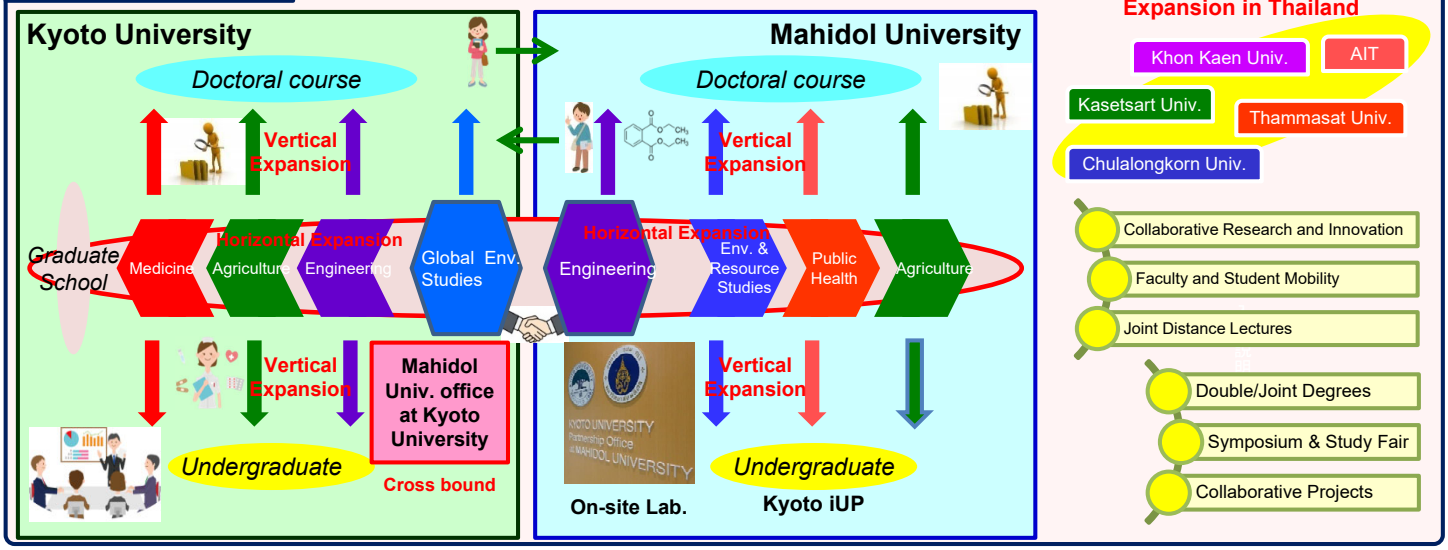
Positive ripple effects to the university's activities

- 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 2018–2023】

- **On-site Laboratory Workshops**: 1st Workshop (MU, Mar 8, 2019, 155 participants), 2nd Workshop (KU, Nov 25, 2019, 44 participants), 3rd Workshop (On-line, Mar 11, 2020, 51 participants), 4th Workshop (On-line, Nov 27, 2020, 88 participants), 5th Workshop (On-line, Mar 11, 2022, 118 participants) , 6th Workshop (On-line, Mar 29, 2023, 110 participants), 7th Workshop (Feb 23, 2024, 63 onsite and 60 on-line participants). In addition, the International Symposium was co-hosted (on-line, November 30–Dec 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 2022, respectively. As of the end of March 2024, 1 KU student and 14 Mahidol students have enrolled/will enroll in the GSGES program, and 2 Mahidol student s 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 2020–2022, only 9 of 7 groups from Mahidol and 1 from KU visited each due to COVID-19. In 2023, 30 researchers/students of 9 groups from KU and 19 of 6 groups visited each.
- **Others**: Joint lectures, joint research, co-authored research presentations, internships, etc., were conducted.

Activity Overview



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

Main Activities in FY 2023

❶ Symposium/workshops

- Kyoto University International Symposium, Dec 11, 2023: Held by the Graduate School of Global Environmental Studies at Hue University of Agriculture and Forestry with Zoom broadcast. Members from Mahidol actively contributed to this event by (1) serving as the coordinator of the "Environmental Technology" session (Suwanna Boontanon, Cross-appointment Assoc. Prof. between KU and MU), (2) 7 presentations (including 2 joint research projects with KU), and (3) winning three poster presentation awards.
- 7th Kyoto University-Mahidol University On-Site Laboratory Workshop, Feb 23, 2024: 123 participants (63 onsite (at MU Salaya Campus) and 60 online participants). First, Prof. Yasuyuki Kono, Vice President of KU, and Prof. Thanapat, Dean of the Faculty of Engineering of MU, gave opening remarks, followed by a lecture and discussion on the double degree program and its collaboration with the On-site Laboratory. After that, the participants were divided into four sessions of "Environmental Engineering," "Chemical Engineering," "Agriculture and Ecosystems," and "Public Health," where they introduced their research and held discussions for joint research and education. This was followed by a summary session of reports from each session and general discussions and ended with closing remarks by Prof. Pattaraporn Posoknistakul, Vice Dean of the Faculty of Engineering, and Prof. Makoto Usami, Vice Dean of GSGES.

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 July 2022. Preparations for the new double degree programs are also underway at the Graduate School of Engineering (with MU Graduate School of Engineering) and the Graduate School of Agricultural Science (with MU Graduate School of Science). Furthermore, an interdepartmental student exchange agreement was concluded between GSGES and the MU School of Public Health in March 2024.
- Two students on the double degree program (who entered Engineering, MU in August 2020, and GEGE in April 2021) received a master's degree from MU in 2023 after receiving a master's degree from KU in March 2023.
- Two students on the double degree program (who entered Engineering, MU in August 2021, and GEGES, Kyoto University in April 2022) came to Kyoto University in April 2022, and left in March 2023. They received a master's degree from KU in March 2024.
- Two students on the double degree program (who entered Engineering, MU in August 2022, and GEGES, Kyoto University in April 2023) came to Kyoto University in April 2023, and left in March 2024.
- Two students who entered MU Engineering in August 2023 were selected for the double degree program. They plan to stay at GSGES for one year from April 2024.
- One student in MU Public Health, who entered MU in June 2020, received a professional degree in the Department of Social and Health Medicine from KU in September 2023.
- One student, who finished MS program in chemical engineering in MU Engineering, entered the Ph.D. program in Chemical Engineering at the Graduate School of Engineering, KU with a MEXT scholarship (university recommendation) in April 2023.

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

- Research results produced through collaboration between the two universities have been presented 8 times at international/domestic conferences and published in 5 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

Positive ripple effects to the university's activities

- 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

Main Activities in FY 2023

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

- Research results are published through collaboration with research groups within VISTEC. As an example, during the period 4/1/2023-3/31/2024, a total of 17 papers (including 5 in Nature Index) were published.
- VISTEC's study abroad program and on-site lab expenses were utilized to dispatch students to major research groups, especially in Europe and the U.S., and to strengthen collaborative research systems. PhD students participated in and presented their research at overseas conferences throughout the year.
- Dr. Thidarat Imyen (iCeMS Junior Fellow), who has been working with us, was promoted to a faculty position at Kasetsart University, Thailand, in recognition of her achievements in the on-site lab.

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

- Dr Horike participated in the admissions process and was involved in the placement of students to establish an annual student intake system, and is on track to receive one new PhD student in FY2024.
- Received high evaluation at the mid-term review for two ongoing Program Management Unit (PMU-B) projects in Thailand. The organizers have asked us to continue and expand the PMU-B projects, and we plan to submit a new application in FY2024.

Participating institutions
for the ongoing 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

Positive ripple effects to 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 2023】

- Successfully matched talented Chinese students with faculty members through holding online and face-to-face lectures and interview sessions. Significant relaxation of restrictions in China will be expected in FY 2024. After travel restrictions are lifted, face-to-face interview sessions will be resumed in Beijing and Shanghai.
- Negotiations have begun to conduct graduate school admissions in Shanghai as a future strategy.

Overview of activities

- 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 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 2023

❶ Activities under travel restrictions in China

- Fudan University counterparts changed their administration drastically during the Corona pandemic, and it was necessary to reestablish relations with Fudan University. As a result, the Dean of the School of Pharmacy at Fudan University visited Japan in March 2024.
- The relationship with the Department of Chemistry at Peking University was established by utilizing the On-site Laboratory. As a result, Professor Xiaoguang Lei of Peking University is scheduled to be a visiting professor at the Institute of Chemical Research in FY2024. Additionally, the relationship was also established with Shanghai Jiao Tong University, and three selected undergraduate students in advanced course were accepted at iCeMS in FY 2023 for a one-month internship. The program will continue in the future.
- In August 2023, Prof. Uesugi visited Fudan University to discuss an international joint research project on self-assembling compounds that selectively inhibit protein phase separation with Prof. Lu Zhou of Fudan University.

❷ Dissemination of collaborative research results

Despite the severe restrictions, research collaboration in advanced chemistry was promoted remotely through online meetings and sample delivery. In particular, the collaboration with Fudan University reported the design and utility of a tyrosine target compound consisting of 67 million compounds. The research results were published as "ABPP-CoDEL: Activity-Based Proteome Profiling-Guided Discovery of Tyrosine-Targeting Covalent Inhibitors from DNA-Encoded Libraries" in J. Am. Chem. Soc. 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.

iPS Cell Research Center at Gladstone Institutes

General Information

- Approved as KU On-site Laboratory in FY 2019
- Established by the Center for iPS Cell Research and Application (CiRA) in September 2019.
- 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

Positive ripple effects to the university's activities

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

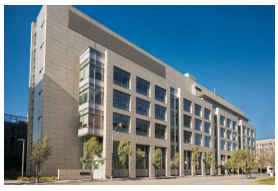
【FY 2024】

- Create opportunities to offer internship education to students from neighboring universities.
- Develop research collaborations with other laboratories and partner institutions and deepen the understanding for the functions of pluripotent stem cells.
- Promote further applications of iPS cell technologies to industries and academia.

Activity Overview

Shinya Yamanaka (PI)

Collaborative Research
Collaborative Management



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 2023

❶ Guest Lecture at 2023 CiRA International Symposium

- Dr. Kiichiro Tomoda, the associate professor cross-appointed and stationed at the OSL, delivered a guest lecture titled "iPS Cell Research Center at Gladstone" and introduced activities of the laboratory (November 2023, held at Kyoto University Clock Tower Centennial Hall).
- During the two-day symposium, Dr. Tomoda actively engaged in scientific discussions and connected with participating researchers and students (about 250), other international lecturers (16 leaders of the field), and poster presenters (about 60).

❷ Further Improvement of Research & Educational Environment

- The lab has increased its research members and laboratory staff to accelerate its research.
- One researcher who completed her Ph.D. and worked at the OSL as a postdoctoral fellow has started a new company in the U.S.A. aiming for human reproductive therapies.
- Drs. Shinya Yamanaka and Kiichiro Tomoda, and the research team at the OSL recently showed that tight junctions between cells play a critical role in the gastrulation of human embryos. The achievements were published in Developmental Cell.
  https://www.cira.kyoto-u.ac.jp/e/pressrelease/news/230721-160000.html

Developmental Cell

Loss of TJP1 disrupts gastrulation patterning and increases differentiation toward the germ cell lineage in human pluripotent stem cells

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

Positive ripple effects to 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). 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**

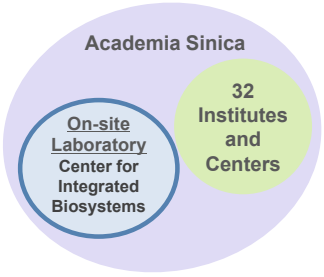
Cell molecular sensing function | Functional screening | State-of-the art equipment Rapid research collaboration | Rapid application

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

Main activities in FY 2023

❶ Mini Symposium
Kyoto University & Academia Sinica

Presentations and discussions by six students and researchers from the Institute for Integrated Cell-Material Sciences (iCeMS) and Graduate School of Medicine, of Kyoto University and six students and researchers from the Institute of Biomedical Sciences (IBMS) of Academia Sinica.

❷ Mini Symposium
Kyoto university & National Taiwan University

Presentations and discussions by six students and researchers from the Institute for Integrated Cell-Material Sciences (iCeMS) and Graduate School of Medicine of Kyoto University and six students and researchers from the Department of Life Science of National Taiwan University (NTU).

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

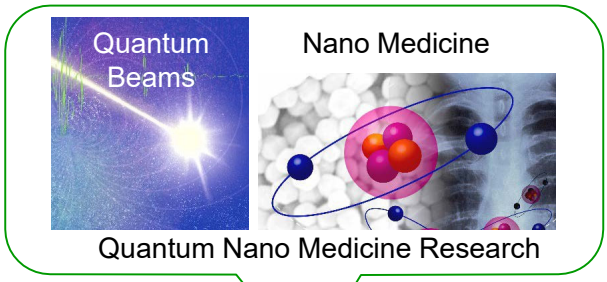
Positive ripple effects to the university's activities

- 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



iCeMS, KUIAS, Kyoto University

Dept. of MIMG/UCLA

UCI collaboration
Dept. of Physics and Astronomy

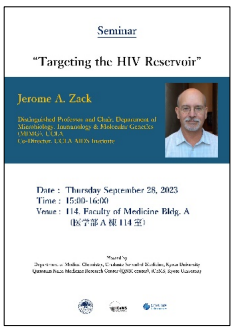
Collaboration: Institute for Integrated Radiation and Nuclear Science and SPring-8

Quantum Nano Medicine Research Center

Main Activities in FY 2023

❶ Academic exchange between UCLA and Kyoto University, publication of the *KAWARABAN* newsletter

- Dr. Yvonne Y. Chen from UCLA was invited to give a lecture in the Online seminar series, which was held in a hybrid format.
  ➢Online seminar series #6, held on July 4,2023.
  ➢One presenter from Kyoto University and one from UCLA



- Dr. Jerome Zack from UCLA spoke at the iCeMS retreat, and at a seminar held jointly with the Faculty of Medicine.

- Vol. 6 of the *KAWARABAN* newsletter was published in December 2023 to disseminate information about the QNMC and its activities.

❷ Working towards the establishment of a consortium

- A seminar titled "Towards Innovation in Cancer Treatment" was held on March 27, 2024.

- The policy for a consortium that aims to accelerate the development of innovations in cancer treatment has been drafted with a view to its establishment.

Laboratory for Green Porous Materials

General Information

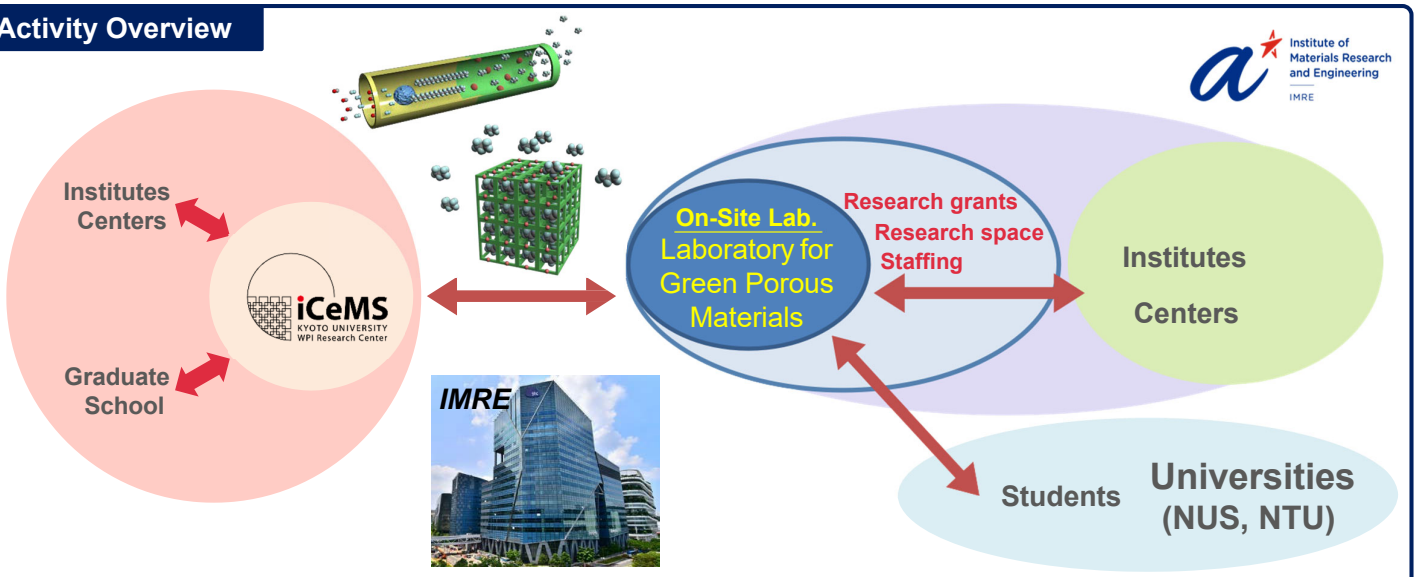
- Approved in FY 2020
- Established in FY 2020
- Established by the Institute for Integrated Cell-Material Sciences (iCeMS), Kyoto University Institute for Advanced Study (KUIAS)
- Partner institution: The Institute of Materials Research and Engineering (IMRE), Agency for Science, Technology and Research (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.

Positive ripple effects to 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



Laboratory for Green Porous Materials

Main activities in FY 2023

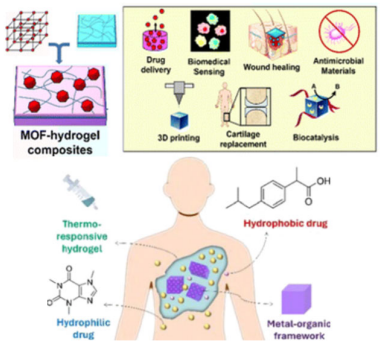
❶ Research on design and synthesis of green porous materials

1. In 2023, we mainly conducted online meetings for the following research topics because researchers were unable to freely travel between Kyoto and Singapore due to the COVID-19 pandemic and its after-effect.
   - 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 published papers based on the results of the collaborative research on Theme 4.
   (1) "Biomedically-relevant Metal Organic Framework-Hydrogel Composites", Jason Y. C. Lim , Leonard Goh , Ken-ichi Otake , Shermin S Goh , Xian Jun Loh and Susumu Kitagawa,
   Biomaterial Sciences, **11**, 2661-2677, 2023
   (2) "MOF-Thermogel Composites for Differentiated and Sustained Dual Drug Delivery" Xin Li, Tristan Tan, Qianyu Lin, Chen Chuan Lim, Rubayn Goh, Ken-ichi Otake, Susumu Kitagawa, Xian Jun Loh, Jason Lim,
   ACS Biomaterials Science & Engineering, **9**, 5724-5736, 2023

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



❷ Mutual Research Visit

- Distinguished Prof. Susumu Kitagawa of iCeMS stayed at the Onsite Lab from July 30th to August 1st for discussion and research exchanges.
- Asst Prof. Jason Lim, a member of the Onsite Lab, stayed at iCeMS as a visiting researcher from February 28th to March 2nd for research exchanges.
- The opening ceremony of the on-site lab and the Scientific Seminar, which had been postponed due to the COVID-19 pandemic, were held at IMRE on March 11th. Ten Kyoto University staff members, including Kitagawa and Otake, visited IMRE for research exchange

Center for Integrated Data-Material Sciences (iDM)

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.

Positive ripple effects to 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)

- University of Auckland (7 laboratories)
- Massey University (2 laboratories)
- Victoria University of Wellington (12 laboratories + Administrative office)
  - Space provided by MDI
  - Researchers assigned by MDI
  - Researchers from iCeMS stationed in the center
- University of Canterbury (6 laboratories)
- University of Otago (4 laboratories)

- 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 2023

❶ iDM In-Person Workshops

- *The 1st MacDiarmid Institute-Kyoto University Workshop on Integrated Data-Material Sciences.* Kyoto University Rakuyu-Kaikan, August 29 – 30. 10 speakers from Kyoto University (8 from iCeMS, 2 from other departments), 8 speakers from New Zealand.
- *MacDiarmid Institute-iCeMS Symposium.* Victoria University of Wellington, February 19 – 20. 6 speakers from Kyoto University, 22 speakers from New Zealand (including 1 from industry, 1 from the Ministry of Foreign Affairs and Trade, and 5 students).

1st MacDiarmid Institute-Kyoto University Workshop (Kyoto)

MacDiarmid Institute-iCeMS Symposium (Wellington)

❷ Data-harvesting protocol for organic solar cell materials

- New computational framework for quickly evaluating semiconductor materials for organic solar cells.
- Accurately predicts exciton transport properties when compared to MacDiarmid Institute data.
- Reduced computation time allows for generation of virtual data library for organic semiconductor design.