World Premier International Research Center Initiative (WPI)
Activities Report of the WPI Academy Center
(FY 2020 – FY 2023)

Host Institution	Kyoto University	Host Institution Head	Minato Nagahiro
Research Center	Institute for Integrated Cell-Material Sciences (iCeMS)		
Center Director	Kitagawa Susumu (FY2020-2022) Uesugi Motonari (FY2023)	Administrative Director	Ueda Kazumitsu

Common Instructions:
* Unless otherwise specified, prepare this report based on the current (31 March 2024) situation of your Center.
* Use yen (¥) when writing monetary amounts in the report. If an exchange rate is used to calculate the yen amount, give the rate.
* Prepare this report within 10 pages (excluding the appendices, and including "Summary of State of WPI Academy Center Progress" (within 2 pages)).

Summary of WPI Academy Center's Activities (write within **2 pages**)

WPI-iCeMS was originally established in 2007 to integrate two flagship disciplines of Kyoto University (KU): chemistry and cell biology. Since its founding, WPI-iCeMS has brought together researchers from diverse fields and achieved significant research accomplishments. Through this coordinated integration, WPI-iCeMS endeavors to understand intracellular self-assemblies at the boundary between life and matter, and to inspire innovation in functional self-assembling materials. The specific research projects, system reforms, and globalization strategies of WPI-iCeMS can be summarized as follows.

I. Specific Research Projects

Understanding intracellular self-assemblies at the boundary of life and matter

Life is the ultimate example of self-assembly. WPI-iCeMS is working to gain a molecular-level understanding of intracellular self-assemblies that control compartmentalization, information transfer, gene expression, and energy metabolism, and to lead the way in developing chemical tools that will enable this understanding.

Creating functional self-assembled materials inspired by intracellular self-assemblies

Chemists can gain inspiration from self-assemblies within cells. Motivated by such inspiration, WPI-iCeMS is striving to create novel functional materials and to use them in addressing global issues. Examples of these materials include self-assembling pharmaceuticals, self-assembling materials for purifying substances, self-assembling materials for energy-storing, and materials that self-assemble to initiate the chemical transformation of carbon dioxide.

The environment at WPI-iCeMS, which values diversity in scientific fields, nationality, gender, and age, has been producing fruitful research results, including: "Tunable acetylene sorption by flexible catenated metal-organic frameworks," ***Nat Chem*** **2022 (Bonneau)**, "Separating water isotopologues using diffusion-regulatory porous materials," ***Nature*** **2022 (Su)**, "Overcoming humidity-induced swelling of graphene oxide-based hydrogen membranes using charge-compensating nanodiamonds," ***Nat Energy*** **2021 (Huang)**, "Exploration of glassy state in Prussian blue analogues," ***Nat Commun*** **2022 (Ma)**, "Extracellular calcium functions as a molecular glue for transmembrane helices to activate the scramblase Xkr4," ***Nat Commun*** **2023 (Zhang)**, "Discovery of Self-Assembling Small Molecules as Vaccine Adjuvants," ***Angew Chem-Int Edit*** **2021 (Jin)**, "Flattened 1D fragments of fullerene C_{60} that exhibit robustness toward multi-electron reduction," ***Nat Commun*** **2023 (Hayakawa)**, "Hi-CO: 3D genome structure analysis with nucleosome resolution," ***Nat Protoc*** **2021 (Ohno)**, "Caspase cleavage releases a nuclear protein fragment that stimulates phospholipid scrambling at the plasma membrane," ***Mol Cell*** **2021 (Maruoka)**, "Targeted epigenetic induction of mitochondrial biogenesis enhances antitumor

immunity in mouse model," *Cell Chem Biol* **2022 (Malinee)**, and "Calcium signals tune AMPK activity and mitochondrial homeostasis in dendrites of developing neurons," *Development* **2023 (Hatsuda)**.

II. System Reform and Globalization

WPI-iCeMS serves as a testbed for KU and thus leads the way in conducting proof-of-concept experiments for university-wide planned reforms and next-generation research laboratories, the results of which are shared throughout the organization. Special emphasis is placed on the following points.

Strategic Recruitment of Talented International Students and Young Researchers

The number of international students enrolled in KU's graduate schools has increased. However, their quality is not sufficient when compared to international students in Europe and the United States. Through strategic recruitment initiatives, an effort is being made to secure top-tier international students and talented young researchers. In this effort, we are working with KU's Division of Graduate Studies.

Active Participation of Undergraduate Students in Research Activities

To raise the level of research at KU, it is important to foster a research mindset among undergraduate students before they matriculate to graduate school. Working together with iUP, measures are taken to receive not only Japanese but also international undergraduate students in the research laboratories.

Global Development through On-site Labs

WPI-iCeMS operates KU's On-site Labs in six locations around the world. These On-site Labs serve as a testbed for the globalization of KU. In addition to joint research and equipment sharing, these labs serve as experimental hubs for student recruitment, graduate school admissions testing, and local fundraising. In operating these labs, WPI-iCeMS collaborates with two university-wide divisions: the International Strategy Office (iSO-KU) and the Division of Graduate Studies.

Operation of Core Facilities

Core facilities, which efficiently share, maintain, and manage cutting-edge research equipment, are operated in a manner similar to that in Europe and the United States.

Innovation through the Establishment of Start-ups

For the future development of WPI-iCeMS, it is necessary to give back to society through start-ups. The Innovation Unit of the Research Administration Division (RAD) of iCeMS tests experimental methods in cooperation with KU's Office of Society Academia Collaboration for Innovation (SACI).

Efficient Fundraising

With a clear focus on objectives, iCeMS RAD explores efficient ways of fundraising through targeted publicity campaigns and analysis of donors' decisions and purposes.

Optimization of Internal Communication

Organizations that optimize internal communication are known to have higher levels of efficiency, compliance, and satisfaction, and lower levels of risk and turnover. New initiatives, such as leveraging mobile technology, are being taken to optimize internal communication within WPI-iCeMS.

Interdisciplinary Collaborative Research

The type of internal communication that fosters interdisciplinary collaborative research involves identifying and studying successful patterns of interdisciplinary joint research and then verifying their results through experimentation.

Promotion of Diversity, Equity & Inclusion (DE&I)

At WPI-iCeMS, the percentages of female and foreign faculty members are about 20% each, which is higher than the percentage of female faculty members in KU's natural science departments (9.5%), and closer to the level in Western countries. To address the disparity in these numbers as well as illuminate issues such as unconscious bias, WPI-iCeMS leads the university in raising DE&I to higher Western levels.

* Describe clearly and concisely the progress being made by the Center from the viewpoints below.
- In addressing the below-listed 1-8 viewpoints, place emphasis on the following:
  (1) Whether research standards and operation of the Center is maintaining a "world premier" status.
  (2) Whether the Center participate and cooperate to the activities to advance the overall development of the WPI Program and to promulgate its achievements.

1. Overall Image of Your Center

・Describe the Center's current identity and overall image.
・List the Principal Investigators in Appendix 2, diagram the Center's management system in Appendix 3-1, enter the number of center personnel in Appendix 3-1a, and enter center funding in Appendix 3-2.

Chemistry and cell biology are the research flagships of Kyoto University (KU), and WPI-iCeMS will lead the harmonizing of these two fields, involving faculty and students from across the university. Through this coordinated fusion, we endeavor to understand intracellular self-assemblies at the boundary between life and matter and inspire innovation in functional self-assembling materials. iCeMS serves as a testbed for KU and, as such, will lead the way as a proof-of-concept for university-wide planned reforms and next-generation research laboratories. WPI-iCeMS will continue to collaborate with KU to share the results of our experiments throughout the organization. Particular emphasis will be placed on globalization, equipment sharing through the Analysis Center, innovation through start-ups, and diversity and inclusion. The Research Administration Division (RAD) of iCeMS plays an important role in these testbed endeavors and in promoting the WPI Academy program. Since iCeMS was certified as a "WPI Academy" in 2017, young talents have been recruited as PIs from outside iCeMS. The average age of the ten core PIs is 46.9.

2. Advancing Research of the Highest Global Level

・Describe what's been accomplished in the Center's research objectives and plans.
・In Appendix 1, list the papers underscoring those research achievement and list the Center's research papers published in 2020-2023 in a manner prescribed in Appendix A.

To achieve true integration of "cell biology" and "materials science", flexible thinking and a spirit of challenge are required. The environment at WPI-iCeMS, which values diversity in scientific field, nationality, gender, and age has been producing fruitful research results, which includes: "Tunable acetylene sorption by flexible catenated metal-organic frameworks," ***Nat Chem*** **2022 (Bonneau)**, "Non-contact real-time detection of trace nitro-explosives by MOF composites visible-light chemiresistor," ***Natl Sci Rev*** **2022 (Deng)**, "Separating water isotopologues using diffusion-regulatory porous materials," ***Nature*** **2022 (Su)**, "Overcoming humidity-induced swelling of graphene oxide-based hydrogen membranes using charge-compensating nanodiamonds," ***Nat Energy*** **2021 (Huang)**, "Exploration of glassy state in Prussian blue analogues," ***Nat Commun*** **2022 (Ma)**, "Extracellular calcium functions as a molecular glue for transmembrane helices to activate the scramblase Xkr4," ***Nat Commun*** **2023 (Zhang)**, "Structural colour enhanced microfluidics, " ***Nat Commun*** **2022 (Qin)**, "Discovery of Self-Assembling Small Molecules as Vaccine Adjuvants," ***Angew Chem-Int Edit*** **2021 (Jin)**, "Flattened 1D fragments of fullerene C_{60} that exhibit robustness toward multi-electron reduction," ***Nat Commun*** **2023 (Hayakawa)**, "Hi-CO: 3D genome structure analysis with nucleosome resolution," ***Nat Protoc*** **2021 (Ohno)**, "Caspase cleavage releases a nuclear protein fragment that stimulates phospholipid scrambling at the plasma membrane," ***Mol Cell*** **2021 (Maruoka)**, "Preparation of Hierarchically Porous Niobium(V) Oxide and Alkaline Niobate Monoliths via Sol-Gel Accompanied by Phase Separation," ***Chem Mat*** **2023 (Sato)**, "Powdered Hierarchically Porous Silica Monoliths for the Selective Extraction of Scandium," ***ACS Sustain Chem Eng*** **2023 (Brewer)**, "Targeted epigenetic induction of mitochondrial biogenesis enhances antitumor immunity in mouse model," ***Cell Chem Biol*** **2022 (Malinee)**, "Nanobiomineralization of Carbon Dioxide by Molecularly Engineered Metal-Histidine Complex Nanozymes," ***Chem Mat*** **2023 (Nilouyal)**, "Pore-Networked Gels: Permanently Porous Ionic Liquid Gels with Linked Metal-Organic Polyhedra Networks," ***J Am Chem Soc*** **2023 (Wang)**, "Reversible Discrete-to-Extended Metal-Organic Polyhedra Transformation by Sulfonic Acid Surface Functionalization," ***J Am Chem Soc*** **2022 (Troyano)**, "Magnetic Control of Cells by Chemical Fabrication of Melanin," ***J Am Chem Soc*** **2022 (Nishio)**,

"Chemoproteomic Identification of Blue-Light-Damaged Proteins," *J Am Chem Soc* **2022 (Toh)** and "Calcium signals tune AMPK activity and mitochondrial homeostasis in dendrites of developing neurons," *Development* **2023 (Hatsuda)**.

3. Facilitating Interdisciplinary Research Activities

- Describe the content of measures taken by the Center to facilitate interdisciplinary research activities. For example, measures that create an environment that will facilitate doing joint research by researchers in differing fields.
- Describe the contents and results of interdisciplinary research activities yielded by the measures described above.

Chemistry and cell biology are the research flagships of KU, and WPI-iCeMS will lead the harmonization of these two fields, involving faculty and students from across the university. Through this coordinated fusion, WPI-iCeMS endeavors to understand intracellular self-assemblies at the boundary between life and matter and inspire the innovation of functional self-assembling materials. However, integrating two different disciplines with different cultures and languages, such as materials science and cell biology, is not easy. At iCeMS, we have continued to make efforts to deepen engagement between scientists by providing a shared space where experts from various fields can easily engage in discussions. The well-equipped common facilities at the iCeMS Analysis Center have also facilitated collaboration among different disciplines. The successful integration of chemistry, materials science, cell biology, and other fields, attributed to this unique research environment at iCeMS, includes "Biomedically-relevant metal organic framework-hydrogel composites," *Biomater Sci* **2023 (Lim)**, "Extracellular calcium functions as a molecular glue for transmembrane helices to activate the scramblase Xkr4," *Nat Commn* **2023 (Zhang)**, "Structural colour enhanced microfluidics," *Nat Commun* **2022 (Qin)**, "Magnetic Control of Cells by Chemical Fabrication of Melanin," *J Am Chem Soc* **2022 (Nishio)**, "Protein stabilization and refolding in a gigantic self-assembled cage," *Chem* **2021 (Fujita)**, "Hi-CO: 3D genome structure analysis with nucleosome resolution," *Nat Protoc* **2021 (Ohno)**, "Discovery of Self-Assembling Small Molecules as Vaccine Adjuvants," *Angew Chem-Int Edit* **2021 (Jin)**, "Combined Cohesin-RUNX1 Deficiency Synergistically Perturbs Chromatin Looping and Causes Myelodysplastic Syndromes," *Cancer Discov* **2020 (Ochi)** and "Rhodium-Based Metal-Organic Polyhedra Assemblies for Selective CO2 Photoreduction," *J Am Chem Soc* **2020 (Ghosh)**.

4. Maintaining an International Research Environment

- Describe what's been accomplished in the efforts to raise the Center's recognition as a genuine globally visible research institute, along with innovative efforts proactively being taken, including the following points, for example:
  - Efforts being developed to maintain an international research environment based on the analysis of number and state of world-leading, frontline researchers; exchanges with overseas entities
  - Proactive efforts to raise the level of the Center's international recognition
  - Efforts to make the Center into one that attracts excellent researchers from around the world (such as creating of an environment in which researchers can concentrate on their research, providing startup research funding, supporting efforts that will foster young researchers and contribute to advancing their career paths, and arranging support system for the research activities of overseas researchers.)
  - Consolidation of the administrative structures to support implementing the efforts described above
- In Appendix 3-1, describe the state of cooperation with overseas satellites, and list the main international research meetings held by the Center.

4-1. Promoting the International Circulation through On-site Labs

The pursuit of "a flexible and dynamic approach to knowledge creation" is one component of KU's strategy as a Designated National University. As part of those efforts, the university is implementing an initiative to establish locally-managed "On-site Laboratories" in cooperation with overseas partner universities and research institutions. iCeMS has established six On-site Labs and four other international labs around the world as listed below. They have been serving as testbeds for globalization of KU. In addition to joint research and equipment sharing, the laboratories have served as experimental hubs for student recruitment and donation fund acquisition.

The "**Smart Materials Research Center**", established with Vidyasirimedhi Institute of Science and Technology (VISTEC) in Thailand, aims to synthesize new materials inspired by the biological reactions to solve environmental and energy problems. Looking to the future, **Horike** focuses on the education of

doctoral students and also works on the technical needs of the Thai chemical companies that are collaborating with VISTEC. At the "**Center for Integrated Biosystems**", collaborative research with Academia Sinica researchers is on-going. The joint research is based on unbiased screening to identify new molecules that regulate and control important physiological reactions, which is **Suzuki**'s specialty. The **iCeMS Taiwan Office**, which was established in 2019, is working to deepen exchanges between universities in Taiwan and KU. In the "**Kyoto University Shanghai Lab"**, **Uesugi** is conducting advanced collaborative research in the three fields of chemical biology, new materials, and energy conversion between Shanghai area universities, and utilizing this On-site Lab to give lectures and interviews to recruit graduate students from top-tier Chinese schools. The "**Quantum Nano Medicine Research Center**" was established by cross-appointed professor **Tamanoi** for a collaboration between iCeMS and California Nano-Systems Institute (CNSI) of UCLA. The aim of the center is to highlight the recent emergence of a new field of science created by the convergence of quantum beam research and nanomaterial studies. It is now operated as an in-bound type laboratory with plans to develop this center into a cross-bound type by establishing a laboratory in UCLA. The "**Center for Integrated Data-Material Sciences**" was established by **Packwood** and **Fukazawa** to deepen the paradigm of data-driven materials science while aiming to establish a next-generation materials development process. Towards this end, it combines the expertise in material informatics of iCeMS with the expertise in physical property characterization of the MacDiarmid Institute in New Zealand. The "**Laboratory for Green Porous Materials**" was established by **Kitagawa** with the Institute of Materials Research and Engineering (IMRE) of A*STAR in Singapore. This laboratory aims to conduct research on environmental catalysis using porous materials and develop new fields that contribute to the environment. The "**Small Molecule Laboratory (Smolab)**" is an International Research Project (IRP) with the French National Centre for Scientific Research (CNRS) established by **Furukawa** which aims to synthesize new materials inspired by biological reactions to solve environmental and energy problems. In 2022, two international laboratories started as iCeMS Project Units.

One is the **"India Japan Initiative for Intelligent Biomaterials" (INJA IN BIO)**, established by **Namasivayam**. It is a collaborative research initiative that brings together experts from different disciplines from India, Japan, Switzerland, the United States of America, and Malaysia to address the overarching aims such as developing omics-directed intelligent biomaterials. The other is the **SUSTech-Kyoto University Advanced Energy Materials Joint Innovation Laboratory (SKAEM-JIL)**, established by Kitagawa. It is promoting cutting-edge joint research in materials science for advanced energy applications and exchanging human resources between Southern University of Science and Technology in China and KU. These ten collaborative projects promote international brain circulation and strengthen and energize the interdisciplinary research at iCeMS.

4-2. Strategic Recruitment of Talented International Students and Young Researchers

iCeMS has consistently produced significant research outcomes by nurturing the skills of young researchers through its research activities. The key lies in strategically providing opportunities for talented and motivated young researchers to join iCeMS as postdocs and graduate students. From FY2022 to FY2023, iCeMS invited overseas researchers from Europe and Asia under the Grant for Young International Researchers five times. The program provided for their round trips and stays up to 3 months. Beginning in FY2023, iCeMS PIs have participated in the KU Chemistry Talent-Spot, a venue run by the Institute for Chemical Research to recruit promising graduate student candidates from throughout Asia. The event provides an opportunity for a select group of students to meet the top scientists in their fields and discuss international research possibilities.

4-3. International Symposia Held for Brain Circulation

iCeMS hosted international research meetings both in Japan and abroad, not only as presentation venues for young researchers talented enough to become PIs in the future, but also as events where researchers from different disciplines gather and exchange ideas to acquire new insights, boosting the motivation for research and encouraging networking. The international research meetings outside Japan were co-hosted by local research institutes of On-site Laboratories and iCeMS Project Units, such as the ones in Singapore and Taiwan. Due to the spread of the coronavirus infection, international symposiums were held online in the years 2020 and 2021. This led to exploring new forms of research exchange, such as hybrid formats.

4-4. iCeMS Retreats - Inviting Prominent Overseas Researchers

In FY2020, due to the impact of the coronavirus infection, we were unable to hold a retreat where all members could gather in one place. In FY2021, in lieu of a retreat, we held online communications (iCeMS Crossing) ten times at a frequency of once a month. These sessions not only included reports and discussions on the activities of each research group but also featured lectures from researchers at external research institutions and On-site Laboratories. In FY2022 and FY2023, we returned to the in-person style, providing a venue for research exchange where foreign undergraduate students from KU also participated and presented.

4-5. Academic Exchange and Cooperation Agreements

iCeMS actively engages in international exchange, signed or renewed 14 agreements, including those at the university level, from 2020 to 2023, resulting in a total of 23 effective collaboration agreements. Notably, there have been instances where agreements were elevated from departmental to university level, such as with UCLA, symbolizing the strengthening of research collaboration. During the period from 2020 to 2023, four new international labs were established based on agreements with A*STAR (Singapore), MDI (New Zealand), SUSTech (China), and NNF (India).

5. Making Organizational Reforms

- Describe distinctive effort in managing research operation and administrative organization, such as the strong leadership that the director is giving on the Center's operation, strong performance by the administrative director who provides the center director with strong administrative and managerial support, and division of roles and authority between the Center and its host institution.
- Describe the ripple effects that activities to disseminate experience and know-how accumulated by the Center, such as the followings,

have/had on the host institution (or other research institutes, if any):
- System reforms made through the Center's leading activities to its research operation and administrative organization
- Experience and know-how accumulated by the Center as it have worked to establish itself as top world-level research institutes.

・Other than the above, give examples, if any, of cooperative activities by the Center and the whole WPI Program or other WPI centers, to disseminate experience and know-how accumulated by the WPI program and/or the WPI centers.

In order to make prompt decisions, WPI-iCeMS has implemented a top-down decision-making process. The **Director** is empowered with strong decision-making authority which is supported by the **Executive Board**, which consists of the Director, Deputy Directors, PI Board Chair, Research Administrative Director, and Deputy Research Administrative Director. At **PI Meeting**, the decisions are shared with PIs and researchers, while management tasks suggested by PIs are brainstormed and brushed up. WPI-iCeMS has set up five committees comprised of PIs, RAD members, and administrative staff who devise improvement plans and solutions to various problems: the Safety & Environment Committee, Recruitment Committee, Fundraising Committee, Diversity & Inclusion Committee, and Globalization Committee.

6. Efforts expected to WPI Academy Center to Enhance and Amplify the Visibility and Brand of the Overall WPI Program

・Describe how the Center's outreach activities have contributed to enhancing and amplifying the visibility and brand of the WPI program. Describe the successful cases of the Center's outreach activities in Appendix 4, and enter the number of activities in Appendix 4a.

・Other than the above, describe, if any, the activities and their concrete contents that have contributed to the enhancement and amplification of the visibility and brand of the WPI program (such as holding a large international research meeting, collaborative activities with multiple WPI centers). If you have already provided this information, please indicate where in the report.

・Describe the Center's efforts in making it a place that expands and accelerates the international circulation of the world's best brains. Give their success cases and describe their concrete contents and effect in narrative.

・Describe examples, if any, of cooperative activities by the Center and the whole WPI Program or other WPI centers, to disseminate experience and know-how accumulated by the WPI program and/or the WPI centers.

6-1. Dissemination through International Labs

As described above, WPI-iCeMS operates six On-site Labs and four other international labs around the world. They have been serving as testbeds for globalization of KU. In addition to joint research and equipment sharing, the laboratories can serve as experimental hubs for student recruitment, graduate school admissions testing, and donation fund acquisition. As a testbed, iCeMS collaborates with two university-wide divisions: the International Strategy Office (iSO-KU) and the Division of Graduate Studies.

6-2. Publication of Brochures and Newsletters

iCeMS published its brochures with the general information of the institute, and the newsletters "Our World Your Future" vol. 10-11 all in both English and Japanese to reach high school students and the general public. In FY2023, the iCeMS Vision Book, which highlights the initiatives taken to realize the new Director’s vision, and Concept Book, which conveys the institute’s creative and inspiring atmosphere through images and words, were published.

6-3. International and Domestic Dissemination of Research Results

iCeMS actively publishes research results, both domestically and internationally. More than ten press releases are published in both Japanese and English every year. A unique feature of the iCeMS press releases is that each press release is distributed along with an artistic and approachable illustration to represent the news. The use of illustrations has clearly increased the visibility of iCeMS press releases on science news portals such as Asia Research News and EurekAlert!, which has accelerated the dissemination of the research findings.

6-4. Posting Information through Social Media

iCeMS makes frequent postings to its social media: X (Twitter), YouTube, and Instagram. iCeMS’ postings are viewed by many people and receive active responses. iCeMS is also utilizing social media to acquire research resources, such as the recruitment of young researchers, donations, and opportunities for collaboration. To boost international recognition and recruitment, we released iCeMS Leader Interviews, which is an interview video project in which unique researchers from iCeMS talk enthusiastically about their research themes and perspectives. And we have managed a targeted website and X (Twitter) account to reach overseas young researchers and graduate students.

7. Effort to Secure the Center's Future Development over the Mid- to Long-term

・Address each of the following items that have been done to secure mid- to long-term center development:
- Contents of the measures taken by the host institution to support maintaining the activities of the Center (such as securing financial and personnel resources, coordination among host institution to bring together in-house researchers, in-kind provision and/or facilities afforded in terms of usage of building, lab space and other equipment, new management reform carried out after the funding period ends).
- Actions and measures taken to sustain the Center as a world premier international research center.

7-1. Support Policy of Host Institution to Sustain the Center

To secure resources for iCeMS operations and research activities, KU has implemented the following measures for the previous three fiscal years:

1. As a necessary financial measure for iCeMS operations, the university has provided indirect costs associated with competitive grants to iCeMS.
2. The university has provided 10 positions and expenses for principal investigators (PIs).
3. The university has provided 2 overseas researchers with tenure positions.
4. The university has provided 8 young researchers.
5. The university has provided 9 full-time positions and expenses to support the administrative part.
6. The university has offered a research environment of the highest quality, with a total area of about 11,000 square meters and fully-equipped facilities for exclusive use.
7. The university has supported maintenance cost for large-scale facilities and equipment.

7-2. Personnel Management

In response to its increased need, a new salary system including cross-appointment scheme and annual salary system has been introduced into the personnel management throughout KU. The cross-appointment scheme, which started with Tamanoi of UCLA employed as a PI in 2017, continues to be used for hiring excellent researchers of overseas universities to facilitate joint research and internationalization of research environment. Furthermore, KU has made cross appointments with Sugimoto of SPring-8 and Nakanishi of Nagoya University.

8. Others

・In addition to the above1-7, note any of the Center's notable efforts and activities.

Appendix 1 List of Center's Major Research Achievements

1. List of Major Refereed Papers

*List **up to 20 papers** representative of the Center's research activities during the period between FY 2020 and FY 2023, and give brief descriptions (within 5 to 10 lines) of them.
*For each, write the author name(s); year of publication; journal name, volume, page(s) (or DOI number), and article title. Any listing order may be used as long as format is the same. If a paper has many authors, underline those affiliated with the Center.
*If a paper has many authors (say, more than 10), all of their names do not need to be listed.

1. Bonneau, M; Lavenn, C; Zheng, JJ; Legrand, A; Ogawa, T; Sugimoto, K; Coudert, FX; Reau, R; Sakaki, S; Otake, KI; Kitagawa, S, 2022, **Nat. Chem.**, 14, 816, Tunable acetylene sorption by flexible catenated metal-organic frameworks.
   This paper presents the development of a flexible adsorbent that enables safe and efficient transport of acetylene gas at room temperature, eliminating the need for solvents during filling. Through the rational design of a structurally flexible porous coordination polymer, we have created a smart adsorbent capable of absorbing a significant amount of acetylene at 150 kPa and releasing most of it at ambient pressure. This optimization allows for the maximization of usable capacity within the pressure range of 100 kPa to 150 kPa, ensuring safe acetylene operation below its explosive limit—an achievement not previously realized in conventional methods, which often involve solvents, high pressure, and unwanted impurity inclusion.

2. Deng, WH; Yao, MS; Zhang, MY; Tsujimoto, M; Otake, K; Wang, B; Li, CS; Xu, G; Kitagawa, S, 2022, **Natl. Sci. Rev.**, 9, nwac143, Non-contact real-time detection of trace nitro-explosives by MOF composites visible-light chemiresistor.
   This paper describes the design of smart integration of porous materials and a semiconductive substrate to achieve non-contact real-time detection of trace explosives using visible light. We developed a core-sheath pillar architecture with a synergistic interface that effectively combines the advantages of porous coordination polymers and metal oxides (TiO2) to achieve the mentioned performance. The sheath material can concentrate the target analyte, and the perfectly band-matched synergistic interface enables the TiO2 core to efficiently harvest and utilize visible light. Under room temperature and visible light, the developed hybrid demonstrates an unexpected self-promoting analyte-sensing behavior, with high selectivity and sensitivity, reaching the ppq-level limit of detection.

3. Su, Y; Otake, K; Zheng, JJ; Horike, S; Kitagawa, S; Gu, C, 2022, **Nature**, 611, 289, Separating water isotopologues using diffusion-regulatory porous materials.
   This study tackles the challenge of separating water isotopologues, with similar properties and equilibrium. Using porous materials, we achieved this for the first time. We designed dynamic molecular gates within porous coordination polymers to regulate guest traffic within their pore, enhancing differences in diffusion rates between water isotopologues. Our materials show significant temperature-responsive adsorption, favoring H2O vapor over D2O vapor. This enables efficient vapor separation of H2O/HDO/D2O mixtures at room temperature, with H2O separation factors reaching around 210.

4. Huang, GJ; Ghalei, B; Isfahani, AP; Karahan, HE; Terada, D; Qin, DT; Li; Tsujimoto, M; Yamaguchi, D; Sugimoto, K; Igarashi, R; Chang, BK; Li, T; Shirakawa, M; Sivaniah, E, 2021, **Nat. Energy**, 6, 1176, Overcoming humidity-induced swelling of graphene oxide-based hydrogen membranes using charge-compensating nanodiamonds.
   Graphene oxide (GO) can form ultrapermeable and ultraselective membranes that are promising for various gas separation applications, including hydrogen purification. However, GO films lose their attractive separation properties in humid conditions. Here we show that incorporating positively charged nanodiamonds (ND+s) into GO nanolaminates leads to humidity-resistant, yet high-performing, membranes. Charge compensation was revealed to be the main mechanism for

preparing the robust nanolaminates. The demonstrated material platform offers a solution for separating H2 gas from its usually humid mixtures generated from fossil fuel sources or water splitting, paving the way towards the transition to a decarbonized energy system.

5. Ma, N; Ohtani, R; Le, HM; Sorensen, SS; Ishikawa, R; Kawata, S; Bureekaew, S; Kosasang, S; Kawazoe, Y; Ohara, K; Smedskjaer, MM; Horike, S, 2022, **Nat. Commun.**, 13, 4023, Exploration of glassy state in Prussian blue analogues.
   Despite the long-established and broad interest in Prussian blue analogues (PBAs), developments have centered solely on their crystalline state. We demonstrated a generalized approach to preparing PBAs in their glassy state and shed light on their unique non-crystalline properties arising from preserving short-range order and defect control. The preservation of metal–ligand–metal connectivity in PBA glasses preserved network-based functions, including semiconductivity. Defect engineering through crystal–glass–crystal transformation significantly increases BET surface area by 100% compared to the pristine crystalline state. We generalize the correlation between intrinsic mechanical properties and glass transition difficulties by identifying factors including vacancy/defect content, interstitial water, and the composition of PBAs that dominate successful vitrification.

6. Zhang, PP; Maruoka, M; Suzuki, R; Katani, H; Dou, Y; Packwood, DM; Kosako, H; Tanaka, M; Suzuki, J, 2023, **Nat. Commun.**, 14, 5592, Extracellular calcium functions as a molecular glue for transmembrane helices to activate the scramblase Xkr4.
   Activation of the scramblase Xkr4 was previously shown to be strictly regulated by dimerization by caspase-dependent cleavage of the cytoplasmic region and interaction with the C-terminal region of the nuclear protein XRCC4. In this paper, we show that the third element, extracellular calcium, is essential for the scramblase activity of Xkr4. Calcium enters the transmembrane region of Xkr4 from outside the cell and induces a conformational change that bridges the two transmembrane helices close together like "glue" and activates scramblase.

7. Qin, DT; Gibbons, AH; Ito, MM; Parimalam, SS; Jiang, HD; Karahan, HE; Ghalei, B; Yamaguchi, D; Pandian, GN; Sivaniah, E, 2022, **Nat. Commun.**, 13, 2281, Structural colour enhanced microfluidics.
   The Sivaniah Group conducted this interdisciplinary project in collaboration with the Ganesh Groups at iCeMS. The study developed a new microfluidics platform by producing Organized Microfibrillation (Sivaniah E et al., Nature 2019) structures in polymer films as thin as only 1 micron. Structural colour, a property of Organized Microfibrillation, becomes an intrinsic feature of these microfluidic devices, enabling in-situ sensing capability. Furthermore, the microfluidic technology can manipulate and combine different porosities in a single miniature device, allowing for pore size-based separation of biomolecules. This research was selected for the Editor's Highlights section of the Nature Communications website. Professor Sivaniah supervised this collaborative work.

8. Jin, SY; Vu, HT; Hioki, K; Noda, N; Yoshida, H; Shimane, T; Ishizuka, S; Takashima, I; Mizuhata, Y; Pe, KB; Ogawa, T; Nishimura, N; Packwood, D; Tokitoh, N; Kurata, H; Yamasaki, S; Ishii, KJ; Uesugi, M, 2021, **Angew. Chem.-Int. Edit.**, 60, 961, Discovery of Self-Assembling Small Molecules as Vaccine Adjuvants.
   Vaccine adjuvants are required for the generation of robust and long-lasting immune responses of antigen vaccines. Screening of a newly constructed chemical library of self-assembling molecules led to the rapid discovery of cholicamide, as a potent vaccine adjuvant. Just like viruses, the nanoassembly of cholicamide enters the cells and is recognized by an endosomal Toll-like receptor to elicit potent innate immune responses.

9. Hayakawa, M; Sunayama, N; Takagi, SI; Matsuo, Y; Tamaki, A; Yamaguchi, S; Seki, S; Fukazawa, A, 2023, **Nat. Commun.**, 14, 2741, Flattened 1D fragments of fullerene C_{60} that exhibit robustness toward multi-electron reduction.

The flattened hydrocarbon molecules with the one-dimensional substructure of the fullerene C_{60} have been designed, synthesized, and demonstrated to exhibit an outstanding electron-accepting character that is approaching that of C_{60}. These results highlight the significance of the pentagonal substructure for attaining stability toward multi-electron reduction and provide a strategy for the molecular design of electron-accepting π-conjugated hydrocarbons even without electron-withdrawing groups.

10. Ohno, M; Ando, T; Priest, DG; Taniguchi, Y, 2021, **Nat. Protoc.**, 16, 3439, Hi-CO: 3D genome structure analysis with nucleosome resolution.
    The article argues for the Hi-CO method, a technique used for analyzing the 3D structure of genomes at the nucleosome resolution developed by the Taniguchi group. This method is crucial for understanding how the genome's physical configuration affects its function in cells. The paper provides a detailed protocol for effectively using the Hi-CO method, including steps for preparing samples, processing data, and analyzing results. This technology consists of an experimental procedure for nucleosome proximity analysis and a computational procedure for 3D modeling. The experimental procedure is based on proximity analysis among DNA entry or exit points at every nucleosome locus using DNA sequencing technology. The computational procedure is based on simulated annealing-molecular dynamics, which allows determination of optimized 3D positions and orientations of every nucleosome that satisfies the proximity ligation data sufficiently well.

11. Maruoka, M; Zhang, PP; Mori, H; Imanishi, E; Packwood, DM; Harada, H; Kosako, H; Suzuki, J, 2021, **Mol. Cell**, 81, 1397, Caspase cleavage releases a nuclear protein fragment that stimulates phospholipid scrambling at the plasma membrane.
    Scramblase Xkr4 is activated through dimerization upon cleavage by a caspase. Expression of caspase-cleaved Xkr4 did not show scramblase activity, suggesting the presence of an activator of Xkr4. To identify the activator, we established a "revival screen" that allows screening from dying cells and identified the nuclear protein XRCC4. XRCC4 was also found to be activated by caspase cleavage, which releases a fragment of XRCC4 into the cytoplasm and binds directly to Xkr4 at the plasma membrane. These results suggest that Xkr4 activation is strictly regulated by dimerization and interaction with nuclear factors.

12. Sato, Y; Kanamori, K; Nakanishi, K, 2023, **Chem. Mat.**, 35, 5177, Preparation of Hierarchically Porous Niobium(V) Oxide and Alkaline Niobate Monoliths via Sol-Gel Accompanied by Phase Separation.
    Hierarchically porous niobium(V) oxide monoliths were prepared through the sol–gel process accompanied by phase separation and subsequent heat treatment. Macroporous and esoporous characteristics as well as crystal structures were investigated in detail. Macroporous structures were controlled by the starting composition to manipulate phase separation, whereas mesoporous structures were modified by heat treatment in air to crystallize niobium(V) oxide.

13. Brewer, A; Reicher, C; Manatschal, O; Bai, HZ; Nakanishi, K; Kleitz, F, 2023, **ACS Sustain. Chem. Eng.**, 11, 15432, Powdered Hierarchically Porous Silica Monoliths for the Selective Extraction of Scandium.
    Using the hierarchically porous silica materials developed by Nakanishi group and his start-up, DPS Inc., the efficiency of selectively recovering scandium metals from dilute aqueous solution has been examined in collaboration with the group of Prof. Freddy Kleitz, Vienna University. Separation columns were packed with several tens micron-sized silica particles embedded with micron-sized through pores and nanometer-sized mesopores. Due to the specific adsorption of scandium onto silanols, the recovery has been accelerated.

14. Malinee, M; Pandian, GN; Sugiyama, H, 2022, **Cell Chem. Biol.**, 29, 463, Targeted epigenetic induction of mitochondrial biogenesis enhances antitumor immunity in mouse model.
In recent years, immunotherapy using PD-1/PD-L1 blockade has transformed cancer treatment. However, over half of cancer patients do not respond well to these treatments due to T cell exhaustion caused by insufficient energy-providing mitochondria. Our group has developed a biomimetic epigenetic code called En-PGC1 that includes a p300/CBP-selective bromodomain inhibitor and selective DNA-binding pyrrole imidazole polyamides. Biological evaluation studies have confirmed that EnPGC-1 promotes epigenetic induction of mitochondrial biogenesis in CD8+ T cells and shifts metabolism towards oxidative phosphorylation. When combined with PD-1 blockade immunotherapy, EnPGC-1 has been shown to enhance anti-tumor immunity in mice and improve their survival. This strategy could potentially be expanded for diseases associated with energy metabolism.

15. Nilouyal, S; Karahan, HE; Ng, EWH; Yamaguchi, D; Ito, MMM; Qin, DT; Hirao, H; Sivaniah, E; Ghalei, B, 2023, **Chem. Mat.**, 35, 1610, Nanobiomineralization of Carbon Dioxide by Molecularly Engineered Metal-Histidine Complex Nanozymes.
Next-generation carbon capture, utilization, and storage (CCUS) technologies will be indispensable elements of global decarbonization efforts. The carbonic anhydrases (CAs) have, thus, gained considerable attention as rate promoters for CO_2 hydration. Nevertheless, the poor stability and high cost of CAs limit their practical application prospects. Here, we demonstrate that the molecular size control of histidine-based bolaamphiphiles (HisBolas) is a viable strategy for forming robust nanoarchitectures with unusual CA-like catalytic activity. HisBola molecules self-assemble into nanoparticles that fuse into globules in water, and the metal coordination of these supramolecular nanoassemblies results in nanozymes. The developed bioinspired nanozymes boost the CO_2 hydration kinetics, thus efficiently catalyzing the mineralization process. The alkyl unit-controlled performance manipulation of produced nanozymes offers a new path for engineering supramolecular CA mimics, which share a common trait with proteinaceous enzymes in terms of the supporting role of noncatalytic units in catalytic activity.

16. Wang, ZM; Ozcan, A; Craig, GA; Haase, F; Aoyama, T; Poloneeva, D; Horio, K; Higuchi, M; Yao, MS; Doherty, CM; Maurin, G; Urayama, K; Bavykina, A; Horike, S; Gascon, J; Semino, R; Furukawa, S, 2023, **J. Am. Chem. Soc.**, 145, 14456, Pore-Networked Gels: Permanently Porous Ionic Liquid Gels with Linked Metal-Organic Polyhedra Networks.
Porous liquids (PLs) are attractive materials because of their capability to combine the intrinsic porosity of microporous solids and the processability of liquids. However, a gap exists between PLs and solid adsorbents for some practical cases, where the liquid characteristics and mechanical stability without leakage are simultaneously required. Here, we fill in this gap by demonstrating a new concept of pore-networked gels, in which the solvent phase is trapped by molecular networks with accessible porosity. To achieve this, we fabricate a linked metal–organic polyhedra (MOPs) gel, followed by exchanging the solvent phase with a bulky liquid such as ionic liquids (ILs). The remaining volatile solvents in the MOP cavities can then be removed by thermal activation, endowing the obtained IL gel (Gel_IL) with accessible microporosity. The CO2 capacities of the gels are greatly enhanced compared to the neat IL. The exchange with the IL also exerts a positive influence on the final gel performances such as mechanical properties and low volatility.

17. Troyano, J; Furukawa, S; Horike, S, 2022, **J. Am. Chem. Soc.**, 144, 19475, Reversible Discrete-to-Extended Metal-Organic Polyhedra Transformation by Sulfonic Acid Surface Functionalization.
This paper describes that the superior chemical stability of the Rh2 unit and the elevated number of functional groups on the surface (24 per cage) result in a porous cage with high solubility and stability in water, including acidic, neutral, and basic pH conditions. We also prove that the sulfonic

acid-rich form of the cage can be isolated through postsynthetic acid treatment. This transformation involves an improved gas uptake capacity and the capability to reversibly assemble the cages into a three-dimensional (3D) metal–organic framework (MOF) structure. Likewise, this sulfonic acid functionalization provides both MOP and MOF solids with high proton conductivities (>10–3 S cm–1), comparable to previously reported high conducting metal–organic materials.

18. Nishio, K; Toh, K; Perron, A; Goto, M; Abo, M; Shimakawa, Y; Uesugi, M, 2022, **J. Am. Chem. Soc.**, 144, 16720, Magnetic Control of Cells by Chemical Fabrication of Melanin.
    The Uesugi group found a way to create customized materials in mammalian cells by chemically fabricating melanin. This approach uses synthetic tyrosine derivatives to hijack the melanin biosynthesis pathway. A magnetic tyrosine analog permitted the intracellular generation of magnetic melanin materials, conferring mammalian cells with the ability to respond to magnetic fields.

19. Toh, K; Nishio, K; Nakagawa, R; Egoshi, S; Abo, M; Perron, A; Sato, S; Okumura, N; Koizumi, N; Dodo, K; Sodeoka, M; Uesugi, M, 2022, **J. Am. Chem. Soc.**, 144, 20171, Chemoproteomic Identification of Blue-Light-Damaged Proteins.
    Blue light can cause cell dysfunction and contribute to cellular aging and age-related pathologies. A chemoproteomic approach was utilized to map blue-light-damaged proteins in live mammalian cells, revealing that cell surface proteins, particularly the integrin family of cell surface receptors, are more readily oxidized than other susceptible proteins. The finding suggests that the photodamage of integrins contributes to the blue-light-induced cell dysfunction.

20. Hatsuda, A; Kurisu, J; Fujishima, K; Kawaguchi, A; Ohno, N; Kengaku, M, 2023, **Development**, 150, dev201930, Calcium signals tune AMPK activity and mitochondrial homeostasis in dendrites of developing neurons.
    Brain adopts 'use it or lose it' rule and refines neural network according to the activity level of its constituent neurons: more active neurons grow larger and form more synaptic connections. In this study, we demonstrate a link between activity-dependent dendritic development and mitochondrial homeostasis in rodent hippocampus. Calcium influx triggered by neuronal activity induces synchronized oscillation of AMP-activated protein kinase (AMPK) activity. AMPK is known to regulate mitochondrial dynamics and function and has been implicated in neurodegenerative diseases. We demonstrate that AMPK activity is fine-tuned by neuronal activity to regulate mitochondrial homeostasis in developing dendrites of brain neurons.

2. Major Invited Lectures, Plenary Addresses (etc.)

*List up to 10 main presentations made between FY 2020 and FY 2023 in order from most recent.
*For each, write the date(s), lecturer/presenter's name, presentation title and conference name.

Date(s)	Lecturer/Presenter's name	Presentation title	Conference name
2023/12/18	Uesugi Motonari	Chemical Biology of Self-Assembly	ISBOC-13 IUPAC Singapore
2023/9/21	Tamanoi Fuyuhiko	Development of Auger radiation therapy for cancer	The 9th Japanese-German University Presidents' Conference
2023/9/19	Kitagawa Susumu	Exploring Gas Science and Technology through PCPs and MOFs: A Journey to Discover Soft Porous Crystals	Nobel Symposium NS193, Alfred Nobel's Björkborn Manor in Karlskoga, Sweden
2023/8/16	Suzuki Jun	Revival screening: genetic screening approach for dying cells to reveal mechanisms of membrane dynamics	The 3rd Japan and Australia Meeting on Cell Death 2023
2023/5/12	Furukawa Shuhei	Assembling metal-organic cages as porous materials	Gordon Research Conference "Self-assembly and Supramolecular Chemistry"
2023/3/3	Ueda Kazumitsu	How and Why of ABC proteins	ABC2023-9th FEBS Special Meeting
2023/2/8	Fukazawa Aiko	Design of Novel Nonbenzenoid π-Electron Systems toward Unusual Yet Stable Functional Materials	10th International Conference on Advanced Materials & Nanotechnology (AMN10)
2022/3/15	Kengaku Mineko	Cytoskeletal forces driving neuronal migration in 3D brain tissues.	International Symposium on Development and Plasticity of Neural Systems
2022/1/17	Sivaniah Easan	High-Performance, Low Cost, Membrane Technology for Carbon Capture	2022 INTERNATIONAL CONFERENCE ON HIERARCHICAL GREEN ENERGY MATERIALS
2021/6/24	Taniguchi Yuichi	Nucleosome-level 3D organization of the yeast genome	Cold Spring Harbor Asia Conference: Yeast and life science

3. Major Awards

*List main awards received between FY 2020 and FY 2023 in order from the most recent (within 10 awards)..
*For each, write the date issued, recipient's name and the name of award. In case of multiple recipients, underline those affiliated with the Center.

Date	Recipient's name	Name of award
2023/11/17	Kitagawa Susumu	Highly Cited Researchers
2023/4/1	Daishi Fujita	The Young Scientists' Award (MEXT)
2023/3/23	Imahori Hiroshi	Chemical Society of Japan (CSJ) Award
2023/2/7	Horike Satoshi	The 19th Japan Academy Medal
2023/2/7	Horike Satoshi	Japan Society for the Promotion of Science (JSPS) Prize
2022/11/17	Sugiyama Hiroshi	The Award of Japan Society of Nucleic Acids Chemistry (Ikehara Award)
2022/4/13	Kusada Kouhei	The Young Scientists' Award (MEXT)
2022/2/10	Taniguchi Yuichi	Japan Society for the Promotion of Science (JSPS) Prize
2021/11/27	Taniguchi Yuichi	Osaka Science Prize
2021/10/14	Nakanishi Kazuki	International Sol-Gel Society (ISGS) Life Achievement Award

Appendix 2　FY 2023 List of Principal Investigators

NOTE:
*Underline names of principal investigators who belong to an overseas research institution.
*Indicate newly added researchers for FY 2020-2023 in the "Notes" column.

		<Principal Investigators at the end of FY 2023>				**Principal Investigators Total: 24**	
Name	Age	Affiliation (Position title, department, organization)	Academic degree, Specialty	Effort (%)*	Starting date of participation	Status of participation (Describe in concrete terms)	Note
Uesugi Motonari	57	Professor, Instutute for Integrated Cell-Material Sciences; Institute for Chemical Research, Kyoto University	Ph.D. Chemical biology	40	Oct. 1, 2007	Director Stays at the center two days a week	
Kitagawa Susumu	72	Distinguished Professor, Institute for Integrated Cell-Material Sciences; Institute for Advanced Study, Kyoto University	Ph.D. Coordination chemistry	60	Oct. 1, 2007	Usually stays at the center	
Kengaku Mineko	57	Professor, Institute for Integrated Cell-Material Sciences, Institute for Advanced Study, Kyoto University	Ph.D. Developmental neurobiology	60	Oct. 1, 2008	Deputy Director Usually stays at the center	
Sivaniah Easan	52	Professor, Institute for Integrated Cell-Material Sciences, Institute for Advanced Study, Kyoto University	Ph. D. Physics	60	July 1, 2013	Usually stays at the center	
Suzuki Jun	46	Professor, Institute for Integrated Cell-Material Sciences, Institute for Advanced Study, Kyoto University	Ph.D. Medical biochemistry, Cell membrane	60	January 1, 2017	Deputy Director Usually stays at the center	
Fukazawa Aiko	44	Professor, Institute for Integrated Cell-Material Sciences, Institute for Advanced Study, Kyoto University	Ph.D. Organic chemistry	60	November 1, 2018	Deputy Director Usually stays at the center	
Furukawa Shuhei	46	Professor, Institute for Integrated Cell-Material Sciences, Institute for Advanced Study, Kyoto University	Ph.D. Chemistry of molecular assemblies	60	October 1, 2010	Usually stays at the center	
Taniguchi Yuichi	45	Professor, Institute for Integrated Cell-Material Sciences, Institute for Advanced Study, Kyoto University	Ph.D. Biophysics, System biology	60	October 1, 2020	Usually stays at the center	New

Tamanoi Fuyuhiko	76	Program-Specific Professor, Institute for Integrated Cell-Material Sciences, Institute for Advanced Study, Kyoto University	Ph.D. Nanoparticles and cancer therapy	36	April 1, 2017	Cross-appointed with UCLA	
Ueda Kazumitsu	70	Program-Specific Professor, Institute for Integrated Cell-Material Sciences, Institute for Advanced Study, Kyoto University	Ph.D. Cellular biochemistry	60	Oct. 1, 2007	Research Administrative Director Usually stays at the center	
Nakanishi Kazuki	63	Program-Specific Professor, Institute for Integrated Cell-Material Sciences, Institute for Advanced Study, Kyoto University	Ph.D. Sol-gel science, Porous materials	12	August. 1, 2019	Cross-appointed with Nagoya University	
Fujita Daishi	40	Associate Professor, Institute for Integrated Cell-Material Sciences, Institute for Advanced Study, Kyoto University	Ph.D. Supramolecular chemistry, Chemical biology	60	April 1, 2018	PI Board Chair Usually stays at the center	
Packwood Daniel Miles	38	Associate Professor, Institute for Integrated Cell-Material Sciences, Institute for Advanced Study, Kyoto University	Ph.D. Applied mathematics, Theoretical chemistry	60	April 1, 2016	Usually stays at the center	
Namasivayam Ganesh Pandian	44	Junior Associate Professor, Institute for Integrated Cell-Material Sciences, Institute for Advanced Study, Kyoto University	Ph.D. Bio-inspired therapeutics, Epigenetics	60	October 1, 2010	Usually stays at the center	
Abe Ryu	50	Professor, Graduate School of Engineering, Kyoto University	Ph.D. Artificial photosynthesis, Solar hydrogen production, Photocatalysts	10	Apr. 1, 2017	Adjunct PI	
Hamachi Itaru	63	Professor, Graduate School of Engineering, Kyoto University	Ph.D. Chemical biology, Supramolecular biomaterials	10	May 1, 2017	Adjunct PI	
Horike Satoshi	46	Professor, Graduate School of Science, Kyoto University	Ph.D. Materials chemistry	20	January 1, 2017	Adjunct PI	

Imahori Hiroshi	62	Professor, Graduate School of Engineering, Kyoto University	Ph.D. Organic chemistry	10	Oct. 1, 2007	Adjunct PI	
Kageyama Hiroshi	54	Professor, Graduate School of Engineering, Kyoto University	Ph.D. Solid-state chemistry	10	May 1, 2017	Adjunct PI	
Kitagawa Hiroshi	62	Professor, Graduate School of Science, Kyoto University	Ph.D. Solid-state chemistry: Electron-proton coupled system	10	May 1, 2017	Adjunct PI	
Matsuda Michiyuki	65	Professor, Graduate School of Biostudies, Kyoto University	Ph.D. Bio-imaging, Visualization of inter- and intra-cellular signal transduction	10	May 1, 2017	Adjunct PI	
Mori Yasuo	64	Professor, Graduate School of Engineering, Kyoto University	M.D. Ph.D. Molecular biology	10	Apr. 1, 2017	Adjunct PI	
Tanaka Koichiro	61	Professor, Graduate School of Science, Kyoto University	Ph.D. Terahertz optical science	10	Apr. 1, 2008	Adjunct PI	
Tanaka Motomu	53	Professor, Center for Integrative Medicine and Physics, Institute for Advanced Study, Kyoto University	Ph.D. Medical physics, Soft matter physics	10	Apr. 1, 2018	Adjunct PI	

*Percentage of time that the principal investigator devotes to his/her work for the Academy center vis-à-vis his/her total working hours.

Principal Investigators resigned since FY 2020

Name	Next Affiliation (Position title, department, organization)	Period of participation
Matsuda Michiyuki	Visiting Professor, Graduate School of Medicine, Kyoto University	Mar. 1, 2017-Mar. 31, 2024
Tanaka Motomu	Professor, Institute of Physical Chemistry, Heidelberg University	Apr. 1, 2018-Mar. 31, 2024
Carlton Peter	Associate Professor, Graduate School of Biostudies, Kyoto University	Mar. 1, 2010-Mar. 31, 2023
Kamei Kenichiro	Associate Professor, Divisions of Science and Engineering, New York University Abu Dhabi	May 24, 2010-Jan 31, 2023
Sugimoto Kunihisa	Professor, Graduate School of Science and Engineering, Kindai University	Jan 10, 2019-Mar. 31, 2022
Sugiyama Hiroshi	Specially Appointed Professor, Institute for Integrated Cell-Material Sciences, Institute for Advanced Study, Kyoto University	Apr. 1, 2008-Mar. 31, 2022
Wang Dan Ohtan	Team Leader, Laboratory for Neuroepitranscriptomics, RIKEN Center for Biosystems Dynamics Research	May 1, 2011-Mar. 31, 2021
Kageyama Ryoichiro	Team Leader, Neural Stem Cell Research, RIKEN Center for Brain Science	Feb. 2, 2013-Mar. 31, 2021
Sugimura Kaoru	Associate Professor, Graduate School of Science, University of Tokyo	Apr. 1, 2011-Dec. 31, 2020
Hasegawa Koichi	Staff, StemRIM Inc.	Apr. 17, 2011-July 31, 2020

Appendix 3-1 Record of Center Activities (FY 2020-FY 2023)

1. Researchers and Center Staffs, Satellites, Partner Institutions

1-1. Researchers and Center Staffs Participated in the Center's Activities

- Enter the number of researchers and center staffs affiliated with the Center in the table in Appendix 3-1a.

Special mention

- Describe the Center's concrete plans for the future and already-established schedules for employing researchers, particularly principal investigators.
- As background to how the Center is working on the global circulation of world's best brains, give good examples, if any, of how career paths are being established for the Center's researchers; that is, from which top-world research institutions do researchers come to the Center and to which research institutions do the Center's researchers go, and how long are their stays at those institutions.
- In Appendix 3-1b, describe the positions that postdoctoral researchers acquire upon leaving the Center.

iCeMS plans to recruit a highly motivated female principal investigator in FY2024.

1-2. Satellites and Partner Institutions

- List the satellite and partner institutions, both domestic and overseas, in the table below.
- Indicate newly added and deleted institutions in the "Notes" column.

<Satellite institutions>

Institution name	Principal Investigator(s), if any	Notes
Smart Material Research Center w/ VISTEC (Thailand)	Horike Satoshi (PI)	Overseas Satellite 1 Kyoto Univ On-site Laboratory Since 2018.8
Kyoto University Shanghai Lab w/ Fudan University (China)	Uesugi Motonari PI)	Overseas Satellite 2 Kyoto Univ On-site Laboratory Since 2019.9
Center for Integrated Biosystems w/ Academia Sinica (Taiwan)	Suzuki Jun (PI)	Overseas Satellite 3 Kyoto Univ On-site Laboratory Since 2019.12
iCeMS Taiwan Office w/ NTU, CMU, etc. (Taiwan)	Suzuki Jun (PI)	Overseas Satellite 4 iCeMS Project Unit Since 2019.6
Laboratory for Green Porous Materials w/ A*STAR (Singapore)	Kitagawa Susumu (PI)	Overseas Satellite 5 Kyoto Univ On-site Laboratory Since 2021.2
Center for Integrated Data-Material Sciences w/ MDI (New Zealand)	Fukazawa Aiko (PI) Packwood Daniel Miles (PI)	Overseas Satellite 6 Kyoto Univ On-site Laboratory Since 2021.11
SKAEM-JIL (SUSTech-Kyoto University Advanced Energy Materials Joint Innovation Laboratory) w/ SUS-Tech (China)	Kitagawa Susumu (PI)	Overseas Satellite 7 iCeMS Project Unit Since 2022.5
Smolab (Small Molecular Lab) w/ CNRS (France)	Furukawa Shuhei (PI)	CNRS-International Research Project iCeMS Project Unit Since 2018.10
Quantum Nano Medicine Research Center w/ UCLA (USA)	Tamanoi Fuyuhiko (PI)	Inbound-type Laboratory 1 Kyoto Univ On-site Laboratory Since 2019.10
INJA IN BIO (India Japan Initiative for Intelligent Biomaterials) w/ NNF etc. (India)	Namasivayam Ganesh Pandian (PI) Uesugi Motonari (Adjunct PI)	Inbound-type Laboratory 2 iCeMS Project Unit

< Partner institutions>

Institution name	Principal Investigator(s), if any	Notes
iGCORE (Institute for Glyco-core Research), Tokai National Higher Education and Research System	Ando Hiromune	Since 2017.4
CiMPhy (Center for Integrative Medicine and Physics)	Tanaka Motomu (Adjunct PI)	2018.4 - 2024.3
ZEISS-iCeMS Innovation Core, Carl Zeiss (Germany)	Kengaku Mineko (PI)	Since 2019.10
TRiKUC (Toyota-Riken-Kyoto University Research Center)	Maeno Yoshiteru	Since 2022.4

2. Status of Collaboration with Overseas Satellites

2-1. Coauthored Papers

- List the refereed papers published between FY 2020 and FY 2023 that were coauthored between the Center's researcher(s) in domestic institution(s) (include satellite institutions) and overseas satellite institution(s). List them by overseas satellite institution in the below blocks.
- Transcribe data in same format as in Appendix 1. Italicize the names of authors affiliated with overseas satellite institutions.

Overseas Satellite 1: Smart Material Research Center (VISTEC) (Total: 18 papers)

1) Wei, YS; Ashling, CW; *Watcharatpong, T;* Fan, ZY; *Horike, S,* 2023, Adv. Funct. Mater., 2307226, Hierarchical Metal-Organic Network-Forming Glasses toward Applications, WOS:001104593300001
2) *Tiyawarakul, T;* Imyen, T; *Kongpatpanich, K; Watcharatpong, T; Horike, S,* 2023, APL Mater., 11, 41119, Macroscopic shaping of coordination polymer via crystal-glass phase transformation as monolithic catalyst for efficient catalyst recovery, WOS:000971138300007
3) Ma, NTP; Impeng, S; *Bureekaew, S;* Morozumi, N; Haga, MA; *Horike, S,* 2023, J. Am. Chem. Soc., 145, 9808, Photoexcited Anhydrous Proton Conductivity in Coordination Polymer Glass, WOS:000974579100001
4) *Kaiyasuan, C; Somjit, V;* Boekfa, B; Packwood, D; *Chasing, P; Sudyoadsuk, T; Kongpatpanich, K; Promarak, V,* 2022, Angew. Chem.-Int. Edit., 61, e202117608, Intrinsic Hole Mobility in Luminescent Metal-Organic Frameworks and Its Application in Organic Light-Emitting Diodes, WOS:000765590700001
5) *Thanaphatkosol, C;* Ma, N; Kageyama, K; *Watcharatpong, T; Tiyawarakul, T; Kongpatpanich, K; Horike, S,* 2022, Chem. Commun., 58, 6064, Modulation of proton conductivity in coordination polymer mixed glasses, WOS:000784890100001
6) Ma, N; *Horike, S,* 2022, Chem. Rev., 122, 4163, Metal-Organic Network-Forming Glasses, WOS:000745936300001
7) *Watcharatpong, T; Pila, T;* Maihom, T; Ogawa, T; Kurihara, T; Ohara, K; Inoue, T; Tabe, H; Wei, YS; *Kongpatpanich, K; Horike, S,* 2022, Chem. Sci., 13, 11422, Coordination polymer-forming liquid Cu(2-isopropylimidazolate), WOS:000857447000001
8) Noro, S; Zheng, X; Wang, AQ; Suzuki, K; *Kosasang, S; Horike, S;* Padovan, D; Nakajima, K; Sato, H; Takahashi, K; Nakamura, T, 2022, Inorg. Chem., 61, 3379, Mechanical Force Induced Formation of Extrinsic Micropores in Coordination Polymers, WOS:000790015500004
9) Ma, N; Horike, N; Lombardo, L; Kosasang, S; Kageyama, K; *Thanaphatkosol, C; Kongpatpanich, K;* Otake, K; *Horike, S,* 2022, J. Am. Chem. Soc., 144, 18619, Eutectic CsHSO4-Coordination Polymer Glasses with Superprotonic Conductivity, WOS:000866457100001
10) Ma, N; Ohtani, R; Le, HM; Sorensen, SS; Ishikawa, R; Kawata, S; *Bureekaew, S; Kosasang, S;* Kawazoe, Y; Ohara, K; Smedskjaer, MM; *Horike, S,* 2022, Nat. Commun., 13, 4023, Exploration of glassy state in Prussian blue analogues, WOS:001057311000001
11) *Somjit, V; Thinsoongnoen, P; Waiprasoet, S; Pila, T; Pattanasattayavong, P; Horike, S; Kongpatpanich, K,* 2021, ACS Appl. Mater. Interfaces, 13, 30844, Processable UiO-66 Metal-Organic Framework Fluid Gel and Electrical Conductivity of Its Nanofilm with Sub-100 nm Thickness, WOS:000672492800057
12) Ma, N; *Kosasang, S;* Yoshida, A; *Horike, S,* 2021, Chem. Sci., 12, 5818, Proton-conductive coordination polymer glass for solid-state anhydrous proton batteries†, WOS:000631728500001
13) *Wechwithayakhlung, C;* Wannapaiboon, S; Na-Phattalung, S; *Narabadeesuphakorn, P; Tanjindaprateep, S; Waiprasoet, S;* Imyen, T; *Horike, S; Pattanasattayavong, P,* 2021, Inorg. Chem., 60, 16149, Mixed-Metal Cu-Zn Thiocyanate Coordination Polymers with Melting Behavior, Glass Transition, and Tunable Electronic Properties, WOS:000715230700034
14) *Wechwithayakhlung, C;* Packwood, DM; Harding, DJ; P*attanasattayavong, P,* 2021, J. Phys. Chem. Solids, 154, 110085, Structures, bonding, and electronic properties of metal thiocyanates, WOS:000652065700049
15) *Horike, S;* Ma, N; Fan, ZY; *Kosasang, S;* Smedskjaer, MM, 2021, Nano Lett., 21, 6382, Mechanics, Ionics, and Optics of Metal-Organic Framework and Coordination Polymer Glasses, WOS:000685244900004
16) *Tangsermvit, V; Pila, T;* Boekfa, B; *Somjit, V;* Klysubun, W; *Limtrakul, J; Horike, S; Kongpatpanich, K,* 2021, Small, 17, 2006541, Incorporation of Al3+ Sites on Bronsted Acid Metal-Organic

Frameworks for Glucose-to-Hydroxylmethylfurfural Transformation, WOS:000630749200001

17) *Worakajit, P;* Hamada, F; Sahu, D; Kidkhunthod, P; *Sudyoadsuk, T; Promarak, V;* Harding, DJ; Packwood, DM; Saeki, A; *Pattanasattayavong, P,* 2020, Adv. Funct. Mater., 30, 2002355, Elucidating the Coordination of Diethyl Sulfide Molecules in Copper(I) Thiocyanate (CuSCN) Thin Films and Improving Hole Transport by Antisolvent Treatment, WOS:000544389300001
18) Packwood, DM; *Pattanasattayavong, P,* 2020, J. Phys.-Condes. Matter, 32, 275701, Disorder-robust bands from anisotropic orbitals in a coordination polymer semiconductor, WOS:000528040000001

Overseas Satellite 2: Kyoto University Shanghai Lab (Fudan University) (Total: 7 papers)

1) *Jiang, LL;* Liu, SX; *Jia, XL; Gong, QT;* Wen, X; Lu, WW; *Yang, JT;* Wu, XY; Wang, X; Suo, YR; Li, YL; *Uesugi, M; Qu, ZB;* Tan, MJ; Lu, XJ; *Zhou, L,* 2023, J. Am. Chem. Soc., 145, 25283, ABPP-CoDEL: Activity-Based Proteome Profiling-Guided Discovery of Tyrosine-Targeting Covalent Inhibitors from DNA-Encoded Libraries, WOS:001108450900001
2) Zhuo, SH; Noda, N; Hioki, K; Jin, SY; Hayashi, T; Hiraga, K; Momose, H; Li, WH; Zhao, L; Mizukami, T; Ishii, KJ; Li, YM; *Uesugi, M,* 2023, J. Med. Chem., 66, 13266, Identification of a Self-Assembling Small-Molecule Cancer Vaccine Adjuvant with an Improved Toxicity Profile, WOS:001064223400001
3) Jung, YJ; Noda, N; Takaya, J; Abo, M; Toh, K; Tajiri, K; *Cui, CY; Zhou, L;* Sato, S; *Uesugi, M,* 2022, ACS Chem. Biol., 17, 340, Discovery of Non-Cysteine-Targeting Covalent Inhibitors by Activity-Based Proteomic Screening with a Cysteine-Reactive Probe, WOS:000768010700001
4) Jin, SY; Zhuo, SH; Takemoto, Y; Li, YM; *Uesugi, M,* 2022, Chem. Commun., 58, 12228, Self-assembling small-molecule adjuvants as antigen nano-carriers, WOS:000869367100001
5) Long, TF; Liu, L; Tao, YQ; Zhang, WL; Quan, JL; Zheng, J; Hegemann, JD; *Uesugi, M;* Yao, WB; Tian, H; Wang, H, 2021, Angew. Chem.-Int. Edit., 60, 13414, Light-Controlled Tyrosine Nitration of Proteins, WOS:000648679600001
6) *Zhang, XD; Jiang, LL; Huang, K; Fang, CT; Li, J; Yang, JT; Li, HT; Ruan, XX; Wang, PH; Mo, MG;* Wu, P; *Xu, YH;* Peng, C; *Uesugi, M; Ye, DY; Yu, FX; Zhou, L,* 2020, ACS Chem. Biol., 15, 632, Site-Selective Phosphoglycerate Mutase 1 Acetylation by a Small Molecule, WOS:000526387600004
7) Punzalan, LL; *Jiang, LL;* Mao, D; Das Mahapatra, A; Sato, S; Takemoto, Y; Tsujimura, M; Kusamori, K; Nishikawa, M; *Zhou, L; Uesugi, M,* 2020, Cell Chem. Biol., 27, 708, Chemoproteomic Profiling of a Pharmacophore-Focused Chemical Library, WOS:000542791900011

Overseas Satellite 3: Center for Integrated Biosystems (Academia Sinica) (Total: 1 papers)

1) *Maruoka, M;* Zhang, PP; Mori, H; Imanishi, E; Packwood, DM; Harada, H; Kosako, H; *Suzuki, J,* 2021, Mol. Cell, 81, 1397, Caspase cleavage releases a nuclear protein fragment that stimulates phospholipid scrambling at the plasma membrane, WOS:000637214700009

Overseas Satellite 4: iCeMS Taiwan Office w/ NTU, CMU, etc. (Total: 0 papers)

Overseas Satellite 5: Laboratory for Green Porous Materials w/ A*STAR (Total: 3 papers)

1) *Li, X; Tan, TTY; Lin, QY; Lim, CC; Goh, R; Otake, KI; Kitagawa, S; Loh, XJ; Lim, JYC,* 2023, ACS Biomater. Sci. Eng., 9, 5724, MOF-Thermogel Composites for Differentiated and Sustained Dual Drug Delivery, WOS:001070780800001
2) *Lim, JYC; Goh, L; Otake, KI; Goh, SS; Loh, XJ; Kitagawa, S,* 2023, Biomater. Sci., 11, 2661, Biomedically-relevant metal organic framework-hydrogel composites, WOS:000936213900001
3) *Tan, TTY; Li, X; Otake, K; Tan, YC; Loh, XJ; Kitagawa, S; Lim, JYC,* 2022, Chem. Commun., 58, 11402, UiO-66 metal organic frameworks with high contents of flexible adipic acid co-linkers, WOS:000858482100001

Overseas Satellite 6: Center for Integrated Data-Material Sciences w/ MDI (Total: 1 papers)

1) *Wechwithayakhlung, C; Weal, GR;* Kaneko, Y; *Hume, PA; Hodgkiss, JM; Packwood, DM,* 2023, J. Chem. Phys., 158, 204106, Exciton diffusion in amorphous organic semiconductors: Reducing simulation overheads with machine learning, WOS:001027490600003

Overseas Satellite 7: SUSTech-Kyoto University Advanced Energy Materials Joint Innovation Laboratory w/ SUS-Tech (Total: 3 papers)

1) Zou, LL; Wei, YS; Wang, QJ; Liu, Z; *Xu, Q;* Kitagawa, S, 2023, Sci. China-Mater., 66, 3139, Cobalt phosphide nanofibers derived from metal-organic framework composites for oxygen and hydrogen evolutions, WOS:000988485200002
2) Kitagawa, S; Kaskel, S; *Xu, Q,* 2022, Small Struct., 3, 2200072, Metal-Organic Frameworks: Synthesis, Structures, and Applications, WOS:000793965000021
3) Zhao, D; Cheetham, A; Furukawa, S; Kitagawa, S; *Xu, Q;* Zhang, W; Zou, RQ, 2020, APL Mater., 8, 40401, Open framework materials for energy applications, WOS:000523749800001

CNRS-International Research Project: Smolab (Small Molecular Lab) w/ CNRS (Total: 3 papers)

1) *Veselska, O; Vaidya, S;* Das, C; *Guillou, N; Bordet, P; Fateeva, A; Toche, F; Chiriac, R; Ledoux,* G; Wuttke, S; Horike, S; *Demessence, A,* 2022, Angew. Chem.-Int. Edit., 61, e202117261, Cyclic Solid-State Multiple Phase Changes with Tuned Photoemission in a Gold Thiolate Coordination Polymer, WOS:000756111000001
2) *Ghosh, AC;* Legrand, A; *Rajapaksha, R;* Craig, GA; Sassoye, C; Balázs, G; *Farrusseng, D;* Furukawa, S; *Canivet, J;* Wisser, FM, 2022, J. Am. Chem. Soc., 144, 3626, Rhodium-Based Metal-Organic Polyhedra Assemblies for Selective CO2 Photoreduction, WOS:000773646200034
3) Bonneau, M; Lavenn, C; Zheng, JJ; Legrand, A; Ogawa, T; Sugimoto, K; *Coudert, FX;* Reau, R; Sakaki, S; Otake, KI; Kitagawa, S, 2022, Nat. Chem., 14, 816, Tunable acetylene sorption by flexible catenated metal-organic frameworks, WOS:000784692200001

Inbound-type Laboratory: Quantum Nano Medicine Research Center w/ UCLA (Total: 9 papers)

1) Laird, M; Matsumoto, K; Higashi, Y; Komatsu, A; Raitano, A; Morrison, K; Suzuki, M; *Tamanoi, F,* 2023, Nanoscale Adv., 5, 2537, Organosilica nanoparticles containing sodium borocaptate (BSH) provide new prospects for boron neutron capture therapy (BNCT): efficient cellular uptake and enhanced BNCT efficacy, WOS:000979147900001
2) Higashi, Y; Ikeda, S; Matsumoto, K; Satoh, S; Komatsu, A; Sugiyama, H; *Tamanoi, F,* 2022, Cancers, 14, 951, Tumor Accumulation of PIP-Based KRAS Inhibitor KR12 Evaluated by the Use of a Simple, Versatile Chicken Egg Tumor Model, WOS:000761413300001
3) Roa, D; Kuo, J; Moyses, H; Taborek, P; Tajima, T; Mourou, G; *Tamanoi, F,* 2022, Photonics, 9, 403, Fiber-Optic Based Laser Wakefield Accelerated Electron Beams and Potential Applications in Radiotherapy Cancer Treatments, WOS:000818135100001
4) Gisbert-Garzarán, M; Lozano, D; Matsumoto, K; Komatsu, A; Manzano, M; *Tamanoi, F;* Vallet-Regí, M, 2021, ACS Appl. Mater. Interfaces, 13, 9656, Designing Mesoporous Silica Nanoparticles to Overcome Biological Barriers by Incorporating Targeting and Endosomal Escape, WOS:000626502700030
5) Komatsu, A; Matsumoto, K; Yoshimatsu, Y; Sin, Y; Kubota, A; Saito, T; Mizumoto, A; Ohashi, S; Muto, M; Noguchi, R; Kondo, T; *Tamanoi, F,* 2021, Cells, 10, 2613, The CAM Model for CIC-DUX4 Sarcoma and Its Potential Use for Precision Medicine, WOS:000726356600001
6) *Tamanoi, F;* Chinnathambi, S; Laird, M; Komatsu, A; Birault, A; Takata, T; Doan, TLH; Mai, NXD; Raitano, A; Morrison, K; Suzuki, M; Matsumoto, K, 2021, Int. J. Mol. Sci., 22, 2251, Construction of Boronophenylalanine-Loaded Biodegradable Periodic Mesoporous Organosilica Nanoparticles for BNCT Cancer Therapy, WOS:000628300200001
7) Higashi, Y; Matsumoto, K; Saitoh, H; Shiro, A; Ma, Y; Laird, M; Chinnathambi, S; Birault, A; Doan, TLH; Yasuda, R; Tajima, T; Kawachi, T; *Tamanoi, F,* 2021, Sci Rep, 11, 14192, Iodine containing porous organosilica nanoparticles trigger tumor spheroids destruction upon monochromatic X-ray irradiation: DNA breaks and K-edge energy X-ray, WOS:000675632800001
8) *Tamanoi, F;* Matsumoto, K; Doan, TLH; Shiro, A; Saitoh, H, 2020, Nanomaterials, 10, 1341, Studies on the Exposure of Gadolinium Containing Nanoparticles with Monochromatic X-rays Drive Advances in Radiation Therapy, WOS:000558194000001

9) Chinnathambi, S; *Tamanoi, F,* 2020, Pharmaceutics, 12, 890, Recent Development to Explore the Use of Biodegradable Periodic Mesoporous Organosilica (BPMO) Nanomaterials for Cancer Therapy, WOS:000580123500001

Inbound-type Laboratory: India Japan Initiative for Intelligent Biomaterials w/ NNF, etc.
(Total: 12 papers)

1) *Lathakumari, S; Seenipandian, S; Balakrishnan, S; Raj, APMS;* Sugiyama, H; Pandian, GN; *Sivasubramaniam, S,* 2023, Gene Rep., 31, 101774, Identification of genes responsible for the social skill in the earthworm, Eudrilus eugeniae, WOS:001043002800001
2) *Dhivahar, J;* Parthasarathy, A; *Krishnan, K;* Kovi, BS; Pandian, GN, 2023, Heliyon, 9, e22351, Bat-associated microbes: Opportunities and perils, an overview, WOS:001129846300001
3) *Karthikeyan, S;* Grishina, M; Kandasamy, S; *Mangaiyarkarasi, R; Ramamoorthi, A;* Chinnathambi, S; Pandian, GN; *Kennedy, LJ,* 2023, J. Biomol. Struct. Dyn., 41, 14599, A review on medicinally important heterocyclic compounds and importance of biophysical approach of underlying the insight mechanism in biological environment, WOS:000948605800001
4) *Rupavarshini, M; Karthikeyan, S; Anandh, S; Ramamoorthi, A; Ramakrishnamurthy, S; Bharanidharan, G; Aruna, P; Mangaiyarkarasi, R;* Chinnathambi, S; Pandian, GN; *Ganesan, S,* 2023, Results Chem., 5, 100755, A biophysical approach of cytarabine anticancer drug insights into human serum albumin and checkpoint kinase 1, WOS:000918698100001
5) *Abu, N;* Chinnathambi, S; Kumar, M; Etezadi, F; *Bakhori, NM; Zubir, ZA; Salleh, SNM; Shueb, RH; Karthikeyan, S;* Thangavel, V; *Abdullah, J;* Pandian, GN, 2023, RSC Adv., 13, 28230, Development of biomass waste-based carbon quantum dots and their potential application as non-toxic bioimaging agents, WOS:001069344700001
6) Chinnathambi, S; Shirahata, N; Kumar, M; *Karthikeyan, S;* Abe, K; Thangavel, V; Pandian, GN, 2023, RSC Adv., 13, 6051, Nano-bio interaction between human immunoglobulin G and nontoxic, near-infrared emitting water-borne silicon quantum dot micelles, WOS:000935311100001
7) *Jayaraman, V;* Mahalingam, S; Chinnathambi, S; Pandian, GN; *Prakasarao, A; Ganesan, S; Ramasamy, J;* Ayyaru, S; Ahn, YH, 2022, Appl. Sci.-Basel, 12, 11222, Facile Synthesis of Hafnium Oxide Nanoparticle Decorated on Graphene Nanosheet and Its Photocatalytic Degradation of Organic Pollutants under UV-Light Irradiation, WOS:000880985400001
8) *Kumar, R; Arora, R; Bansal, V;* Sahayasheela, VJ; *Buckchash, H; Imran, J; Narayanan, N;* Pandian, GN; *Raman, B,* 2022, Multimed. Tools Appl., 81, 27631, Classification of COVID-19 from chest x-ray images using deep features and correlation coefficient, WOS:000780464800009
9) Sahayasheela, VJ; Lankadasari, MB; *Dan, VM; Dastager, SG;* Pandian, GN; Sugiyama, H, 2022, Nat. Prod. Rep., 39, 2215, Artificial intelligence in microbial natural product drug discovery: current and emerging role, WOS:000844567500001
10) *Arora, R; Bansal, V; Buckchash, H; Kumar, R;* Sahayasheela, VJ; *Narayanan, N;* Pandian, GN; *Raman, B,* 2021, Phys. Eng. Sci. Med., 44, 1257, AI-based diagnosis of COVID-19 patients using X-ray scans with stochastic ensemble of CNNs, WOS:000704057200001
11) *Siddiqui, SK;* SahayaSheela, VJ; *Kolluru, S;* Pandian, GN; *Santhoshkumar, TR; Dan, VM; Ramana, CV,* 2020, Bioorg. Med. Chem. Lett., 30, 127431, Discovery of 3-(benzofuran-2-ylmethyl)-1H-indole derivatives as potential autophagy inducers in cervical cancer cells, WOS:000574942400021
12) *Kumar, R; Gupta, A; Arora, HS;* Pandian, GN; *Raman, B,* 2020, IEEE Access, 8, 79440, CGHF: A Computational Decision Support System for Glioma Classification Using Hybrid Radiomics- and Stationary Wavelet-Based Features, WOS:000549839700017

2-2. Status of Researcher Exchanges

- Using the below tables, indicate the number of researcher exchanges between the Center (include domestic satellite institutions) and overseas satellite institutions during the period of FY 2020-FY 2023. Enter by institution and fiscal year.
- Write the number of principal investigator visits in the upper space and the number of other researcher visits in the lower space.

Overseas Satellite 1: Smart Material Research Center w/ VISTEC

<To overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	1	2	3
Other researchers	0	0	2	6	8
Total	0	0	3	8	11

<From overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	0	1	1
Other researchers	0	0	2	2	4
Total	0	0	2	3	5

Overseas Satellite 2: Kyoto University Shanghai Lab w/ Fudan University

<To overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	0	1	1
Other researchers	0	0	0	0	0
Total	0	0	0	1	1

<From overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	0	1	1
Other researchers	0	0	0	0	0
Total	0	0	0	1	1

Overseas Satellite 3: Center for Integrated Biosystems w/ Academia Sinica

<To overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	1	2	3
Other researchers	0	0	6	3	9
Total	0	0	7	5	12

<From overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	0	1	1
Other researchers	0	0	0	4	4
Total	0	0	0	5	5

Overseas Satellite 4: iCeMS Taiwan Office w/ NTU, CMU, etc.

<To overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	3	5	8
Other researchers	0	0	1	7	8
Total	0	0	4	12	16

<From overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	2	20	22
Other researchers	0	0	2	12	14
Total	0	0	4	32	36

Overseas Satellite 5: Laboratory for Green Porous Materials w/ A*STAR

<To overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	0	2	2
Other researchers	0	0	1	3	4
Total	0	0	1	5	6

<From overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	0	1	1
Other researchers	0	0	1	0	1
Total	0	0	1	1	2

Overseas Satellite 6: Center for Integrated Data-Material Sciences w/ MDI

<To overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	n/a	0	1	5	6
Other researchers	n/a	0	0	2	2
Total	n/a	0	1	7	8

<From overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	n/a	0	0	6	6
Other researchers	n/a	0	0	2	2
Total	n/a	0	0	8	8

Overseas Satellite 7: SUSTech-Kyoto University Advanced Energy Materials Joint Innovation Laboratory w/ SUS-Tech

<To overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	n/a	n/a	0	0	0
Other researchers	n/a	n/a	0	1	1
Total	n/a	n/a	0	1	1

<From overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	n/a	n/a	0	1	1
Other researchers	n/a	n/a	0	0	0
Total	n/a	n/a	0	1	1

CNRS-International Research Project: Smolab (Small Molecular Lab) w/ CNRS

<To overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	1	0	1
Other researchers	0	1	1	1	3
Total	0	1	2	1	4

<From overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	0	3	3
Other researchers	0	0	0	2	2
Total	0	0	0	5	5

Inbound-type Laboratory: Quantum Nano Medicine Research Center w/ UCLA

<To overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	0	2	2
Other researchers	0	0	1	0	1
Total	0	0	1	2	3

<From overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	0	0	0	0	0
Other researchers	0	0	0	0	0
Total	0	0	0	0	0

Inbound-type Laboratory: India Japan Initiative for Intelligent Biomaterials w/ NNF

<To overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	n/a	n/a	1	1	2
Other researchers	n/a	n/a	1	6	7
Total	n/a	n/a	2	7	9

<From overseas satellite>

	FY 2020	FY 2021	FY 2022	FY 2023	Total
Principal investigators	n/a	n/a	0	1	1
Other researchers	n/a	n/a	3	5	8
Total	n/a	n/a	3	6	9

3. Holding and Participating in International Research Meetings

3-1. Holding international Research Meetings

- Indicate the number of international research conferences or symposiums held between FY 2020 and FY 2023, and give up to **five examples** of the most representative ones using the table below.

FY 2020: 1 meeting	FY 2021: 7 meetings	FY 2022: 11 meetings	FY 2023: 26 meetings

Major examples (meeting titles, places and dates held)	Number of participants
Mini-symposium on cellular and organ renovation, China Medical University Hospital, Taiwan, Mar 26, 2024	From domestic institutions: 30 From overseas institutions: 26
Opening Ceremony for iCeMS-IMRE On-site Laboratory / Morning Scientific Sessions, Singapore, Mar 11, 2024	From domestic institutions: 10 From overseas institutions: 34
ACBI 2024 Istanbul Meeting, Grand Hotel Halic, Mar 1-4, 2024	From domestic institutions: 15 From overseas institutions: 18
UCLA-Kyoto University Online seminar series #5, Online, Apr 11, 2023	From domestic institutions: 46 From overseas institutions: 16
The 2nd International Symposium on Dynamic Exciton (ISDyEx), online, Oct 1, 2021	From domestic institutions: 20 From overseas institutions: 40

3-2. Participating in International Research Meetings

- Give up to five examples of the most representative case in which the Center, not individual researchers, participated in international research meetings to enhance the visibility and brand of the Center or of the overall WPI Program

Meeting titles, places, dates held and number of participants	Form of participation (e.g. operating a booth)	Number of participants from the Center
MacDiarmid Institute-iCeMS Symposium, Victoria University of Wellington, New Zealand, Feb 19-20, 2024, ca. 50	Invited Lecture (Fukazawa, Kitagawa, Packwood, Suzuki, Namasivayam, Kusada)	6
The 25th iCeMS International Symposium, Kyoto University, iCeMS, Jan 11-12, 2024, ca. 50	Invited Lecture:(Inose, Kusada, Kim, R. Suzuki, Y. Suzuki)	5
NCKU & iCeMS Bilateral symposium: Precision Medicine and Cell Therapy, College of Medicine, NCKU, 2023/9/8, ca. 30	Invited Lecture:(Uesugi, Suzuki, Kengaku, Wee, Yamato, packwood, Namasivayam, Motani, Petta)	9
10th International Conference on Advanced Materials & Nanotechnology (AMN-10), Rotorua, New Zealand, Feb 7-10, 2023, ca. 400	Keynote Lecture (Fukazawa), Invited Lecture (Furukawa, Packwood), and Poster Presentation (Wechwithayakhlung, Nurhuda)	5
The 45th Annual Meeting of the Molecular Biology Society of Japan (MBSJ2022), Chiba (Makuhari), Nov 30-Dec 2, 2022, ca. 40	Organizer (Kengaku), Invited Lecture (Taniguchi), Attendance (Ohno, Zhou)	4

4. List of the Cooperative Research Agreements with Overseas Institutions

- Indicate the number of agreements concluded with overseas institutions still in effect as of the end of FY 2023 (March 31, 2024). Give five examples of the most representative agreements.

Number of effective agreements (as of March 31, 2024): 23 (including a University-level agreement with Academia Sinica (Taiwan, 2019), UCLA (USA, 2021), CNRS (France, renewed in 2022), and CMU (Taiwan, 2022)

Five examples of the most representative agreements:

1. Name of the Agreement: MEMORANDUM OF UNDERSTANDING ("MOU") BETWEEN KYOTO UNIVERSITY ("KU") AND THE REAGENTS OF THE UNIVERSITY OF CALIFORNIA, ON BEHALF OF ITS LOS ANGELES CAMPUS ("UCLA")
   Dates of the Agreement: Feb 17, 2021
   Counterpart in the Agreement: University of California, Los Angeles (UCLA), USA
   Summary of the Agreement: This MOU serves as a written understanding of agreed-upon principles between KU and UCLA concerning a set of general academic objectives. Both parties agree to encourage the development of the following types of activities:
   - Visits and informal exchanges of faculty, scholars, and administrators in specific areas of education, research, and outreach
   - Cooperation in postgraduate education and training
   - Organization of joint conferences, symposia, or other scientific meetings on subjects of mutual interest
   - Exchange of academic information and materials
   - Pursuit of avenues for graduate and professional student exchange during the academic year or summer terms
   - Exploration of possibilities for developing joint research programs and collaborations
   - Other exchange and cooperation programs to which the parties agree

   This collaboration leads two parties to establish an On-site Laboratory named "Quantum Nano Medicine Research Center" located in Japan.

2. Name of the Agreement: General Memorandum for Academic Cooperation and Exchange between The Kyoto University Institute for Advanced Study, Kyoto University and The China Medical University Hospital
   Dates of the Agreement: Jan 22, 2022
   Counterpart in the Agreement: China Medical University Hospital (CMUH), Taiwan
   Summary of the Agreement: The Kyoto University Institute for Advanced Study of Kyoto University and the China Medical University Hospital conclude an agreement for academic cooperation and exchange. The two parties will promote in particular the following activities:
   - Exchange of scientific materials, publications, and information
   - Exchange of faculty members and researchers
   - Exchange of students
   - Joint research and meetings for research

   This agreement was concluded for research collaboration derived from the activities of the "iCeMS Taiwan Office." CMUH has committed to donating 10 million NT dollars annually to Kyoto University for three years starting in 2022.

3. Name of the Agreement: General Memorandum for Academic Cooperation and Exchange between The Kyoto University Institute for Advanced Study (KUIAS), Kyoto University and The MacDiarmid Institute for Advanced Materials and Nanotechnology
   Dates of the Agreement: Apr 7, 2021
   Counterpart in the Agreement: MacDiarmid Institute for Advanced Materials and Nanotechnology, New Zealand
   Summary of the Agreement: The Kyoto University Institute for Advanced Study of Kyoto University and The MacDiarmid Institute for Advanced Materials and Nanotechnology conclude an agreement for academic cooperation and exchange in the field of advanced materials for renewable energy,

climate change, and biomedicine. The two parties will promote in particular the following activities:

- Exchange of scientific materials, publications, and information
- Exchange of faculty members and researchers
- Exchange of students
- Joint research and meetings for research

Based on this agreement, two parties have established an On-site Laboratory named "Center for Integrated Data-Material Sciences" located in New Zealand. In FY2023, based on this international laboratory, we held symposia once in Japan and once in New Zealand, achieving close research and personnel exchange.

4. Name of the Agreement: MEMORANDUM OF UNDERSTANDING BETWEEN THE KYOTO UNIVERSITY INSTITUTE FOR ADVANCED STUDY (KUIAS), KYOTO UNIVERSITY, JAPAN AND VIDYASIRIMEDHI INSTITUTE OF SCIENCE AND TECHNOLOGY (VISTEC), THAILAND
   Dates of the Agreement: March 1, 2021
   Counterpart in the Agreement: Vidyasirimedhi Institute of Science and Technology (VISTEC), Thailand
   Summary of the Agreement: This MOU serves as a written understanding of agreed upon principles between the Kyoto University Institute for Advanced Study (KUIAS), Kyoto University and Vidyasirimedhi Institute of Science and Technology (VISTEC) concerning a set of general academic objectives. Both institutions agree to explore the development of the following types of activities:
   - Visits and informal exchanges of faculty, scholars, and administrators in specific areas of education, research, and outreach
   - Cooperation on postgraduate education and training
   - Organization of joint conferences, symposia, or other scientific meetings on subjects of mutual interest
   - Exchange of academic information and materials
   - Pursuit of avenues for graduate and professional student exchange during the academic year or summer vacation period
   - Exploration of possibilities for the development of joint research programs and collaborations
   - Other exchange and cooperation programs to which both parties agree

   Based on this agreement, two parties have established an On-site Laboratory named "Smart Materials Research Center located" located in Thailand. In FY2023, graduate students from both institutes took the initiative to organize a research presentation, demonstrating the maturity of the ongoing exchange at this international laboratory.

5. Name of the Agreement: General Memorandum for Academic Cooperation and Exchange between The Kyoto University Institute for Advanced Study (KUIAS), Kyoto University and The Institute of Materials Research and Engineering (IMRE), A*STAR Research Entities
   Dates of the Agreement: Feb 4, 2021
   Counterpart in the Agreement: Institute of Materials Research and Engineering (IMRE), A*STAR Research Entities, Singapore
   Summary of the Agreement: The Kyoto University Institute for Advanced Study of Kyoto University and the Institute of Materials Research and Engineering of A*STAR Research Entities (IMRE) conclude this General Memorandum for Academic Cooperation and Exchange in the fields of advanced energy materials for energy efficiency, renewable energy harvesting, and new energy carriers. The two parties will promote in particular the following activities:
   - Exchange of scientific materials, publications, and information
   - Exchange of faculty members and researchers
   - Exchange of students
   - Joint research and meetings for research

   Based on this agreement, two parties have established an On-site Laboratory named "Laboratory for Green Porous Materials" located in Singapore. The opening ceremony of this international laboratory was held on March 11, 2024.

5. Postdoctoral Positions through Open International Solicitations

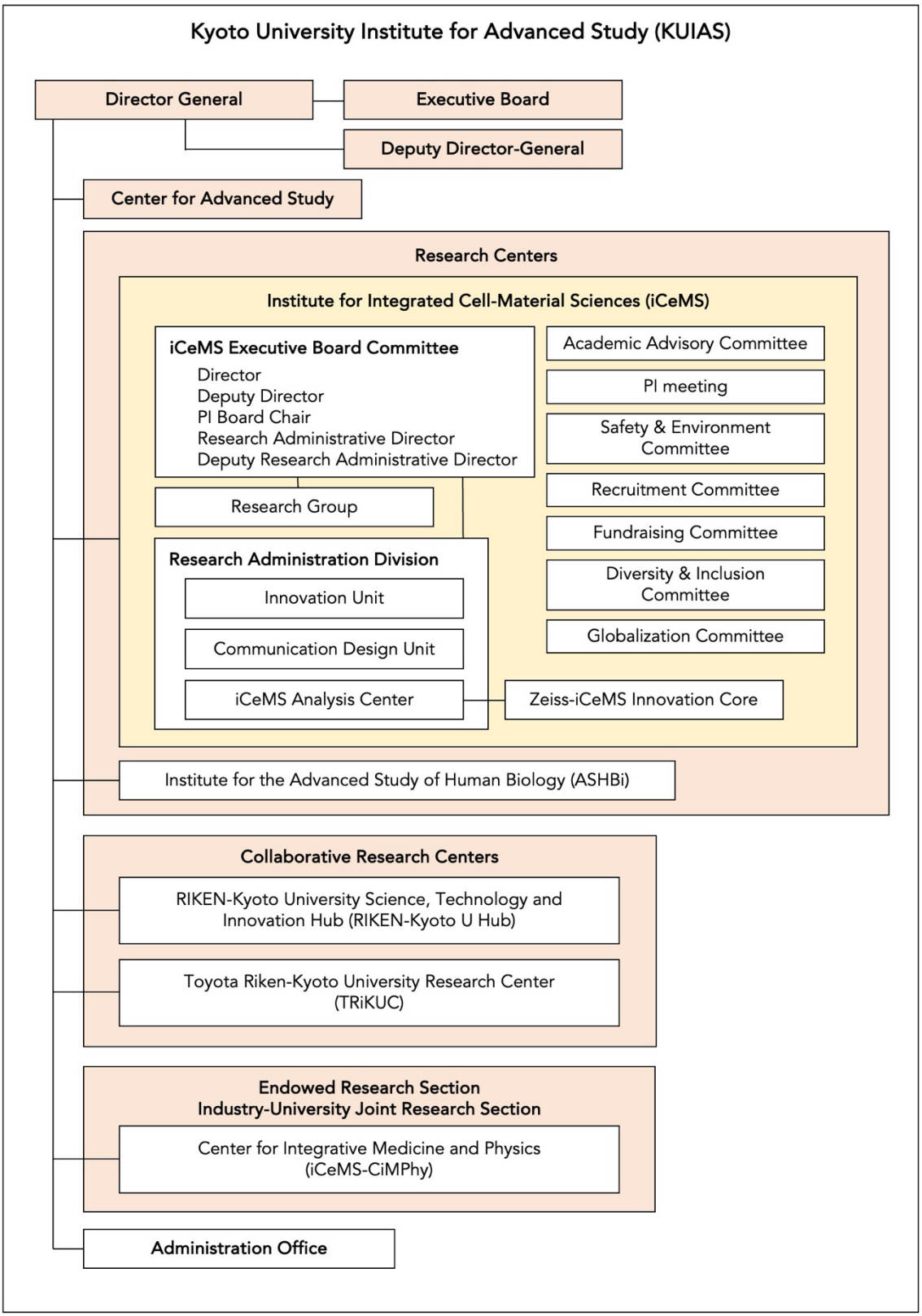
- In the columns "number of applications" and "number of selections," put the total number (upper) and the number and percentage of overseas researchers in the < > brackets (lower).
- In Appendix 3b, describe the status of employment of postdoctoral researchers.

Fiscal year	Number of applications	Number of selections
FY 2020	9	3
	〈9, 100%〉	〈3, 100%〉
FY 2021	19	9
	〈19, 100%〉	〈9, 100%〉
FY 2022	21	8
	〈11, 52%〉	〈7, 88%〉
FY 2023	23	4
	〈23, 100%〉	〈4, 100%〉

6. Diagram of Management System

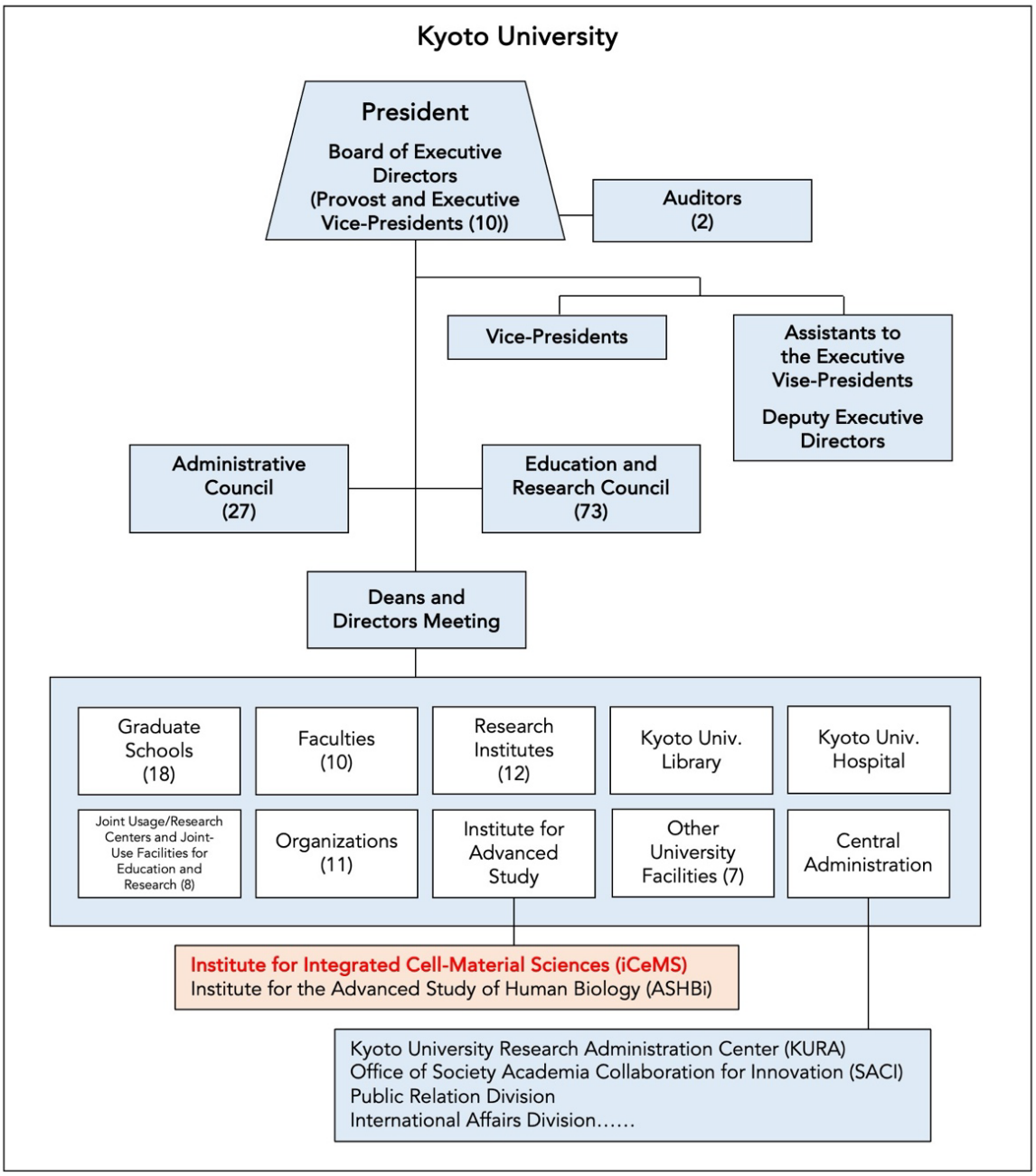
6-1.

- Diagram the Center's management system within the Center in an easily understood manner.
- If any changes have been made in the Center's management system vis-à-vis that stated in the application for WPI Academy center certification, describe them. Especially describe any important changes made in such as the center director, administrative director, head of host institution, and officer(s) in charge at the host institution (e.g., executive vice president for research).



6-2.

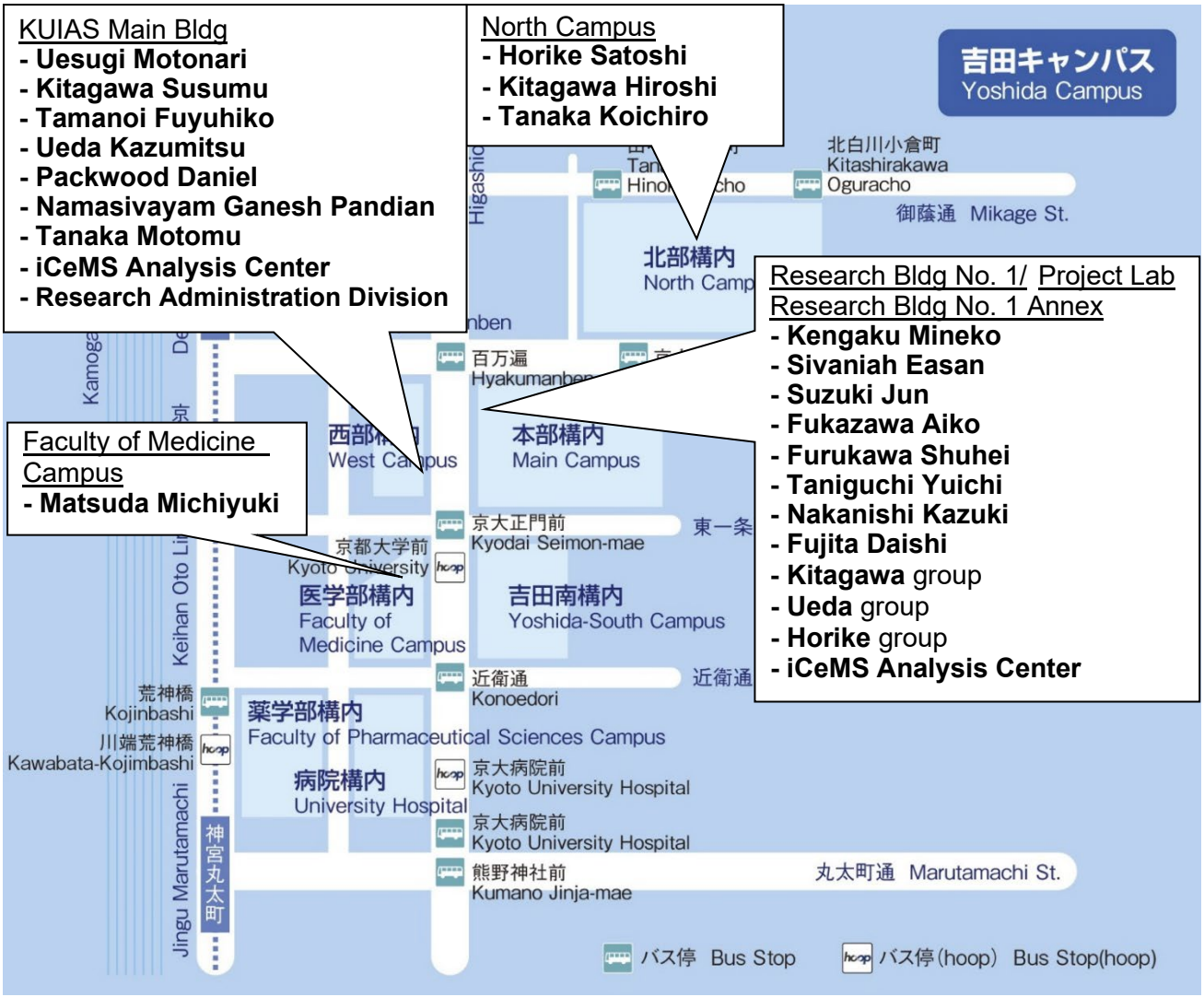
- Make a diagram of the organizational chart to show Center's position **within the host institution**.



As of July 2022

7. Campus Map

- Draw a simple map of the campus showing where the main office and principal investigator(s) are located.


KUIAS Main Bldg
- Uesugi Motonari
- Kitagawa Susumu
- Tamanoi Fuyuhiko
- Ueda Kazumitsu
- Packwood Daniel
- Namasivayam Ganesh Pandian
- Tanaka Motomu
- iCeMS Analysis Center
- Research Administration Division
North Campus
- Horike Satoshi
- Kitagawa Hiroshi
- Tanaka Koichiro
Research Bldg No. 1/ Project Lab
Research Bldg No. 1 Annex
- Kengaku Mineko
- Sivaniah Easan
- Suzuki Jun
- Fukazawa Aiko
- Furukawa Shuhei
- Taniguchi Yuichi
- Nakanishi Kazuki
- Fujita Daishi
- Kitagawa group
- Ueda group
- Horike group
- iCeMS Analysis Center
Faculty of Medicine Campus
- Matsuda Michiyuki
吉田キャンパス
Yoshida Campus
北白川小倉町
Kitashirakawa
Oguracho
御蔭通 Mikage St.
北部構内
North Camp
百万遍
Hyakumanben
本部構内
Main Campus
京大正門前
Kyodai Seimon-mae
東一条
京都大学前
医学部構内
Faculty of Medicine Campus
吉田南構内
Yoshida-South Campus
近衛通
Konoedori
荒神橋
Kojinbashi
川端荒神橋
Kawabata-Kojimbashi
薬学部構内
Faculty of Pharmaceutical Sciences Campus
病院構内
University Hospital
京大病院前
Kyoto University Hospital
熊野神社前
Kumano Jinja-mae
丸太町通 Marutamachi St.
Keihan Oto Li
Jingu Marutamachi
神宮丸太町
バス停 Bus Stop
バス停(hoop) Bus Stop(hoop)

Appendix3-1a Number of Center Personnel FY 2020-FY 2023

	FY 2020		FY 2021		FY 2022		FY 2023	
	Number of persons	%	Number of persons	%	Number of persons	%	Number of persons	%
Researchers	83		85		88		92	
Overseas researchers	19	23	21	25	22	25	21	23
Female researchers	20	24	20	24	23	26	25	27
Principal investigators (PIs)	30		28		24		24	
Overseas PIs	4	13	4	14	4	17	3	13
Female PIs	3	10	2	7	2	8	2	8
Other researchers	31		23		28		29	
Overseas researchers	3	10	3	13	4	14	4	14
Female researchers	11	35	4	17	4	14	5	17
Postdocs	22		34		36		39	
Overseas Postdocs	12	55	14	41	14	39	14	36
Female Postdocs	6	27	14	41	17	47	18	46
Research support staffs	64		67		76		82	
Administrative staffs	26		21		22		17	
TOTAL	173		173		186		191	

Number of persons who were/have been paid using the host institution's operating budget (excluding indirect funding) among the above persons.

	FY 2020	FY 2021	FY 2022	FY 2023
Principal investigators (PIs)	26	23	21	20
Other researchers	5	3	4	4
Postdocs	1	1	2	1
Research support staffs	3	6	4	7
Administrative staffs	16	19	21	17

※ Make consistent with the number of persons reported in Appendix 3-2.

* The number of "Administrative staff" in this document (Appendix3-1a) only counts the staff members who directly belong to the KUIAS or iCeMS, while Appendix3-2 includes the members of the common administrative staff in charge of several other departments in addition to the KUIAS/iCeMS staff. Therefore, the numbers differ in the two Forms.

	FY 2020		FY 2021		FY 2022		FY 2023	
	Number of persons	%	Number of persons	%	Number of persons	%	Number of persons	%
Doctoral students	14		16		21		30	
Employed	7	50.0	10	62.5	8	38.1	12	40.0

※ The number of doctoral students indicated in the lower table can also include those in the upper table of Total numbers.

Changes vis-à-vis the Center's application for academy center certification

※ If changes have been made vis-à-vis the Center's application for academy center certification, describe the main changes and the reasons for them.

Appendix 3-1b　Career Path of WPI Postdocs

Enter the information below during the period from the start of the center through the end of FY 2023.

* For each person, fill in the spaces to the right. More spaces may be added.

* Leave "Position as of April 2024" blank if unknown.

Japanese Postdocs

Employment period	Position before employed at WPI center		Next position after WPI center		Position as of April 2024*	
	Position title, organization	Country where the organization is located	Position title, organization	Country where the organization is located	Position title, organization	Country where the organization is located
2022.4 - 2024.4			Researcher, Kyoto University	Japan	Researcher, UC Berkley	USA
2023.4 - 2024.3			Researcher, Kyoto University	Japan	Researcher, Hokkaido University	Japan
2023.4 - 2024.1			Postdocs, University of Illinois at Urbana-Champaign	USA	Postdocs, University of Illinois at Urbana-Champaign	USA
2021.1 - 2023.10	Researcher, Daikin Industries, Ltd	Japan	Assistant Professor, Kyoto University	Japan	Assistant Professor, Kyoto University	Japan
2022.4 - 2023.3	PhD student, University of Cambridge	UK	Postdoc, Friedrich-Schiller Universität	Germarny	Postdoc, Friedrich-Schiller Universität	Germarny
2018.8 - 2023.3			Reseacher, Fukushima Medical University	Japan		Japan
2013.9 - 2023.3	Lecturer, Azad University,	Iran	Senior Scientist, Vandstrom Inc.	USA	Senior Scientist, Vandstrom Inc.	USA
2022.4 - 2022.9	Researcher, KUREHA Co., Ltd.	Japan	Postdoctoral Fellow, Brandeis University	USA	Postdoctoral Fellow, Brandeis University	USA
2021.9 - 2022.8	Phd student, Kyoto University	Japan	Scientist, Cambridge Display Technology Ltd.	UK	Scientist, Cambridge Display Technology Ltd.	UK
2020.4 - 2022.3	PhD student, Institute for Molecular Science	Japan	Postdoc, Kyoto University	Japan	Assistant Professor, Kyoto University	Japan

2018.4 - 2021.9	PhD student, Indian Institute of Technology Bombay	India	Postdoc, Technische Universität Dortmund	Germarny	Assistant Professor, SRM Univ.	India
2019.6 - 2020.9	PhD student, Kyoto University	Japan	Assistant Professor, Kanazawa University	Japan	Assistant Professor, Kanazawa University	Japan
2018.4 - 2020.9	PhD student, Hokkaido University	Japan	Postdoc, University of Basel	Switzerland	Assistant Professor, Kyushu University	Japan

Overseas Postdocs

Employment period	Position before employed at WPI center		Next position after WPI center		Position as of April 2024*		Nationality
	Position title, organization	Country where the organization is located	Position title, organization	Country where the organization is located	Position title, organization	Country where the organization is located	
2022.8 - 2024.3	PhD, Kyoto University	Japan	Project Instructor, Keio University	Japan	Project Instructor, Keio University	Japan	Indian
2021.12 - 2024.3	Student, VISTEC	Thailand	Data analyst, Bank of Thailand	Thailand	Data analyst, Bank of Thailand	Thailand	Thailand
2023.6 - 2024.1	PhD, Kyoto University	Japan	Post-doctoral fellow, King Abdullah University of Science and Technology (KAUST)	Saudi Arabia	Post-doctoral fellow, King Abdullah University of Science and Technology (KAUST)	Saudi Arabia	Indian
2020.4 - 2024.1	Doctral course student, Sun-Yat Sen University	China	Assistant Professor, Sun Yat-Sen University	China	Assistant Professor, Sun Yat-Sen University	China	China
2023.5 - 2023.12			R&D Associate researcher, SYSMEX CORPORATION	Japan	R&D Associate researcher, SYSMEX CORPORATION	Japan	China
2019.10 - 2023.10	PhD, Indian Insitute of Technology -Madras	India	CEO, ReguGene Co., Ltd.	Japan	CEO, ReguGene Co., Ltd.	Japan	Indian
2021.7 - 2023.7	Phd Student, University of La Laguna	Spain	Postdoc, University of Groningen	The Netherlands	Same as left		Spain
2022.6 - 2023.6	Student, Institut Pasteur	Iran	Postdoctoral Researcher, Royan Institute	Iran	Postdoctoral Researcher, Royan Institute	Iran	Iran
2022.4 - 2023.3	D3 Student, Kyoto University	Japan	Researcher, Rigaku Ltd	Japan	Researcher, Rigaku Ltd	Japan	Korean

2018.7 - 2023.3	Postdoctoral Fellow, The Graduate University for Advanced Studies (SOKENDAI)	Japan	Professor, Sichuan Univesity	China	Professor, Sichuan Univesity	China	China
2020.11 - 2022.12	Graduate student, Institut Charles Gerhardt of Montpellier	France	Researcher, Universität des Saarlandes	Germany	Researcher, Universität des Saarlandes	Germany	France
2018.10 - 2022.12	Postdoctoral Researcher, Institute for Basic Science	South Korea	Post-doctoral research associate, I2CNER, Kyushu University	Japan	DevOps-Cloud Trainee	India	India
2018.4 - 2022.10	Postdoc, Kyoto University	Japan	CNRS Researcher, CNRS - University of Lille	France	Same as left		France
2014.10 - 2022.7	D3 Student, Chinese Academy of Science	China	Assistant professor, NTU Singapore	Singapore	Assistant professor, NTU Singapore	Singapore	Chinese
2019.5 - 2022.6	D3 Student, Kyoto University	Japan	Research Fellow, NUS	Singapore	Assistant professor, Donghua University	China	Chinese
2021.5 - 2022.4	PhD, Kyoto University	Janan	Post-doctoral fellow, University de Sherbrooke	Canada	Assistant Professor, University de Sherbrooke	Canada	Indian
2019.9 - 2022.4	Doctral course student, University of Limerick	Ireland	Postdoctral Fellow, Sandia National Laboratory	U.S.	Postdoctral Fellow, Sandia National Laboratory	U.S.	India
2018.12 - 2022.4	Assistant professor, Fujian Institute of Research on the Structure of Matter (FJIRSM)	China	Professor, Insititute for Process Engineering, CAS	China	Professor, Insititute for Process Engineering, CAS	China	China
2020.10 - 2022.3	Researcher, Doushisha University	Japan	Researcher, 中国医学科学研究院	China	Researcher, 中国医学科学研究院	China	China
2019.4 - 2022.3	PhD, ACADEMY OF SCIENTIFIC & INNOVATIVE RESEARCH(CSIR-IGIB)	India	Post-doctoral fellow, Weill cornell medical college	USA	Post-doctoral fellow, Weill cornell medical college	USA	Indian
2019.9 - 2022.1	Postdoc, Catalan Institute of Nanoscience and Nanotechnology	Spain	Maria Sambrano Researcher, Autonomous University of Madrid	Spain	Ramon y Cajal Researcher, Autonomous University of Madrid	Spain	Spain

2016.7 - 2022.1	Internship, Air Liquide Laboratories	France	Research Scientist, King Abdullah University of Science and Technology	Saudi Arabia	Research Scientist, King Abdullah University of Science and Technology	Saudi Arabia	France
2020.12 - 2021.11	Postdoc, University of Canturbury	New Zealand	Postdoc, University of Limerick	Ireland	Assistant Professor, Harvey Mudd College	USA	Ireland
2019.11 - 2021.9	PhD Student, Universidad National Autonoma de Mexico	Mexico	Assitant Professor, Universidad National Autonoma de Mexico	Mexico	Same as left		Mexico
2021.4 - 2021.6	Research Associate, CSIR-Institute of Genomics and Integrative Biology	India	Post-doctoral fellow,John Hopkins Medicine	USA	Post-doctoral fellow,John Hopkins Medicine	USA	Indian
2018.7 - 2021.3	doctral course student, Tongji University	China	Assistant Professor, Tongji Univesity	China	Professor, Tongji Univesity	China	China
2018.9 - 2020.11	Post-doctoral Researcher, Fukui Institute for Fundamental Chemistry, Kyoto University	Japan	Associate Professor, National Center for Nanoscience and Technology	China	Associate Professor, National Center for Nanoscience and Technology	China	China
2019.1 - 2020.8	Reseacher, Kyoto University	Japan	Research associate, University of Cambridge	UK	Research associate, University of Cambridge	UK	Chinese
2019 .11 - 2020.7	Postdoc, University of Inubria	Italy	Marie-Curie Researcher, University of Granada	Spain	Same as left		Spain
2019.10 - 2020.7	Postdoc, Queen's University of Belfast	UK	Postdoc, Wroclaw University of Science and Technology	Poland	Principal Investigator, Ł ukasiewicz – PORT	Poland	Hong Kong

Project Expenditures FY2023

(Thousand yens)

	Amount	Details	Operational subsidies to National University Corporations/Incorporated Administrative Agency		Funding by WPI Academy		Government Subsidies except Funding from WPI Academy		Donations		Indirect funding		Joint research projects		Competitive funding		Others	
			Total costs	Details (no. of persons)	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details
Personnel	423,931	Operational subsidies to National University Corporations/Incorporated Administrative Agency	14,995	Center director 1				Administrative director										
	14,930	Funding by WPI Academy	5,608	Administrative director 1														
	-	Government Subsidies except Funding from WPI Academy	181,463	Principal investigator 19	-	Principal investigator 0	-	0	5,687	1	2,653	1	4,452	1	-	0	-	0
	5,687	Donations	92,780	・Full-time／Japane 7		・Full-time／Japanese		・Full-time／Japanese		・Full-time／Japanese	2,653	・Full-time／Japane 1	4,452	・Full-time／Japane 1		・Full-time／Japanese		・Full-time／Japanese
	84,956	Indirect funding	52,926	・Concurrent／Japa 9		・Concurrent／Japanese		・Concurrent／Japanese	5,687	・Concurrent／Japa 1		・Concurrent／Japanese		・Concurrent／Japanese		・Concurrent／Japanese		・Concurrent／Japanese
	7,580	Joint research projects	35,757	・Full-time／Overse 3		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas
	-	Competitive funding		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas
	-	Others	41,899	Other researchers 4	7,083	Other researchers 2	-	0	-	0	65,207	11	3,128	1	-	0	-	0
			29,482	・Associate professor /Assistant professor 3		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor
			12,417	・Others 1	7,083	・Others 2		・Others		・Others	65,207	・Others 11	3,128	・Others 1		・Others		・Others
			5,851	Postdocs 1	4,613	Postdocs 1		Postdocs		Postdocs	17,096	Postdocs 3		Postdocs		Postdocs		Postdocs
			39,109	Research support staffs 7		Research support staffs		Research support staffs		Research support staffs		Research support staffs		Research support staffs		Research support staffs		Research support staffs
			135,006	Administrative staffs 52	3,234	Administrative staffs 1		Administrative staffs		Administrative staffs		Administrative staffs		Administrative staffs		Administrative staffs		Administrative staffs
Subtotal	537,084		423,931	85	14,930	4	-	0	5,687	1	84,956	15	7,580	2	-	0	-	0
Project activities	148,059	Operational subsidies to National University Corporations/Incorporated Administrative Agency	148,059	Project activities	2,276	Acquisition of postdocs and student					96,337	Project activities						
	11,365	Funding by WPI Academy			274	International joint research												
	-	Government Subsidies except Funding from WPI Academy			1,870	Innovation												
	-	Donations			3,908	Communication optimization												
	96,337	Indirect funding			3,037	Utility costs												
	-	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	255,761		148,059		11,365		-		-		96,337		-		-		-	
Travel	2,125	Operational subsidies to National University Corporations/Incorporated Administrative Agency	2,125	Travel	3,349	Acquisition of postdocs and student					4,448	Travel						
	5,723	Funding by WPI Academy			2,331	International joint research												
	-	Government Subsidies except Funding from WPI Academy			43	Others												
	-	Donations																
	4,448	Indirect funding																
	-	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	12,296		2,125		5,723		-		-		4,448		-		-		-	
Equipment	84,462	Operational subsidies to National University Corporations/Incorporated Administrative Agency	1,925	Draft chamber							2,164	Individually ventilated cage system						
	-	Funding by WPI Academy	1,925	Draft chamber							2,164	Individually ventilated cage system						
	-	Government Subsidies except Funding from WPI Academy	66,000	Nanoscale material structure analysis system							2,164	Individually ventilated cage system						
	-	Donations	2,360	Local modification of highly accurate gas&vapor adsorption							2,164	Individually ventilated cage system						
	29,143	Indirect funding	10,766	Highly accurate gas&vapor adsorption							1,926	Enhaust ventilation system						
	-	Joint research projects	1,486	Others							4,950	Probes for nuclear magnetic resonance spectrometers						
	-	Competitive funding									2,035	System kitchen						
	-	Others									9,999	Optical Emission Spectrometer						
											1,577	Others						
Subtotal	113,605		84,462		-		-		-		29,143		-		-		-	
Research projects	58,866	Operational subsidies to National University Corporations/Incorporated Administrative Agency	58,866	Research projects			25,130	Research projects	77,393	Research projects	4,310	Research projects	199,482	Research projects	723,433	Research projects		
	-	Funding by WPI Academy																
	25,130	Government Subsidies except Funding from WPI Academy																
	77,393	Donations																
	4,310	Indirect funding																
	199,482	Joint research projects																
	723,433	Competitive funding																
	-	Others																
Subtotal	1,088,614		58,866		-		25,130		77,393		4,310		199,482		723,433		-	
Others	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency			1,862	Consumption tax					24	Consumption tax						
	1,862	Funding by WPI Academy																
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	24	Indirect funding																
	-	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	1,886		-		1,862		-		-		24		-		-		-	
Total	2,009,246		717,443		33,880		25,130		83,080		219,218		207,062		723,433		-	

Operational subsidies to National University Corporations/Incorporated Administrative Agency	運営費交付金
Funding by WPI Academy	WPIアカデミー国際頭脳循環の加速・拡大事業
Government Subsidies except Funding from WPI Academy	機関補助金(WPIアカデミー国際頭脳循環の加速・拡大事業を除く
Donations	寄付金
Indirect funding	間接経費
Joint research projects	共同研究費
Competitive funding	競争的資金
Others	その他

Project Expenditures FY2022

(Thousand yens)

	Amount	Details	Operational subsidies to National University Corporations/Incorporated Administrative Agency		Funding by WPI Academy		Government Subsidies except Funding from WPI Academy		Donations		Indirect funding		Joint research projects		Competitive funding		Others	
			Total costs	Details (no. of persons)	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details
Personnel	400,305	Operational subsidies to National University Corporations/Incorporated Administrative Agency	15,829	Center director 1														
	12,445	Funding by WPI Academy		Administrative director 1			10,884	Administrative director 1										
	25,300	Government Subsidies except Funding from WPI Academy	177,689	Principal investigator 20	-	Principal investigator 0	-	0	4,679	1	2,692	1	4,430	1	-	0	-	0
	4,679	Donations	85,450	・Full-time／Japane 7		・Full-time／Japanese		・Full-time／Japanese		・Full-time／Japanese	2,692	・Full-time／Japane 1	4,430	・Full-time／Japane 1		・Full-time／Japanese		・Full-time／Japanese
	104,482	Indirect funding	52,109	・Concurrent／Japa 9		・Concurrent／Japanese		・Concurrent／Japanese	4,679	・Concurrent／Japa 1		・Concurrent／Japanese		・Concurrent／Japanese		・Concurrent／Japanese		・Concurrent／Japanese
	8,547	Joint research projects	35,217	・Full-time／Overse 3		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas
	-	Competitive funding	4,913	・Concurrent／Over 1		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas
	-	Others	38,105	Other researchers 4	5,828	Other researchers 1	-	0	-	0	78,762	12	3,118	1	-	0	-	0
			37,252	・Associate professor /Assistant professor 4		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor
			853	・Others	5,828	・Others 1		・Others		・Others	78,762	・Others 12	3,118	・Others 1		・Others		・Others
			10,070	Postdocs 2	6,265	Postdocs 1		Postdocs		Postdocs	22,253	Postdocs 4		Postdocs		Postdocs		Postdocs
			19,340	Research support staffs 4		Research support staffs	14,416	Research support staffs 3		Research support staffs		Research support staffs		Research support staffs		Research support staffs		Research support staffs
			139,272	Administrative staffs 52	352	Administrative staffs		Administrative staffs		Administrative staffs	775	Administrative staffs	999	Administrative staffs 1		Administrative staffs		Administrative staffs
Subtotal	555,758		400,305	83	12,445	2	25,300	4	4,679	1	104,482	17	8,547	3	-	0	-	0
Project activities	95,706	Operational subsidies to National University Corporations/Incorporated Administrative Agency	95,706	Project activities	3,749	PR & outreach					122,340	Project activities						
	20,201	Funding by WPI Academy			1,320	Retreats and other research meetings												
	-	Government Subsidies except Funding from WPI Academy			7,671	International joint research												
	-	Donations			3,859	Utility costs												
	122,340	Indirect funding			3,602	Others												
	-	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	238,247		95,706		20,201		-		-		122,340		-		-		-	
Travel	670	Operational subsidies to National University Corporations/Incorporated Administrative Agency	670	Travel	11,354	Travel					4,088	Travel						
	11,354	Funding by WPI Academy																
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	4,088	Indirect funding																
	-	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	16,112		670		11,354		-		-		4,088		-		-		-	
Equipment	8,628	Operational subsidies to National University Corporations/Incorporated Administrative Agency	7,216	Digital camera system							1,978	Work station						
	-	Funding by WPI Academy	1,412	Others							1,667	Others						
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	3,645	Indirect funding																
	-	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	12,273		8,628		-		-		-		3,645		-		-		-	
Research projects	77,201	Operational subsidies to National University Corporations/Incorporated Administrative Agency	77,201	Research projects			16,707	Research projects	73,935	Research projects			164,870	Research projects	404,409	Grants-in-aid in scientific reseach		
	-	Funding by WPI Academy													331,202	Commissioned research		
	16,707	Government Subsidies except Funding from WPI Academy													5,697	Commissioned project		
	73,935	Donations																
	-	Indirect funding																
	164,870	Joint research projects																
	741,308	Competitive funding																
	-	Others																
Subtotal	1,074,021		77,201		-		16,707		73,935		-		164,870		741,308		-	
Others	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency									37	Consumption tax						
	-	Funding by WPI Academy																
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	37	Indirect funding																
	-	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	37		-		-		-		-		37		-		-		-	
Total	1,896,448		582,510		44,000		42,007		78,614		234,592		173,417		741,308		-	

Operational subsidies to National University Corporations/Incorporated Administrative Agency	運営費交付金
Funding by WPI Academy	WPIアカデミー国際頭脳循環の加速・拡大事業
Government Subsidies except Funding from WPI Academy	機関補助金（WPIアカデミー国際頭脳循環の加速・拡大事業を除く
Donations	寄付金
Indirect funding	間接経費
Joint research projects	共同研究費
Competitive funding	競争的資金
Others	その他

Project Expenditures FY2021

(Thousand yens)

	Amount	Details	Operational subsidies to National University Corporations/Incorporated Administrative Agency		Funding by WPI Academy		Government Subsidies except Funding from WPI Academy		Donations		Indirect funding		Joint research projects		Competitive funding		Others	
			Total costs	Details (no. of persons)	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details
Personnel	396,863	Operational subsidies to National University Corporations/Incorporated Administrative Agency	15,990	Center director 1														
	14,491	Funding by WPI Academy		Administrative director			10,869	Administrative director 1										
	31,000	Government Subsidies except Funding from WPI Academy	190,915	Principal investigator 22	-	Principal investigator 0	-	0	5,412	1	7,777	2	4,435	1	-	0	-	0
	5,412	Donations	94,101	・Full-time／Japane 8		・Full-time／Japanese		・Full-time／Japanese		・Full-time／Japanese	7,777	・Full-time／Japane 2	4,435	・Full-time／Japane 1		・Full-time／Japanese		・Full-time／Japanese
	98,955	Indirect funding	57,133	・Concurrent／Japa 10		・Concurrent／Japanese		・Concurrent／Japanese	5,412	・Concurrent／Japa 1		・Concurrent／Japanese		・Concurrent／Japanese		・Concurrent／Japanese		・Concurrent／Japanese
	4,435	Joint research projects	34,819	・Full-time／Overse 3		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas		・Full-time／Overseas
	-	Competitive funding	4,862	・Concurrent／Over 1		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas		・Concurrent／Overseas
	-	Others	26,876	Other researchers 3	5,692	Other researchers 1	-	0	-	0	70,158	11	-	0	-	0	-	0
			26,876	・Associate professor /Assistant professor 3 ・Others	5,692	・Associate professor /Assistant professor ・Others 1		・Associate professor /Assistant professor ・Others		・Associate professor /Assistant professor ・Others	70,158	・Associate professor /Assistant professor ・Others 11		・Associate professor /Assistant professor ・Others		・Associate professor /Assistant professor ・Others		・Associate professor /Assistant professor ・Others
			8,755	Postdocs 1	3,063	Postdocs 2		Postdocs		Postdocs	11,363	Postdocs 4		Postdocs		Postdocs		Postdocs
			15,285	Research support staffs 6	1,553	Research support staffs 1	20,131	Research support staffs 3		Research support staffs		Research support staffs		Research support staffs		Research support staffs		Research support staffs
			139,042	Administrative staffs 50	4,183	Administrative staffs 1		Administrative staffs		Administrative staffs	9,657	Administrative staffs 4		Administrative staffs		Administrative staffs		Administrative staffs
Subtotal	551,156		396,863	83	14,491	5	31,000	4	5,412	1	98,955	21	4,435	1	-	0	-	0
Project activities	33,568	Operational subsidies to National University Corporations/Incorporated Administrative Agency	33,568	Project activities	11,954	PR & outreach	24,015	Consumables			121,599	Project activities						
	42,868	Funding by WPI Academy			175	Retreats and other research m	19	Communication and transportation										
	27,776	Government Subsidies except Funding from WPI Academy			22,017	International joint research	3,742	Provision of services										
	-	Donations			6,064	Utility costs												
	121,599	Indirect funding			2,658	Others												
	-	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	225,811		33,568		42,868		27,776		-		121,599		-		-		-	
Travel	3,078	Operational subsidies to National University Corporations/Incorporated Administrative Agency	3,078	Travel	19	Travel					2,126	Travel						
	19	Funding by WPI Academy																
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	2,126	Indirect funding																
	-	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	5,223		3,078		19		-		-		2,126		-		-		-	
Equipment	13,952	Operational subsidies to National University Corporations/Incorporated Administrative Agency	1,208	Accessories for digital NMR sy	3,300	Biotage Selekt,Two Chammel,S	5,000	Incubation monitoring system			1,144	Objective lens						
	10,070	Funding by WPI Academy	3,500	Quantstudio 3 Real－time PC	1,573	TE-HER CO2 Incubator	2,420	Standard workstation			1,103	DI water purifier						
	110,688	Government Subsidies except Funding from WPI Academy	1,979	Super electroporator	2,200	2-slot chassis for electrochemic	4,890	Gas chromatograph-mass spectrometer			1,720	Ultra-deep freezer						
	-	Donations	1,307	Objective lens	2,235	Bio clean bench	77,990	Structured illumination super resolution microscope system			5,000	Draft chamber						
	10,418	Indirect funding	1,757	Ultra-micro UV-visible spectro	762	Others	1,847	PARISS spectrograph			1,451	Others						
	-	Joint research projects	1,675	CO2-incubator			1,851	Picosecond pulsed diode laser										
	-	Competitive funding	1,897	Bioshaker			1,298	ETC camera viewer option for HRx0 and DHR										
	-	Others	629	Others			1,994	Control PC for lattice structured Illumination super-resolution microscope system										
							12,655	High-pressure, high-precision gas/vapor adsorption measurement system										
							743	Others										
Subtotal	145,128		13,952		10,070		110,688		-		10,418		-		-		-	
Research projects	80,739	Operational subsidies to National University Corporations/Incorporated Administrative Agency	80,739	Research projects					60,750	Research projects	28,030	Research projects	104,323	Research projects	351,516	Grants-in-aid in scientific reseach	12,805	Research projects
	-	Funding by WPI Academy													343,198	Commissioned research		
	-	Government Subsidies except Funding from WPI Academy													14,189	Commissioned project		
	60,750	Donations																
	28,030	Indirect funding																
	104,323	Joint research projects																
	708,903	Competitive funding																
	12,805	Others																
Subtotal	995,550		80,739		-		-		60,750		28,030		104,323		708,903		12,805	
Others	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency			1,852	Consumption tax												
	1,852	Funding by WPI Academy																
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	-	Indirect funding																
	-	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	1,852		-		1,852		-		-		-		-		-		-	
Total	1,924,720		528,200		69,300		169,464		66,162		261,128		108,758		708,903		12,805	

Operational subsidies to National University Corporations/Incorporated Administrative Agency	運営費交付金
Funding by WPI Academy	WPIアカデミー国際頭脳循環の加速・拡大事業
Government Subsidies except Funding from WPI Academy	機関補助金（WPIアカデミー国際頭脳循環の加速・拡大事業を除く
Donations	寄付金
Indirect funding	間接経費
Joint research projects	共同研究費
Competitive funding	競争的資金
Others	その他

Project Expenditures FY2020

(Thousand yens)

	Amount	Details	Operational subsidies to National University Corporations/Incorporated Administrative Agency		Funding by WPI Academy		Government Subsidies except Funding from WPI Academy		Donations		Indirect funding		Joint research projects		Competitive funding		Others	
			Total costs	Details (no. of persons)	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details	Total costs	Details
Personnel	407,596	Operational subsidies to National University Corporations/Incorporated Administrative Agency	16,531	Center director 1														
	18,223	Funding by WPI Academy		Administrative director			10,844	Administrative director 1										
	35,000	Government Subsidies except Funding from WPI Academy	203,076	Principal investigator 25	-	Principal investigator 0	-	0	6,957	2	7,766	2	4,435	1	-	0	-	0
	6,957	Donations	102,418	・Full-time／Japane 10		・Full-time／Japanese			3,044	・Full-time／Japane 1	7,766	・Full-time／Japane 2	4,435	・Full-time／Japane 1				
	98,547	Indirect funding	62,549	・Concurrent／Japa 11		・Concurrent／Japanese			3,913	・Concurrent／Japa 1								
	4,435	Joint research projects	33,376	・Full-time／Overse 3		・Full-time／Overseas												
	-	Competitive funding	4,733	・Concurrent／Over 1		・Concurrent／Overseas												
	6,805	Others	39,748	Other researchers 5	-	Other researchers 0	-	0	-	0	58,620	11	-	0	-	0	-	0
			9,671	・Associate professor /Assistant professor 1		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor		・Associate professor /Assistant professor
			30,077	・Others 4		・Others		・Others		・Others	58,620	・Others 11		・Others		・Others		・Others
			6,730	Postdocs 1	15,216	Postdocs 5		Postdocs		Postdocs	16,498	Postdocs 5		Postdocs		Postdocs		Postdocs
			6,707	Research support staffs 3	3,007	Research support staffs 3	24,156	Research support staffs 3		Research support staffs	5,376	Research support sta 1		Research support staffs		Research support staffs	6,805	Research support sta 3
			134,804	Administrative staffs 51		Administrative staffs		Administrative staffs		Administrative staffs	10,287	Administrative staffs 5		Administrative staffs		Administrative staffs		Administrative staffs
Subtotal	577,563		407,596	86	18,223	8	35,000	4	6,957	2	98,547	24	4,435	1	-	0	6,805	3
Project activities	53,797	Operational subsidies to National University Corporations/Incorporated Administrative Agency	53,797	Project activities	15,717	PR & outreach	30,586	Consumables			138,408	Project activities					9,046	Project activities
	21,901	Funding by WPI Academy			3,882	Utility costs	209	Communication and transportation										
	34,298	Government Subsidies except Funding from WPI Academy			2,302	Others	3,503	Provision of services										
	-	Donations																
	138,408	Indirect funding																
	-	Joint research projects																
	-	Competitive funding																
	9,046	Others																
Subtotal	257,450		53,797		21,901		34,298		-		138,408		-		-		9,046	
Travel	2,653	Operational subsidies to National University Corporations/Incorporated Administrative Agency	2,653	Travel	168	Travel					1,878	Travel						
	168	Funding by WPI Academy																
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	1,878	Indirect funding																
	-	Joint research projects																
	-	Competitive funding																
	-	Others																
Subtotal	4,699		2,653		168		-		-		1,878		-		-		-	
Equipment	17,167	Operational subsidies to National University Corporations/Incorporated Administrative Agency	9,999	Capillary Protein Assay System			1,683	Solar Simulator			10,000	Dynamic Light Scattering Photometer						
	-	Funding by WPI Academy	2,702	Ultrapure Water System			549	Others			9,108	Automatic sample changer						
	2,232	Government Subsidies except Funding from WPI Academy	2,298	Program fluid control system							8,118	DNA Sequencing by Capillary Electrophoresis						
	-	Donations	1,123	Objective Lense							4,950	Draft chamber						
	53,455	Indirect funding	1,045	cell culture microscope system							4,403	Incubation Monitoring System						
	-	Joint research projects									4,356	Cooling unit for Digital NMR system						
	-	Competitive funding									4,013	Lasers for multispectral confocal laser microscopy						
	-	Others									3,421	Large capacity high-speed cooling centrifuge						
											3,986	Ultrapure Water Systems						
											1,100	NMR Remote Control System						
Subtotal	72,854		17,167		-		2,232		-		53,455		-		-		-	
Research projects	77,476	Operational subsidies to National University Corporations/Incorporated Administrative Agency	77,476	Research projects					63,288	Research projects	43,025	Research projects	92,599	Research projects	311,215	Grants-in-aid in scientific research	19,430	Research projects
	-	Funding by WPI Academy													306,691	Commissioned research		
	-	Government Subsidies except Funding from WPI Academy													6,127	Commissioned project		
	63,288	Donations																
	43,025	Indirect funding																
	92,599	Joint research projects																
	624,033	Competitive funding																
	19,430	Others																
Subtotal	919,851		77,476		-		-		63,288		43,025		92,599		624,033		19,430	
Others	-	Operational subsidies to National University Corporations/Incorporated Administrative Agency			2,410	Consumption tax											650	Consumption tax
	2,410	Funding by WPI Academy																
	-	Government Subsidies except Funding from WPI Academy																
	-	Donations																
	-	Indirect funding																
	-	Joint research projects																
	-	Competitive funding																
	650	Others																
Subtotal	3,060		-		2,410		-		-		-		-		-		650	
Total	1,835,477		558,689		42,702		71,530		70,245		335,313		97,034		624,033		35,931	

Operational subsidies to National University Corporations/Incorporated Administrative Agency	運営費交付金
Funding by WPI Academy	WPIアカデミー国際頭脳循環の加速・拡大事業
Government Subsidies except Funding from WPI Academy	機関補助金（WPIアカデミー国際頭脳循環の加速・拡大事業を除く
Donations	寄付金
Indirect funding	間接経費
Joint research projects	共同研究費
Competitive funding	競争的資金
Others	その他

Appendix 4 Outreach Activities and Their Results

List up to three of the Center's outreach activities carried out during the period between FY 2020 and 2023 that have contributed to enhancing the brand or recognition of your Center and/or the brand of the overall WPI program, and describe its concrete contents and effect in narrative style. (Where possible, indicate the results in concrete numbers.)

Examples:
- As a result of using a new OO press-release method, a OO% increase in media coverage was obtained over the previous year.
- By holding seminars for the public that include people from industry, requests for joint research were received from companies.
- We changed our public relations media. As a resulting of using OO to disseminate information, a OO% increase in inquiries from researchers was obtained over the previous year.
- As a result of vigorously carrying out OO outreach activity, ¥OO in external funding was acquired.

Enter a list of your outreach activities in Attachment 4a.

Example 1: Press Release

Starting in 2018, iCeMS has been creating illustrations to represent its research results to add to its press releases. The illustrations have also been posted on iCeMS website, and press release sites such as EurekAlert! along with the text explanations. This is helping to increase the publicity of the research results. For example, in FY2020-23 , 12 of iCeMS' press releases were published in the latest trends of EurekAlert, the world's largest science press release sharing platform, and 30 press releases were picked up for the top page of Asia Research News, a science press release sharing portal of Asia. English-language media tend to use the illustrations in the press releases as they are for their articles, and it seems that attractive illustrations increase the likelihood that the news will be shared.

Example 2: iCeMS Vision Book and Concept Book

In FY 2023, the iCeMS Vision Book, which highlights the initiatives taken to realize the new Director's vision, and Concept Book, which conveys the institute's creative and inspiring atmosphere through images and words, were published. Aimed at student and young researchers, together the books artfully present research life at iCeMS and the roadmap which will define its future. The publications mark a shift in strategy by showing a broad view of iCeMS in tangible print format, while ongoing content such as First Author Interviews and iCeMS Frontrunners, which focus on individual iCeMS members and their research, have moved to digital-only versions.

Example 3: X (Twitter)

Beginning in July 2020, iCeMS has managed an English X (Twitter) account "@iCeMS_KU_INTL" aimed both at reaching international students and young researchers, and sharing the iCeMS brand worldwide. The account, which shares information on research news, snapshots from iCeMS' members' lives and research, and events and opportunities at iCeMS, averages 16 tweets a month. The account shares posts from some of iCeMS PIs, increasing their reach and ability to share information. The account is also used to advertise and recruit for the growing iCeMS internship program.

Appendix 4a　State of Outreach Activities from FY 2020 to FY 2023

* For each activity, enter the number of times that the activity was held each fiscal year.

Activities	FY 2020 (number of activities, times held)	FY 2021 (number of activities, times held)	FY 2022 (number of activities, times held)	FY 2023 (number of activities, times held)
PR brochure, pamphlet	4	4	0	3
Lectures, seminars for general public	2	4	3	13
Teaching, experiments, training for elementary, secondary and high school students	0	5	3	17
Science café	0	0	0	0
Open house	0	0	0	0
Participating, exhibiting in events	0	3	1	5
Press releases	32	17	14	16
Publications of popular science books	0	0	0	0
Others（SNS）	514	539	687	253
Others（Website news）	76	103	69	144

*If there are activities that the center hasn't implemented, delete those lines. If you have other activities, list them in the space between parentheses after "Others" and state the number of times they were held in the spaces on the right. Another line under "Others" can be added, if needed.

<Notes>

A. WPI papers

1. Original articles

1. Fukuda, R; Shima, R; Shibukawa, S; Murakami, T, 2023, ACS Appl. Bio Mater., 7, 99, Comprehensive Analysis of Drug Loading into Engineered Lipoprotein Nanoparticles toward Their Eye Drop Application, WOS:001143514500001
2. Hammi, N; Bonneau, M; El Kadib, A; Kitagawa, S; Loiseau, T; Volkringer, C; Royer, S; Dhainaut, J, 2023, ACS Appl. Mater. Interfaces, 15, 53395, Enhanced Gas Adsorption in HKUST-1@Chitosan Aerogels, Cryogels, and Xerogels: An Evaluation Study, WOS:001108490400001
3. Lu, X; Liu, CY; Xiao, X; Nguyen, TS; Xiang, ZL; Chen, CH; Cui, SL; Yavuz, CT; Xu, Q; Liu, B, 2023, ACS Appl. Mater. Interfaces, 15, 54458, Clathrating CO2 in a Supramolecular Granatohedron Cage with Noncovalent CO2-NH3 Interactions and High CO2 Capture Efficiency under Ambient Conditions, WOS:001111124400001
4. Fujiwara, H; Daikokuya, S; Mirokuin, T; Hayashi, K; Matsuzaka, M; Ohashi, Y; Pin, C; Kaiju, H; Hirai, K; Uji-i, H, 2023, ACS Appl. Nano Mater., 6, 13885, Site-Specific Synthesis of Conductive Graphitic Nanomaterials on a NiFe Thin Film by Localized Laser Irradiation, WOS:001033855300001
5. Li, X; Tan, TTY; Lin, QY; Lim, CC; Goh, R; Otake, KI; Kitagawa, S; Loh, XJ; Lim, JYC, 2023, ACS Biomater. Sci. Eng., 9, 5724, MOF-Thermogel Composites for Differentiated and Sustained Dual Drug Delivery, WOS:001070780800001
6. Cai, MK; Tong, X; Liao, PS; Shen, SJ; Zhao, HY; Li, X; Xia, L; Zhi, HQ; Zhou, N; Xue, ZQ; Jin, L; Li, JY; Li, GQ; Dong, F; Kabashin, AV; Wang, ZM, 2023, ACS Catal., 13, 15546, Manipulating the Optically Active Defect-Defect Interaction of Colloidal Quantum Dots for Carbon Dioxide Photoreduction, WOS:001116716000001
7. Zhang, SQ; Gu, R; Sakaki, S; Zeng, GX, 2023, ACS Catal., 13, 6452, N-N Bond Formation by a Small-Ring Phosphine Catalyst via the PIII/PV Cycle: Mechanistic Study and Guidelines to Obtain a Good Catalyst, WOS:000981726900001
8. Perron, A; Mandal, S; Chuba, TN; Mao, D; Singh, VP; Noda, N; Tan, R; Vu, HT; Abo, M; Uesugi, M, 2023, ACS Chem. Biol., 18, 2170, Small-Molecule Drug Repurposing for Counteracting Phototoxic A2E Aggregation, WOS:001067234000001
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