Application Procedures for Grants-in-Aid for Scientific Research - KAKENHI -

FY2024

Grant-in-Aid for Transformative Research Areas

(A)(Publicly Offered Research)

This English version is provided for convenience of prospective KAKENHI applicants who experience difficulty in reading the Japanese original, which should be referred to, in case of dispute.

July 14, 2023

The Ministry of Education, Culture, Sports, Science and Technology (MEXT)

Introduction

This document describes the procedures and other matters relevant to the "Call for Proposals for the Grants-in-Aid for Scientific Research-KAKENHI- for FY2024" including the "Grant-in-Aid for Transformative Research Areas (A)(Publicly Offered Research), " and the "Grant-in-Aid for Scientific Research on Innovative Areas."

The contents are：

Ⅰ. **Outline of the Grants-in-Aid for Scientific Research-KAKENHI-**
Ⅱ. **Call for Proposals**
Ⅲ. **Instructions for Prospective Applicants**
Ⅳ. **Instructions for Administrative Staff of Research Institution**
Ⅴ. **Other Relevant Issues**

"II. Call for Proposals" provides for each of the research categories, such basic issues as the subjects in the research categories to be called, the range of envisaged total budget, a project period, etc. The schedule from the call for proposals, through the proposal submission and the review, to the grant delivery is also described.

The subsequent sections, "III. Instructions for Prospective Applicants," and "Ⅳ Instructions for Administrative Staff of Research Institution" describe conditions for application, required procedures, and other matters to be followed by the respective actors.

This Call for Proposals is announced prior to the finalization of the national budget for FY2024, so as to let prospective applicants proceed with an early preparation for the review and enable to commence their research activities as soon as possible. It is, therefore, to be reminded that, depending on the situation of the national budget enactment, details on the grant allocation and other matters may be subject to change at a later stage.

See Major Changes in the Call for Proposals for Fiscal Year 2024 for details on these changes.

Explanation of Important Matters

- Grants-in-Aid for Scientific Research is a competitive research funding intended to provide financial support for creative and pioneering research conducted by individual researchers. Therefore, the contents of the Research Proposal Document must be original planned by the applicant.
  Plagiarism and/or misappropriation of the research contents of others are strictly impermissible. Applicants must comply with research ethics. Please note that the use of generative AI in the preparation of the Research Proposal Document causes the risk of inadvertent infringement of copyright and leakage of personal information and confidential information. It is the responsibility of the individual researcher to make appropriate decisions about the usage of generative AI.

- The research using the KAKENHI fund should be carried out by the researchers' own initiative and responsibility. Therefore, the implementation of a KAKENHI research project and publication of the research results are solely attributed to the researchers' responsibility and view, and do not reflect that of the funding sector nor of the government.

- To ensure the quality of scientific knowledge and to gain trust of society on scientists and scientific communities, it is essential to exercise fair and conscientious research activities with the adherence to the code of conduct for scientists. Applicants must understand and practice the contents of both the Statement "Code of Conduct for Scientists -Revised Version-" (section I. "Responsibilities of Scientists") by the Science Council of Japan and the booklet "For the Sound Development of Science - The Attitude of a Conscientious Scientist -" (especially section I "What Is a Responsible Research Activity?") issued by the Japan Society for the Promotion of Science (JSPS).

- From the perspective of enhancing the quality of research activities among the international scientific research networks, researchers are urged to disseminate their research results aggressively to the international society by publication of scientific papers in international journals, co-authoring of international papers, presentations in international conferences, etc.

<Major Changes in the Call for Proposals for Fiscal Year 2024>

(1) Changes to schedule for the Call for Proposals

○The schedule for the call for proposals for FY 2024 KAKENHI grants, etc. that will be made in FY2023 has been changed as follows. (Refer to II. Call for Proposals 2. Schedule from Application to Grant Delivery)

<FY2024 KAKENHI Grants>

Research Category	Start of Call for Proposals	Deadline for Submission of Applications	Notice of Review Results	Provisional Grant Decision
Specially Promoted Research	April 13, 2023	June 19, 2023	Early January 2024	Early April 2024
Transformative Research Areas (A/B)	April 13, 2023	June 19, 2023	Late February 2024	Early April 2024
Transformative Research Areas (A) (Publicly Offered Research)	July 14, 2023	September 19, 2023	Late February 2024	Early April 2024
Scientific Research (S)	April 13, 2023	June 19, 2023	Mid-February 2024	Early April 2024
Scientific Research (A/B/C), Early-Career Scientists, and Encouragement of Scientists	July 14, 2023	September 19, 2023	Late February 2024	Early April 2024
Challenging Research (Pioneering/Exploratory)	July 14, 2023	September 19, 2023	Late June 2024	Late June 2024
Publication of Scientific Research Results	July 14, 2023	September 19, 2023	Late March 2024	Early April 2024

<FY2023 KAKENHI Grants>

Research Category	Start of Call for Proposals	Deadline for Submission of Applications	Notice of Review Results	Provisional Grant Decision
International Collaborative Research (former Fostering Joint International Research(B))	March 1, 2023	May 10, 2023	Early September 2023	Early September 2023

Fostering Joint International Research (former Fostering Joint International Research (A)), and Home-Returning Researcher Development Research	July 14, 2023	September 19, 2023	Late February 2024	Late February 2024

○The underlined sections in the tables show the changes from the call for proposals made in FY2022. For the schedule for research categories other than those shown above, please check application procedures and other documents for the respective categories.

○Please carefully note that changes have been made to both the start of call for proposals and the deadline for submission of applications.

○The timing of the call for proposals for some research categories subject to the restriction on parallel grant application/receiptvaries . Applicants should check the "Table of Restriction on Parallel Grant Application/Receipt" carefully. In a case for which the restriction on parallel grant application/receipt applies, the applicant is not eligible to submit a new application for a different research category even if he/she withdraws the research proposal that he/she had already submitted (transmitted) through the electronic application system after the deadline for submitting (transmitting) the Research Proposal Document under the research category of the proposal.

(2) Digitalization and Colorization of Review Materials

○For some research categories (see the below for the categories subject to the change), the reviewers will view the submitted Research Proposal Documents (PDF files) in electronic form on the electronic application system to conduct reviews. Accordingly, Research Proposal Documents under the applicable categories will no longer be printed out in monochrome (grayscale) and mailed to the reviewers. Research Proposal Documents using colored figures and text will be used as they appear in the review.

[Research Categories Subject to Digitalization and Colorization of Review Materials]

- For FY2024　Specially Promoted Research and Scientific Research (S)
- For FY2023　Research Activity Start-up, International Collaborative Research, Fostering Joint International Research, and Home-Returning Researcher Development Research

* For the review of other research categories, Research Proposal Documents printed out in monochrome will continue to be used as review materials. Please note, however, that JSPS plans to expand research categories subject to digitalization and colorization based on the review situation.

(3) New "Draw Back" Function for Application Documents Has Been Implemented

○ Starting from the current call for proposals, the administrative staff of research institutions can, at any time prior to the deadline for submission (transmission), draw back the Research Proposal Documents (application documents) that they have already submitted (transmitted) to JSPS, and correct the content as necessary and resubmit them. (Refer to IV. Instructions for Administrative Staff of Research Institution 4. Submission and Other Matters of the Research Proposal Document (Preparing the Research Proposal Document))

(4) Handling of Significant Changes to Research Plans for Continued Research Projects

○ In the case of a research project that is to be continued in a fiscal year for a new call for proposals (hereinafter referred to as a "continued research project"), if the PI would like to make significant changes in his/her research plan, he/she needs to submit an application document (Research Proposal Document) that will be reviewed once again. JSPS will discontinue to accept applications for continued research projects beginning with the FY2024 call for proposals, since the flexible implementation of carry-over procedures, the progress in the introduction of a multi-year fund, and other circumstances now allow researchers to change their research plans flexibly, and the number of applications has decreased.

(5) Abolition of Notice of Completion of Research Project and Statement of Reason

○ If the PI of a continued research project decides that his/her project proceeded beyond expectation and the initial research goal has already been reached, and the researcher intends to pursue a new research development by transferring to another research category, he/she may opt to apply for a new KAKENHI grant, after submitting a "Notice of Completion of Research Project" and a "Statement of Reason" (hereinafter referred to as "completion report-related documents"). JSPS will discontinue to accept completion report-related documents beginning with the FY2024 call for proposals, since the expansion of the research categories for which applications may be submitted through the "Research proposal submission in the fiscal year previous to the final fiscal year of the research period of an on-going research project," the advancement of the timeline for proposal solicitations and reviews, and other factors now allow for the timely and appropriate update of

continued research projects, and the number of applications has decreased.

(6) Participation of JSPS Fellows (DC) as Co-Investigators

○Starting from FY2023, JSPS Fellows (DC) can participate in research projects under KAKENHI-funded research categories as Co-Investigators. (Refer to III. Instructions for Prospective Applicants 1. Procedures to be Completed Prior to Application (1) <Important Point 2>)

(7) Changes to the Application Requirements for Grant-in-Aid for Research Activity Start-up

○The application requirements for FY2024 Grant-in-Aid for Research Activity Start-up will be changed. Applicants must fall under either A) or B) below. (Refer to the FY2024 application procedures for the applicable categories (Call for proposals is scheduled to begin in early March 2024))

A) An individual who obtains eligibility for KAKENHI application on or after September 20, 2023, and has not submitted an application under the call for proposals for the following research categories(*) announced by MEXT and JSPS.

B) An individual who has not submitted an application under the call for proposals for the following research categories(*) announced by MEXT and JSPS because he/she was on maternity leave or childcare leave in FY2023.

(*) FY2024 Grants-in-Aid for Specially Promoted Research, Transformative Research Areas, Scientific Research, Challenging Research, and Early-Career Scientists

(8) Changes to the Structure of the Research Proposal Document

○ Starting from the current call for proposals, the “Status of Application and Acquisition of Research Grants” column will not be shown in the Research Proposal Document PDF file. Instead, the content shown on the electronic application system will be reviewed. Nevertheless, this column will remain part of the Research Proposal Document, and the method of entering the Research Proposal Document (Items to be entered in the Website) will remain unchanged.(Refer to Supplementary edition to the Application Procedures for Grants-in-Aid for Scientific Research-KAKENHI- for FY2024 (Grant-in-Aid for Transformative Research Areas(A)(Publicly Offered Research)) (Forms / Procedures for Preparing and Entering a Research Proposal Document))

(9) Ensuring International Research Activities

○This document clarifies that from the perspective of encouraging researchers to conduct international research activities, applicants who have made international

efforts related to their research plans (such as their records of joint international research and research history in overseas institutions) can describe such efforts in their Research Proposal Documents as necessary. (Refer to III. Instructions for Prospective Applicants 3. Preparation of the KAKENHI Application Form (Research Proposal Document), etc. (1) (Reference))

○ This document clearly states that researchers are urged to make an effort to disseminate their KAKENHI-funded research achievements aggressively to the international society. (Refer to Introduction and I. Outline of the Grants-in-Aid for Scientific Research -KAKENHI- 6. Dissemination, etc. of Research Achievements Supported by KAKENHI)

(10) Research Integrity

○ In response to the "Policy for Securement of Research Integrity" (April 27, 2021, Decision of the Integrated Innovation Strategy Promotion Council), etc., JSPS is taking necessary measures to ensure the transparency of research activities.
As an ongoing measure, applicants will be required to provide information to ensure the transparency of research activities in their Research Proposal Documents for the FY2024 call for proposals.
As described in (8), applicants are required to enter their status of application and acquisition of research grants directly on the KAKENHI electronic application system in the FY2024 call for proposals as they were in the previous fiscal year. The status information registered on e-Rad will be linked to the KAKENHI electronic application system in the next fiscal year or later.

(11) Changes in Eligibility for KAKENHI Application for Fostering Joint International Research

○ In order to vigorously promote the internationalization of research activities of young researchers, JSPS has added "Grant-in-Aid for JSPS Fellows" to root research projects for Fostering Joint International Research and expanded opportunities for researchers selected as JSPS Research Fellows to apply for this research category. Accordingly, JSPS has also decided to permit researchers selected as JSPS Research Fellows (DC) to apply for research categories as Principal Investigators, if the eligibility for KAKENHI application for the said research categories is given by their host research institutions.

Summary of Deliberations at the 11th Meeting of the Subdivision on Grants-in-Aid for Research (February 1, 2023)
URL: https://www.mext.go.jp/content/20230308-mxt_gakjokik-000013407_1.pdf

Table of Contents

References

The application forms (Research Proposal Document) and other application materials are contained in separate files. Please refer to "Supplementary edition to the Application Procedures for Grants-in-Aid for Scientific Research-KAKENHI- for FY2024 (Grant-in-Aid for Transformative Research Areas (A)(Publicly Offered Research)) (Forms / Procedures for Preparing and Entering a Research Proposal Document)."(Japanese only)

* The application forms (Research Proposal Document) and other application materials can be downloaded from the MEXT website (cf. URL below).

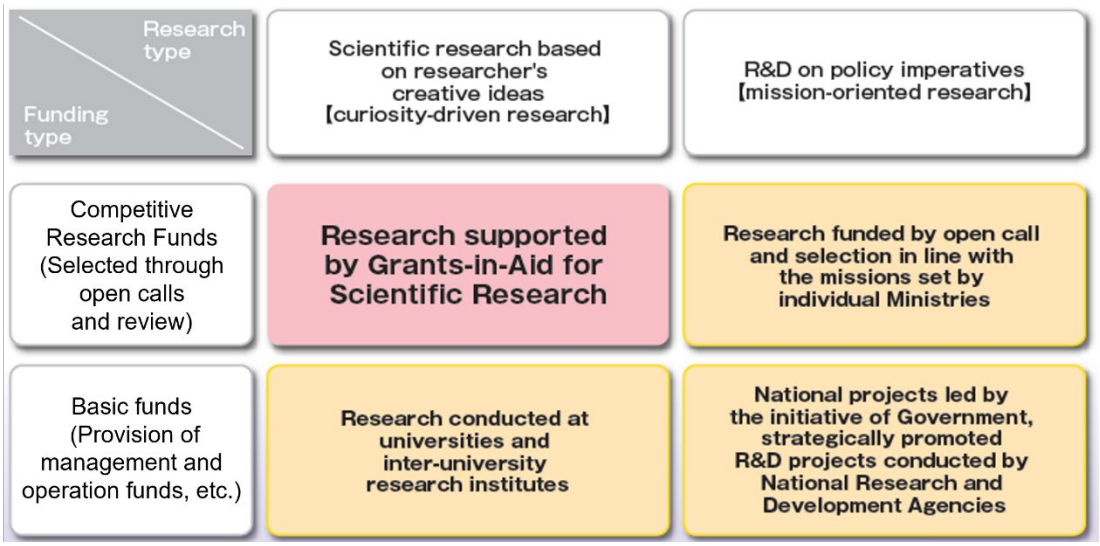
(URL) https://www.mext.go.jp/a_menu/shinkou/hojyo/boshu/1351544.htm

I. Outline of the Grants-in-Aid for Scientific Research-KAKENHI-

1. Purpose and Character of Grants-in-Aid for Scientific Research-KAKENHI-

Grants-in-Aid for Scientific Research (hereinafter referred to as "KAKENHI") are competitive research funds that are intended to promote development of scientific research (based on original ideas of researchers), encompassing basic to applied researches in all fields ranging from humanities and social sciences to natural sciences. The grants provide financial support for creative and pioneering research projects that will become the foundation of social development. The research projects are selected by peer-review process.

<The placement of "KAKENHI" in the policy on the promotion of science, technology and scientific research in Japan>



2. Research Categories

Different research categories of KAKENHI listed below are provided so as to meet the variety of the research content and budget scale.

❖ As of July 2023

Research categories	Purposes and description of each research category	Type of fund*1
Grants-in-Aid for Scientific Research		
Grant-in-Aid for Specially Promoted Research	Outstanding and distinctive research conducted by one or a relatively small number of researchers expected to achieve remarkably excellent research results that opens up a new scientific field. The research period is 3 to 5 years. (In a truly necessary case, period up to 7 years is acceptable.) The budget ranges from 200 million to 500 million yen per project (Only in a truly necessary case, budget exceeding 500 million yen is asked for.).	SG
Grant-in-Aid for Scientific Research on Innovative Areas (Research in a Proposed Research Area)	This category is intended to foster novel research areas proposed by diverse groups of researchers that are expected to lead to development and heightening of Japan's research level in the respective fields, to be conducted by collective research efforts through collaboration, scholarly training, shared use of equipment, etc. The period is 5 years. The budget range is generally set between 10 million to 300	SG

	million yen per fiscal year per proposed area. [A call for proposals for budget for collecting research results of Finished Research Area only is put out in FY2023 and beyond.]		
Grant-in-Aid for Transformative Research Area	(A) Research areas proposed through co-creative and interdisciplinary efforts of diverse researchers, which aim to create research areas that will lead the way to radical transformation of and change in the existing framework and/or direction of research as well as upgrade and level-up of scientific research in Japan and nurturing young researchers, and will contribute to the development of the proposed research areas through efforts for joint research and shared use of equipment, etc. (5 years; more than 50 million yen and up to 300 million yen per fiscal year per research area (In a truly necessary case, a budget exceeding 300 million yen may be requested.)) (B) Research areas proposed by compact groups of researchers who will be bearers of the next generation of research with a smaller budget scale (about 3 or 4 groups), which aim to create research areas that will lead the way to radical transformation of and change in the existing framework and/or direction of research as well as upgrade and level-up of scientific research in Japan through more challenging and exploratory research, and expected to lead to the Transformative Research Areas (A) in the future. (3 years; 50 million yen or less per fiscal year per research area)	SG	
Grant-in-Aid for Scientific Research	(S): Creative/pioneering research conducted by one or a relatively small number of researchers. 5 years (in principle) 50 million to 200 million yen (A), (B), (C): Creative/pioneering research conducted by one researcher or jointly by multiple researchers. (A) 3 to 5 years; 20 million to 50 million yen (B) 3 to 5 years: 5 million to 20 million yen (C) 3 to 5 years; 5 million yen or less	(S)	SG
		(A)	SG
		(B)	SG
		(C)	MF
Grant-in-Aid for Challenging Research (Pioneering/Exploratory)	Research conducted by a single or multiple researchers that aims at radically transforming the existing research framework and/or changing the research direction and has a potential of rapid development. The scope of the (Exploratory) category encompasses research proposals that are highly exploratory and/or are in their budding stages. (Pioneering) 3 to 6 years; 5 million to 20 million yen (Exploratory) 2 to 3 years; 5 million yen or less	MF	
Grant-in-Aid for Early-Career Scientists	Research conducted by an individual researcher (*2) who is less than 8 years after Ph.D. acquisition. 2 to 5 years; 5 million yen or less	MF	
Grant-in-Aid for Research Activity Start-up	Research conducted by a single researcher who has been freshly appointed to a research position, or who has returned from his/her maternity, childcare or other kinds of leave. Up to2 years; Up to 1.5 million per fiscal year	MF	
Grant-in-Aid for Encouragement of Scientists	Research conducted by an individual who is ineligible for application for other KAKENHI categories (e.g., individuals who belong to educational or research institutions, private companies, etc. and engage in the researches to contribute to the promotion of the science). 1 year; 100 thousand to 1 million yen	SG	
Grant-in-Aid for Special Purposes	Research projects of pressing urgency and importance.	MF	
Grant-in-Aid for Publication of Scientific Research Results			
Publication of Research Results	Subsidy for publication and/or international dissemination of research achievements of high academic values executed by academic associations and other organizations.	SG	
Enhancement of International Dissemination of Information	Subsidy for efforts by academic societies and other scholarly organizations to strengthen international dissemination of academic information for the purpose of international academic exchange.	SG	
Scientific Literature	Subsidy for academic publication of research results (books) authored by an individual or a group of researchers.	SG	

Databases	Subsidy for creation and operation of a database open to public use by an individual or a group of researchers.	
Grant-in-Aid for JSPS Fellows	Funding period is up to 3 years for research conducted by JSPS Fellows (including Foreign JSPS Fellows). As for Cross-border Postdoctoral Fellowship (CDP) the period is up to 5 years	MF
Fund for the Promotion of Joint International Research		
International Leading Research	This grant aims to enable research groups led by top-level researchers in our country to play a central role in the international network, thereby achieving research results of high scientific value internationally. With the participation of postdoctoral fellows and graduate students, the grant seeks to foster researchers who can play leading roles in the international research community in the future. (7 years (extendable up to 10 years); up to 500 million yen)	
Fostering Joint International Research	Support of joint international research project conducted by a KAKENHI grantee in collaboration with researcher(s) at a foreign university or a research institution over a period of 6 to 12 months. The grant seeks to markedly advance research plans for the root research project and to foster independent researchers who can be internationally competitive. (The budget is up to 12 million yen.) [The category name is changed from FY2023 call for proposals.]	
International Collaborative Research	Support of joint international research project conducted by multiple domestic researchers and a researcher who belongs to overseas research institution. In addition to the development of scientific research, the grant seeks to build out infrastructure of joint international research or further strengthen joint international research and to foster researchers who can be internationally competitive. (The period is 3 to 6 years. The budget is up to 20 million yen.) [The category name is changed from the FY2023 call for proposals.]	MF
International Activities Supporting Group	Support of international activities within Scientific Research on Innovative Areas. (Set period of the Area, up to 15 million yen per fiscal year) [After FY2018 call for proposals "International Activities Supporting Group" has been incorporated into "Grant-in-Aid for Scientific Research on Innovative Areas "Administrative Group." (It continued until the FY2019 call for proposals.)]	
Home-Returning Researcher Development Research	Support of research to be conducted by a Japanese researcher with current affiliation abroad who is to be newly appointed at university or research institution in Japan. (The period is up to 3 years. The budget is up to 50 million yen.)	

*1 SG: Series of Single-year Grants, MF: Multi-year Fund

*2 Individuals who are in the prospect of acquiring Ph.D. are also eligible. When counting the years after Ph.D. acquisition, the period of maternity leave and childcare leave can be excluded.

3. Role Sharing Between MEXT and JSPS

Up to FY 1998, all aspects of KAKENHI funding were handled by the Ministry of Education (the predecessor of The Ministry of Education, Culture, Sports, Science and Technology (hereinafter "MEXT")). From FY1999 on, these tasks have been gradually transferred to the Japan Society for the Promotion of Science (hereinafter "JSPS"). The current role-sharing between MEXT and JSPS is as shown below.

Research category	**Call for proposals, Review** Preparation of the Application Procedures, Reception of proposal submission	**Grant delivery** Notifications of provisional grant decision Reception of the form of the formal application for grant delivery and other documents for the relevant procedures. Notification of grant decision
Scientific Research on Innovative Areas, Transformative Research Areas, Special Purposes, Fund for the Promotion of Joint International Research (International Activities Supporting Group)	MEXT	JSPS

Specially Promoted Research, Scientific Research, Challenging Exploratory Research, Challenging Research, Early-Career Scientists, Research Activity Start-up, Encouragement of Scientists, Publication of Scientific Research Results, JSPS Research Fellow, Fund for the Promotion of Joint International Research (International Leading Research Fostering Joint International Research, International Collaborative Research, Home-Returning Researcher Development Research)	JSPS	JSPS

4. Rules Pertaining to KAKENHI

KAKENHI (Series of Single-year Grants) are governed by the "Law on Optimizing Implementation of Budgets Relating to Subsidies" (Law No. 179, 1955), the "Procedures on the Handling of Grants-in-Aid for Scientific Research" (Public Notice of MEXT), the "Procedures on the Handling of JSPS Grants-in-Aid for Scientific Research" (KAKENHI (Series of Single-year Grants)) (Regulations No. 17, 2003), and other rules.

KAKENHI (Multi-year Fund) are governed by the application with modifications of the "Law on Optimizing Implementation of Budgets Relating to Subsidies" (Law No. 179, 1955) and the application of the "Basic Policy on the Management of the KAKENHI (Multi-year Fund) (Decision by the Minister of Education, Culture, Sports, Science and Technology)", the "Procedures on the Handling of JSPS Grants-in-Aid for Scientific Research (KAKENHI (Multi-year Fund))" (Rule No. 19, 2011) and other rules.

(1) Three Types of Rules Pertaining to KAKENHI

The following three sets of rules pertain to various aspects of KAKENHI.

i) Application Rules: rules concerning the submission of research proposals

ii) Assessment Rules: rules concerning the pre-assessment (review) of applications, and rules concerning the interim, and other progress assessment of granted projects.

iii) Spending Rules: rules concerning the use of KAKENHI

These three sets of rules apply as follows.

❖ As of April 2023

	Application Rules	Assessment Rules	Spending Rules
KAKENHI (Series of Single-year Grants)	MEXT Application Procedures	MEXT Rules concerning the assessment for Grants-in-Aid for Scientific Research	JSPS For researchers: Supplementary conditions For research institutions: Administrative work and other tasks concerning the use of Grants-in-Aid for Scientific Research (KAKENHI (Series of Single-year Grants)), to be performed by each research institution
KAKENHI (Multi-year Fund)	JSPS Application Procedures	JSPS Rules concerning the review and assessment for Grants-in-Aid for Scientific Research	JSPS For researchers: Funding conditions For research institutions: Administrative work and other tasks concerning the use of Grants-in-Aid for Scientific Research (KAKENHI (Multi-year Fund)), to be performed by each research institution

(2) Appropriate Use of KAKENHI

KAKENHI are funded by the tax of citizens and other sources, so please ensure that the KAKENHI is used efficiently and effectively, for example through planning for the communal use of purchased items.

Researchers receiving the KAKENHI have a duty to comply with the related laws, regulations and spending rules by researchers (supplementary conditions or funding conditions), and also to use such grants appropriately. To facilitate the appropriate use of KAKENHI, research institutions to which the researchers belong are responsible for the management of KAKENHI. The Administrative work that each research institution is required to carry out (rules for use for institutions) is determined by JSPS. The research institutions are responsible for the appropriate accounting of KAKENHI. It is desirable, for example, to set up an accounting system for proper management of KAKENHI budget and expenditure, purchase order and delivery inspection, and internal auditing. To prevent improper business transactions, it is important, in addition to appropriate delivery inspections, to make all traders thoroughly informed of the KAKENHI rules and thus obtain cooperation of traders in the prevention of this kind of fraudulent accounting. Research institutions should take rigorous measures so as to eliminate business malpractice.

KAKENHI applicants and their research institutions must have full understanding of the KAKENHI rules prior to the submission of their research proposals.

(3) The Distinction between KAKENHI (Series of Single-year Grants) and KAKENHI (Multi-year Fund)

A research project submitted to the categories of KAKENHI (Series of Single-year Grants), if adopted, is granted as a package plan for the multi-year research period. The actual funding, however, is made on the single-year basis for each fiscal year of the research period. Therefore, this type of KAKENHI cannot be used to cover the expenditures in fiscal years other than the respective grant year.

When it is anticipated that spending of the grant cannot be completed within the fiscal year, owing to reason(s) unforeseeable at the time of grant delivery, the grant can be carried over to the next fiscal year after going through the due procedure. Firstly a Principal Investigator submits an application for carry-forward of grant through his/her affiliated research institution to JSPS. After reviewing it by JSPS and MEXT, the Minister of MEXT makes a request to the Minister of Finance for the carry-forward of grant to obtain his/her approval.

On the other hand, the KAKENHI (Multi-year Fund) is handled as single funding for the whole research period. Therefore, it is possible to use the grant to cover the expenditures extending over fiscal year boundaries.

Moreover, if an amount of grant remains unused by the end of a fiscal year, it can be carried over to the successive fiscal year(s) as long as they are within the overall research period, without going through prior authorization procedures. In case such a grant carry-over becomes necessary in the final year of the research period, the grantee may choose to request an official approval of one-year extension of the research period.

(4) Penalty for Non-submission of "Report on the Research Achievements"

i) The "Report on the Research Achievements" plays the important role in making the achievements of the research funded by the KAKENHI widely known to the public, and thereby returning the outcome of KAKENHI supported by citizens' tax, to the society.

The contents of the "Report on the Research Achievements" submitted by KAKENHI grantees are compiled and made available to the public on the "Grants-in-Aid for Scientific Research Database" (KAKEN) of the National Institute of Informatics and other platforms. "Report on the Research Achievements" should be submitted via the research institution to which the KAKENHI grantees belong.

ii) No KAKENHI grant will be awarded to a researcher who failed to submit the "Report on the Research Achievements" at the end of his/her research period without any justifiable reason. If such a non-compliance case is uncovered, the decision of grant award to the researcher in question may be cancelled, the on-going grant may be suspended, and return of the delivered grant may be ordered. In addition, relevant information, such as the name of the research institution to which the researcher in question belongs, may be made public.

Furthermore, if researchers have failed to submit the scheduled report on the research

achievements without justifiable reason, then execution of other KAKENHI implemented in the same fiscal year will be suspended. Therefore, it is the responsibility of the representative of the research institution to ensure that the report on the research achievements is submitted without fail.

(5) Penalty for the Case of Infringement of Related Laws and Regulations

If there have been serious falsehoods in the application documents, or violation of relevant laws, regulations and guidelines, the delivery of KAKENHI may be suspended or cancelled.

5. "Guidelines on the Proper Implementation of Competitive Research Funds," etc.

The "Guidelines on the Proper Implementation of Competitive Research Funds" (Agreement of the Liaison Meeting of Related Offices and Ministries on Competitive Research Funds, September 9, 2005; revised December 17, 2021) states common understandings among the research-related ministries and offices in regard to allocation of competitive research funds, in terms of elimination of such inappropriate practices as unreasonable duplication and/or excessive overconcentration in the grant allocation, fraudulent acquisition and/or unlawful use of grants, and misconducts in research activities. The implementation of the KAKENHI system as well as other competitive research funds scheme follows the above-mentioned "Guidelines" and other related rules. Applicants are urged to take special notice of the following points.

(1) Elimination of Unreasonable Duplication and/or Excessive Overconcentration in the Grant Allocation

i) Towards elimination of "Unreasonable Duplication and/or Excessive Overconcentration" (see below) of competitive research funds, relevant information on funding applications is shared among the pertinent ministries and funding agencies, making use of the Cross-ministerial Research and Development management system (e-Rad).

Therefore, applicants, when submitting more than one KAKENHI applications and/or other competitive research funds, are urged to prepare their application documents with due care to clearly state the differences between the project to be submitted and their other projects so as to make it clear that they do not constitute unreasonable duplication.

In case a particular KAKENHI application is recognized as constituting a case of unreasonable duplication and/or excessive overconcentration, that application may not be granted.

ii) The following conducts may result in rejection of the research project, cancellation of grant, or reduction of the research budget: untruthful statement or misrepresentation in any of the entry of the status of applications and acquisitions of other competitive research funds (including those of other ministries) and other KAKENHI grants in the research proposal document (such as name of research grant, title of research project, research period, amount of budget, effort, affiliated institution/position upon application/acquisition of such grants, etc.); if it is found that the applicant has not appropriately shared with his/her affiliated research institution, the information necessary to ensure the transparency of all research activities that he/she is

involved in, including information on research funds and side jobs, etc., as well as information on donations and information on supports other than monetary funds, for example, through the provision of facilities and/or equipment.

iii) Inquiries on the status of acceptance of facilities and/or equipment used for the research, the status of management of such facilities/equipment, and request for other information may be made to researchers, etc.

Elimination of Unreasonable Duplication and Excessive Overconcentration in Grant Allocation

"Guidelines on the Proper Implementation of Competitive Research Funds" -Extract-

(Agreement of the Liaison Meeting of Related Offices and Ministries on Competitive Research Funds, September 9, 2005; revised December 17, 2021)

2. Elimination of Unreasonable Duplication and/or Excessive Overconcentration in the Grant Allocation

(1) Basic Policy of the Unreasonable Reduplication and Excessive Overconcentration

i) In the Guidelines, "Unreasonable Duplication" refers to a situation where more than one competitive research fund and other research grants (all current research funds that are allocated to individual research contents, including both domestic and overseas grants-in-aid, subsidies, joint research funds, commissioned research funds, etc.; hereinafter the same) are unnecessarily and redundantly allocated to the same research project (meaning, the name and content of the research to which the competitive research funds are allocated; hereinafter the same) by the same researcher. Any of the following cases fall under "Unreasonable Duplication."

- **Cases where simultaneous applications have been made to more than one competitive research funds / other research funds for substantially the same research project, and where these research projects are redundantly adopted.**
- **Cases where an application has been made again for substantively the same research project as another project that has already been adopted, and for which the allotment of competitive research funds / other research funds has already been completed.**
- **Cases where there is duplication in the use of research funds among more than one research projects.**
- **Other cases corresponding to those above.**

ii) In these guidelines, "Excessive Concentration" is a situation in which the entire research funds that are allotted to one and the same researcher or research group (hereinafter referred to as "researcher, etc.") in the fiscal year in question exceeds the limit within which they can be used effectively and efficiently, and in which the research funds cannot be used within the research period. Either of the following cases falls under "Excessive Concentration."

- **Cases where, in the light of the abilities of the researcher, etc. and the research methods, etc., excessive research funds are allotted.**
- **Cases where, in comparison with the effort (the time allocation rate (%) of time necessary for the implementation of the research activities with the entire working time of researcher) that is being allotted to the research project in question, excessive research funds are allotted.**
- **Cases where the purchase of unnecessarily expensive equipment is carried out.**
- **Other cases corresponding to the cases mentioned above.**

(2) Dealing with "Improper Grant Spending," "Fraudulent Grant Acquisition" or "Research Misconduct"

○ "Improper Grant Spending," "Fraudulent Grant Acquisition" and "Research Misconduct" refer to the following type of acts respectively.

・"Improper Grant Spending":

Use of funds for other purposes, intentionally or by gross negligence, for example, by

conducting fictitious business transactions ("*azukekin*") with a trader through fictitious order placements, or by charging costs higher than actually needed for personnel, travel expenses, etc., or use of funds in violation of the content of the funding decision or the conditions it implies.

・"Fraudulent Grant Acquisition":
Receiving funds by deception or other fraudulent means, for example, by applying under the name of another researcher, or by making false entries in application documents.

・"Research Misconduct":
Fabrication, falsification, or plagiarism of data, information, or findings published research achievements based on the intent of the researcher, or the failing of the researcher to fulfill the basic duty of care that he/she has.

(i) **No KAKENHI will be offered, for a fixed period of time, when a researcher or related party has committed an improper grant spending of KAKENHI, has committed a fraudulent grant acquisition of KAKENHI, or has committed a research misconduct.** Moreover, for research projects for which it is established that an improper grant spending of grants, a fraudulent grant acquisition of grants or research misconduct has been committed, the researcher in question may be required to return the given KAKENHI completely or partially.

Moreover, an outline of the improper grant spending of KAKENHI, the fraudulent grant acquisition of KAKENHI, and/or the research misconduct in question of the researcher who falls in those categories (containing an outline of the outcome of the investigation in the research institution, the names of the people involved, the name of the system, the institution they belong to, the research project, the budget, the fiscal year of the research, the fraudulent content, details of the measures taken, etc.) will be made public.

Also researchers who have committed improper grant spending or fraudulent grant acquisition of competitive research funds other than the KAKENHI (including funds under the jurisdiction of other Offices and Ministries), etc., and/or has committed research misconduct by means of these competitive research funds, and therefore are excluded from receiving these funds in question for a certain period of time, will not receive the KAKENHI for the same period of time.

Note: This applies to those schemes newly starting a call for proposals in FY2024 (and onward) for "competitive research funds other than KAKENHI, etc. (including funds under the jurisdiction of other Offices and Ministries)" as well. It also applies to those schemes that ended before FY2023. Refer to the website below for the schemes to which this specifically applies at present.
URL: https://www8.cao.go.jp/cstp/compefund/

○Period of KAKENHI suspension

[Improper Grant Spending and Fraudulent Grant Acquisition of KAKENHI]

<table>
<tr><th>Researcher categories</th><th colspan="2">Extent of the improper grant spending</th><th>Period of KAKENHI suspension</th></tr>
<tr><td>I. Researchers who committed improper grant spending of KAKENHI and researchers who conspired in such acts</td><td colspan="2">1. Misappropriation of KAKENHI for personal gain</td><td>10 years</td></tr>
<tr><td rowspan="3">II. Researchers who committed improper grant spending of KAKENHI and researchers who conspired in such acts</td><td rowspan="3">2. Other than 1.</td><td>(i) Impact of the misconduct on the society is substantial and maliciousness of the misconduct is judged to be high</td><td>5 years</td></tr>
<tr><td>(ii) Cases other than (i) and (iii)</td><td>2 to 4 years</td></tr>
<tr><td>(iii) The impact of the misconduct on the society is small and the maliciousness of the misconduct is judged to be low</td><td>1 year</td></tr>
<tr><td>III. Researchers who acquired KAKENHI by deception or other fraudulent means and researchers who conspired in such acts</td><td colspan="2">－</td><td>5 years</td></tr>
<tr><td>IV. Researchers who were not directly involved in the improper grant spending of KAKENHI, but failed to exercise due care and used the funds as a result</td><td colspan="2">－</td><td>The upper limit is 2 years and the lower limit is 1 year depending on the degree of the breach of duty by the researchers who have the duty of care as a good manager. .</td></tr>
</table>

For cases judged as subcritical to the punitive suspension measures, sharp reprimand is administered to the individual(s) concerned.

The following cases are pertinent to the “sharp reprimand” penalty.

1. Among the case II above, the researchers in case that the influence on society and the maliciousness of their conducts are judged to be insignificant and the amount of money involved is small.
2. Among the case IV above, the researchers in case that the influence on society and the maliciousness of their conducts are judged to be insignificant.

[Research Misconduct]

<table>
<tr><th colspan="3">Individual Involvement in the Misconducts</th><th>Negative Impacts on Science and on Public at Large Degree of Maliciousness</th><th>Period of KAKENHI Suspension</th></tr>
<tr><td rowspan="4">Subject of Research Misconduct</td><td colspan="2">(a) Particularly malicious individual(s) who, for example, had intention of research misconduct from the very beginning of the research</td><td></td><td>10 years</td></tr>
<tr><td rowspan="3">(b) Author(s) of paper(s), etc. related to the research in which research misconduct (s) have been identified (other than (a) above)</td><td rowspan="2">Responsible author(s) of the paper(s) in question (corresponding author, lead author or other authors bearing equivalent responsibilities)</td><td>Cases where it is judged that the impact on the progress of the science in the field in question and the social impact are major, or the level of maliciousness involved in the acts is high</td><td>5 to 7 years</td></tr>
<tr><td>Cases where it is judged that the impact on the progress of the science in the field in question and the social impact are minor, or the level of maliciousness involved in the acts is low</td><td>3 to 5 years</td></tr>
<tr><td>Author(s) of the paper(s) in question other than the responsible author(s) described above</td><td></td><td>2 to 3 years</td></tr>
<tr><td colspan="2">(c) Individual(s) involved who are not the authors of the research paper(s) for which research misconduct(s) are identified.</td><td></td><td>2 to 3 years</td></tr>
<tr><td colspan="3" rowspan="2">Responsible author(s) of paper(s), (corresponding author, lead author or other authors bearing equivalent responsibilities) for which research misconduct(s) are identified, but not involved in the alleged research misconduct</td><td>Cases where it is judged that the impact on the progress of the science in the field in question and the social impact are major, or the level of maliciousness involved in the acts is high</td><td>2 to 3 years</td></tr>
<tr><td>Cases where it is judged that the impact on the progress of the science in the field in question and the social impact are low, or the degree of severity of the acts is low</td><td>1 to 2 years</td></tr>
</table>

* In cases where specific issues for extenuation such as voluntary withdrawal of the paper in question may be taken into account, the suspension period can be shortened as judged fit.

(ii) The relevant information of each research misconduct case may be provided to the offices of the research funding agencies (including Incorporated Administrative Agencies) under the jurisdiction of the relevant Office. Thereby the penalized researcher may be also subject to restriction in application of and/or participation to research projects in other competitive research funds other than KAKENHI.

Note: "Application and/or participation" means proposing new research projects, applying, responding to call for proposals, newly participating to research as a person involved in collective research, etc. and participating as a Principal Investigator or a person involved in collective research, etc. in research projects in progress (continued research projects).

(iii) Research institutions are required to comply with the "Guidelines on the Management and Audit of Public Research Funds at Research Institutions (Implementation Standards) (revised in February 1, 2021), Ordered by the Minister of Education, Culture, Sports, Science and Technology" and the "Guidelines for Responding to Research Misconduct (adopted August 26, 2014 by MEXT)." Therefore, research institutions should pay adequate attention to these two sets of Guidelines when researchers implement their research activities.

In case where the status of the system improvement in line with these guidelines is recognized inadequate based on the survey results, the measures such as the reduction in indirect cost of all kinds of grants disbursed by MEXT or the Incorporated Administrative Agencies under the

control of MEXT to the research institution(s) in question can be taken.

○ "Guidelines on the Management and Audit of Public Research Funds at Research Institutions" (Revised February 1, 2021; Ministry of Education, Culture, Sports, Science and Technology)

URL:https://www.mext.go.jp/a_menu/kansa/houkoku/1343904_21.htm

○ "Guidelines for Responding to Research Misconduct" (Established August 26, 2014; Ministry of Education, Culture, Sports, Science and Technology)

URL: https://www.mext.go.jp/a_menu/jinzai/fusei/index.htm

(Reference): Examples of improper grant spending, fraudulent grant acquisition and research misconduct of KAKENHI.

○ Improper grant spending

- **Someone instructed a trader to forge fictitious transaction pretending to have purchased expendables, made the university pay a KAKENHI for them, and then instructed the trader to keep the money as deposit for future use.**
- **Someone instructed a trader to forge a fictitious transaction, obtaining a false invoice which carries item names different from those actually ordered and delivered, and then made the university pay a KAKENHI for them.**
- **Someone instructed his/her students to submit false work attendance sheets, made the university pay a KAKENHI for them, and then kept the money as a pooled fund of his/her lab.**
- **Someone visited destination not listed on the oversea travel itinerary, in order to have a meeting on cooperative research unrelated to the purpose of the KAKENHI research project.**

(Note) The expenditure of the KAKENHI for fictitious and other transactions, like the ones mentioned in the case examples above, are all considered "misappropriation or misuse," even if the expenditure was intended for the purpose of conducting the KAKENHI research project.

○ Fraudulent grant acquisition

- **A researcher ineligible for the KAKENHI funding made application and acquired a KAKENHI grant.**

○ Research misconduct

- **Someone manipulated or forged experimental data or figures in a research paper published as an achievement of the research supported by a KAKENHI.**
- **Someone published books of his/her achievement with KAKENHI which contained an article translated from an original English research paper with no prior consent from the author(s) nor proper quotation statement.**

6. Dissemination, Etc. of Research Achievements Supported by KAKENHI

KAKENHI research achievements are made broadly available to other researchers and to the general public, through posting and publication of the "Research Outline" and the "Report on the Research Achievements" on the Grants-in-Aid for Scientific Research Database (KAKEN) operated by the National Institute of Informatics.

Moreover, the expenses for outreach-related activities including dissemination of international research achievements by publishing research papers, etc., can be covered by direct expenses. The KAKENHI grantees are urged to actively pursue public promotion of their international research achievements through the aid of KAKENHI so as to make them widely known to the public at large.

Upon disseminating the research achievements, please take note of the following issues as well.

(1) The acknowledgement for KAKENHI grant in research publications

When publishing research achievements of the KAKENHI project, researchers should be sure to express that the project has been supported by the KAKENHI grant, by stating in the "Acknowledgment" or other designated section of the paper the "JSPS KAKENHI Grant Number JP8 digits" in the case of English publication or "JSPS 科研費　JP8 桁の課題番号" in the case of Japanese publication.

〈Example〉
【English】This work was supported by JSPS KAKENHI Grant Number JP12K34567.
【Japanese】本研究は JSPS 科研費 JP12K34567 の助成を受けたものです。

(2) The implementation of the fair and conscientious research activities

The research using the KAKENHI should be carried out based on researcher's own self-awareness and responsibility. Therefore the publication on the implementation of the research or research achievements, etc. should not come from the government request and the views and responsibilities on the research achievements should be attributed to the researchers themselves.

On the occasion such as researchers release the research achievements using the KAKENHI broadly to the public, the examples of the indication noting that the research achievements are based on the personal views are given below.

〈Example〉
【English】Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the author's(s') organization, JSPS nor MEXT.
【Japanese】本研究の成果は著者自らの見解等に基づくものであり、所属研究機関、資金配分機関及び国の見解等を反映するものではありません。

(3) Promotion of "Open Access" to the research papers supported by KAKENHI grants

JSPS endorses general policy of promotion of open access of publications of research results funded by public grants including KAKENHI. Note that open access is not mandatory if there are justifiable reasons for deferral such as copyright-related issues, or insufficient repository infrastructure at the research institution.

○ Implementation policy on the promotion of open access of publications of JSPS projects:
URL: https://www.jsps.go.jp/file/storage/general/data/Open_access.pdf

About "Open Access"

What is "Open Access".

"Open Access" refers to the idea that research papers published in peer-reviewed journals, etc. should be made freely accessible by anyone on line.

Different Routes to Open Access.

There are three main ways of open access implementation ((i) to (iii) below).

(i) A way in which the article published in the conventional subscription fee type academic journal after a certain period (Embargo)(*1) (for example 6 months later) is made open access by opening the final manuscript to an Institutional Repository(*2) established by the research institution to which the author belongs, or by opening the final manuscript to the website, etc. established by the researchers (self-archiving)(*3).

(ii) A way to make the article open access by posting the article on the web established by the research community or public institution.

(iii) A way to make the article open access immediately by paying the publication fee (APC: Article Processing Charge) by the author of the article.

*1: Embargo

The predetermined period from the time of publication of an article in an academic journal to the time of release so that it can be posted on an online open access archiving system (repository).

*2: Institutional Repository

An online archiving system created by university or research institution for storage and dissemination of the intellectual products. Institutional repositories play important roles in the reform of academic information distribution by enabling the researchers register their own articles, such as the transmission of research and education achievements of the research institution, PR for both the research institution and the researcher, guaranteeing the accountability of research and education activities towards society, and the long-term conservation of intellectual products.

*3: Self-archiving

"Self-archiving" refers to online posting of articles published in academic journals, dissertations, or data by those other than the publisher (the researcher or research institution) generally on their institutional repositories.

(4) Management of Research Data

As to the management and utilization of research data obtained through the implementation of research activities, in order to secure the autonomy of Japan's research and development activities and promote international open science, policies such as the Sixth Science, Technology, and Innovation Basic Plan (Cabinet Decision on March 26, 2021) and Basic Policies on the Management and Utilization of Research Data Created by Publicly-Funded Research Activities (April 27, 2021, Decision of Council for Science, Technology and Innovation) call for initiatives towards strategic storage and management of research data as well as broader utilization of the research results.

Therefore, there is a plan in which, starting from the FY2024 KAKENHI call for proposals, upon formal application for grant delivery, the Principal Investigator of an adopted research project will be asked to formulate a Data Management Plan ("DMP") outlining the storage and management, etc. of research results and research data of his/her research project.

○The Sixth Science, Technology, and Innovation Basic Plan (Cabinet Decision on March 26, 2021) P.58-61

URL: https://www8.cao.go.jp/cstp/kihonkeikaku/6honbun.pdf

○Basic Policies on the Management and Utilization of Research Data Created by Publicly-Funded Research Activities (April 27, 2021, Decision of Council for Science, Technology and Innovation)
URL: https://www8.cao.go.jp/cstp/tyousakai/kokusaiopen/sanko1.pdf

7. Code of Conduct for Scientists to Adhere

To ensure the quality of scientific knowledge and to gain trust of society on scientists and scientific communities, it is essential to exercise fair and conscientious research activities with the adherence to the code of conduct for scientists. Applicants must understand and practice the contents of both the Statement "Code of Conduct for Scientists -Revised Version-" (section I. "Responsibilities of Scientists") by the Science Council of Japan and the booklet "For the Sound Development of Science -The Attitude of a Conscientious Scientist-" (especially section I "What Is a Responsible Research Activity?") issued by JSPS.
And also take note that upon the formal application for grant delivery, it shall be confirmed through the electronic application system whether the Principal Investigator and Co-Investigator(s) will have taken the research ethics education coursework, etc. (see "III. Instructions for Prospective Applicants 4. Completion of Research Ethics Education Coursework, etc.")

[Extraction from the Statement "Code of Conduct for Scientists -Revised Version-" by the Science Council of Japan dated January 25, 2013]

I. Responsibilities of Scientists

(Basic Responsibilities of Scientists)

1 Scientists shall recognize that they are responsible for assuring the quality of the specialized knowledge and skills that they themselves create, and for using their expert knowledge, skills and experience to contribute to the health and welfare of humankind, the safety and security of society and the sustainability of the global environment.

(Attitude of Scientists)

2 Scientists shall always make judgments and act with honesty and integrity, endeavoring to maintain and improve their own expertise, abilities and skills, and shall make the utmost effort to scientifically and objectively demonstrate the accuracy and validity of the knowledge they create through scientific research.

(Scientists in Society)

3 Scientists shall recognize that scientific autonomy is upheld by public trust and the mandate of the people, understand the relationships between science, technology, society, and the natural environment from a wide-ranging perspective, and act in an appropriate manner.

(Research that Answers to Social Wishes)

4 Scientists shall recognize that they are responsible for answering to the wishes of society to investigate into truths and to achieve various issues. When using research funds that are to be provided for establishing the research environment and for conducting research scientists shall always recognize that such broad social expectations exist.

(Accountability and Disclosure)

5 Scientists shall strive to disclose and actively explain the roles and significance of their own research, evaluate the possible effects of their research on people, society and the environment as well as the changes that their research might engender, neutrally and objectively disclose the results of this evaluation, and build a constructive dialogue with society.

(Dual Use of Scientific Research Outcomes)

6 Scientists shall recognize that there exist possibilities that their research results, contrary to their own intentions, may be used for destructive actions, and shall select appropriate means and methods as allowed by society in conducting research and publicizing the results.

* URL: http://www.scj.go.jp/ja/scj/kihan/

["For the Sound Development of Science – The Attitude of a Conscientious Scientist –" by JSPS]

(Japanese version (text version)) ("For the Sound Development of Science" Editorial Committee on JSPS)

* URL: https://www.jsps.go.jp/file/storage/general/j-kousei/data/rinri.pdf

II. Call for Proposals

1. Research Categories for Which a Call for Proposals is Organized

The Ministry of Education, Culture, Sports, Science and Technology (hereinafter "MEXT") is organizing a call for proposals for the following research categories.

Grant-in-Aid for Transformative Research Areas (A)(Publicly Offered Research)
Grant-in-Aid for Scientific Research on Innovative Areas(Finished Research Area)

2. Schedule from Application to Grant Delivery

(1) Procedures that Need to Be Completed Prior to the Deadline for the Submission of the Application Documents

Principal Investigator should sufficiently cooperate with the research institution, and should adequately respond to its requests.

The Date and Time	Procedures to be Performed by the Principal Investigator (See "III. Instructions for Prospective Applicants")	Procedures to be Performed by the Research Institution (See "IV. Instructions for Administrative Staff of Research Institution")
Start of the Call for Proposals **Friday, July 14, 2023**		[Procedures to be completed, if the need arises] 1) The Research Institution obtains an ID and Password for e-Rad from the person in charge of the operation of e-Rad (This does not apply if the research institution already obtained them.) *The issue of the ID and the Password takes about up to 2 weeks. 2) Registration of the Researcher Information in e-Rad and other matters. 3) Research institutions issue an ID and password to the Principal Investigators. (This does not apply if the researcher already obtained an ID and a password.)
	1) Preparing the Application Investigators should access the Electronic Application System using the ID and the e-Rad Password which has been provided by the research institution and preparing the application.	4) ・Submission of the "Self-Assessment Checklist on the Improvement of the System" based on the "Guidelines on the Management and Audit of Public Research Funds at Research Institutions" **Deadline for submission:** **Friday, September 29**
	2) Submission (Sending) of the Application Documents The Principal Investigator should submit (send) the application documents to the research institution he/she belongs to, by the deadline decided the research institution.	5) ・Submission of the "Checklist Pertaining to the Current Status" based on the "Guidelines for Responding to Misconduct in Research" **Deadline for submission:** **Friday, December 1** 6) Submission (Sending) of the Application Documents
Deadline for the Submission **4:30 pm** **Tuesday, September 19** **(to be strictly observed)**		

Notes:

1. After the Principal Investigator submit (Sending) to the application to the research institution (mentioned in "Procedures to be Performed by the Principal Investigator" 2)), the research institution should submit (Sending) to the MEXT the application the application by the deadline for the submission (mentioned in "Procedures to be Performed by the Research Institution" 6)).
   Next, the Principal Investigator should verify the section "III. Instructions for Prospective Applicants 3. Preparation of the KAKENHI Application Form (Research Proposal Document), etc.", etc. as well as verify the procedures designated by the research institution, etc. (deadline for the submission of the application, etc., in the research institution) with the administrative staff in charge in the research institution.

2. When the researcher is applying for KAKENHI, he or she should register the researcher information beforehand in e-Rad. The research institution should perform the registration in e-Rad. Therefore, the researcher who is planning to apply should verify the state of the registration with the office worker in charge in the research institution.

3. The research institution should submit a "Self-assessment Checklist on the Improvement of the System" based on the "Guidelines on the Management and Audit of Public Research Funds at Research Institutions (Implementation Standards)" and a "Checklist Pertaining to the Current Status" based on "Guidelines for Responding to Misconduct in Research" (mentioned in "Procedures to be Performed by the Research Institution" 4) and 5)). If it has not been submitted, no official grant decision will be made for the researchers belonging to the research institution in question.

(2) Schedule after the Submission of the Application Documents (plan)

The current schedule is as below. There may be changes in the plan including the timing of the provisional grant decision. When the changes occur it will be announced on the MEXT website and through the research institutions.

Transformative Research Areas (A) (Publicly Offered Research)
October 2023 to January 2024: Review *1 Late February: Notice of review results Early April: Provisional grant decision Late April: Formal application for grant delivery Around April: Disclosure of review results Late June: Official grant decision Middle of July: Grant delivery (part of the first term) *2 Around October: Grant delivery (part of the second term) *2

Notes:

*1 Reviews are conducted by MEXT and the grant delivery after provision grant decision is conducted by JSPS.

*2 The amount requested for funding or the amount requested for payment (direct costs) will be remitted separately in two installments, i.e., one during the first term (from April until September) and the other during the second term (from October until March), if this amount for the fiscal year in question is 3 million yen or more, and it will be remitted in a lump sum during the first term, if it is less than 3 million yen.

3. Details of the Research Category

(1) Transformative Research Areas (A)(Publicly Offered Research) : KAKENHI (Series of Single-year Grants)

A) Intended for:

Research projects of Publicly Offered Research related to 32 research area (which starts in FY2021 or FY2023) shown in Attached Table 1 and Attached Table 2

B) Budget provided and number of research projects scheduled to be selected:

Budget and number per research area shown in Attached Table 1 and Attached Table 2

C) Research period:

Two years (application for research period other than the left is not subject to screening)

D) Important points:

- It is not possible to involve the Co-Investigators in the research (However, it is possible to involve the Research Collaborators in the research when necessary).
- Each reviewer in the committee dedicated to the particular research area (which will also include researchers who are outside of the research area in question) will conduct a two-stage document review.
- When applying, for the details of research area in the "Grant-in-Aid for Transformative Research Area (A)", please refer to "[references] New Research Area"

[References] New Research Area (Extraction from "Application Procedures for Grants-in-Aid for Scientific Research - KAKENHI – (Grant-in-Aid for Transformative Research Areas(A/B) and Grant-in-Aid for Special Purposes)")

A) Purpose:

Research areas proposed through co-creative and interdisciplinary efforts of diverse researchers, which aim to create research areas that will lead to radical transformation of and change in the existing framework and/or direction of research as well as upgrade and level-up of scientific research in Japan and nurturing of young researchers, and will contribute to the development of the proposed research areas through efforts for collective research and shared use of equipment, etc.

B) Intended for:

Research areas that aim to generate renovation and/or transformations in academic areas so as to create emerging and interdisciplinary areas transcending the existing framework of academic disciplines, or research areas that aim for a truly drastic advancement of the leading-edge portions of a particular academic discipline, which are expected to develop innovative and creative scientific research by promotion of collective research with new perspective or methods under organic coordination of diverse researcher groups, and meet all requirements of the following 1) to 3), and if applicable, 4):

1) Basic research area (including the area aiming for development from basic to applied research) which is expected to create research area across multiple areas or develop innovative scientific research;
2) "(i) Area having (or expected to have) international superiority," or "(ii) Japanese unique area or unprecedented area having (or expected to have) creativity and novelty";
3) Area in which each research project is expected to bring sufficient results, and such results are expected to achieve transformation of concepts or methodologies of existing research disciplines after research period ended;
4) In the case of proposals to further develop the research area adopted in "Grants-in-Aid for Scientific Research on Innovative Areas (Research in a Proposed Research Area)" or other research fund programs in the past, the area for which results expected from the grants-in-aid in question were sufficiently achieved and whose contents aim for further significant and drastic development of the leading-edge portions based on the results.

C) Range of total budget:

The budget provided per research area is set at 50 million yen or greater up to 300 million yen per fiscal year. In a truly necessary case, a budget exceeding the maximum limit for each research area may be requested.

* In case the total budget per fiscal year per research area exceeds 300 million yen

Applicants will be required to provide a detailed description of the reason for such need in the Research Area Proposal, and the necessity will be assessed.

D) Research period (set period of the area):

Five years (application for research period other than the left is not subject to screening.)

E) Number of research areas scheduled to be selected:

Around 18 projects.

F) Review section:

In application, the applicant should always select the desired category for screening from the following categories according to the contents of the research plan:

"Transformative Research Areas, Section (I)": Research project focusing mainly on the content of Broad Section "A."

"Transformative Research Areas, Section (II)": Research project focusing mainly on the contents of Broad Sections "B," "C," "D," or "E."

"Transformative Research Areas, Section (III)": Research project focusing mainly on the contents of Broad Sections "F," "G," "H," or "I."

"Transformative Research Areas, Section (IV)": Research project focusing mainly on the contents of Broad Sections "J" or "K."

(For a description on each broad section, see Attached Table 2 "Grants-in-Aid for Scientific Research -KAKENHI- Review Section Table".)

G) Constitution of research area: (Applied research area that does not meet the review criteria is not subject to screening.)

- A research area should consist of "Planned Research" and "Publicly Offered Research"
- The "Planned Research" consists of "Administrative Group" and "Planned Research other than Administrative Group."
- One "Administrative Group" must be established. Sizable numbers of "Planned Research other than Administrative Group" and "Publicly Offered Research" must be established.
- The Administrative Group is an organization which provides the overall management of the research area. A plan for the purpose of conducting research is not permitted.
- A research area should be composed to include two or more "Planned Research other than Administrative Group" with researchers who will be bearers of the next generation of research (researchers of age 45 or under as of April 1, 2024) participating as Principal Investigators.
- A plan in which Planned Research is intended to be added during the research period is not permitted
- "Publicly Offered Research" should be set so that the research period is two years (the second to third year and fourth to fifth year of the set period of the area), and organize a call for proposals for FY2025-2026 in the first year of the set period of the area and a call for proposals for FY2027-2028 in the third year of the set period of the area, and exceed either of the following minimum standards. In such case, the applicant should ensure that the number of research projects and amounts not only exceed the minimum requirement, but also be enough to aim for broader development of research in the research area, considering the purpose of Transformative Research Areas (A) and characteristics of the research area in question.

  1) Each number of research projects scheduled to be selected exceeds 15 in the first year and the third year

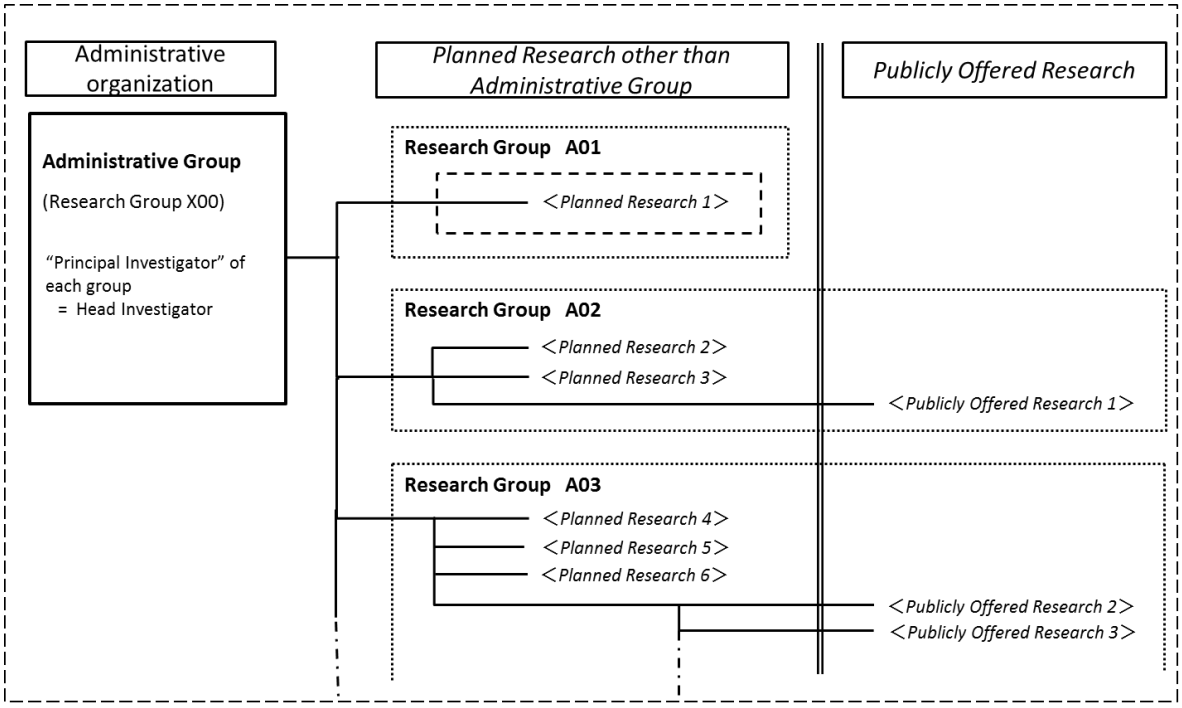
  2) The total amount of budget for Publicly Offered Research (the total from FY2025-2028) exceeds 15 % of the budget (the total for five years) for the whole research area

● Constitution of research area and roles

Planned Research	Administrative Group	Organization which formulates research policy for the whole research area, adjusts projects, and conducts research support activities (provision of support for international activities (formulation of optimum policy for international development (strengthening of the research area by finding current international researches, development of new international network, etc.), analysis of international trends, and performance of support activities (promotion of international joint researches and formulation of overseas network (invitation of overseas researchers who are highly evaluated internationally, mutual dispatch of postdoctoral researchers, etc.))) purchase, development, and operation of equipment and devices shared in the research area, or provision of experimental samples and materials, etc.), and other activities (an organization which does not conduct research)
	Planned Research other than Administrative Group	Research projects in which a Head Investigator (Principal Investigator of "Administrative Group") organizes researchers in the research area in question in advance and systematically make progress in order to develop the research area
Publicly Offered Research	Research projects which one researcher performs in cooperation with "Planned Research" in order to further promote research in the research area in question.	

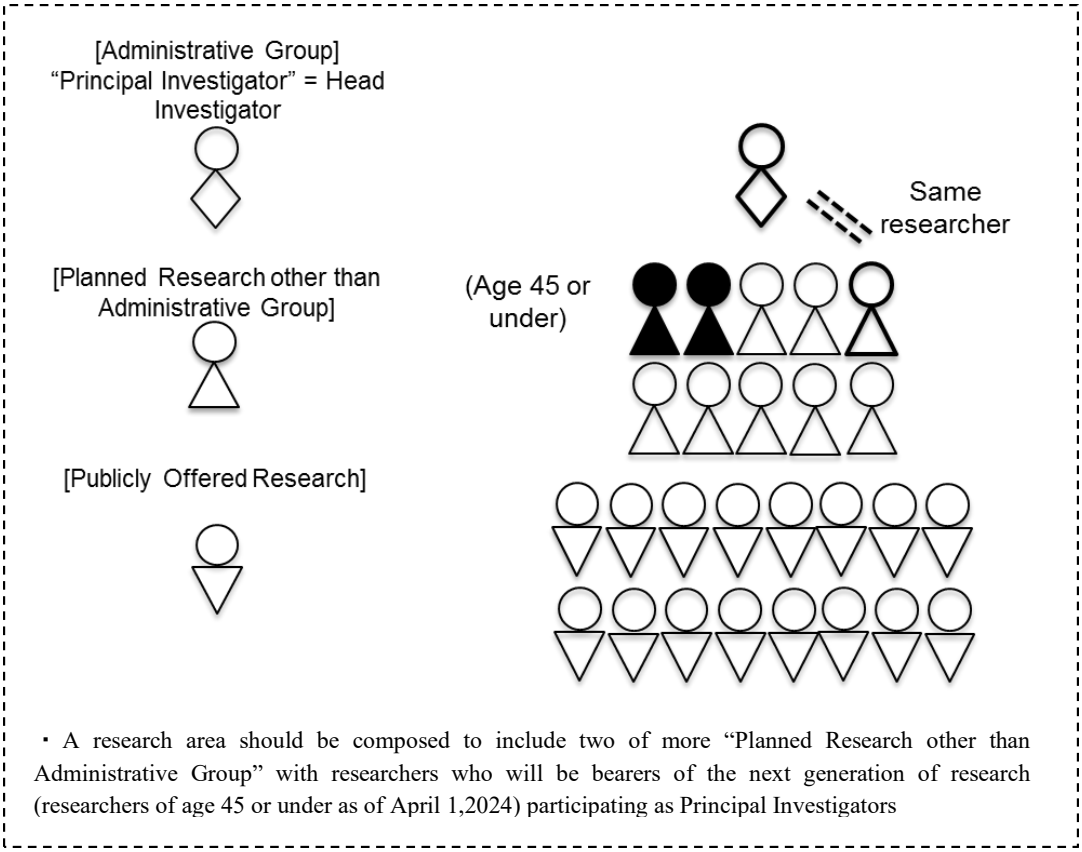
*1: When setting up the budget for Publicly Offered Research, please post annual budget enough to achieve research per project.
*2: The call for proposals and selection of research projects for "Publicly Offered Research" will be conducted in the first year and third year of research period. For a description on review process, see in page 71.
*3: In order to efficiently develop the research area, a research group can be established, in which "Planned Research" or "Publicly Offered Research" are grouped by research theme or role in the research area.
*4: The replacement of the Principal Investigator is not permitted in principle except for the "Administrative Group." If a Principal Investigator of Planned Research lacks (due to death, etc.), however, it may be permitted as a special case via screening by the Academic Deliberation Council for Science and Technology.
*5: It is not permitted to allot direct expenses for research projects of "Administrative Group" to costs directly required for achieving other research projects in the research area in question.

● Image of constitution of research area



∗ A research group needs to have a number of research group such as "A01" for the sake of convenience for electronic processing ("X00" is used for Administrative Group), and please see "Supplementary edition to the Application Procedures for Grants-in-Aid for Scientific Research-KAKENHI- for FY2024 (Grant-in-Aid for Transformative Research Areas (A/B)) (Forms/Procedures for Preparing and Entering a Research Proposal Document)"(Japanese only) for detailed numbering method.

● Image of participation of researchers who will be bearers of the next generation of research



・A research area should be composed to include two of more "Planned Research other than Administrative Group" with researchers who will be bearers of the next generation of research (researchers of age 45 or under as of April 1,2024) participating as Principal Investigators

● Participation of members of research area in “Administrative Group”
The Principal Investigator and Co-Investigator of the “Administrative Group” are as shown below:

“Administrative Group”		Position in the Research Area
Principal Investigator	＝	Head Investigator
Co-Investigator	＝	Principal Investigator or Co-Investigator of “Planned Research other than Administrative Group”

The Principal Investigator of “Planned Research other than Administrative Group” must be a member (Co-Investigator or Research Collaborator) of the “Administrative Group.”

H) Interim assessment, ex-post assessment:
- Interim assessment is conducted in the fourth fiscal year of the set period of the area and ex-post assessment is conducted in the fiscal year following completion of the set period of the area.
- Research plan may be reviewed and adjusted and the allotted amount may be subject to change (including the halt of funding) based on the result of the interim assessment

I) Others:
- During the second fiscal year of the set period of the area, follow-up will be conducted to check whether improvements are made based on issues, etc. pointed out in the opinions expressed upon selection.
- It is possible to perform procedures after screening for review of continuous Planned Research or other matters based on the progress situation of research in the area.
- Submission of a Data Management Plan (DMP)
  In order to secure the autonomy of Japan’s research and development activities and promote international open science, policies such as 6th Science, Technology, and Innovation Basic Plan (Cabinet Decision on March 26, 2021) and the Basic Policies on the Management and Utilization of Research Data Created by Publicly-Funded Research Activities (April 27, 2021, Decision of Council for Science, Technology and Innovation) call for initiatives towards strategic storage and management of research data as well as broader utilization of the research results.
  Therefore, for “Grant-in-Aid for Transformative Research Areas”, the Head Investigator of an adopted research area will be asked, upon formal application for grant delivery, to submit a Data Management Plan (“DMP”) outlining the storage and management, etc. of research results and research data of his/her research project. For the DMP form, etc. under DMP, please refer to the following JSPS website.
  URL: https://www.jsps.go.jp/j-grantsinaid/17_koufu/index.html

  ○ 6th Science, Technology, and Innovation Basic Plan（Cabinet Decision on March 26, 2021） pp.58-61
  URL: https://www8.cao.go.jp/cstp/kihonkeikaku/6honbun.pdf

  ○ Basic Policies on the Management and Utilization of Research Data Created by Publicly-Funded Research Activities (April 27, 2021, Decision of Council for Science, Technology and Innovation)
  URL: https://www8.cao.go.jp/cstp/tyousakai/kokusaiopen/sanko1.pdf

- For Grant-in-Aid for Transformative Research Areas, there are no plans for calls for “budget for collecting research results of Finished Research Area”

(2) Scientific Research on Innovative Areas (Finished Research Area) : KAKENHI (Series of Single-year Grants)

Omitted

Attached Table 1　　List of Research Areas in which "Publicly Offered Research" is Solicited in Grant-in-Aid for Transformative Research Areas (A)

No	Number of Research Area	Title	Term of Project	Research Period	Number of projects scheduled to be selected	Upper Limit of Annual Budget (in million yen)
1	21A101	Human behavioral science for subjectification ("tojisha-ka") by interaction-based & rule-/story-based understanding of the brain & the world	FY2021-2025	2 years	10 5	3 5.2
2	21A102	Integrated Sciences for Sustainable Human-Aqua Environment	FY2021-2025	2 years	7 8	1.1 3.6
3	23A101	Qualia Structure: Bridging a gap between subjective conscious experience and scientific objectivity by establishing a super interdisciplinary research program	FY2023-2027	2 years	10 10	3 5
4	23A102	Integrative bioarchaeological studies on human prehistory in the Japanese archipelago	FY2023-2027	2 years	10 6	2 5
5	23A103	Establishing the Field of "Dignity Studies":Toward an Interdisciplinary Paradigm of Social Integration Based on the Concept of Dignity	FY2023-2027	2 years	16	1
6	21A201	The Natural Laws of Extreme Universe--A New Paradigm for Spacetime and Matter from Quantum Information	FY2021-2025	2 years	16 6	2 3.5
7	21A202	Creation of Materials by Super Thermal Field: Neo-3D printing by Manipulating Atomic Arrangement through Giant Potential Gradient	FY2021-2025	2 years	16	3.5
8	21A203	Science of Slow to Fast Earthquakes	FY2021-2025	2 years	16 6	2 4
9	21A204	Digitalization-driven Transformative Organic Synthesis (Digi-TOS)	FY2021-2025	2 years	7 24	3 3.5
10	21A205	Bottom-up creation of cell-free molecular systems: surpassing nature	FY2021-2025	2 years	25	4
11	21A206	Science of 2.5 Dimensional Materials: Paradigm Shift of Materials Science Toward Future Social Innovation	FY2021-2025	2 years	15 4	3 5
12	23A201	1000-Tesla Chemical Catastrophe : Science of Chemical Bonding under Non-perturbative Magnetic Fields	FY2023-2027	2 years	10 14	1.5 2.5
13	23A202	Unveiling, Design, and Development of Asymmetric Quantum Matters	FY2023-2027	2 years	6 13	1 2.5
14	23A203	Materials Science of Meso-Hierarchy	FY2023-2027	2 years	5 6 12	2 3 3.5
15	23A204	Latent Chemical Space Based on Diverse Natural Products for Bio-active Molecular Design	FY2023-2027	2 years	21	3
16	23A205	The creation of multi-messenger astrophysics -- The unified picture of dynamical universe driven by births of black holes	FY2023-2027	2 years	8 8 2	1 3 5
17	23A206	Green Catalysis Science for Renovating Transformation of Carbon-Based Resources	FY2023-2027	2 years	20	3
18	21A301	Census-based biomechanism of circuit construction and transition for adaptive brain functions	FY2021-2025	2 years	3 10 4 4	2 4 5 6
19	21A302	New cross-scale biology	FY2021-2025	2 years	2 14	2 4
20	21A303	Life Science Innovation Driven by Supersulfide Biology	FY2021-2025	2 years	15 5	2 3

21	21A304	Biology of Non-domain Biopolymer	FY2021-2025	2 years	18	4
22	21A305	Understanding multicellular autonomy by competitive cell-cell communications	FY2021-2025	2 years	16	4.5
23	23A301	Shin-biology regulated by protein lifetime	FY2023-2027	2 years	17	4
24	23A302	Integration of extracellular information by multimodal ECM activity	FY2023-2027	2 years	4 12	3 4
25	23A303	Hibernation biology 2.0: understanding regulated hypometabolism and its function	FY2023-2027	2 years	16	4.3
26	23A304	Dynamic reproductive lifespan: Life-long changes and fluctuations in germ cell function and risk for next generation	FY2023-2027	2 years	15	4
27	23A305	Photosynthesis ubiquity: Supramolecular complexes and their regulations to enable photosynthesis all around the globe	FY2023-2027	2 years	10 10	3 5
28	21A401	Hierarchical Bio-Navigation Integrating Cyber-Physical Space	FY2021-2025	2 years	20	3
29	21A402	Advanced mechanics of cell behavior shapes formal algorithm of protozoan smartness awoken in giorama conditions.	FY2021-2025	2 years	6 20	2 3
30	21A403	Digital biosphere: integrated biospheric science for mitigating global environment change	FY2021-2025	2 years	14 9 2	2 4 8
31	23A401	Plant Climate Feedbacks	FY2023-2027	2 years	5 13	2 4
32	23A402	Extension and validation of unified theories of prediction and action	FY2023-2027	2 years	5 7 4	3 5 10

Attached Table 2 Research Outline of Research Areas Showed on Attached Table 1

When applying for Publicly Offered Research, the applicant should note the following points.

- Research period is 2 years (Application of research period other than this period is not subject to screening).

- The Principal Investigator cannot set up a team of project members together with a Co-Investigator. (However, Research Collaborator is allowed to participate in research project when necessary.)

- Please be aware that the maximum application amount listed is not the total amount for the research period (two years) but the amount equal to a single fiscal year.

- It is possible to receive grants for up to 2 projects in Publicly Offered Research.
  In case that there are no projects of Publicly Offered Research for which grants has currently been received, it is possible to apply and receive grants for new 2 projects. However, it is not possible to apply and receive grants for 2 projects in the same research area.
  In case that grants have been received for 2 projects continuation of which will be in FY2024 in Publicly Offered Research, it is not possible to apply for another project.

- Please refer to the website of each research area for the details of application contents.

Research Outline of Research Areas

Human behavioral science for subjectification (“tojisha-ka”) by interaction-based & rule-/story-based understanding of the brain & the world
https://tojishaka.net/english/

Number of Research Area	:	21A101	Term of Project :	FY2021-2025
Head Investigator	:	KASAI Kiyoto		
Research Institution	:	The University of Tokyo Hospital		

1. Details of Research Area

People with minority characteristics that do not match the world designed to be predictable for the majority have developed the knowledge that noticing the discrepancy between their own rules/stories and those of the world is the beginning of recovery. Learning from this, we consider rules and stories as follows. When humans interact with the world, if the same event is repeated many times, the brain internalizes it as a rule and uses it to predict the next situation, which is defined as rule-based process. On the other hand, story-based process is defined as the internalization of a single event in the world as an episode, a position, and its transition with a spatio-temporal beginning and end point. If we define rule-/story-based process in this way, it is possible that this two-dimensionality is the basic mode of recognizing and internalizing the environment and events by the brain in animals in general including humans. Furthermore, the cognitive process by which human beings find and internalize rules and stories in the world when they earnestly interact with the real world, which is difficult to predict and difficult to follow, is defined as "tojisha-ka”. We will elucidate the adolescent developmental process and mechanism of “tojisha-ka” through academic innovation that integrates the academician's own “tojisha-ka”, co-production with user researchers with minority characteristics, and the integrative sciences.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

Research group A01 calls for theoretical research that constructs a brain model of the individual-world interaction loop that can be applied to population science based on reinforcement learning theory, game theory, etc. However, cognitive enhancement research using AI, etc., should be submitted after careful consideration of the possibility that the research results will be enjoyed exclusively by the majority, leading to increased social disparity. For A02, we are looking for empirical research on the individual-world interaction loop and the process of “tojisha-ka” through population science using domestic and international adolescent cohorts. For A03, we expect research proposals on the interaction of era, generation, geography, and gender in the individual-world interaction loop that integrate a wide range of academic methods, including evolutionary science, brain science, social psychology, cultural psychology, medical anthropology, and sociology. The subject can be a large group or a small number of individuals, and the analysis method can be either quantitative or qualitative. However, if the results of the analysis of animal collective behavior are to be used to interpret the nature of human groups, please apply after careful scientific and ethical consideration so as not to merely endorse the mechanisms that have caused social disparities in human history. For B01, we are looking for psychological and behavioral analysis research on the mechanism of “tojisha-ka” and the process of adolescent development, especially based on the understanding of the rule-/story-based process in the individual-world interaction. Theoretical studies and intervention studies using methods such as user-led research, complex systems science, and knowledge science are also eligible. B02 calls for research on experimental animals or human subjects that will lead to the elucidation of the brain basis of “tojisha-ka”. We expect new research proposals that address the brain basis for modeling the individuals' interactions with the world. Research that deals only with the elemental functions of the brain by simply reading prediction/prediction error, episodic memory, and the formation/elimination of fear conditioning as rule-based or story-based function is not eligible. Despite conventional dichotomy of rule-based process as targets in natural science and story-based process as those in humanities and social science, this research area is expected to produce results that will lead to an integration of these two fields, as well as the integration of Planned Research A: Research on Interaction Loop and Planned Research B: Research on Rule/Story (see the area website). We welcome applications from young researchers, female researchers, and user researchers with diverse backgrounds. With the support of the Coordinating Team, we hope that researchers will actively participate in the academic transformation of “tojisha-ka” themselves and co-production of research with user researchers.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Population neuroscience of brain-behavior model of “tojisha-ka” based on individual brain-world interaction loop	Large-scale research : 5.2 Small-scale research : 3	Large-scale research : 5 Small-scale research : 10
A02	Population science of real-world process of `tojisha-ka” based on individual-world interaction loop		
A03	Elucidation of era, generation, and gender effects of individual brain-world interaction loop		
B01	Behavioral science of rule-/story-based process during “tojisha-ka” and co-production		
B02	Neuroscience of rule-/story-based process during “tojisha-ka”		

Research Outline of Research Areas

Integrated Sciences for Sustainable Human-Aqua Environment
https://mizu kyosei.net

Number of Research Area	:	21A102	Term of Project :	FY2021-2025
Head Investigator	:	ARAYA Kunio		
Research Institution	:	Kyushu University, Faculty of Social and Cultural Studies		

1. Details of Research Area

The hydrosphere environment, which is essential for life, is constantly subject to "fluctuations" caused by a variety of internal and external factors, such as climate change, ecosystem transition, and changes in social conditions related to water. As the range of these "fluctuations" increases, human society and ecosystems will be greatly affected by frequent weather disasters, water resource conflicts, and loss of biodiversity. Reducing these water crises and risks, and realizing a society where water, humans, and creatures can coexist in a sustainable manner, is an internationally important issue. In this Research Area, we consider the hydrosphere environment as a "water cycle system" established by the interaction of the geosphere, biosphere, and anthroposphere. We aim to create a new academic area, "Aqua Science," with the main objective of elucidating the historical transition and current dynamics of the balance among these three spheres, exploring ways to solve social issues related to the water environment in line with local conditions, and proposing a vision for the future.

There are four research plans under three Research Groups targeting the geosphere (A), anthroposphere (B), and biosphere (C) in this Research Area. Planned Research A01 is to create information to understand the interaction between the geosphere, biosphere, and anthroposphere dynamically from the viewpoint of the water cycle based on the measurement and analysis of information on water and the surrounding environment, and to develop an information translation approach necessary for utilizing the information in other Planned Research. Planned Research B02 is to dynamically clarify the fluctuation of the water cycle system from the past to the present from the viewpoint of social culture and history, and to extract the socio-cultural factors that should be protected or modified in order to create a desirable water symbiotic society. Planned Research B03 will empirically analyze, from the standpoint of economics, what kind of water use methods are suitable for realizing healthy and prosperous lives in regions where water resources are scarce and water infrastructure is poor, and what kind of management measures and systems are necessary to conserve and improve the water environment to explore the ideal form of sustainable water resource governance. Planned Research C01 will assess the health of the basin ecosystem system by investigating the characteristics of the ecosystem and biodiversity that form the basis of the "basin sphere" where the natural environment surrounding water and human society and culture coexist to explore ways to conserve, restore, and sustainably use the water cycle system in ecosystems.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

In the Publicly Offered Research, proposals are invited to elucidate the dynamics of the water cycle system, explore ways to solve social issues related to the water environment in line with local conditions, and propose a vision for the future to create Aqua Science. There are four Research Groups (A01, B02, B03, and C01) related to Planned Research and two Research Groups (D01 and E01) related to the entire Research Area, which aim to adopt about 7 research plans with an upper limit of 1.1 million yen per year and about 8 research plans with an upper limit of 3.6 million yen per year. Examples for each Research Group are shown below. For details, please refer to our website.

Research Group A01 calls for research that addresses social issues related to the water environment with other Planned Research Groups through the development and utilization of information on water and its surrounding environment. Research Group B02 calls for research on society, culture, and behavior related to the dynamics of the water circulation system. Specifically, research that addresses the socio-cultural factors involved in the creation of Aqua Science and research that contributes to the development of future visions and scenarios is expected. Research Group B03 invites applications that create Aqua science through research on waterborne diseases and poverty in developing countries, research on agricultural water use and water pollution, research on water quality management and agricultural management, historical research on water resource allocation issues among industrial sectors, historical empirical analysis of water resource use and water-related disasters, and research on the history of water and sewage system development. In Research Group C01, research on empirical clarification of the basin ecosystem is expected for the creation of Aqua Science, including economic approaches to realize a regional circulation symbiosis zone in the basin ecosystem, construction of a biological monitoring system using environmental DNA, and research proposals on bio-environment interactions in the basin ecosystem using stable isotopes. Research Group D01, which is related to the entire Research Area, calls for research on the relationship between the water cycle system and human activities. Research Group E01, which is also related to the entire Research Area, calls for research on the interaction between the geosphere, biosphere, and anthroposphere regarding water. The accepted researchers are expected to actively participate in the research activities of each Planned Research and the entire Research Area, especially in the joint field research. Young and female researchers are expected to actively apply for any of the Research Groups. An environment that facilitates the participation of diverse researchers will be created, such as enabling remote participation in web conferences and setting hours that take into consideration researchers of child-rearing age.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Research on the development and utilization of information on water and its surrounding environment	1.1 3.6	7 8
B02	Research on fluctuations in the water cycle system and society, culture, and behavior		
B03	Research on various problems related to water use and water environment, and countermeasures against them		
C01	Research on empirical clarification of basin ecosystems		
D01	Research on the relationship between the water cycle system and human activities		
E01	Research on the interaction among the geosphere, biosphere, and anthroposphere regarding water		

Research Outline of Research Areas

Qualia Structure: Bridging a gap between subjective conscious experience and scientific objectivity by establishing a super interdisciplinary research program

https://sites.google.com/monash.edu/a2023-2027/home_english

Number of Research Area :	23A101	Term of Project :	FY2023-2027
Head Investigator :	Naotsugu Tsuchiya		
Research Institution :	Advanced Advanced Telecommunications Research Institutes International		

1. Details of Research Area

Do subjective consciousness and the brain as objective matter belong to completely different domains? How are qualia, the contents of consciousness, related to the brain? The question of consciousness and the brain is not only of scientific interest. It is also directly related to everyday situations associated with difficulties in understanding feelings in others. Quality of experience, or qualia, is difficult to verbalize. To avoid this difficulty, conventional studies of consciousness have focused on the experimental paradigms, where experience can be reducible to a binary judgment (e.g., seeing vs. not seeing) by fixing perceptual stimuli, then they tried to isolate the neural correlates of consciousness. Recently, we have established a new paradigm to characterize Qualia Structures: by measuring a massive number of similarity judgements between a range of visual qualia. From there, we are to reveal their neural correlates and their information structures. This Research Area will expand the Qualia Structure paradigm by adding phenomenological studies, cognitive development, and constructivist approaches. By targeting perceptual and emotional qualia, this Research Area aims to establish the Qualia Structure paradigm. The outcome of this Research Area includes a better understanding of the consciousness of others, including animals and artifacts, aiming to address the issues that matter in real society.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

The overall aim of this Research Area is to understand the relationship between the structure of qualia and the structure of information obtained from brain information. Towards this aim, this Research Area takes the following basic strategy: 1) to focus on perception and emotional qualia, 2) to employ various theoretical and empirical methods, which generates synergy between them. However, with this limited strategy, it is difficult to arrive at our ultimate goal of a better understanding of the consciousness of others in a way that tackles the issues in real society. Thus, we invite Publicly Offered Research to collaborate with our Planned Research. In particular, those research that 1) deals with **research topics or employing methods, which are not employed by Planned Research**, 2) deals with **qualia with a structural approach,** 3) without focusing on a particular type of qualia, deals with **the relationship between the unconscious and consciousness**, **self-consciousness, changes of qualia structures associated with changes in levels of consciousness** (e.g., dreams, sleep, anesthesia, etc.). Those Publicly Offered Research will be overseen by relevant Planned Research to enable effective collaboration. We hope to attract those represented less in the field (e.g., young, female, or non-Japanese researchers) to participate, either individually or in teams with collaborators. To promote diverse participants, meetings in Research Areas will be recorded via web conferencing as much as possible, and consideration will be given to researchers of child-rearing age. The selected researchers will be expected to actively participate in the research activities of this Research Area, such as public relations through YouTube and SNS, the Qualia Summer School (from 2024~) to promote this Research Area to be recognized at the international level. The following summarizes some example projects. See our website for details.

A01: Using large-scale online experiments, try to deal with qualia for value, beauty, and free will. Approaches from ethics, aesthetics, and religious studies are welcomed. Similarities and other methods can be used to visualize their qualia structures. Mathematical approach such as quantum cognition, topological data analysis.
A02: Philosophy, religious studies, aesthetics. Dealing with the relationship between embodiment, culture, and qualia.
A03: Human infants and mammals: comparative cognitive-behavioral research in atypical development (other than autism). Qualia structure approach from cultural psychology, evolutionary studies, etc.
B01: Qualia structure research by brain measurement and manipulation.
C01: Qualia structure research using information structure and model research and real neuronal data.
C02: Constructivism research using AI and robots (natural language processing, cognitive robotics, etc.). Also, research related to symbol emergence and consciousness in linguistics, sociology, cultural anthropology, etc.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Budget (M JPY/year)	# of projects to be selected
A01	Experimental psychology and mathematics of qualia structures	5 3	10 10
A02	Phenomenological studies of qualia structures		
A03	Typical/atypical development of qualia structures		
B01	Measuring/manipulating brain activity related to qualia structures		
C01	Correspondence between informational structures and qualia structures		
C02	Symbol emergence from qualia structures		
D01	Unconsciousness, self, levels of consciousness and qualia structures		

Research Outline of Research Areas

Integrative bioarchaeological studies on human prehistory in the Japanese archipelago
http://i-bioarchaeology.org

Number of Research Area	:	23A102	Term of Project :	FY2023-2027
Head Investigator	:	YAMADA Yasuhiro		
Research Institution	:	Tokyo Metropolitan University, graduate school of Humanities		

1. Details of Research Area

Prehistoric archaeology is currently at a major turning point. It is clear that the results of many conventional, pure archaeological research methods, are forced to be revised due to recent results of natural scientific analyses.
Today, it is no longer possible to understand the real picture of the past using purely traditional archaeological methods. In order to escape from this crisis, archeology itself needs to shift from the traditional humanities academic field and be reborn as a new academic field.
Therefore, we advocate for the construction of a new form of integrative bioarchaeology, a comprehensive academic field that takes bioarchaeology and other current archaeological methods mainly focusing on excavated materials such as human bones, animal and plant remains, etc. in Japan and interweaves them with natural scientific methods such as radiocarbon dating, isotope analysis, and genomic analysis.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

The research area of this project consists of the following 11 Planned Research.
A01: Research on the social structure of prehistoric humans using archaeological methods,
A02: Research on the relationships among prehistoric peoples using genomic data and osteological features,
A03: Research on age, dietary restoration, and migration through the isotopic analysis of prehistoric bone,
B01: Elucidation of the formation process of prehistoric humans in the Japanese archipelago,
B02: Establishment of prehistoric humans and culture in Hokkaido,
B03: Establishment of prehistoric humans and culture in the Ryukyu Islands,
B04: Establishment of prehistoric humans and culture in the Honshu, Shikoku, and Kyushu regions,
B05: Research on the population dynamics of prehistoric humans,
C01: Research on paleoenvironmental changes in the Japanese archipelago,
C02: Research on artificial environment formation (fauna) by prehistoric humans,
C03: Research on artificial environment formation (flora) by prehistoric humans.
The aim of this project is to improve the quality of research and help advance the field in this Research Area, to further the broaden the scope of research in this entire field, and to recruit for focus areas not currently covered. If possible, we expect research application to cover multiple Research Groups. Please refer to the homepage of the relevant research area for details of the contents of recruitment for each Research Group. In addition, we welcome active applications from female and early career researchers to help further the goal of fostering and supporting female and young researchers and their research pursuits.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Research on Yayoi period tomb systems and social structure in Eastern Japan		
A02	Research on the environmental conditions and kinship structures at archaeological sites using osteological features and genomic data		
A03	Research on stable isotopic ratio mapping and the creation of an isotopic ratio database		
B01	Research on a high-resolution reconstruction of coastline changes in the Japanese archipelago in the late Pleistocene		
B02	Group Formation Theory, Ethnicity/Racial Theory, Multispecies Research, Environmental Change Research		
B03	Research on the movement and exchange of people, material goods, and culture in the Nansei Islands and Kyushu	2	10
B04	Research on human migration and inter-regional networks in the Jomon, Yayoi, and Kofun periods	5	6
B05	Research on population dynamics in the Yayoi and Zoku-Jomon periods		
C01	Environmental archaeological research on prehistoric human migration and population change based on high-precision climate change data		
C02	Research on the relationship between humans and animals in the Japanese archipelago using archaeological and genomic analyses		
C03	Research on the relationship between humans and plants in the Japanese archipelago using archaeological and genomic analyses		

Research Outline of Research Areas

Establishing the Field of "Dignity Studies": Toward an Interdisciplinary Paradigm of Social Integration Based on the Concept of Dignity

https://songengaku.jp/

Number of Research Area : 23A103 Term of Project : FY2023-2027
Head Investigator : KATO Yasushi
Research Institution : Sugiyama Jogakuen University, School of Cross-Cultural Studies

1. Details of Research Area

The concept of dignity originated with Cicero's translation of Plato's "*axia*" (the inner value of human beings) as "*dignitas*".
In England, "dignity" became associated with social position or status and was characterized as a value that could increase or decrease. In contrast, Kant characterized it as an "internal absolute value" that cannot fluctuate, and regarded it as normative. After the two World Wars, this concept emerged as an ideal that supported the new international and social order, and it became an object of legal interest. E.g., in international contexts, conventions against gender discrimination and ableism tend to highlight the importance of "human dignity". In the field of bioethics, "dignity" has also been used to promote an appropriate social acceptance of medical technologies in questions of brain death, organ transplantation, genome editing, and death with dignity. In that sense, AI technologies (especially chatbots like ChatGPT), robots, big data, etc., also need to be examined from the ethical perspective of dignity. Also, in the "Basic Guidelines" of the Ministry of Health, Labor and Welfare in Japan, the dignity of animals is explicitly mentioned.
In this way, the concept of "dignity" has been incorporated into the foundations of social and international order as an ideal for integration. However, when "human dignity" was introduced into the EU constitution, differences in content between Germany's objectivist "*Menschenwürde*" and the UK's subjectivist "human dignity" were pointed out. While the concept of "dignity" has been used as an ideal to solve social issues, it faces the problem of lacking a comprehensive interpretation and definition. Hence, we aim to integrate diverse academic fields, including natural sciences, and comprehensively discuss the concept of dignity while also seeking to establish the clinical and praxis-oriented field of "Dignity Studies".

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

The framework of this research area consists of "theoretical and conceptual historical research" (A01-04), "clinical applied research" (B01-05), as well as "social implementation" (C01). In order to establish the field of "Dignity Studies," it is necessary to base it on fundamental research. Therefore, we will examine the value-based justification of "dignity" and, based on this, construct a conceptual history that includes the non-Western world. Based on the research results, we will analyze the clinical application of advanced science and medical technology. Moreover, we will examine the concrete implementation of the concept of dignity in society by applying it to various educational settings and develop through it the concept of dignity. The open call for publicly offered research proposals will complement the above plan. We welcome proposals that will offer perspectives and arguments that are not envisioned in this research area, even critical ones.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Philosophical Possibilities of Absolute Value	1	16
A02	History of the concept of dignity (Ancient and Medieval Western Philosophy)		
	History of the concept of dignity (Contemporary Western Modernity)		
A03	A study on view of human in traditional cultures in non-Western countries		
	A study on present conditions of human rights in developing countries		
A04	The concept of 'dignity' in the non-Western world		
	Gender and the concept of 'dignity' in world philosophy		
B01	Dignity provisions in the constitutions of Asian countries and their interpretation		
	The concept of dignity in social security and employment insurance		
B02	Dignity in the international relations		
B03	Research on Human/Personal Dignity in Clinical Psychiatry		
B04	Robots and Gender		
	Artificial Intelligence and War		
B05	Reproductive Technology and Ethics		
	Advanced Biotechnology and Human Dignity		
C01	Research on "Dignity Education" in Japan and the World		

Research Outline of Research Areas

The Natural Laws of Extreme Universe--A New Paradigm for Spacetime and Matter from Quantum Information
https://www2.yukawa.kyoto-u.ac.jp/~extremeuniverse/en

Number of Research Area	:	21A201	Term of Project :	FY2021-2025
Head Investigator	:	TAKAYANAGI Tadashi		
Research Institution	:	Kyoto University, Yukawa Institute for Theoretical Physics		

1. Details of Research Area

Conventionally, physics has explained the laws of nature using time, space, and matter as its basic building blocks. However, in the extreme situations in nature (which we call the "extreme universe" in our area), due to the strong quantum nature of the target physical systems, the degrees of freedom of space, time, and matter themselves fluctuate enormously, and existing theoretical approaches in physics face difficulties in the following three limits: the "limit of space" (quantum theory of black holes), the "limit of time" (quantum theory of cosmology), and the "limit of matter" (dynamics of quantum matter). However, as soon as the field of quantum information emerged in the 21st century, this new way of looking at things began to bring dynamic changes to physics. For example, the extreme universe based on quantum gravity can be regarded as an accumulation of quantum information, while such accumulation of quantum information also provides a highly accurate numerical analysis method for quantum materials called tensor network. In addition to the limits of space, time, and matter, this Research Area aims to bring together researchers involved in the study of the "limit of information" (quantum information), and to promote interdisciplinary research beyond the boundaries of existing fields toward the ultimate laws of physics associated with the various problems in the extreme universe.

The goals of Planned Research are as follows. In the limit of space, the quantum theory of black holes is to be clarified and verified by integrating the viewpoint of quantum information into the gauge-gravity correspondence (B01), ultra-cold atom experiments (B02), and the general relativity (B03). In the limit of time, we explore quantum theory of cosmology by introducing quantum information theoretic ideas into quantum gravity (C01), quantum Hall experiment (C02) and cosmology (C03). In the limit of matter, we aim to reveal the dynamics of quantum matter by incorporating the concept of quantum information into quantum field theory (D01) and quantum many-body problems (D02). In addition, A01 will promote theoretical research on quantum information, and bridge the latest progress in quantum information research to physics of the extreme universe. Another important objective of this area is to promote international research on the extreme universe in the light of quantum information, and to actively encourage young researchers. Through these efforts, we aim to realize the above research goals and to transform physics into a discipline suitable for the era of quantum information.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

This Research Area brings together various researchers in quantum information and physics to study quantum information and the extreme universe (quantum theory of black holes, quantum theory of cosmology, and dynamics of quantum matter). We also aim to create new developments beyond conventional research fields. In addition to research directly related to Research Groups A01-D02, we expect theoretical and experimental proposals complementary to Research Groups or those covering multiple research topics above. For example, various research on quantum information theory such as quantum computational complexity, quantum algorithms, quantum cryptography, quantum communication, and quantum error correction; research related to the implementation of quantum computers; applications of tensor networks, quantum circuit models, and quantum computers for simulating physical systems; studies on strongly correlated matter, quantum many-body systems and their non-equilibrium dynamics; gauge/gravity correspondence and quantum field theory; cosmology and numerical relativity; experiments related to the above. In addition, experimental research of highly controllable systems like qubit systems, and new approaches based on experiments and observations in the fields of elementary particles, atomic nuclei, and cosmology are also envisaged. We also appreciate innovative ideas connecting quantum information and physics, as well as bridging theory and experiment. In addition, we welcome proposals promoting international collaborations and fostering next-generation researchers such as graduate students. For details of Research Groups, please refer to the homepage of this Research Area.

The upper limit of the annual budget is set at 2 million yen and 3.5 million yen per year, depending on the scale of the research; 2 million yen is mainly for theoretical research, while 3.5 million yen is mainly for experimental research.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
E01	Theoretical or Experimental Research on Quantum Information	3.5	6
E02	Theoretical Research on Extreme Universe	2	16
E03	Experimental Research on Extreme Universe		

Research Outline of Research Areas

Creation of Materials by Super Thermal Field: Neo-3D printing by Manipulating Atomic Arrangement through Giant Potential Gradient

http://www.mat.eng.osaka-u.ac.jp/super3dp

Number of Research Area	:	21A202	Term of Project : FY2021-2025
Head Investigator	:	KOIZUMI Yuichiro	
Research Institution	:	Osaka University, Graduate School of Engineering	

1. Details of Research Area

The target of this area is the mechanisms of unique crystal growth under superthermal fields generated by local heating by electron beams or lasers, which have been found to occur in metal 3D printing (3DP). Studies to be conducted include advanced in-situ observations, such as high-speed temperature field analysis, synchrotron X-ray transmission imaging, and laser irradiation in a transmission electron microscope, focusing on the occurrence of absolute stability, as well as numerical simulations using computational thermal fluid dynamics, phase-field method, molecular dynamics, precisely matched to the experiments to elucidate the mechanisms. Furthermore, artificial intelligence to analyze the process of microstructure to structure performance correlation and establish the Science for Creation of Materials by Superthermal Field, which contributes to the creation of new materials, such as 3DP of high-quality single-crystals. The outcomes will contribute to a great novelty in materials science.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

The followings describe the scope of planned research for the groups A01, A02, A03, the publicly offered research for each. Researches that can be linked to the scope, or that will open new developments to the cited research fields, are welcomed. For more information, see the website of this area.

Research Group A01 "Construction of Digital Research Infrastructure for Superthermal Field Material Fabrication Science"

【Digital twin science for creation of materials by super-thermal field (A01-a)】 In-process monitoring of a 3DP and computer simulation to evaluate the dynamic changes of the superthermal field. **《Expected proposal》** Advanced analytical methods such as *in-situ* measurement of crystal orientation in 3DP processes, large-scale, high-accuracy, computer simulations of melting, fluid flow, crystal growth, microstructure formation, and diffusion. **【Materials informatics for creation of materials by super thermal field (A01-b)】** Discovery of the laws in the relationships among the process, thermal field, microstructure, and material properties. Derivation of the parameters for the simulation byA01-a. **《Expected proposal》** Monitoring big data analysis, the creation of microstructure-property correlation data, computer simulation, image sharpening processing (in collaboration with A02).

Research Group A02 "In-situ and Precise Analysis of Crystal Growth under Superthermal Field"

【Micro-dynamics of crystal growth by superthermal field (A02-a)】 *In-situ* observation by synchrotron X-ray imaging of rapid melting, rapid solidification, and crystal growth in superthermal field. **《Expected proposal》** Improvement of resolution of imaging, the advanced analysis of imag data, *in-situ* observation of crystal growth by various of microscopy (in collaboration with A01 and A03). **【Lattice defects analysis of materials created by superthermal field (A02-b)】** Analysis of microstructure, composition, stress, strain, and lattice defects using advanced analytical methods such as electron microscopy, neutron diffraction, and positron annihilation. **《Expected proposal》** Atom probe tomography, theoretical and simulation research on defect formation, the evaluation of lattice defects by various methods, and 3D observation by serial sectioning tomography.

Research Group A03 "Fabrication of Transcendental Materials Utilizing Superthermal Fields"

【Science for creation of super-titanium by superthermal field (A03-a)】 Development of lightweight and heat-resistant super-titanium materials by controlling crystal orientation and microstructure using superthermal fields **《Expected proposal》** Analysis of thermal stress with crystal anisotropy (in collaboration with A01 and A02), measurement of fundamental properties of the new titanium alloys, strengthening and fracture mechanisms of 3DP titanium alloys and related materials, and advanced research using advanced methods. **【Science for creation of biomaterials by super thermal field (A03-b)】** Improvement of metallic implant devices by controlling mechanical biocompatibility through crystal orientation control of biomedical metallic materials by using superthermal fields, and by surface fabrication using superthermal fields. **《Expected proposal》** Computer simulation of surface fabrication in 3DP process by superthermal field (in collaboration with A01 and A02), and molecular orientation control and surface fabrication of polymer materials by superthermal field. **【Science for creation of ceramic materials by super thermal field (A03-c)】** Establishment of the academic basis for the fabrication of new ceramics materials by applying superthermal fields to melt growth, gas phase growth, and solid particle deposition, direct observation of crystal growth front. **《Expected proposal》** Research on interactions between lasers and inorganic crystalline materials, correlations with atomic bonding, and heterogeneous absorption due to microstructure.

Research Group B01"Groundbreaking Research" Researche that brings new aspects to the materials creation in superthermal fields in new matters such as molecular crystals, low-dimensional materials, organic materials, MOF, soft matter, polymer materials, and semiconductors, formation of new ultra-temperature fields, thermodynamic theory research in ultra-temperature fields, and operando measurement methods.

3. Research Group, Upper Limit of Annual Budget and Number of research projects to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Digital twin science for creation of materials by super-thermal field (A01-a)	3.5	16
	Materials informatics for creation of materials by super thermal field (A01-b)		
A02	Micro-dynamics of crystal growth by super thermal field (A02-a)		
	Lattice defects analysis of materials created by super thermal field (A02-b)		
A03	Science for creation of super-titanium by super thermal field (A03-a)		
	Science for creation of biomaterials by super thermal field (A03-b)		
	Science for creation of ceramic materials by super thermal field (A03-c)		
B01	Groundbreaking research		

Research Outline of Research Areas

Science of Slow to Fast Earthquakes
https://slow-to-fast-eq.org

Number of Research Area	:	21A203	Term of Project :	FY2021-2025
Head Investigator	:	IDE Satoshi		
Research Institution	:	The University of Tokyo, Graduate School of Science		

1. Details of Research Area

Slow earthquakes, first discovered in the 21st century, result from shear deformation like previously recognized fast earthquakes, but they do not radiate strong seismic waves. As our understanding of slow earthquakes deepens, the relationship between slow and fast earthquakes, including large earthquakes, has become a high research priority. To update earthquake science based on a comprehensive understanding of slow and fast earthquakes and to make a quantitative forecast of future earthquakes, we have launched a research initiative: Science of Slow-to-Fast Earthquakes in 2021.

The critical question for a comprehensive and holistic understanding is "How and when does a slow earthquake become a fast earthquake?" and this question involves many related questions. Answering these questions requires the cooperation of researchers from many different fields. In addition to geophysics (seismology and geodesy), understanding crustal materials cannot be achieved without inputs from geology and geochemistry. Studies of earthquake rupture and frictional sliding are underpinned by fundamental physics. Developments in instrument technology open new avenues for geophysical observation, and application of information science and statistical methods can extract information from the large and expanding earthquake datasets.

This research initiative inherits the DNA of the research project "Science of Slow Earthquakes." Following the strategy of the previous research project, we promote collaborative research in various fields and incorporate technological innovations progressing in related fields. The initiative is organized around a core of six Research Groups (A01 Experimental Physics, A02 Structural Anatomy, A03 International Comparison, B01 New Technology Observation, B02 Information Science, and B03 Model Prediction), supported by Publicly Offered Research projects to be solicited this time.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

We plan to fund 22 projects with maximum annual budgets of either 2 or 4 million yen (see below). The research plan for each proposed project should match with one or more of research activities of the six Research Groups. The projects include research on slow earthquakes, but also research on ordinary earthquakes and research that is aware of the connection between earthquakes and society. Proposal from women, young researchers, non-Japanese researchers, etc. that contribute to increasing diversity in the field are also very welcome.

Research Group A01: Research on physical and chemical processes of slow-to-fast phenomena. Rock/analog experiments considering in-situ environments, scale, and geometry effects; theoretical physical modeling of non-equilibrium states.

Research Group A02: Research on the structure and state of the slow-to-fast earthquake zone. Geophysical survey for structure and materials; field observation, experiments, and modeling to clarify deformation, reaction, fluid movement, etc.

Research Group A03: International comparative study on regional characteristics of seismological structure, resistivity, and friction parameters; research for various slow-to-fast phenomena, such as landslides, volcanism, and mud volcanism.

Research Group B01: Development of instruments and methods with higher spatial and temporal resolution and lower noise; Comparison of the accuracy of developed instruments with existing instruments; multi-scale and multi-method observations

Research Group B02: Various data-driven research. Discovery of new phenomena; investigation of interactive phenomena; development of methods to characterize seismic wavefields; construction of seismic catalogs to understand scaling laws

Research Group B03: Modeling of static and dynamic deformation to understand of slow-to-fast earthquakes; modeling and forecast of seismicity and shaking using numerical simulations; research for social advice on slow-to-fast phenomena.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Physicochemical processes in slow-to-fast phenomena	4	6
A02	Anatomy of Slow-to-Fast seismogenic zones		
A03	SF Eqs through comparison across global subduction zones		
B01	Development of multiscale observation techniques	2	16
B02	Data-driven discovery & monitoring of Slow-to-Fast earthquakes		
B03	Multiscale modeling and forecast of Slow-to-Fast earthquakes		

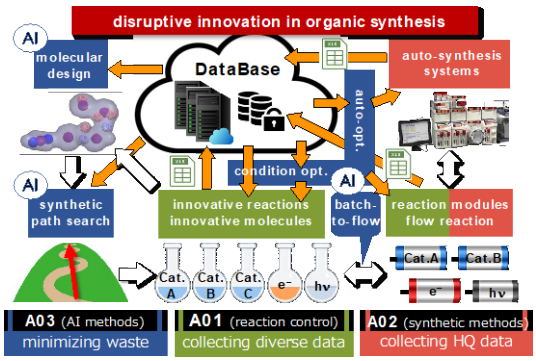
Research Outline of Research Areas

Digitalization-driven Transformative Organic Synthesis (Digi-TOS)
https://en.digi-tos.jp/

Number of Research Area	:	21A204	Term of Project : FY2021-2025
Head Investigator	:	OHSHIMA Takashi	
Research Institution	:	Kyushu University, Graduate School of Pharmaceutical Sciences	

1. Details of Research Area

Synthetic organic chemistry plays a vital role in manufacturing by transforming readily available organic materials into complex and valuable molecules. With the advent of digitalization, the field is undergoing significant changes. There is an urgent need to establish a foundation for digital organic synthesis—a fusion of experimental (synthetic organic chemistry) and information sciences—that leads to disruptive innovations. This research area focuses on developing automated methods that leverage artificial intelligence (AI) techniques, such as molecular design, synthetic pathway search, optimization of reaction conditions, batch-to-flow conversion, and autonomous synthesis systems. The aim is to eliminate waste, accelerate innovation, and create novel reactions and molecules. Additionally, we will construct our own specialized database optimized for machine learning (ML) in organic chemistry to serve as the basis for automated methods development.



2. Call for Proposals and Expectations for Publicly Offered Research, etc.

This research area consists of three Research Groups: A01 (deepening reaction control with AI), A02 (deepening synthetic methods with AI), and A03 (deepening AI methods to support organic synthesis). The key to success lies in integrating synthetic organic chemistry and information science effectively. Rapid accumulation of reliable reaction data for ML and its utilization for verifying predictions or devised molecules, reaction conditions, and pathways in actual experiments are crucial. The Publicly Offered Research proposals for Groups A01 and A02 should contribute to providing data to the database and utilize AI and ML techniques, while those for Group A03 must collaborate with experimental groups.

Research Group A01 aims to develop innovative reactions with advanced control (reversal) of selectivity and elucidate their mechanisms. In the Publicly Offered Research, we welcome researchers interested in exploring diverse "novel reactions" that go beyond the scope of the Planned Research. Proposals should actively leverage ML techniques for optimizing reaction conditions and catalyst design. Thorough analysis of reaction mechanisms is essential, and we encourage proposals that utilize ML methods for in-depth analysis.

Research Group A02 focuses on promoting automation of organic synthesis and applying new scientific principles. Proposals are sought for the development of solid-phase support methods for catalysts, converting batch reactions to flow reactions, highly reliable systems for rapid data collection, and autonomous synthesis systems with automatic optimization of reaction conditions and in-line analysis.

Research Group A03 aims to deepen AI methods for organic synthesis, support Groups A01 and A02, and create a new theory of informatics through interdisciplinary collaboration. Proposals are invited to contribute to the discovery of innovative chemical reactions, enhance development efficiency through parameter optimization, identify key factors controlling reactions, and develop AI methods for understanding and predicting reaction mechanisms. Novel molecular (reaction) generation techniques suitable for organic chemistry diversity and research on synthetic route design, including retrosynthetic analysis, are encouraged. Proposals integrating computational science and ML are expected, particularly those exploring innovative and creative ML methods beyond simple predictive model construction.

Since this research area integrates data science and organic synthesis, joint research must reaffirm data recognition. To construct our next-generation, ML-optimized database, we plan to collect side reaction and negative data not typically available publicly, along with comprehensive chemoselectivity data using a functional group evaluation kit. We encourage researchers who comprehend the research area's objectives, can contribute to data provision (closed, shared, and open stages), and structure the data to apply. Active participation in various project research and contribution to overall research progress in this area are welcomed. We particularly encourage young and female researchers to apply.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Deepening reaction control with AI support	3.5	16
A02	Deepening synthetic method with AI support	3.5	8
A03	Deepening AI methods to support organic synthesis	3.0	7

Research Outline of Research Areas

Bottom-up creation of cell-free molecular systems: surpassing nature
https://bottomup-biotech.elsi.jp /en/

Number of Research Area	:	21A205	Term of Project :	FY2021-2025
Head Investigator	:	MATSUURA Tomoaki		
Research Institution	:	Tokyo Institute of Technology, Earth-Life Science Institute		

1. Details of Research Area

In this Research Area, we aim to construct molecular systems which have capabilities that exceed those of natural cells, or that natural cells do not possess, from the bottom up. Outcomes of this research will have applied and social impacts, e.g., material production, drug discovery, sensing, environmental and energy technology, etc.

Research on the bottom-up biology has progressed substantially around the world, resulting in reconstituted molecular systems that mimic various cellular functions and properties. However, the bottom-up construction of molecular systems aimed at applied and socially relevant goals has seldomly been pursued. Moreover, there are a limited number of examples of constructing molecular systems from the bottom-up which utilize the concept of Darwinian evolution to screen for an optimal combination of multiple components among various combinations, suggesting that research which incorporates continuous trials followed by selection may dramatically improve bottom-up research outcomes. In this Research Area, we define cell-free molecular systems as those constructed from defined molecules and materials from the bottom up, without using cells or organelles themselves as components. To construct cell-free molecular systems that can contribute to practical and applied goals, we will combine biomolecules, organic compounds, polymers, and micro- and nano-devices, while utilizing theoretical studies. In addition, we will search for optimum combinations of components, as nature has done in the course of Darwinian evolution, and elucidate the interactions among the components. In this way, we will construct a molecular system in which the components are highly functional by virtue of evolved interactions, and simultaneously systematize the methodology to create such systems.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

We invite a wide range of researchers working on Research Group F01 and F02.

Research Group F01: Experimental work on bottom-up construction of cell-free molecular systems. Research proposals aiming to construct cell-free molecular systems that contribute to practical applications (material production, drug discovery, sensing, environmental/energy technology, etc.) by combining biomolecules, organic compounds, polymers, nano/microdevices, etc. are solicited. The components of molecular systems are not limited to those mentioned earlier. Researchers from a wide range of fields such as biophysics, bioengineering, applied physics, applied chemistry and nano-, micro-technology, are expected. Research on the construction of molecular systems which use as components living cells or organelles, and research on the construction of systems consisting of a single molecular species are out of scope. In addition, research aimed merely at the construction of molecular systems that mimic natural cellular functions are also out of scope.

Research Group F02: Theoretical studies that contribute to the construction of cell-free molecular systems. Research proposals are solicited that aim to design cell-free molecular systems composed of multiple components, or theories for optimizing cell-free molecular systems and the design of their constituent using statistical science, AI, MD, etc. Research proposals that aim to construct theories and implement them in experimental themes in collaboration with Planned Research Groups are desired but not mandatory. A wide range of fields such as mathematical science, information science, systems engineering, biophysics, and bioinformatics is expected. For details of each Planned Research Group, please refer to the area website.

The Principal Investigators of the Publicly Offered Research have access to the “Center for Systems Materials” and the “Center for Measurements and Analysis” organized and run by the Planed Research Groups (see the website for details). Proposals that assume the use of materials and methods provided by the Centers are encouraged.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
F01	Experimental work on bottom-up construction of cell-free molecular systems	4	21
F02	Theoretical studies that contribute to the construction of cell-free molecular systems	4	4

Research Outline of Research Areas

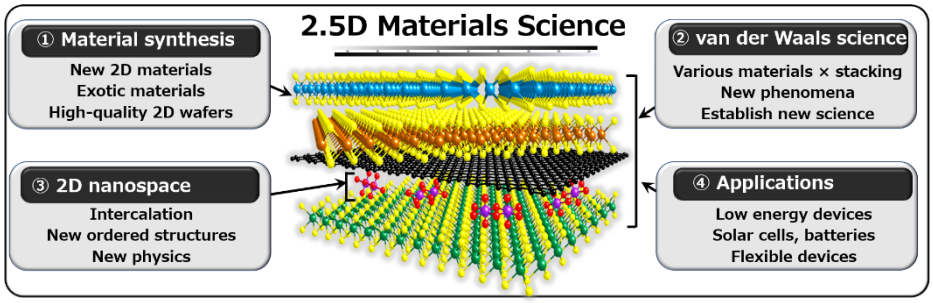
Science of 2.5 Dimensional Materials: Paradigm Shift of Materials Science Toward Future Social Innovation
http://25d-materials.jp/en/

Number of Research Area	:	21A206	Term of Project :	FY2021-2025
Head Investigator	:	AGO Hiroki		
Research Institution	:	Kyushu University, Global Innovation Center (GIC)		

1. Details of Research Area

Materials science has established the basis of our modern society through the development of emergent internet of things (IoT) technologies. Traditional materials science is mainly based on the precise control of bulk materials with rigid chemical bonds. On the other hand, two-dimensional (2D) materials, such as graphene, offer innovative approaches to create new materials by integrating different layers via van der Waals interaction. This is accomplished by stacking 2D materials with controlled compositions and stacking angles, an approach that is expected to significantly expand the frontiers of materials science. Furthermore, the well-defined 2D nanospace between the layers of stacked 2D materials provides opportunities to explore novel physical and chemical phenomena and to synthesize new materials.

In this Research Area we propose to explore the "Science of 2.5 dimensional materials" by introducing the concepts of "freedom of integration" and "2D nanospace", in combination with the synthesis of a wide variety of 2D materials. We aim to develop academic research based on this unique "2.5D" concept to achieve world-leading results, giving rise to upcoming future social innovation. This Research Area consists of five Research Groups (A01~A05), and all the members in this area collaborate closely to establish the new scientific field. In addition, the collaborations are supported by the joint research centers organized in this Area, allowing access to a wide range of facilities, such as automatic stacking equipment, to all the members.



2. Call for Proposals and Expectations for Publicly Offered Research, etc.

In this Research Area, we are developing unique and novel 2.5D material research by integrating the strength of each member through extensive collaboration. Therefore, researchers applying to this Publicly Offered Research are strongly encouraged to provide a detailed plan of collaboration with some of our group members in addition to an original research plan. Applicants also should show how their proposed research can contribute to this Research Area.

Here, "0.5D" symbolizes the new degrees of freedom offered by 2D materials including material stacking, 2D nanospace science, and the integration of 2D materials with 0D, 1D, and 3D materials into mixed-dimensional heterostructures. Emergence of new materials, physical properties, and applications are expected through the introduction of this "0.5D" concepts in 2D materials research. The followings are the details of the intended candidates:

(1) Researchers studying 2D material and planning to develop 2.5D research through extensive collaborations
(2) Researchers who have not worked with 2D materials, but want to start 2.5D research based on their original concepts and techniques
(3) Researchers with specialized analysis techniques which are applicable to 2.5D materials
(4) Researchers studying theoretical physics and materials informatics that can form the basis of 2.5D research
(5) Researchers studying semiconductor devices, energy creation/storage, or areas that contribute to social innovation
(6) Young researchers and female researchers

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Materials synthesis for 2.5D structures	Experimental: 5 Experimental or theoretical: 3	4 15
A02	Assembly for 2.5D integrated structures		
A03	Development of analysis methods for 2.5D structures		
A04	Development of novel physical properties with 2.5D structures		
A05	Development of electronic, photonic, and energy applications with 2.5D structures		

Research Outline of Research Areas

1000-Tesla Chemical Catastrophe : Science of Chemical Bonding under Non-perturbative Magnetic Fields
https://ymatsuda.issp.u-tokyo.ac.jp/

Number of Research Area : 23A201 Term of Project : FY2023-2027
Head Investigator : MATSUDA Yasuhiro
Research Institution : University of Tokyo, Institute for Solid State Physics

1. Details of Research Area

Magnetic fields are essential to the formation of nature, but on the Earth, their effects are generally weak and perturbative. On the other hand, the strong magnetic field in space, which is 16 orders of magnitude larger than the Earth's magnetic field, gives non-perturbative magnetic field effects. In this research area, we use the recently developed 1000 T ultrahigh magnetic field to clarify the non-perturbative magnetic field effects in the nature on the Earth. The 1000-T magnetic field gives electron spins an energy change of 1350 K in terms of thermal energy, which exceeds the Curie temperature of the iron and the melting point of gold. The phenomenon of Chemical catastrophe, which is a destructive effect on chemical bonds, is expected to be realized in solids. From solids to molecules, biomolecules, elementary particles, and plasma, innovative phenomena such as the creation of new crystals by magnetic fields will allow us to explore the essence of the mechanisms that shape the natural world.

There are six Research Groups in the Planned Research: A01 Molecular Orbital Catastrophe, A02 Spin Catastrophe, A03 Band Electron Catastrophe, A04 Chemical Reaction Catastrophe, A05 Elementary Particle Universe Catastrophe, and A06 Magnetic Field Catastrophe Theory, each with one Planned Research project.

A01 to A03 are on solid-state physics. One of the chemical catastrophe phenomena is crystal deformation due to a magnetic field. Through the wave function shape, Zeeman effect, Landau quantization, etc., the crystal structure is optimized in a magnetic field, which makes it possible to create new crystals in a magnetic field that cannot be realized in a low magnetic field. Solid oxygen, which undergoes a phase transition from monoclinic to cubic at 120 T by reconfiguration of molecular steric configuration, is one of the typical examples, but the research objectives of the field are to expand the research to a wider range of target materials and to understand the phase transition mechanism quantum mechanically. In A04, the main research target is non-perturbative magnetic field effects on photochemical reactions in molecules and polymers. Non-perturbative effects of magnetic fields, including photoexcited states, on chemical reaction processes through the Zeeman effect and Lorentz force will be the subject of research. The correlation between chirality and spin currents and magnetic fields will also be utilized to create new molecules in high magnetic fields and to understand their formation mechanisms. A05 studies non-perturbative magnetic field effects on plasma and elementary particle phenomena. The following phenomena are studied: production, scattering, and decay reactions of dark matter and dark energy, birefringence and anomalous synchrotron radiation in a quantized vacuum, and shock waves, jet collimation, and magnetic reconnection in magnetized plasmas, which are expected to occur when catastrophic phenomena in outer space are reproduced. We will conduct ultrahigh magnetic field experiments using a variety of quantum beams. We will elucidate the mechanisms at the microscopic level of elementary particles and plasmas, and clarify the role of magnetic fields in extreme space environments. A06 aims to theoretically elucidate the non-perturbative magnetic field effects of ultrahigh magnetic fields of up to 1000 T in molecules, polymers, plasmas, and elementary particles, with a focus on solids.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

As Research Group B01, we invite applications for experimental and theoretical studies of catastrophic phenomena induced by non-perturbative magnetic field effects in solids. The research topics include crystal deformations induced by magnetic field control of the spatial extent of wavefunctions, violation of the effective mass approximation due to interference with the crystal period, structural phase transitions caused by competitions of the magnetic energy and several excitations, nonperturbative magnetic field effects on phonons, and so on. We expect proposals beyond the framework of conventional magnetic field research. Plans to complement the target material groups in Planned Researches A01-A03 are also welcome. Research Group B02 invites experimental and theoretical studies of nonperturbative magnetic field effects on chemical reactions of molecules and macromolecules, and biological phenomena. Proposals for target molecules, macromolecules, and biological materials that complement Planned Research A04, and studies of magnetic field effects on catalysis and artificial photosynthesis are expected. For Research Group B03, we expect experimental or theoretical studies that pioneer non-perturbative magnetic field phenomena in astrophysics and particle physics. Hadron physics, solar physics, and other research topics that are related to Planned Research A05 are also open to applications. Researchers with no previous experience in high magnetic field experiments are also eligible to apply, as technical guidance will be provided after the proposal is accepted. (It is expected that high magnetic field experiments will be conducted using the shared use system of domestic magnetic field facilities and the portable pulsed magnetic field equipment to be developed in this research area.)

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
B01	Non-perturbative magnetic field catastrophe in solids	Experiment 2.5 Theory 1.5	8 4
B02	Non-perturbative magnetic field catastrophe to chemical reactions	Experiment 2.5 Theory 1.5	3 3
B03	Non-perturbative magnetic field catastrophe to particles and space	Experiment 2.5 Theory 1.5	3 3

Research Outline of Research Areas

Unveiling, Design, and Development of Asymmetric Quantum Matters
https://asymmetry.hiroshima-u.ac.jp

Number of Research Area	:	23A202	Term of Project : FY2023-2027
Head Investigator	:	ONIMARU Takahiro	
Research Institution	:	Hiroshima University, Graduate School of Advanced Science and Engineering	

1. Details of Research Area

In this research area, we transcend the understanding of electromagnetic effects such as cross-correlation response and non-reciprocal conduction that arose from the asymmetric electronic states in solids by employing the multipole concepts and develop innovative functions. Recent developments of quantum beam and physical properties measurements in high resolution facilitate the visualization of the orders of multipoles and the quantification of the susceptibility to the external fields. We construct a theoretical model describing the cross-correlation mechanism based on the obtained knowledge and it helps us to design new asymmetric quantum matters. We apply this model to molecular clusters, artificial materials, and broader target, to lead the evolution of next-generation material science and to frame the "asymmetronics". In planned research A01, we conduct microscopic analysis using quantum beams, and in A02, we develop new functions by combining microfabrication technology and various macroscopic measurements in high resolution. The theory group B01 constructs basic theoretical models that incorporate many-body effects and designs new materials. In C01, solid crystals are synthesized to develop new asymmetric quantum matters, and in C02, the strategy is to expand the material scales in wider range.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

In publicly offered research, promotion of strong research collaboration in the research area is highly expected. Research that advances complementary with the planned research and that expands this research area are expected. The former involves various measurements of polarized quantum beams, precise macroscopic measurements using microfabricated samples, and research using advanced many-body numerical calculation techniques. The latter includes research that expand the concept of asymmetric quantum matters to softer and broader materials such as organic compounds and molecular clusters, as well as artificial substances. We welcome themes that utilize shared equipment, such as a cryogen-free low-temperature automatic measurement system and a focused ion beam processing equipment, or themes related to sophistication of the equipment. We expect applications from young researchers working on ambitious themes.

A01: Researches using advanced quantum beam analysis techniques to investigate the electronic states of asymmetric quantum matters and the order parameters of multipoles. For example, they include resonant inelastic X-ray scattering (RIXS), neutron PDF analysis, and fluorescent X-ray holography to clarify the electronic states.
A02: Experimental researches that will lead to technological innovation, such as providing new functions of matters and realizing a huge response by microfabrication and the practical application of anisotropic superconductivity. The concept is widely applied to organic chemistry and metamaterials to detect electrical, magnetic, thermal, and elastic cross-correlation responses and control them using various external fields.
B01: Theoretical researches that construct basic theories based on multipoles and promote its application. For example, theory to evaluate responses to external fields, elucidation of mechanisms of multipole order, applications to mesoscales, and development of new asymmetric quantum matters using first-principles calculations and materials informatics.
D01: Experimental researches that can collaborate with C01 and C02, with sufficient prospects for development of new materials, novelty of synthetic methods, and development and control of functional properties. A wide range of materials are objects based on a scale-seamless perspective, e.g., not only crystals without inversion symmetry, but also molecular clusters, metal complexes, organic compounds, and artificial materials such as metamaterials.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Probing Microscopic Properties of Asymmetric Quantum Matters through Quantum Beam Analysis	Theoretical: 1 Experimental: 2.5	6 13
A02	Exploring Novel Functionalities in Asymmetric Quantum Matters through Precise Measurements		
B01	Fundamental Theories and Theoretical Design of Asymmetric Quantum Matters		
D01	Development of Asymmetric Quantum Matters		

Research Outline of Research Areas

Materials Science of Meso-Hierarchy
https://mesohierarchy.jp/en/

Number of Research Area	:	23A203	Term of Project :	FY2023-2027
Head Investigator	:	YAGAI Shiki		
Research Institution	:	Chiba University, Graduate School of Engineering		

1. Details of Research Area

In this research area, we define "meso-hierarchical materials" as materials that are hierarchically self-assembled in the mesoscopic scale, and provide a platform for researchers to collaborate on supramolecular chemistry, design theory to induce meso-hierarchical structures, structure visualization technology, methodology for controlling energy levels of nano-structured materials through strong coupling by resonator, and characterization methods on mechanical properties of the meso-hierarchical materials. By promoting this research area through the collaboration of researchers from various research fields, we will accumulate knowledge and promote an integrated understanding of meso-hierarchical materials. This will establish the interdisciplinary field of "meso-hierarchical materials science" that links the nano to the macro, and will bring about an innovation in the creation of materials. Seven planned researches are being pursued: "synthesis" and "visualization" in A01, "photofunctional science" and "optical characterization" in A02, "stimulus-responsive materials" and "nonlinear response" in A03, and "theoretical computation" in B01. In the Publicly Offered Research, we expect research proposals that complement the above researches or are based on new ideas.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

C01 Synthesis and Characteriation of Meso-Hierarchical Structures: We welcome challenging research proposals that control self-assembly of organic and inorganic materials, or their hybrids in a hierarchical manner to realize structural control in the mesoscopic region. Organic molecules are expected to be π-electron molecules, functional dyes (preferably systems in which π-electron systems can interact to realize meso-scale exciton transfer), and functional biomolecules, etc. Inorganic materials are expected to be metal nanoclusters and quantum dots, etc. The meso-hierarchical structures can be of any morphology, but should not diverge to macroscopic scales without forming hierarchical structures. We also welcome research proposals that use original methods to analyze and observe the hierarchical structures that appear in the formation process of these materials. → Corresponding to Planned Research A01

C02 Analysis and Utilization of Photophysical/Mechanical Properties of Meso-Hierarchical Structures: Meso-hierarchical materials are expected to exhibit various physical properties based on the hierarchical structures. We expect proposals that elucidate optical and mechanical properties unique to meso-hierarchical materials, as well as research proposals that prepare materials that intentionally utilize these properties. For example, we welcome challenging and original research proposals on the control of the number of excitons and oxidized/reduced molecules via photoexcited states, long-range exciton transfer and its control by force, and physical property measurements of photofunctional mesohierarchical structures capable of energy amplification. → Corresponding to Planned Research A02 Also, research proposal for novel methods to analyze and visualize the mechanical properties unique to meso-hierarchical structures, or techniques for manipulating energy levels through resonator strong coupling. We also welcome applied research that proposes unique and novel applications, for example, meso-hierarchical mechano-functional materials and exciton circuits using ultra-long range exciton transfer. → Corresponding to Planned Research A03

C03 Theoretical Analysis of Meso-Hierarchy: A key to construct meso-hierarchical materials is to discover the fundamental theoretical principles that generate emergent phenomena as the system size increases from the atomic to the macroscopic level. We expect proposals for the construction of theories to analyze the formation mechanism and stability of meso-hierarchical structures, as well as their optical and dynamical properties and functions, and their application calculations. Theoretical researchers in not only molecular theoretical models such as quantum chemistry (first principles) calculations and (coarse-grained) molecular dynamics, but also in peripheral fields such as condensed matter theory, soft matter physics, and elasticity theory are welcome. → Corresponding to Planned Research B01

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
C01	Synthesis and Characterization of Meso-Hierarchical StructuresMeso-Hierarchy Synthesis and structural analysis of structures	3.5	12
C02	Analysis and Utilization of Photophysical/Mechanical Properties of Meso-Hierarchical Structures	3	6
C03	Theoretical Analysis of Meso- Hierarchy	2	5

Research Outline of Research Areas

Latent Chemical Space Based on Diverse Natural Products for Bio-active Molecular Design

https://latent.chemical.space

Number of Research Area	:	23A204	Term of Project :	FY2023-2027
Head Investigator	:	KIKUCHI Kazuya		
Research Institution	:	Osaka University, Graduate School of Engineering		

1. Details of Research Area

The discovery and identification of biologically active molecules using two typical compound resources, natural products (first) and synthetic compound libraries (second), has been a driving force in promoting chemical biology research, a field that integrates chemistry and biology. In this research area, we propose a third resource to follow these two. This third resource is virtually generated from the Latent Chemical Space, which is constructed by deep learning technology based on bioactivity data of natural products, and is realized in real space using robust organic synthesis. The Latent Chemical Space created by the fusion of natural products and informatics research will bring about a paradigm shift in data-driven chemical biology research and revolutionize the design of biologically active molecules. To realize this, we will launch the "Cyber Bioactive Molecule Design Lab" consisting of three groups: Chemical Biology, Informatics, and Organic Synthesis. The goal is to establish a new science of bioactive molecule design that can develop innovative molecules that lead to the clarification of new biological functions and to the seeds for pharmaceuticals and agrochemicals, starting from the compounds created from this third resource.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

We invite applications for research members to add depth and breadth to our research perspectives and backgrounds, and to strengthen our research system to achieve the goals of this research area, which aims to create new scientific principles for designing biologically active molecules by integrating chemical biology, informatics, and synthetic organic chemistry research. The goal is to create a new science of biologically active molecular design method. In order to achieve research objective, it is necessary to recruit a wide range of research topics that share the same sense of purpose and to accumulate successful research examples. In order to lay the foundation for the future development of the research field, we expect active applications from active female and young researchers who share the same vector of research goals. The following are the main points of the research topics for which applications are solicited.

For research item A01 (Chemical Biology Group), it is necessary to increase the variation of evaluation methods, and we invite applications from researchers who can strongly promote activity evaluation methods from unique viewpoints. In order to construct a high-quality compound potential space, a more comprehensive activity evaluation is desirable. For this purpose, we envision the adoption of group members specializing in bio-related chemistry and structural biology, which provide excellent activity evaluation methods and structural biological basis. Furthermore, we expect to receive applications from researchers specializing in natural product chemistry who are updating the first resource using original evaluation methods.

For research item B01 (Informatics Group), we are seeking researchers who can further expand the chemical latent space, which is constructed based on a deep learning method originally developed by the planned research members of this research area, from the knowledge of computer science. Specifically, we are widely inviting proposals for research on the application of latent spaces to virtual screening and chemoinformatics, the development of novel machine learning methods, and the learning and application of language models (not limited to natural language). Researchers specializing in deep learning, data mining, and graph information processing are also welcome, as this research area will collect various labeled data on compounds and organize them in graph data structures. Even if they have no previous experience in chemistry or biology, we expect applications from researchers who develop and apply excellent algorithms and methods in the fields of computer science and artificial intelligence.

In research item C01 (Organic Synthesis Group), the following two points will be pursued in parallel: (1) synthesis of novel bioactive candidate molecules derived from compound potential space, and (2) construction and expansion of a library of novel synthetic compounds based on bioactive molecules. In order to respond to the structural diversity of new molecules proposed by information analysis, it is important to advance and diversify the synthetic technologies possessed by this research area. Therefore, we expect applications from researchers who possess original technologies and high synthetic capabilities useful for the synthesis of complex molecules, and who can actively contribute to the deepening of the chemical space by working on the above items (1) and (2) through further advancement of these technologies.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Chemical Biology: Collection of bioactivity data from diverse compounds	3	7
B01	Informatics: Construction and application of latent chemical space		7
C01	Organic Synthesis: Construction of synthetic compounds for evaluation of biological activity		7

Research Outline of Research Areas

The creation of multi-messenger astrophysics -- The unified picture of dynamical universe driven by births of black holes
https://multimessenger.jp/en/

Number of Research Area	:	23A205	Term of Project :	FY2023-2027
Head Investigator	:	YOSHIDA Shigeru		
Research Institution	:	International Center for Hadron Astrophysics, Chiba University		

1. Details of Research Area

The gravitational energy produced by the mighty gravity of black holes has been the primary energy source of the universe since the Big Bang and is the source of the diversity of the universe, driving the growth of black holes, the synthesis of elements that are the origin of matter, and the creation of ultra-high energy cosmic ray nuclei with enormous energy that has never been achieved by human-made accelerators. In this Research Area, we will promote multi-messenger observations that combine neutrino and gravitational wave measurements which have made overwhelming progress in recent years, with traditional electromagnetic wave observations, in order to obtain the unified picture of the final fate of gravitational energy, from the growth process of ultra-dense fireball plasma produced by the strong gravitational field to elemental synthesis and high-energy radiation.

This Research Area consists of three groups: Group A, which is a collection of the subgroups to dramatically advance observational research in multi-messenger astrophysics by strengthening the observational experiments and facilities currently in operation; Group B, which conducts future-oriented development research; and Group C, which promotes theoretical research. Each of these research groups is as follows. Cosmic neutrinos (IceCube - A01), gravitational waves (LIGO - A02), visible, near-infrared and radio waves (A03), X-rays (A04), gamma rays (CTA - A05), astroparticle detection technology (B01), multi-messenger observation satellite (B02), theoretical study of high energy neutrino astrophysics (C01), and theory of strong gravitational radiation from astronomical objects (C02).

Multi-messenger astrophysics is a newly born interdisciplinary field that requires the formation of a new community of researchers with expertise in different research backgrounds. The ultimate goal of this Research Area is to create an expert group of multi-messenger astrophysics with a diverse spectrum of astrophysics researchers and make world-leading discoveries to reveal the nature of extreme universe.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

Multi-messenger astrophysics, by its very nature, is related to a wide range of astronomical, space, and particle physics research fields. Although each of the Planned Research Groups has introduced a top-down approach for integrating various specialized research fields, there are many research topics and projects that cannot be covered by this top-down program. We expect bottom-up research proposals that broaden the base of interdisciplinary research in the open call for Publicly Offered Research proposals. We welcome observation research proposals that are not part of the top-down research agenda, such as observational research using balloons and other flying objects, survey observation specializing in a certain wavelength band, and cosmic particle observation using ground-based detectors, as well as proposals for detector development based on novel ideas. We also expect seed research proposals that will promote interdisciplinary research, such as developments on methods for integrating and analyzing data of different quality, and theoretical research proposals on cosmology, particle theory, gravity theory and so on, which will form the basis of the framework of multi-messenger astrophysics.

We would also like to remark that the Research Group Number E01 can accept truly pioneering proposals which requests annual budget up to 5 million yen, in order to promote relatively large-scale observation and development programs.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
E01	Observational study or R&D for multi-messenger astrophysics : Large-scale programs	5	2
E02	Observational study, numerical simulation, or R&D for multi-messenger astrophysics	3	8
E03	Theoretical research on multi-messenger astrophysics	1	8

Research Outline of Research Areas

Green Catalysis Science for Renovating Transformation of Carbon-Based Resources
https://greencatalysis.jp

Number of Research Area	:	23A206	Term of Project :	FY2023-2027
Head Investigator	:	OOI Takashi		
Research Institution	:	Institute of Transformative Bio-Molecules, Nagoya University		

1. Details of Research Area

Considering the sustainable development of society, organic synthesis must evolve into an environmentally benign technology that can efficiently convert any molecule for providing value-added organic molecules. In other words, there is an urgent need for a transformative shift toward greener organic synthesis in view of effective utilization of ubiquitous carbon resources, molecular transformations using renewable energy, and minimization of waste. However, achieving this goal within the framework of conventional organic synthesis is extremely challenging. This is mainly because most of the existing synthetic methods rely on ionic reactions using thermal energy, which require functional groups as a handle for executing precise transformations of starting materials. On the other hand, radical reactions are not dependent on functional groups and hold significant potential for implementing truly sustainable chemical synthesis with a wide range of carbon resources. However, it is very difficult to tame short-lived, highly reactive radicals, and no guiding principle has been established for the development of radical-mediated selective organic transformations. The research area "Green Catalysis Science" aims to realize precise control of radical reactions by the development of catalysts capable of harnessing light and/or electric energy based on the integration of inorganic coordination chemistry, solid surface chemistry, and organic chemistry, leading to transform organic synthesis into a form suitable for a sustainable society. Specifically, we will pursue the design of inorganic complexes and solid-state catalysts with the ability to generate radicals at targeted positions in starting materials through light excitation or electron transfer with electric energy. Meanwhile, organic molecular and metal catalysts will also be rationally designed for rigorous control of the subsequent bond-forming processes of radicals. These catalysts will be exploited in developing molecular transformations to assemble high value-added molecules, which were previously considered nearly impossible to synthesize, from small molecules such as methane and hexane, polymers, and biomass, which have been difficult to use as starting materials, in the shortest possible steps. This will revolutionize methods for the transformation of carbon resources, establishing the next-generation organic synthesis that embodies greenness and is independent on the structure of molecules.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

In this research area, research is conducted through the organization of three groups: Research Group A01 (Control of Radical Generation), Research Group A02 (Control of Radical Reactions), and Research Group A03 (Expansion of Synthetic Processes). To achieve the goal of the area, a fusion of a wide range of fields is essential. Particularly, collaborative research based on understanding and controlling radical species through photo- and electrochemical approaches, advanced measurement science, theoretical and computational science, and broad catalysis science creates a basis for exploring methodologies for the transformation of carbon resources. The content expected for publicly offered research in each research group is as follows:

In **Research Group A01**, the focus is on controlling radical generation and developing methodologies to generate radicals from a wide range of carbon resources, such as small molecules like CO_2 and methane, biomass, and polymers, for use as starting materials. Therefore, proposals related to the exploration of catalytic methods for radical generation are expected with an emphasis on the activation of molecules that have been difficult to use as starting materials in conventional organic synthesis.

In **Research Group A02**, the focus is on catalytic control of selectivity associated with radical-mediated bond formations. Proposals for catalyst development based on various approaches, such as enzymatic and supramolecular catalysis, are expected. Proposals related to molecular design and methodology development for the application of inorganic complexes and solid-state catalysts to the control of radical reactions are also welcome.

In **Research Group A03**, the focus is on expanding synthetic processes by radical reactions. This includes not only the development of new reactions with organic small molecules but also novel methods effective for natural product synthesis, polymer synthesis, and even the development of photo- and electrochemical reactions with polymers. Proposals to merge catalytic radical reactions utilizing light and electric energy with process chemistry and flow synthesis are also encouraged.

For each of the research group, proposals that contribute to the "understanding" to control radicals and develop new reactions are welcomed from theoretical science and advanced measurement science. As diversity is the foundation of interdisciplinary collaboration, applications from young and female researchers with diverse backgrounds are especially encouraged.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Control of radical generation	3	20
A02	Control of radical reactions		
A03	Expansion of synthetic processes		

Research Outline of Research Areas

Census-based biomechanism of circuit construction and transition for adaptive brain functions
https://ac-census.org/

Number of Research Area	:	21A301	Term of Project :	FY2021-2025
Head Investigator	:	ISOMURA Yoshikazu		
Research Institution	:	Tokyo Medical and Dental University, Graduate School of Medical and Dental Sciences		

1. Details of Research Area

We will focus on neural circuit formation and transitions responsible for adaptive brain functions. Combining cutting-edge technologies of advanced neuroscience that enable measuring and manipulating neural circuit activity and single-cell gene expression analysis will provide detailed information about cell type-specific adaptive circuits. In this Research Area, Adaptive Circuit Census (ACC), we will experimentally validate the responsible circuits and theoretically establish adaptive circuit operating principles. To further promote the ACC Research Area, we establish a seamless, interdisciplinary cooperative framework to exchange creative and innovative ideas as well as cutting-edge experimental and analytical techniques. The Research Groups are divided into A01, "Census of adaptive circuit construction," and B01, "Census of adaptive circuit transition," based on timescale differences. In addition, Research GroupC01 (Experimental) and C02 (Theoretical), "Technology and theory for adaptive circuit census," interacts with A01 and B01 to facilitate targeting of adaptive circuits.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

Research Group A01 aims to elucidate the mechanism of formation/reorganization of neuronal circuits during dynamic structural changes such as development, homeostasis, formation of instinct behaviors, brain degenerative diseases, and relevant compensatory responses. Research Group B01 aims to elucidate how neuronal circuits change brain state and lead to adaptation during functional transitions such as memory/learning, emotion, decision making, consciousness, mental illness, and drug addiction. We will use a unique experimental animal that suits each question and employ a precise cell type census and neuronal circuit identification method to capture the properties of specific neuronal circuits. We then compare and analyze the results from each Research Group to obtain comprehensive knowledge of the ACC.

We utilize profiling technology that captures cell types and dissects cell-type specific neuronal circuits; however, profiling itself is not the project's primary purpose. Instead, we expect to reveal the responsible adaptive circuits and fundamental operation mechanisms that alter animal behavior using various methodologies (spatial distribution, circuit structure, and neuronal activity information).

The profiling methodology is not necessarily limited to transcriptome analysis (various types of RNA-seq), and experience with transcriptomic analysis is not necessary since the integration of neuroscience and omics-based analyses is a key focus of the project. Moreover, to perform RNA-seq for the first time, it is crucial to make a detailed experimental design and collect preliminary data such as the cell viability and RNA amount before starting transcriptomic analysis to obtain a successful result. Therefore, the ACC offers consultation of experimental plan, technical advice, and financial support related to transcriptomic analysis to the members.

Research Group C01 aims to develop profiling technology to reveal the mechanism of adaptive circuits. Experience in the neuroscience field is not necessary. We also seek theoretical and bioinformatics experts in Research Group C02, who can verify the operating principle of adaptive circuits by theoretical models and simulations or identify circuit structures responsible for adaptation from experimental data. Altogether, we expect to establish a seamless, interdisciplinary cooperative framework to exchange creative and innovative ideas as well as cutting-edge experimental and analytical techniques.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Cell type census for adaptive circuit construction	6	4
B01	Cell type census for adaptive circuit transition	4	10
C01	Technology and theory for adaptive circuit census (Experimental)	5	4
C02	Technology and theory for adaptive circuit census (Theory)	2	3

Research Outline of Research Areas

New cross-scale biology
https://structure.m.u-tokyo.ac.jp/xscalebio

Number of Research Area	:	21A302	Term of Project :	FY2021-2025
Head Investigator	:	KIKKAWA Masahide		
Research Institution	:	The University of Tokyo Graduate School of Medicine		

1. Details of Research Area

In this research area, we aim to elucidate the molecular and cellular mechanisms of life phenomena and diseases by using quantitative cross-scale measurements. In particular, we focus on "meso-entangled bodies (MEBs)." We define MEB as a sub-cellular "body," where molecules are disordered, whose size is 20 to 500 nm, and hypothesize that the transition from MED to an ordered state is the determinant of the fate of cells and organisms. A liquid-liquid phase separation (LLPS) condensate is one of the MEB examples.

For the cross-scale measurement, we combine multiple techniques, including cryo-electron tomography, super-resolution imaging, intracellular NMR, and intracellular atomic force microscopy (AFM). Computational science is also used to integrate and interpret experimental data. The aims of our research area include, but are not limited to, the following three biological and medical areas: "The polarity of cell and development," "The shape and topology of membranes", and "Structural abnormalities and quality control of proteins that cause diseases." We want to create new frameworks of cell biology that answer how highly ordered and functional structures are built from the random MEBs by analyzing these fundamental phenomena by cross-scale measurements.

In the last two years, a virtual "Cross-scale cell measurement center" has already been in operation, in which two groups, A01=Technical and A02=Biological, collaborate with each other. Therefore, in the current call for proposals, applicants should understand ***open science***, in which research data is shared among this research area, while we respect the contribution of individual researchers.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

(A01) Technology group: we expect applications from researchers developing unique technologies for analyzing intracellular molecular structures and dynamics at the mesoscale level. Technologies not covered by the planned research group, e.g., quantitative proteome, labeling techniques that can be applied to multiple intracellular cross-scale visualization, technologies to deliver and control large molecules such as proteins and nucleic acids inside cells, technologies that can be linked with the technologies in the planned research (e.g. Super-resolution microscopy and cryo-electron microscopy in the same field of view), and analysis of intracellular structural dynamics using other light sources such as X-rays. The examples listed here are only examples; researchers with methods other than those listed above are also expected to apply.

As research in the area progresses, we need researchers who can apply computational science to meso-complexes. Examples include computational science to analyze data obtained from cross-scale observations (e.g., cryo-electron tomography data) and large-scale simulation studies on MEBs using supercomputers such as Fugaku. In the case of the computational science, in order to broaden the scope of the program, we call for two proposals from individuals or small groups up to 2-million-yen annual budget. Groups of normal size may also apply with a maximum of 4 million yen.

In both cases, the grant applicant should clearly explain the advantages and uniqueness of their technologies, and how the technologies contribute to the elucidation of the MEBs.

(A02) Biology group: we expect applications from researchers aiming to elucidate the mechanisms of fundamental phenomena in cells from the viewpoint of intracellular molecular structure dynamics. Example areas include, not limited to, cell differentiation, reprogramming, cell cycle control, cell-cell communication, immunological synapse, and LLPS. We also expect applications from researchers who aim to elucidate disease mechanisms from the viewpoint of intracellular molecular structure dynamics.

The grant applicant should clearly explain what kind of MEBs is expected to be observed by the above methods and what can be concluded from the observation.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Technology group	Computational science: 2 All technology: 4	2 4
A02	Biology group	4	10

Research Outline of Research Areas

Life Science Innovation Driven by Supersulfide Biology
https://supersulfide-proj.com/english/en-index.html

Number of Research Area	:	21A303	Term of Project :	FYFY2021-2025
Head Investigator	:	MOTOHASHI Hozumi		
Research Institution	:	Tohoku University, Institute of Development, Aging and Cancer		

1. Details of Research Area

Sulfur has been an essential element for living organisms on the earth during the long history of evolution. Unique chemical properties of sulfur include redox-sensitive nature and ability to catenate only by itself. The latter allows generation of a wide variety of sulfur-containing molecules that are rather fragile due to the former. We define "supersulfides" as metabolites and proteins possessing sulfur catenation.

Because supersulfides are so sensitive to redox perturbation and easily degraded or altered during the sample processing, their presence in biological contexts has been overlooked for a long time. Thanks to a recent technical advancement in the analytical chemistry, substantial amount of supersulfides, such as glutathione persulfide and cysteine persulfide, have been found in various organisms. Low-molecular weight supersulfides are now recognized as universal metabolites and play critical roles in energy production, antioxidant function, and anti-inflammatory function. Supersulfidated proteins are expected to be involved in the protein folding, proteostasis regulation, and regulation of protein functions. Based on these emerging biological functions of sulfur, we aim at creating and establishing innovative sulfur biology by further clarifying chemical, physical and biological characteristics of supersulfides and interdisciplinary research network among wide range of scientific fields, including chemistry, physics, geoscience, biology, mathematics and so on.

Here are three goals of our Research Area.

1) Development of quantification methods for supersulfides in terms of high sensitivity, high fidelity, and high reproducibility.
2) Discovery of life principles from a viewpoint of supersulfides in electron transfer and signal transduction.
3) Application of supersulfides for contribution to the SDGs

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

We welcome all research focusing on sulfur-containing metabolites and proteins for reevaluation of biological function of sulfur by cooperating with Planned Research Group members. Young investigators and women investigators are strongly encouraged to apply for the Publicly Offered Research.

Specific topic examples in each Research Group are as follows.

Research Group A01) Clarification of structure and properties of supersulfides from the viewpoint of inorganic and organic chemistry, biochemical analysis of interaction between sulfur and metal (iron, zinc, molybdenum, etc.), functional analysis of supersulfide-synthesizing enzymes and supersulfidated proteins, and development of new methodologies for quantification and synthesis of supersulfides.

Research Group A02) Analysis of electron transfer inside and outside of organisms via sulfur, clarification of redox reactions involving supersulfides and their significance, discovery of new homeostasis regulation utilizing sulfur, and clarification of relations between sulfur and other free radicals (reactive oxygen species, nitrogen species, etc.).

Research Group A03) Clarification of functional significance of sulfur-containing metabolites and proteins in signal transduction, mechanisms of supersulfide synthesis from the viewpoint of genetic and epigenetic regulation, and regulation of sulfur-metabolizing enzyme activities at protein levels.

Research Group B01) Interdisciplinary research on sulfur, such as sulfur cycle at global scale, roles of environmental biogenic sulfur, molecular evolution of aminoacyl-tRNA synthetase, sulfur utilization by living organisms during the evolution, is highly welcome. Other creative proposals are encouraged to be applied.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Analysis, quantification, and visualization of supersulfides	2	5
A02	Electron flux mediated by supersulfides	2	5
A03	Signal transduction utilizing supersulfides	2	5
B01	Interdisciplinary research on sulfur biology	3	5

Research Outline of Research Areas

Biology of non-domain biopolymer
https://www.nondomain.org

Number of Research Area	:	21A304	Term of Project :	FY2021-2025
Head Investigator	:	NAKAGAWA Shinichi		
Research Institution	:	Hokkaido University, Faculty of Pharmaceutical Sciences		

1. Details of Research Area

In recent years, there have been increasing reports of biopolymers such as long noncoding RNAs and intrinsically disordered proteins that play critical physiological roles without possessing conserved functional domains across species. These molecules share the common characteristic of not forming specific three-dimensional structures, suggesting they function through unique molecular mechanisms that diverge from the traditional molecular biology doctrine - where the primary sequence dictates structure, and structure determines function. In this research area, we define RNAs and proteins whose functions are difficult to predict from their primary sequences as 'non-domain biopolymers'. We aim to advance a hierarchical, cross-sectional analysis, from physiological function to molecular action mechanisms, to elucidate new strategies organisms use to acquire functionality without a high dependence on primary sequences. We are excited to launch our group grant for this project and warmly encourage applications from interested researchers.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

In this open call for research, we anticipate analyses of "novel" non-domain biopolymers independently discovered by applicants. However, we also encourage research focusing on particular regions or domains of "known" molecules, where functions are difficult to predict from primary sequences. These include poorly characterized peptides translated from untranslated regions of mRNA and intrinsically disordered regions of proteins with low sequence conservation across species. Further, we are interested in studies on originally discovered reaction fields, structures, and molecular condensates formed by non-domain biopolymers. We also look forward to new approaches for elucidating the molecular mechanisms of non-domain polymers, such as deep mutagenesis and the development of various measurement technologies.

In the A01 Physiological Function Unit, we solicit projects that verify the physiological functions of non-domain biopolymers at the individual animal level. While mice and fruit flies are used as model organisms in our planned research, we are open to research proposals using not only common model organisms such as bacteria, yeast, Arabidopsis, nematodes, and zebrafish, but also various non-model organisms.

The A02 Cellular Function Unit seeks research proposals to elucidate the functions of non-domain biopolymers using molecular biological methods and biochemical techniques involving cultured cells. Additionally, we welcome research topics that identify new non-domain biopolymers using large-scale screening technologies like CRISPR libraries, perform deep mutagenesis analyses of known molecules, and design new functional non-domain biopolymers.

The A03 Molecular Mechanism Unit invites research topics that clarify the detailed molecular mechanisms at play when non-domain biopolymers function. Additionally, this unit welcomes projects that elucidate the behavior of non-domain biopolymers from a soft matter physics perspective, and projects that analyze common sequence characteristics in non-domain biopolymers using bioinformatics and deep learning techniques.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Analyses of the physiological functions of nondomain biopolymer at individual animal level	4	18
A02	Analyses of the functions of nondomain biopolymer at the cellular level		
A03	Analyses of the functions of nondomain biopolymer at the molecular and atomic levels		

Research Outline of Research Areas

Understanding multicellular autonomy by competitive cell-cell communications
http://www.multicellular-autonomy.lif.kyoto-u.ac.jp/en/

Number of Research Area	:	21A305	Term of Project :	FY2021-2025
Head Investigator	:	IGAKI Tatsushi		
Research Institution	:	Kyoto University, Graduate School of Biostudies		

1. Details of Research Area

A critical difference between multicellular living organisms and non-living thing is that the former has 'autonomy'. A multicellular system can spontaneously construct tissues and organs and optimize its structure and function by itself. Such characteristic of the multicellular system is emerged only when cells are grouped together, and it is a unique natural phenomenon that reduces entropy (randomness). While the mechanism by which a cell population spontaneously creates a structure is gradually being clarified, the mechanism by which a cell population optimizes its own structure and function is still elusive. Recent advances in single-cell analysis technology have identified that there are 'variations' in various cell populations within the animal and that these variations are eliminated over time. In addition, when cells with slightly different properties or status are emerged in a cell population, 'unfit' cells are actively eliminated from the population through cell-cell interactions, a phenomenon called 'cell competition'. Cell competition is a context-dependent cell elimination whereby slightly abnormal cells that can survive on their own are eliminated from the population when coexisting with normal cells, thereby optimizing the structure and function of the cell population. In this research area, we will approach one of the greatest mysteries of life, the multicellular autonomy, by studying competitive cell-cell communications. To achieve this, we will strongly promote research on cell competition in various model systems and physiological processes, and dramatically advance our understanding of competitive cell-cell communication and its physiological roles. We will also promote interdisciplinary research in the research area to understand how multicellular autonomy is created by competitive cell-cell communications.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

In this research area, we aim to comprehensively understand competitive cell-cell communications and elucidate the principle that autonomy is created in multicellular systems. In the planned research, in addition to approaches that have strongly promoted cell competition researches (which include genetic, biochemical, and cell biological analyses using *Drosophila*, cultured mammalian cells, mice, and zebrafish), we will promote constructive approaches such as synthetic biology and development of spatial omics technology to understand competitive cell-cell communications. Therefore, for the publicly offered researches, we will call for proposals not only for researches on various cell competition phenomena that complement and strengthen the planned researches but also on competitive cell-cell communications that do not fall within the category of cell competition. We also call for researches that aim to elucidate the principle by which competitive cell-cell communication creates multicellular autonomy and optimizes multicellular structure or function. In addition, we expect research proposals on competitive cell-cell communication or the phenomenon in which the structure and function of multicellular systems are autonomously optimized using model organisms, cutting-edge technologies, mechanobiology, mathematical analysis, or data analysis methods that are not covered by the planned research. We also expect proposals that strengthen theoretical approaches to understand how competitive cell-cell communication creates multicellular autonomy, synthetic approaches to reconstruct multicellular autonomy, and any approaches to clarify the impact of cell competition on various biological and pathological phenomena. In addition to researches on competitive cell-cell communication in animal development, tissue repair, and regeneration, cell competition researches in the context of various temporal changes such as diseases and animal aging are also expected, if it matches the goals and directions of the research area. While aiming to accelerate the research area and achieve goals through collaboration with the planned researches, we also expect challenging research proposals that seek to find new questions or dramatically develop and transform the research area. We look forward to applications from young researchers and female researchers who will lead future cell competition and multicellular autonomy researches.

In this research area, in order to eliminate the barriers among different specialties, we have set only A01 as the research group. Therefore, all the publicly offered researches belong to A01. In order to achieve the above goals, we have set the upper limit of the amount of the publicly offered research budget to 4.5 million yen per year for 16 research proposals.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Understanding multicellular autonomy by competitive cell-cell communications	4.5	16

Research Outline of Research Areas

Shin-biology regulated by protein lifetime
https://www.proteinlifetime.jp

Number of Research Area	:	23A301	Term of Project :	FY2023-2027
Head Investigator	:	MURATA Shigeo		
Research Institution	:	The University of Tokyo, Graduate School of Pharmaceutical Sciences		

1. Details of Research Area

Proteins are vital to living organisms, and the functions of cells and tissues are determined by the proteome, which consists of thousands of different proteins. Protein synthesis follows genetic information, but the correlation between mRNA, translation, and protein levels is weak. Post-translational regulation, especially proteolysis, plays a critical role. Proteins vary in lifetime, from minutes to years. Existing laws explain some protein lifetimes, but most remain elusive. The regulation of individual protein lifetime is extensively studied in key biological events, but only limited aspects of protein dynamics are observed. During major functional transformations, protein composition undergoes significant reconfiguration, affecting degradation and synthesis. The mechanisms behind selective and large-scale proteolysis in biological and pathological contexts are unknown. To unravel these mysteries, we'll explore new principles of protein lifetime regulation, establish techniques for in-depth lifetime measurements, and elucidate regulatory mechanisms that drive compositional changes. We'll integrate sequence, modification, and 3D structure information to study protein lifetime regulation factors. We'll also develop technologies for precise protein lifetime control and methods to manipulate cellular and tissue functions. This interdisciplinary research aims to understand, measure, and manipulate protein lifetime mechanisms to achieve a deep understanding of biological phenomena and pathological conditions.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

Research Group A01 seeks a new understanding of life phenomena through the comprehensive measurement of protein lifetime and the investigation of regulatory mechanisms. While the planned research will focus on cellular senescence, neural stem cell differentiation, and Moyamoya disease, publicly offered research is encouraged to address other life phenomena and disease mechanisms involving protein lifetime regulation. This research area will study the large-scale regulation of protein populations rather than individual proteins. Research Group A02 aims to uncover novel molecular mechanisms that determine protein lifetime. The planned research will focus on the ubiquitin-proteasome and autophagy-lysosome systems in eukaryotic cells, particularly on branched ubiquitin chains, ubiquitin chain discrimination, and the enhancement of degradation by liquid-liquid phase separation. Publicly offered research is not limited to these systems but should investigate diverse substrates and lifetime determination mechanisms that involve significant changes in protein composition rather than a regulatory system for a specific substrate. Research Group A03 aims to develop tools for in-depth measurement and computational analysis of protein half-lives and for controlling the lifetimes of target proteins. The planned research includes the establishment of high-resolution measurement techniques, the analysis of the correlation between lifetime and proteoforms, and the further development of techniques such as auxin-degron and PROTACs for protein lifetime control. Proposals should introduce new methods and tools for measurement, control, information analysis, and mathematical analysis of protein lifetimes, using diverse approaches such as synthetic biology, analytical chemistry, informatics, organic chemistry, and computational science. Administrative Group has established mass spectrometry and information analysis teams. We invite publicly offered research that synergizes with planned research and contributes to the development of this research area. Diverse and highly original research by young and female investigators is encouraged.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Biology of Protein Lifetime Dynamics	4	7
A02	Mechanisms of Protein Lifetime Determination	4	6
A03	Measurement and Control of Protein Lifetime	4	4

Research Outline of Research Areas

Integration of extracellular information by multimodal ECM activity
https://www.multimodal-ecm.com/

Number of Research Area	:	23A302	Term of Project :	FY2023-2027
Head Investigator	:	FUJIWARA Hironobu		
Research Institution	:	RIKEN Center for Biosystems Dynamics Research		

1. Details of Research Area

Multicellular organism's structures and functions are complex but tightly organized. Although they emerge from the interplay between cells and the extracellular matrix (ECM), biological research has largely focused on cells, neglecting the ECM as just a 'static scaffold'. However, recent advancements in ECM measurement and manipulation techniques have begun to unveil that the ECM is far more dynamic than previously thought, providing cells with a wide range of biochemical (e.g., composition, adhesive and soluble signals) and physical (e.g., adhesion, viscoelasticity, geometry) information. This information collectively constitute 'multimodal spatiotemporal information' within the ECM. We anticipate that the ECM plays a pivotal role in establishing and integrating different biological scales and, thus, in governing dynamic and ordered multicellular phenomena, such as self-organization and morphogenesis. This research area aims to harness the expertise of experimental biologists, polymer materials engineers, and mathematical/data scientists to better understand and control the dynamics and multimodal information encoded within the ECM through interdisciplinary and holistic approaches. By unravelling the dynamic operating principles of the ECM, we endeavour to transform the current cell-centric framework of biology.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

The insufficient exploration of the ECM's dynamics and multimodal information stems from visualization challenges and struggles to decouple the ECM's diverse biochemical and physical parameters. Thus, this research area aims to achieve a greater understanding of the ECM through studies in the following three research groups: 'Operating principles of the ECM-multicellular dynamic unit (A01)', 'Manipulation of extracellular information by designer matrices (A02)', and 'Mathematical and data science for ECM-multicellular systems (A03)'. We invite proposals for Publicly Offered Research focused on any multicellular organisms and ECMs. We welcome proposals that a) complement the planned research, b) aim to be developed in collaboration with the planned research, or c) explore new concepts with innovative perspectives or methods. We plan to select 12 experimental research projects with a funding limit of 4 million yen each and 4 theoretical research projects with a funding limit of 3 million yen each. Young and female researchers are especially encouraged to apply.

Research Group A01 aims to investigate the mechanisms underlying the dynamics of the ECM in governing multicellular systems. We prioritize studies that extend beyond the static analysis of individual ECM molecules and strive for a comprehensive quantitative understanding of the spatiotemporal interactions between cells and the ECM. Potential research areas include the ECM dynamics (e.g., production, movement, activity, degradation) that regulate processes like morphogenesis, tissue regeneration, fibrosis, cancer development, and evolution. We also welcome proposals that examine the cross-scale dynamics of the ECM from the micro to macro scales, investigate the regulatory mechanisms of the ECM-cell interface, and explore the interplay between the ECM and soluble factors.

Research Group A02 invites proposals for the development of designer matrices, including reconstituted ECM, artificial ECM, and synthetic polymer hydrogels, capable of decoupling, integrating, and manipulating individual ECM parameters. We encourage proposals that aim to manipulate cell populations in conjunction with culture systems (e.g., organoids) and contribute to a greater understanding of the emergent functions of the assembly of ECM molecules. We also welcome proposals for measuring, visualizing and manipulating the mechanical properties and components of the ECM.

Research Group A03 seeks proposals focused on the use of mathematical and data science in the study of ECM-multicellular interactions. This includes the development of methodologies aimed at acquiring, quantifying, and integrating multidimensional data related to the ECM and cells, such as gene expression, spatial distribution, proteome, mechanical properties, and dynamics. We also encourage the development of innovative mathematical models of ECM-multicellular interactions alongside a simulation-based analysis. The above examples are intended only as illustrations. We welcome all proposals that align with the research area's objectives.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Operating principles of the ECM-multicellular dynamic unit	Experimental research: 4 Theoretical research: 3	12 4
A02	Manipulation of extracellular information by designer matrices		
A03	Mathematical and data science for ECM-multicellular systems		

Research Outline of Research Areas

Hibernation biology 2.0: understanding regulated hypometabolism and its function
https://hibernationbiology.jp

Number of Research Area	:	23A303	Term of Project :	FY2023-2027
Head Investigator	:	YAMAGUCHI Yoshifumi		
Research Institution	:	Institute of Low Temperature Science, Hokkaido University		

1. Details of Research Area

Most mammals are homeotherms that keep their core body temperature within a narrow body temperature range of 37°C. If the core body temperature continues to deviate from the range, a breakdown of systemic homeostasis occurs, leading to death. On the other hand, some mammals called hibernators can achieve hibernation, during which basal metabolisms and core body temperature become very low under conditions such as cold or starvation when a food, a source of body heat production, is insufficient. During hibernation and torpor, animals can maintain homeostasis and survive for a long period of time. Elucidating the mechanism of hibernation will lead to the clarification of the mechanism of whole-body homeostasis under extreme hypothermia, which could not be approached in non-hibernators such as humans, and has the potential to expand and spread to various fields. Recently, hibernation research is entering a new stage with the spread of genetic modification techniques in mammalian hibernators and the identification of neurons that induce a hibernation-like hypometabolic state in non-hibernators. This research area aims to take advantage of these breakthroughs and elucidate the mechanisms of induction and adaptation of "hibernation/torpor " and to derive new knowledge on the mechanism of "extended homeostasis," the mechanism by which homeostasis is maintained despite extreme low core body temperature.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

A wide range of research to deepen our understanding of the principles of hibernation and torpor in mammals is invited in each research category from A01 to A03. In addition to research that uses mammalian hibernators (e.g., hamsters and chipmunks), we are also seeking research that draws a picture of the essence of hibernation by comparing hibernation diversity, and research on the mechanisms that induce hibernation-like low metabolism and hypothermia in mice a hibernation-like hypometabolism (e.g. QIH: Q neurons-Induced Hypometabolism and hypothermia). Research that contributes to an understanding of the extended homeostasis observed during hibernation and torpor, not only with regard to central regulation, but also with regard to the nature of peripheral organs and the systemic organ connections with the central nervous system, is also welcome. Proposals from young and female researchers are also welcome in order to promote the future development of research in this area and to encourage research from diverse perspectives.

A01 Molecular and Neural Basis for Hibernation: Proposals are invited to examine the functions of genes, molecules, and neural circuits predicted to be involved in the control of hibernation and torpor. Although hamsters will be used as a model hibernator in this area, interspecies comparisons will be an important element in understanding the principles of hibernation. We welcome studies on torpor and hibernation-like low metabolism models in mice, as well as proposals related to the control and significance of hibernation and torpor in poikilotherms, which should contribute to our understanding of homeostasis mechanisms in mammals through comparative verification.
A02 Biological Responses Induced by Hibernation: Proposals are invited to elucidate the responses to the biological environment such as hypometabolism and hypothermia induced by hibernation and torpor, and their mechanisms at the cellular, tissue, or individual level using techniques from molecular biology, biochemistry, or neuroscience. Research that pursues not only the response in mammalian hibernators, but also the low temperature response and its mechanisms in non-hibernators such as mice and humans, as well as in organisms for which comparative physiological verification is possible, is included in this section.
A03: Elemental Technologies for Hibernation Research: Proposals are invited to introduce or propose emerging technologies and methods necessary to elucidate the mechanisms of hypometabolism induction, low temperature response, and stress tolerance that occur during hibernation and torpor. We also welcome research proposals that appropriately address problem setting in hibernation research, even for existing experimental techniques and methodologies that have not been addressed in hibernation research due to difficulties in their application at low temperatures or in mammalian hibernators.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Molecular and Neural Basis for Hibernation	4.3	7
A02	Biological Responses Induced by Hibernation		7
A03	Elemental Technologies for Hibernation Research		2

Research Outline of Research Areas

Dynamic reproductive lifespan: Life-long changes and fluctuations in germ cell function and risk for next generation
https://reproductivelifespan.jp/en/

Number of Research Area	:	23A304	Term of Project :	FY2023-2027
Head Investigator	:	KITAJIMA Tomoya		
Research Institution	:	RIKEN Center for Biosystems Dynamics Research		

1. Details of Research Area

This research area aims to elucidate the dynamic nature of the reproductive lifespan by clarifying the changes and fluctuations of germ cell functions and properties across the lifespan. Traditionally, the reproductive lifespan has been defined as a period during which an individual has the ability to produce the next generation. This is based on a qualitative view in which an individual's reproductive capacity is turned on and off in a binary manner at physiological turning points. However, as recent technological innovations have quantitatively analyzed germ cell functions and properties at the cellular level, it has become clear that they can change and fluctuate throughout life in terms of reproductive capacity and risk to the next generation. In this research area, we will quantitatively characterize such changes and fluctuations in germ cells across the entire lifespan and elucidate their underlying mechanisms.

Our particular interest includes changes and fluctuations in germ cell function and the risk to the next generation throughout the adult stage. For example, in mammalian females, oocytes enter a dormant state after production and remain non-proliferative throughout the adult stage. However, as life progresses, functions such as chromosome segregation deteriorate, leading to infertility and miscarriage, and increasing the risk of aneuploidies in the next generation. In males, however, sperm stem cells acquire the ability to suppress genomic mutations, continue to proliferate, and produce numerous sperm throughout the adult stage. However, the risk of transmitting mutations to the next generation increases with age. Not limited to these examples, germ cell function and risks to the next generation change and fluctuate from various perspectives, and these changes and fluctuations shape a dynamic reproductive lifespan with the processes of "acquisition, maintenance, adjustment, and deterioration" in life. This research area brings together research and technological development focusing on "acquisition" during the developmental and juvenile stages, "maintenance and adjustment" during the adult stages, and "deterioration" during the aging stages, to conduct germ cell research throughout the entire life span, with the goal of elucidating the dynamic reproductive life span.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

Researches that focus on changes and fluctuations in germ cell function (A01) and risk to the next generation (A02) across the lifespan, as well as the development of technologies to facilitate these researches (A03), are eligible. We welcome research proposals that bring new approaches and perspectives not found in existing germ cell research, as well as research that takes advantage of technologies that have been developed in the field of germ cell research to date. While this research area is a group that gathers to elucidate the dynamic reproductive lifespan, it is intended to be a place where outstanding individual research can be enhanced through collaboration within the research area, and proposals based on open ideas that contribute to this concept are encouraged. In addition, as this research area seeks to promote diversity in human resources, proposals from young scientists and women scientists are strongly encouraged.

The following is a list of examples of research that we expect to see, but proposals are not limited to these, as long as a proposal contributes to the goals of this research area.

- Research to elucidate the dynamic changes and fluctuations in germ cells by taking advantage of mammalian or non-mammalian animal models.
- Research to elucidate cellular changes and mechanisms using techniques such as *in vitro* germ cell reconstitution and live imaging.
- Research that focuses on the fundamental processes of the reproductive cycle, such as germ cell differentiation, meiosis, and fertilization.
- Research that focuses on the environment and mechanical control of germ cells.
- Research focusing on the dynamics of long-term turnover of molecules and cells during the reproductive lifespan.
- Research that focuses on the effects of external factors, such as nutrition, on germ cell function and risk to the next generation.
- Research that focuses on risk factors inherited by the next generation, not limited to the genome itself.
- Research that develops or utilizes engineering and informatics technologies such as device fabrication and artificial intelligence, as well as original technologies.
- Research that theoretically elucidates the reproductive lifespan using quantitative data at the cellular level.
- Research to elucidate basic germ cell functions related to the reproductive lifespan of primates, including humans.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Reproductive lifespan by germ cell function	4	15
A02	Reproductive lifespan for next generation		
A03	Technology development for reproductive lifespan research		

Research Outline of Research Areas

Photosynthesis ubiquity: Supramolecular complexes and their regulations to enable photosynthesis all around the globe
https://www.photosynthesis-ubiquity.jp/en/

Number of Research Area	:	23A305	Term of Project :	FY2023-2027
Head Investigator	:	KURISU Genji		
Research Institution	:	Osaka University, Institute for Protein Research		

1. Details of Research Area

Photosynthesis is one of the most important topics in plant science, as it is an excellent light-driven chemical reaction in very diverse conditions from the tropics to the poles. Photosynthetic organisms cover the globe overcoming not only high or low light, but also dynamically changing light conditions, which embodies the concept of "photosynthesis everywhere". Thus, if we can address how photosynthetic organisms have adapted to diverse light conditions and understand and verify the principle of photosynthetic adaptation to diverse light environments, not only high academic impact but also pervasive social effects, such as the potential application to global warming or climate changes, will be expected.

The latest scientific research in plant biochemistry, plant physiology, and structural biology, elucidated that photosynthetic organisms have evolved specific proteins or the combination to adapt to their environments by diversifying light-harvesting antenna and its regulation system, without changing the core molecular apparatuses on the thylakoid membrane. Furthermore, these adaptations are thought to be strengthened by optimizing the regulation of gene expression, thylakoid membrane structure, and electron transfer activity. In other words, it is now becoming clear that it is important to understand environmental adaptation in photosynthesis based on the functional analysis and structural studies of various types of supramolecular protein complexes. However, it has not yet been accomplished to link the supramolecular complex structures, which are dynamically formed on the thylakoid membranes in response to environmental changes, and the physiology of various photosynthetic organisms. In this Research Area, leading scientists in structural biology, plant physiology, and biochemistry, team up with researchers in information science to tackle how the supramolecular complexes express their structural and functional features to accomplish the ubiquitous photosynthesis.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

For Publicly Offered Research, we seek for research proposals that cover biological diversity of environmental responses using non-model organisms (Research Group B01) and that pursue unique measurement techniques such as the development of new structural and functional analysis methods (Research Group B02) to fill the gaps in Planned Research Groups.

In Research Group B01, we will actively select research proposals using species that are not be covered by the Planned Research but expected to serve as important keystones in studying the principle of photosynthetic adaptation to diverse light environments. The strength of photosynthesis and plant/algal research in our country lies in the wealth of human resources who work with a wide range of photosynthetic organisms and make use of each characteristic to achieve high-quality results. Unfortunately, however, there are many researchers who are not sufficiently well funded despite their high-quality researches. Therefore, in Research Group B01, we would like to encourage the participation of researchers who work with characteristic materials in a wide range of lineages, such as "Cyanobacteria in extreme environments", "Glaucophyta, one of the earliest divergent eukaryotic algal lineages without light-harvesting antennae of LHC", "Bangiophyceae, red algae with a hybrid light-harvesting antennae of LHC and PBS", and "Prasinophytes and streptophyte algae known for their characteristic physiological functions", which are important for investigating the principle of photosynthetic adaptation.

In Research Group B02, we will actively pursue research proposals that address the development of new methods for analyzing supramolecular functions based on the emerging atomic-level information. For example, vibrational spectroscopy such as Rama/IR or ultrafast spectroscopy, as well as new method development for molecular simulation using computational chemistry are expected to be applied.

In addition, we especially expect young researchers in Category II to actively apply for the program, since it is important for this Research Area to provide an appropriate environment of which they can take advantage for networking in early stages of their careers. In both B01 and B02, we expect active applications from young and female researchers.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
B01	Structural and environmental adaptation of supramolecules	Category I: 5	10
B02	New techniques to analyze structures/functions of supramolecules	Category II: 3	10

Research Outline of Research Areas

Hierarchical Bio-Navigation Integrating Cyber-Physical Space

https://bio-navigation.jp/en/

Number of Research Area	:	21A401	Term of Project :	FY2021-2025
Head Investigator	:	HASHIMOTO Koichi		
Research Institution	:	Tohoku University, Graduate School of Information Sciences		

1. Details of Research Area

Our world is filled with the movements of living things, including humans and artificial objects. In this Research Area, we define "navigation" (how to reach a destination) as individual-level behaviors focusing on movements; "interaction" as behaviors that influence other individuals and the environment; and "hierarchical navigation" as behaviors that allow individuals and groups to reach a destination hierarchically. Hierarchical navigation is the primary mechanism supporting biological and human society. We will develop engineering and information techniques to identify the essential components of hierarchical navigation and their causal relationships. We aim to transform the methods and techniques used to solve problems involving the behavior of organisms, thereby creating a new academic field: "hierarchical bio-navigation." We will develop or use existing fundamental technologies for behavior measurement, quantification, intervention, and modeling and automate these technologies to expand our knowledge of hierarchical bio-navigation. In addition, we will integrate these technologies to create an AI-driven experimental logging robot ("χ logbot"), in which AI is used to select intervention strategies autonomously, and a new experimental methodology called "seamless CPS" (CPS: Cyber-Physical System) is implemented. These will enable a comprehensive understanding of hierarchical navigation.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

The Planned Research falls within two groups. Research Group A01 will collect and analyze data on hierarchical navigation in the real world, create models, and conduct interventions to improve our understanding of the relationship between the environment, biological information, behavior, and other factors. Research Group A02 will develop modeling approaches and use engineering techniques for measurement and intervention to develop technologies for the χ logbot. We will build an academic community integrating biology, engineering, and informatics with the Planned Research. To this end, the call for Publicly Offered Research is open to a wide range of research related to hierarchical navigation. This complements our Planned Research and fusion research spanning fields related to the area.

Research Group A01 invites research proposals in zoology (mammalogy, ornithology, herpetology, etc.), animal behavior, ecology, neuroethology, neuroscience, and fields related to hierarchical navigation in various species. We solicit wide-ranging research on the individual- and population-level movement of insects, migratory birds, fish, and other animals with excellent navigation skills. Examples include herd dynamics, decision-making in organisms moving in groups, and migration studies of fishery species, pest animals, and invasive species of high social importance. For mice and other model animals, high-precision analysis at the cellular level using biogenetics and other techniques is expected. Particular emphasis will be placed on research using the χ logbot and intradisciplinary fusion research with the concept of sharing navigation data within the Research Area and collaborating with engineering and information science researchers.

Research Group A02, in collaboration with Research Group A01, invites engineering, information science, and related research on measurement and intervention in hierarchical navigation. Examples include research on technologies fundamental to the χ logbot, such as robotics, measurement, and control technologies with high accuracy and over longer lengths of time in various environments. Research on information technologies is also solicited, e.g., exploratory AI research, mathematical, statistical, and machine learning models for hierarchical navigation, and research on analyzing, designing, and planning human and object movements using sensors and cameras, including IoT. We welcome proposals to share the developed technology through software releases or lectures. While applicants are not required to have prior experience with animal data, we encourage them to present a clear vision of contribution to addressing issues within this Research Area.

Please refer to the Research Area's website for details on each Research Group and the χ logbot/seamless CPS. For Publicly Offered Research, we intend to offer joint use of the χ logbot, technical workshops, support for young researchers, and support for overseas travel expenses if necessary.

3. Research Group, Upper Limit of Annual Budget, and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Research proposals on hierarchical bio-navigation in related fields, such as ecology and neuroscience	3	10
A02	Research proposals on hierarchical bio-navigation in related fields, such as engineering and information science	3	10

Research Outline of Research Areas

Advanced mechanics of cell behavior shapes formal algorithm of protozoan smartness awoken in diorama conditions.
http://diorama-ethology.jp/

Number of Research Area	:	21A402	Term of Project : FY2021-2025
Head Investigator	:	NAKAGAKI Toshiyuki	
Research Institution	:	Hokkaido University, Research Institute for Electronic Science	

1. Details of Research Area

Intelligence broadly describes an ability to adapt to the environment. In this sense, single-celled organisms like protists (eukaryotic unicellular organisms) have a prototype of intelligence, or rather they can demonstrate skillful behavior in complex field environments due to their sophisticated evolution over hundreds of millions of years. This behavioral ability seems to be inherited as 'single-cellular' behavior in multicellular organisms (sperm motility during fertilization, cell motility in the internal environment, etc.).

In this Research Area, we define 'proto-intelligence' as the fundamental adaptability to the environment that single-celled organisms potentially possess. We name such artificial conditions as 'diorama environments', where organisms can show their potential proto-intelligence. Diorama environments may mimic the complexity of a habitat but in a setup designed for testing proto-intelligence. For example, one such instance is that of an amoeboid organism of slime mold, which displays the ability to find the shortest path in a maze of diorama environments.

Since the mechanisms of proto-intelligence can often be formulated using coupled kinetic equations of cell motion and the environment, such environment-coupled mechanics will be thoroughly applied. We will challenge and advance the algorithms (heuristics) of proto-intelligence. 'Ethological dynamics in diorama environments' is short for the full name of this research project.

The Planned Research consists of four groups (diorama ethology, diorama implementation, mechanical modeling, algorithmic evaluation). Firstly, this focuses on the two main areas of (1) single sperm behavior (the smallest scale) and (2) collective motion of a red tide (the largest scale) in order to survey a wide range of scale for ethological dynamics. Secondly, the scope of investigation will be expanded to include the behavior of various other organisms (e.g. ciliates and algae). In Publicly Offered Research, we expect that the proposed research area will be applied to a wide range of species, enabling the establishment of ethological dynamics in diorama environments through active research exchanges between the research groups within the Research Area.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

The call for proposals is seeking skillful assessments of cell movement and behavior in various species. In this way, we seek to establish ethological dynamics of proto-intelligence across the species. Planned Research Groups may propose technical support (advanced measuring instruments and technologies, and advanced methods for mechanical modeling and simulation) for possible collaboration with Publicly Offered Research. Joint research and research exchanges between Publicly Offered Research groups are strongly encouraged.

In Research Group A01, the call is for cell biological and ethological research on smart adaptive behaviors under diorama environments, field environments, the internal environment of multicellular organisms, or industrial environments (bio-reactor, etc). The main target is single-celled eukaryotes (protists), but single-cellular behaviors found in multicellular organisms and prokaryotic behaviors are also included. In Research Group A02, the call is for research on technologies and methods that contribute to the creation of a diorama environment. Expected subjects are, for example, measurement engineering and micro-engineering, technology for measuring cell behavior with high temporal and spatial resolution, development of software for visualizing and analyzing cell behavior, development of methods for applying complex physical stimuli to cells, methods of collecting and culturing protists from a field environment, and development of microscope for observing cell behavior within a field environment, etc

In Research Group B01, the call is for biophysical and applied-mathematical research. Expected subjects are not only excellent mathematical model of cell behavior, and simulation with high temporal and spatial resolution, but also, for example, mathematical models dealing with the interaction of multiple species, simulation technology with the aim of assimilation with experimental data, and kinetic research on intracellular machines that control cell behavior. In Research Group B02, the call is for research on information science and comparative cognitive science. Expected subjects are not only excellent research proposals on the algorithm of proto-intelligence in a diorama environment, but also, for example, research on environmental adaptation, learning and evolution in cellular organisms, and research on proto-intelligence in comparative cognitive psychology.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	studies on skillful cell behavior in diorama environments	3	20
A02	studies on creation of diorama environments and measurement		
B01	studies on mechanical modeling for skillful cell behavior	2	6
B02	studies on algorithm evaluation of photo-intelligence		

Research Outline of Research Areas

Digital biosphere: integrated biospheric science for mitigating global environmental change
https://digital-biosphere.jp/en

Number of Research Area	:	21A403	Term of Project :	FY2021-2025
Head Investigator	:	ITO Akihiko		
Research Institution	:	University of Tokyo, Graduate School of Life and Agricultural Sciences		

1. Details of Research Area

Preventing global environmental change is an urgent issue for human sustainable society, and so various countermeasures have been proposed and deployed. Facilitating biospheric functions such as CO_2 assimilation and biomass production is expected to make contributions to mitigation, but our understanding, data, and models are far from sufficient.

This Research Area aims at establishing a new research field of integrated biospheric science by re-organizing findings of relevant areas, and thereby at presenting a new countermeasure to prevent critical global environmental impacts. Research members conduct a wide variety of basic studies and related applications to overcome barriers associated with scale gaps spanning from micro to macro scales of biological systems and global biodiversity and heterogeneity. This Research Area is composed of three categories of Research Group: A) investigation of mechanisms of biospheric functions, B) observation of biospheric functions under changing global environment, and C) development of a new model, called Digital Biosphere. Through intimate collaborations and simulations with the integrated model, this Research Area conducts a quantitative assessment of important mitigation-related indices such as CO_2 fixation, biomass production, and required land extent.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

In the second-half research period, participation of Publicly Offered Research that compensates for gap areas of the Research Area and contributes to integration into the Digital Biosphere, especially by model development, is expected. The Research Area expects diverse and collaborative applications from biosphere-related scientific fields such as ecology, Earth sciences, applicative fields such as agronomy, forestry, and fishery, integration of big-data from the biosphere with machine learning, technological support of model development, and comprehensive assessment across the biosphere and human society.

Research Group A04 conducts studies related to the Planned Research A, i.e., mechanisms of CO_2 fixation and biomass supply. Since the Planned Research investigates forest, vegetation, and soil microbes, the publicly offered research is expected to conduct studies on other mechanisms, such as blue carbon accumulation in coastal area and functional response to short- to long-term environmental variations. Also, a proposal on the relationship between biodiversity and functions is anticipated.

Research Group B03 conducts studies related to the Planned Research B, i.e., broad-scale observation of biospheric function. The Planned Research performs micrometeorological measurements and high-resolution remote sensing, and we expect participation of many sites to cover a wide spatial extent. Applications of long-term monitoring by utilizing existing sites and integrated data synthesis by participating intensive field campaign and manipulative experiments are expected.

Research Group C03 conducts studies related to the Planned Research C, i.e., biospheric modeling and mitigation options. The Planned Research develops a high-resolution model 'Digital Biosphere' and assesses climatic feedback using the Earth system model. The publicly offered research is expected to make contributions to these model studies and to facilitate intimate collaborations with the Research Groups of A and B. Proposals on improvement of simulation effectiveness with data-driven models and on examination of mitigation options taking account of socioeconomic factors are expected.

The Research Area plans to adopt three categories of the Publicly Offered Research: studies about high-priority topics and integration with the Administrative Group at 8 million yen per year (about 2 projects), developing research topics at 4 million yen per year (about 9 projects), and emerging (beyond the Research Area) topics at 2 million yen per year (about 14 projects). Applications from young and/or diverse researchers are strongly encouraged.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A04	Studies on mechanisms of biospheric functions	8 [high priority/integration]	2
B03	Studies on monitoring by observations	4 [developing]	9
C03	Studies on modeling and mitigation options	2 [emerging]	14

Research Outline of Research Areas

Plant Climate Feedbacks
https://www.plant-climate-feedback.com

Number of Research Area	:	23A401	Term of Project :	FY2023-2027
Head Investigator	:	SATAKE Akiko		
Research Institution	:	Kyushu University		

1. Details of Research Area

Climate change not only affects seasonal activity of plants, but it is also impacted by it as plants alter atmospheric composition and climatic processes. In addition to CO2 fixation and evapotranspiration, plants affect global climate by emission of biogenic volatile organic compounds (BVOCs) that comprise a large variety of molecules differing in size and physicochemical properties. BVOC have been shown to influence solar radiation and rainfall through the formation and growth of secondary organic aerosols, and contribute to tropospheric ozone production. BVOC emissions are one of the phenological traits that show pronounced diurnal and seasonal variation, and their seasonal emission behavior will have important implications for the future global environment However, there are many challenges to be overcome in elucidating the dynamic feedback between plant phenology and climate, such as large uncertainties associated with the estimates of BVOC emission and how BVOC emissions respond to future environmental change. Our aim is to address the intricate relationship between plant seasonal activity and climate This endeavor involves the establishment of a novel field "plant climate feedback," which integrates disciplines such as mathematical biology, plant molecular biology, ecology, atmospheric chemistry, and climate modeling. To achieve our objectives, we have formed two distinct research sections within our planned research group: "Regulatory Mechanisms" and "Feedback." In the "Regulatory Mechanisms" section, we unravel the genetic regulatory mechanisms that govern crucial plant phenological processes, including BVOC release, flowering, and leaf development. will develop predictive models to better understand how individual plants respond to climate change. In the "Feedback" section, we develop BVOCs monitoring method and climate prediction models to extend our understanding from individual plant-level responses to encompass population and broad-scale levels. By doing so, we aim to capture a comprehensive picture of the feedback mechanisms between plants, and we are also establishing the Plant Climate Integration Center, which will have strong organizational support in advanced measurement techniques, modeling capabilities, and field research assistance. This center will provide a robust framework for collaboration and enable seamless integration of expertise from various disciplines.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

The research scope in this field ranges from genes to ecosystems to climate. A multidimensional approach is necessary to effectively analyze the multilevel data obtained, and it is crucial to enrich areas beyond the capabilities of the research teams through participation in Publicly Offered Research. The followings are examples of the projects. A01: Experimental and Monitoring Research (Biological Systems). This research focuses on observing plant phenological changes and stress tolerance in response to climate change and elucidating control mechanisms. It includes research on biosynthesis genes of terpene compounds and low molecular weight phenols related to BVOCs, as well as molecular mechanisms related to the accumulation and release of BVOCs, including methane. The project encourages proposals that analyze interactions between organisms and ecosystems, considering dynamic changes in gene expression. Additionally, it welcomes research that incorporates phytoclimatic feedback concepts into paleoclimatic and paleontological studies. B01: Experimental and Monitoring Research (Ecosystem, Atmospheric Science, Climate). This research seeks six proposals related to phytoclimatic feedbacks driven by molecules other than BVOCs. It also includes ecosystem observation using innovative devices such as automated remote observation systems for species identification, biomass and phenology observation, and technology development to enhance BVOC and aerosol measurements. The projects encompass the development of advanced technologies for BVOC and aerosol measurement. C01: Data Analyses and Modeling. This category focuses on data analysis and modeling and will accept five proposals. It seeks the development of new methods for analyzing large-scale, multilevel, and high-dimensional data. It also encourages the development of new biodiversity models that consider genetic diversity and theoretical research that mathematically models feedbacks between plants and climate to predict future scenarios. Since this category primarily involves data analysis and modeling, with no experimental expenses required, the maximum funding limit for applications is set at 2 million yen, lower than the other categories. In addition to BVOCs, research on other molecules, various plant species, and regions is also welcomed.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Experiment and monitoring (Biological systems)	4	7
B01	Experiment and monitoring (Ecosystem, Atmospheric Science, Climate)	4	6
C01	Data analyses and modeling	2	5

Research Outline of Research Areas

Extension and validation of unified theories of prediction and action
https://unifiedtheory.jp/en/

Number of Research Area	:	23A402	Term of Project :	FY2023-2027
Head Investigator	:	ISOMURA Takuya		
Research Institution	:	RIKEN Center for Brain Science		

1. Details of Research Area

Elucidating the computational principle of the brain and implementing it in artificial intelligence (AI) is the greatest frontier of natural and computational sciences. Although AI has achieved great success by gaining inspiration from neuroscience (e.g., feature extraction and reinforcement learning), a significant gap still exists between human intelligence and AI.

The brain constructs a 'generative model' that expresses the dynamics of external states to enable prediction and action to minimise future risks. The Bayesian brain hypothesis and the free-energy principle have been proposed to account for the perception, learning, and action of biological organisms. However, the neuronal bases underlying these theories are yet to be elucidated, given the difficulty in linking them with the corresponding biological phenomena. Recent developments in experimental techniques have enabled the identification of cell types and the acquisition of high-precision, large-scale data covering multiple layers and regions. Furthermore, reverse engineering of generative models has enabled the mapping of neural circuit quantities to quantities in generative models in a one-to-one manner. These developments have made it practical to identify generative models from experimental data, which will facilitate an understanding of the brain and mind.

Based on these progresses, this project aims to use state-of-the-art techniques to measure highly accurate, large-scale neuronal activity data from the brains of various animals and reverse engineer generative models from these data, to develop a unified theory of the brain and empirically test its validity. We will measure the neural activity related to the prediction of the external world and behaviour in various species—including fish, rodents, monkeys, and humans—and test whether generative models constructed from empirical data can predict brain activity, behaviour, and learning in animals. By integrating theoretical and experimental research, this project will develop a unified theory of the brain that can explain perceptual prediction and the planning and generation of behaviour in a unified manner, paving the way for the development of AI with human-like thinking and early diagnostic methods for psychiatric disorders.

2. Call for Proposals and Expectations for Publicly Offered Research, etc.

The principal investigators of the Planned Research are researchers in the fields of computational neuroscience, information theory, machine learning (Group A), and in neuroscience, neurophysiology, and psychiatry (Group B). However, to develop and verify a unified theory of prediction and action, it is necessary to combine innovative ideas from diverse perspectives with original techniques and theories in a complementary manner. Therefore, research proposals will be recruited from a wide range of fields. Emphasis will be placed on proposals that involve the necessary data science to link theory and experiments, and on the magnitude of the synergistic effect of collaborations between Publicly Offered and Planned Research. For example, we encourage applications from theoretical researchers who are willing to test their original theory empirically with data from the Planned Research, and experimental researchers who deal with functions and measurement scales that are not handled in the Planned Research or who have unique technologies for measuring and controlling biological targets narrowed down in Planned Research. We believe that Publicly Offered research conducted by multitalented researchers will play an extremely important role in the development of this research area. In particular, we expect active applications from young and female researchers with flexible and new perspectives. Research proposals of up to JPY 10, 5, and 3 million per year are invited.

C01: Theoretical research on unified theory—We invite proposals that will lead to the construction of a unified theory of the brain, proposals for theories with an original perspective targeting specific brain functions related to prediction and action, and proposals that will test theories by analysing data measured by the Planned Research and utilizing existing databases. We also emphasise AI applications and invite proposals that include ideas that could lead to the development of next-generation AI; for example, implementing energy-efficient computation using spiking neural networks.

C02: Experimental research on unification theory—We invite proposals with highly original measurement techniques and analysis methods to acquire highly accurate, large-scale neural activity in the brain related to prediction and behaviour in animals or humans. A specialised biological background is not a requirement for applicants. Proposals involving a variety of animal species will be obtained. Proposals focusing on the control and manipulation of biological information to verify theoretical predictions by examining causal relationships will also be invited.

3. Research Group, Upper Limit of Annual Budget and Number of research projects scheduled to be selected

Research Group Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
C01	Theoretical research on unified theory	10	4
C02	Experimental research on unified theory	5 3	7 5

Attached Table 3

List of Research Areas whose Selected Period will End in FY2023 in Grants-in Aid for Scientific Research on Innovative Areas (omitted)

4. Review Panels and Other Matters

(1) Concerning KAKENHI Review

Omitted

(2) Review Methods and Other Matters

The review for Grant-in-Aid for Scientific Research is carried out based on application documents in the Academic Deliberation Council for Science and Technology of MEXT. Moreover, the review takes place behind closed doors.

As applicants provide unpublished research results and research ideas, and other information in their Research Proposal Documents on the premise that the review will be conducted privately, JSPS asks reviewers to maintain their confidentiality obligations, including the following.

- In order to protect the intellectual property of the applicants and ensure fairness of the peerreview system, reviewers must not disclose the content of the Research Proposal Documentsor any other information, in whatever form, that they learn in the course of the review to anyother person including their superiors, colleagues, or subordinates.
- Reviewers must not use any information that they learn in the course of the review for their own benefit.
- Reviewers have the obligation to keep the review materials under strict control.

For details on “assessment rules” ("Rules concerning the assessment for Grants-in-Aid for Scientific Research" (decided by the Research Grant Screening Section of the Academic Deliberation Council for Science and Technology on November 12, 2002) including the review criteria for Transformative Research Areas (A/B), please check the website for Grants-in-Aid for Scientific Research of MEXT (URL: https://www.mext.go.jp/a_menu/shinkou/hojyo/1284403.htm).
("Rules concerning the assessment for Grants-in-Aid for Scientific Research" for FY2024 have already been released as of the time of this call for proposals.)

In Transformative Research Areas (A)(Publicly Offered Research), each reviewer in the committee dedicated to the particular research area (which will also include researchers who are outside of the research area in question) will conduct a two-stage document review. The panel reviews will not be conducted.

(i) In reviews in the first stage, a few reviewers who are assigned to a proposal according to research group will conduct document reviews.

(ii) In reviews in the second stage, all reviewers will conduct document review with referring comments made by other reviewers in the first stage.

In the review process, the reviewers can utilize, as necessary, the “researchmap” and the Grants-in-Aid for Scientific Research Database (KAKEN)See “III. Instructions for Prospective Applicants 5. Registration of the Researcher Information in ‘Researchmap’.”

(3) Notification of the Review Results

Grant-in-Aid for Transformative Research Areas (A)(Publicly Offered Research)

1) MEXT will issue a notification to the PIs and the research institutions via the electronic application system on whether the research area have been adopted or not, based on the results of the review.

2) For Principal Investigators who had requested the disclosure of the first stage review results in the event that their research proposals were not adopted, MEXT will disclose the approximate ranking within the each committee dedicated to the particular research area, the raw scores (average scores), and the “standard-format opinions.” Disclosure will be made on the electronic application system.

III. Instructions for Prospective Applicants

1. Procedures to be Completed Prior to Application

The following three items must be completed prior to the submission of the research proposal:

(1) Ascertainment of the Eligibility for KAKENHI Application,

(2) Confirmation of the Researcher Information Registered in the e-Rad System,

(3) Obtainment of an ID and a Password for the Electronic Application System.

(1) Ascertainment of the Eligibility for KAKENHI Application

An applicant submitting a research proposal to Grants-in-Aid for Scientific Research (KAKENHI) as Principal Investigator (PI) must meet the requirements (i) and (ii) stated below.

A researcher carrying KAKENHI eligibility through more than one research institution can submit application(s) through any of the research institutions. However, in the event of parallel submissions, they have to comply with the rules on restrictions on the parallel grant application/receipt (see "III. Instructions for Prospective Applicants 2. Restriction on Parallel Grant Application/Receipt").

(i) **At the time of the proposal submission, a researcher needs to have been approved by his/her research institution(*1) as an eligible researcher who meets the Requirements a), b) and c) stated below, and have his/her Researcher Information properly registered in the e-Rad system as eligible for KAKENHI application(*2).**

< **Requirements** >

a) **The applicant must be an individual belonging to a research institution with a job assignment including a research activity within the said institution.** (Whether the job is paid/unpaid, or full-time/part-time is irrelevant. It is not a prerequisite of eligibility that the research activity constitutes the main part of his/her job.)

b) **The applicant must be actually engaged in a research activity in his/her research institution.** (Those who are only engaged in research assisting jobs are ineligible.)

c) **The applicant must not be a graduate student nor any other categories of student.** (However, an individual who has a position in a research institution with a research activity as his/her main job (e.g., a university teaching staff, a researcher belonging to a company, etc.) and holds a student status at the same time is eligible.)

*1 Here, the research institution must be such that designated according to the Article 2 of the "Rules for the Handling of Grants-in-Aid for Scientific Research" (Notification of MEXT).

*2 JSPS Fellows (DC) are deemed to have met the application requirements by being nominated as a JSPS Fellow (DC), notwithstanding the items a) through c) in (i) above. However, please check with your research organization regarding the requirements that it must meet.

(Reference) Requirements that the research institution must meet (see "IV. Instructions for Administrative Staff of Research Institution 2. Issues to Be Completed Beforehand by the "Research Institution""):

< Requirements >

- The research institution must authorize the research project for which KAKENHI is granted, as its proper activity.
- The research institution must take responsibility for management and accounting of the KAKENHI delivered to its researchers.

(ii) **The individual must not be categorized as ineligible for grant acquisition in the fiscal year covered by a call for proposals, as a penalty for his/her improper grant spending, fraudulent grant acquisition, or research misconduct using the KAKENHI or other Competitive Research Funds.**

<Important Point 1>

A researcher who is employed with a KAKENHI grant (hereinafter referred to as "KAKENHI employee"), is generally bound by their employment contract to concentrate on the research work relevant to the KAKENHI project for which he/she is employed (hereinafter referred to as "employment-related work") specified in his/her employment contract. Therefore, such a KAKENHI

employee cannot apply for his/her own KAKENHI project which is to be conducted within the working hours of his/her employment.
However, provided that he/she can clearly demarcate his/her own research hours from the working hours of employment and intends to conduct his/her own research project during the working hours on his/her own initiative, the KAKENHI employee can submit his/her own KAKENHI proposal, on the condition that the following points are verified by his/her research institution. The KAKENHI employee can apply for KAKENHI as a PI or become a Co-I.

- The KAKENHI employee is granted on his/her employment contract, to conduct research on his/her own initiative, besides the employment-related work.
- The employment-related work and the work devoted to the research on his/her own initiative are clearly demarcated in regard to the working hours and the effort.
- The KAKENHI employee is able to secure enough research hours (besides the working hours for his/her employment-related work) to be allotted to his/her own KAKENHI project.

[Self-motivated research activities by young researchers employed with KAKENHI funding]

A young researcher (*) who is employed with KAKENHI funds (KAKENHI employee) and meets the following conditions, may conduct his/she own research during the working hours assigned for the employment-related work, after going through the necessary procedures set by his/her research institution. He/She can apply for KAKENHI as a PI or become a Co-I.

(1) A young researcher desires on his/her own will to conduct his/she own research.

(2) The PI and Co-I (the employer of the young researcher) desires that the said research has a positive contribution to the promotion of the funded research project for which he/she is employed, and the research institution approves the said decision.

(3) The PI and Co-I judges that the efforts to be spared by the young researcher to the said research within the extent that do not cause any hindrance to the execution of the funded research project for which he/she is employed, and the research institution approves the judgement. (The upper limit of the efforts to be spared to the self-motivated research is 20 percent of the efforts to be put into the funded research project for which he/she is employed.)

* In this context, “young researcher” is defined as an individual who is aged 39 or under or less than 8 years after Ph.D. acquisition (including an individual who has acquired a Ph.D. within the past 8 years excluding periods of maternity and/or childcare leave taken after his/her Ph.D. acquisition) as of April 1 of each fiscal year (hereinafter referred to as a “KAKENHI-employee young researcher”), and whose job assignment includes research activities. When applying for Grants-in-Aid for Scientific Research (KAKINHI) he/she must meet the eligibility requirements for KAKENHI application.

Provided that the KAKENHI employer approves such self-motivated research activities in accordance with its funding resources (project) rules, if a researcher had originally met the eligibility requirements for KAKENHI's self-motivated research activities at the time of his/her application or participation, he/she may apply for KAKENHI and continue to engage in the adopted research project even if, during the project period, he/she no longer meets the requirements for a KAKENHI-employee young researcher. If there are changes to the funding resources (project) of the KAKENHI employer, the researcher must abide by the new funding resources (project) rules and reobtain the approval to conduct self-motivated research activities as a young researcher at the time the of the changing of funding resources.

(Reference) Views on the self-motivated research activities by the KAKENHI employee

Attachment 1 to the "Changes in the FY2020 Call for Proposals for Grants-in-Aid for Scientific Research (KAKENHI) and Other Matters" (March 19, 2020) (Excerpt)

URL: https://www.jsps.go.jp/j-grantsinaid/06_jsps_info/g_200316/index.html

Grants-in-Aid for Scientific Research (hereinafter referred to as "KAKENHI") is a funding scheme that is intended to promote development of scientific research (based on original ideas of researchers), encompassing basic to applied researches in all fields ranging from humanities and social sciences to natural sciences. Scientific research is a source of innovation i.e., value creation based on new knowledge and has a vital role in nurturing human resources for leading a knowledge-based society broadly. It is particularly important to foster young scientists who are responsible for the next generation in order that the scientific research may sustainably exercise its role in the society.

It enable young researchers employed with a KAKENHI grant to conduct self-motivated research activities (including research activities with other research funds and activities helping research/management capacity building; hereinafter the same). Allowing them to conduct research activities in an independent and free research environment contributes not only to fostering young researchers, but also to the further development of the KAKENHI projects of their research institutions through research based on their freewheeling thinking and to the development of scientific research the entire country. Therefore, the concept of self-motivated research activities by young researchers is introduced in the KAKENHI scheme in this call for proposals.

For details refer to the following.

"Implementation Guidelines for Self-motivated Research Activities by Young Researchers Employed with Competitive Research Funds" (Revised on December 18, 2020, Agreement of the Liaison Meeting of Related Offices and Ministries on Competitive Research Funds)

URL: https://www.mext.go.jp/a_menu/shinkou/torikumi/1385716_00001.htm

<Important Point 2>

If a JSPS Research Fellow (SPD, PD, RPD, or CPD) meets the application requirements set forth above at the research institution which he/she registers as host research institution, **he/she can also apply for the following research categories other than the "Grant-in-Aid for JSPS Fellows," but only from the registered host research institution.** Unlike applying for KAKENHI as PI, he/she may apply for any of these research categories so long as he/she takes part in a KAKENHI proposal as Co-I. In making applications, he/she can apply even if the proposed research period outlasts the tenure of his/her JSPS fellowship.

(i) Publicly Offered Research of Transformative Research Areas (A)
(ii) Scientific Research (B/C)
(iii) Challenging Research (Exploratory)
(iv) Early-Career Scientists
(v) Fund for the Promotion of Joint International Research (Fostering Joint International Research) (Excluding CPD)

JSPS Fellows (DC) can apply for KAKENHI as Principal Investigators (PI) only for the Grant-in-Aid for JSPS Fellows and Fostering Joint International Research. JSPS Fellows (DC) can also participate in research projects under every research category as Co-Is, but only from the host research institutions. As JSPS Fellows (DC) are supposed to seek the acquisition of Ph.D. as doctoral students, their host researchers or PIs of said KAKENHI research projects and their affiliated institutions should take sufficient care, so that JSPS Fellows (DC) will not be burdened with excessive responsibilities in performing these research projects. The Researcher Number is required if JSPS Fellows (DC) apply for other research categories that they can apply for and receive in parallel with Grant-in-Aid for JSPS Fellows as PIs or Co-Is. Please note that students (see Note), such as graduate students and other students, as well as International Research Fellows cannot apply for KAKENHI grants even if they are tasked with the job of conducting research activities at their affiliated research institutions or other research institutions.

(Note) The term "student" as defined here does *not* include such an individual who has a position to conduct research in his/her research institution, as the main job (e.g., university teaching staff, researcher belonging to company, etc.), and holds a student status at the same time.

<Important Point 3>

The PIs and the Co-Is constitute the "members of funded projects," as stipulated in the Law on the Improvement of the Administration of the Budget for Grants-in-Aid (1955, Law No. 179). In an event that they have committed improper grant spending, fraudulent grant acquisition, research misconduct, etc. the eligibility for KAKENHI application will be suspended for a period of time specified by the rule.

In the following cases, an individual registered in the e-Rad system as "eligible for KAKENHI application" may be subject to different treatment.

- In case the research institution to which the individual belongs has made a judgement that it is not appropriate to let the individual conduct the said research activity as a part

of his/her work within the research institution, the research institution may withhold the submission of his/her KAKENHI proposal, or may withhold the formal application for grant delivery of a provisionally adopted KAKENHI grant resulting in declination of the grant in question..

- In case a KAKENHI recipient has failed to submit the "Report on the Research Achievements" that is due after the completion of the research period of his/her KAKENHI without any good reason, no new KAKENHI grant(s) will be delivered to him/her, even if the grant(s) have been provisionally adopted. Moreover, if a KAKENHI recipient has failed to submit the "Report on the Research Achievements" by the due date, then the delivery of KAKENHI grant(s) for that fiscal year will be suspended.

(2) Confirmation of the Researcher Information Registered in the e-Rad System

A researcher who intends to submit a research proposal document as the PI to any of the KAKENHI research categories for which "Call for Proposals" is announced, must carry the eligibility for KAKENHI application at the time of submission of the "Research Proposal Document" from his/her research institution to MEXT, and must be registered in the e-Rad system as such.

Therefore, it is important for the researcher to ascertain proper registration of his/her Researcher Information in the e-Rad system.

The registration in the e-Rad system is handled by the research institution to which the researcher belongs. The researcher should check with the administrative section of his/her institution about the registration procedures including the registration deadline within the institution, the method of confirmation of the current contents of registration, etc. If any of the entry items (such as "affiliation," "position," etc.) of the researcher who has been already registered in the e-Rad system need updating, they should be duly completed.

(3) Obtainment of an ID and a Password for the Electronic Application System

When the research institution completes the e-Rad registration of a researcher, an ID and a password will be issued for him/her. The researcher can access the KAKENHI Electronic Application System using the ID and password and prepare the Research Proposal Document.

The ID and the password issued to a researcher remain valid after he/she moves to another research institution. Every researcher should exercise due care in handling his/her ID and password so as to prevent their leakage and abuse.

(Reference) "Grant-in-Aid for Research Activity Start-up"

The "Grant-in-Aid for Research Activity Start-up" is aimed at supporting researchers who are not able to apply for this round of call for proposals, such as those who are newly obtaining research position, and those who are returning from their leave of absence for childcare, etc. after the regular submission deadline.

The FY2024 Call for Proposals in this category is scheduled for March 2024, and the provisional conditions of the eligibility for application is as follows:

(A) An individual who obtains eligibility for KAKENHI application on or after September 20, 2023, and has not submitted an application under the call for proposals for the following research categories(*) announced by MEXT and JSPS.

(B) An individual who has not submitted an application under the call for proposals for the following research categories(*) announced by MEXT and JSPS because he/she was on maternity leave or childcare leave in FY2023.

(*) FY2024 Grants-in-Aid for Specially Promoted Research, Transformative Research Areas, Scientific Research, Challenging Research, and Early-Career Scientists

(For details, refer to the Application Procedures for "Grant-in-Aid for Research Activity Start-up" to be announced in March 2024.)

Since the registration to the e-Rad system is handled by the research institution, researchers who may come to fall under the category (A) above, should act accordingly by contacting the administrative section of their respective research institutions.

(Note) JSPS Research Fellows (SPD, PD, RPD, or CPD, DC) are not eligible for application to the "Grant-in-Aid for Research Activity Start-up," even if they satisfy the above application conditions.

2. Restrictions on Parallel Grant Application/Receipt

A researcher who intends to submit research proposal(s) to KAKENHI should be well acquainted with the "Restrictions on Parallel Grants Application/Receipt" before starting preparation of research proposal document(s) to check if applications to the intended categories are permitted.

(1) The Basic Policy for Restriction on Parallel Grant Application/Receipt

KAKENHI consists of different "Research Categories" and "Application Sections" set on the basis of budget scale, content, and other factors of the intended research, so as to meet various needs and research styles of the applicants.

On the other hand, in consideration of the necessity to support many excellent researchers with limited funding resources, and of the possible detrimental influence of overcrowding applications on the proper management of the review process, the "Rules for Restrictions on Parallel Submission of Research Proposals" have been set up, according to the following basic principles.

- ○ Give considerations so as to ensure that as many excellent researchers as possible can be supported with limited funding resources.
- ○ Give considerations so as to ensure that the number of applications does not become excessive in comparison with the review scheme of each research category.
- ○ The restrictions to be enforced are primarily directed to the applicant as Principal Investigator (PI) who bears all responsibility for the implementation of the research project. In some cases such as the research categories with large budget scale, however, the restrictions may be also extended to individuals as the Co-Investigator (Co-I).
- ○ The restriction on parallel submission of research proposals and the restriction on simultaneous receipt of grants are separately set on each of the KAKENHI research categories, in accordance of the basic concepts outlined above and by taking into consideration the purpose, characteristics and other factors of each KAKENHI research category

Restrictions on parallel grant application/receipt do apply to the current round of call for proposals. Accordingly, **the applicant should be well acquainted with the description of the rules given below, and the "Attached Table 4 Table of Restriction on Parallel Grant Application/Receipt "**

In case a particular research project falls under the concept of "unreasonable duplication" as put forward in the "Guidelines on the Proper Implementation of Competitive Research Funds" (see "I. Outline of the Grants-in-Aid for Scientific Research-KAKENHI 5. "Guidelines on the Proper Implementation of Competitive Research Funds," etc."), it may be judged as such in the review process. Therefore, the applicant should take due precautions in preparing his/her research proposal document.

(2) Restrictions on Parallel Grant Application/Receipt

○Restrictions on parallel grant application/receipt related to "Grants-in-Aid for Transformative Area (A)(Publicly Offered Research)" and "Grants-in-Aid for Scientific Research on Innovative Areas(Publicly Offered Research)"

The total number of new research proposals and on-going projects, in Publicly Offered Research, including both "Scientific Research on Innovative Areas" and "Transformative Research Areas (A)", is at most two. In case the applicant have one on-going project in "Scientific Research on

Innovative Areas (Research in a proposed research area) (Publicly Offered Research), he/ she can apply for one research project in either “Scientific Research on Innovative Areas (Research in a proposed research area)(Publicly Offered Research)” or “Transformative Research Areas (A) (Publicly Offered Research).”

[Reference] Restrictions on parallel grant application/receipt related to "Grants-in-Aid for Transformative Area (A/B)" and "Grants-in-Aid for Scientific Research on Innovative Areas"

(i) In Grant-in-Aid for “Transformative Research Areas (A)” and “Transformative Research Areas (B)”, cases in which the applicant intends to submit to the same research area.

In Grant-in-Aid for “Transformative Research Areas (A)” and “Transformative Research Areas (B)”, **the application for the same research area by one researcher is limited to one research project, regardless of whether he/she is a Principal Investigator or a Co-Investigator (except for the research project of "Administrative Group.")**. (If a researcher holds an on-going KAKENHI research project in a particular research area, he/she cannot submit a new KAKENHI research proposal in the same research area.)

However, Principal Investigators of "Planned Research other than Administrative Group" must participate as Co-Investigator or Research Collaborator of "Administrative Group." In addition, Co-Investigator of "Planned Research other than Administrative Group" can participate in "Administrative Group" when necessary.

(cases marked with “－” in the Table)

(ii) Cases in which the applicant intends to submit two research proposals as the “Principal Investigator” for both.
【“PI → PI” type】

In case an applicant intends to submit two research proposals (to different research categories) as PI for both, or an applicant who is the PI of the prospected on-going project in FY2024 intends to submit new research proposal as PI the following rules (cases A to D) of restrictions on parallel grant application /receipt apply.

Cases in which a researcher carried over all or prat of a KAKENHI grant (Series of Single-year Grants) to the next fiscal year, or a researcher extended the research period for a KAKENHI grant (Multi-year Fund) or a KAKENHI grant (Partial Multi-year Fund) in the final fiscal year (except the extension of research period due to maternity/childcare leave, research stay abroad, etc.), constitute exception to the rules given below.

A Cases where a researcher can submit only one research proposal as PI.

(cases marked with “×” in the Table)

B Cases where a researcher cannot submit a new research proposal, as he/she holds an on-going research project.

(cases marked with “▲” in the Table)

C Cases where a researcher can make parallel submission of research proposals to a research category in the column A and to another category in the column B. If both proposals are adopted, only one of them is granted, as indicated by the symbols in the Table.

For cases marked with “■” the research category in the column A is given priority.
For cases marked with “□” the research category in the section B is given priority.

D Cases of accepting up to 2 research projects which are applied for and on-going Publicly

Offered Research of "Grant-in Aid for Scientific Research for Transformative Research Areas" (the application for the same area is not permitted).

(cases marked with "◆" in the Table)

(iii) Cases in which an applicant submitting a research proposal as PI to a category in column A participates as Co-I in another research proposal submitted to a category in column B
【"PI → Co-I" type】

For cases in which a researcher submitting a certain research proposal as a PI intends to participate in another research project as a Co-I, or a researcher who is the PI of the prospected on-going project in FY2024 intends to participate in another research project as a Co-I, there are no restrictions in general so that the researcher can participate in both projects.

However, for some research categories, the following rules (cases A to C) of restrictions on parallel grant application/receipt as stated below do apply.

A Cases in which the researcher cannot be a Co-I of the other project

(cases marked with "×" in the Table)

B Cases where the researcher cannot be a Co-I of the other project, because of his/her on-going project.

(cases marked with "▲" in the Table)

C Cases where a researcher can participate in the other proposal as Co-I, but, if both are adopted, he/she has to carry out the project in the column A.

(For cases marked with "■" the research category in the column A is given priority.)

(iv) Cases where a researcher who participates as Co-I in a newly-submitted research proposal or a researcher who is a Co-I of an on-going project intends to submit a new research proposal as the PI of another research project.
【"Co-I → PI" type】

For cases in which a researcher participating in a certain research project (on-going or newly submitted) as a Co-I intends to submit another research proposal as a PI, or a researcher who is a Co-I of the prospected on-going project in FY2024 intends to submit another research proposal as PI, there are no restrictions in general, so that the researcher can participate in both projects. However, for some research categories, the following rules (cases A to C) of restrictions on parallel grant application/receipt as stated below do apply.

A Cases in which the researcher cannot be a PI of the other project

(cases marked with "×" in the Table)

B Cases where the researcher cannot be a PI of the other project, because of his/her on-going project.

(cases marked with "▲" in the Table)

C Cases where a researcher can participate in the other proposal, but, if both are adopted, he/she has to carry out the project in the column B.

(For cases marked with "□" the research category in the column B is given priority.)

(v) Cases in which a researcher who participates as Co-I in more than one research projects (on-going or newly submitted) also intends to participate as Co-I in another research proposal.
【"Co-I → Co-I" type】

For cases in which a researcher participating in a certain research project (on-going or newly submitted) as a Co-I intends to participate in another research project as a Co-I, or a researcher who is a Co-I of the prospected on-going project in FY2024 intends to participate in another research project as a Co-I, there are no restrictions in general, so that the researcher can participate in both projects.

However, the following rules (cases A and B) of restrictions on parallel grant application/receipt as stated below do apply.

A Cases in which the researcher cannot be a Co-I of the other project

(cases marked with "×" in the Table)

B Cases where the researcher cannot be a Co-I of the other project, because of his/her on-going project.

(cases marked with "▲" in the Table)

(3) Restrictions on Simultaneous Receipt of Grants

According to the "Restriction on Parallel Grant Application/Receipt," cases in which parallel submission of research projects is permitted, but only one of them can be granted even if both are adopted, are handled as follows.

Handling of the cases marked with "■" or "□" when both projects are adopted

A For the "PI → PI" type (such as the case of PI of a Specially Promoted Research project and PI of another project in other research categories), the researcher must decline the grant delivery of the project in the lower priority category, or abolish the on-going project in the lower priority. In particular, note that if a PI of a Planned Research project in the Transformative Research Areas is selected as PI for a Specially Promoted Research, such Planned Research project is not allowed to replace its PI and must be abolished. The relative priority of the research categories is indicated by the marks "■" and "□" in the Table.

B If the PI of a newly adopted Specially Promoted Research project has been acting as Co-I of on-going project(s) in other research categories, he/she must withdraw the Co-I status of the latter project(s).

In an event that the withdrawal of the Co-I status makes the implementation of the latter project(s) unsustainable, the said project(s) have to be abolished (or withdrawn).

(4) Important Notes

i)Even for the cases in which parallel grant application/receipt is not prohibited by the rules, the applicant should give a careful consideration so as not to fall in such situation that he/she cannot carry his/her responsibility as PI or Co-I, by committing him/herself to too many research projects. The applicant should be well acquainted with the content of "Elimination of Unreasonable Duplication and/or Excessive Overconcentration in the Grant Allocation" (see "I. Outline of the

Grants-in-Aid for Scientific Research-KAKENHI　5. "Guidelines on the Proper Implementation of Competitive Research Funds," etc.").

ii)Starting from the FY2022 call for proposals, the schedule for the call for proposals has been changed to earlier dates, and as such, the timing of the call for proposals for some research categories subject to the restriction on parallel grant application/receipt may vary. Applicants should check the Attached Table 4 "Table of Restriction on Parallel Grant Application/Receipt" carefully. **In a case for which the restriction on parallel grant application/receipt applies, applicants are not eligible to submit a new application for the other research category even if he/she withdraws the research project that he/she had already submitted (sent) through the electronic application system after the deadline for submitting (sending) the Research Proposal Document under the other research category.**.

Example： A researcher cannot apply for Grant-in-Aid for Challenging Research (Pioneering) as PI after applying for Grant-in-Aid for Transformative Research (A) (Planned Research) as PI (even if he/she withdraws the application for Grant-in-Aid for Transformative Research (A) (Planned Research) after the deadline for submitting (sending) the Research Proposal Document).

iii) In some cases, even after a research proposal has been duly submitted via the Electronic Application System, it may be eliminated from the subsequent review process on the basis of the rules of restrictions on parallel grant application/receipt. This may happen, for example, in a case where the said proposal becomes in conflict with the "Restrictions on Parallel Submission of Research Proposals" by a change in the project members of an on-going research project. The applicant should check against such possibility before submitting the research proposal document.

iv) The rules of restrictions on parallel submission of research proposals do apply to a case in which a researcher carrying eligibility for applications in more than one research institutions intends to submit different proposals from each of those institutions.

v) In regard to the "Attached Table 4 Table of Restriction on Parallel Grant Application/Receipt," the participation to the "Transformative Research Area" and the "Administrative Group" in the "Scientific Research on Innovative Areas (Research in a Proposed Research Area)" are deemed exceptional (see "Application Procedures for Grants-in-Aid for Scientific Research-KAKENHI-FY2024 (MEXT)"). The following points should be noted

A The PIs of the research projects of the "Transformative Research Areas Administrative Group" should check the restriction on parallel submission of proposal as PI or Co-I of other research proposals they intend to submit in parallel by referring to the relevant entries of the "Table of Restriction on Parallel Grant Application/Receipt."

B The Co-Is of the research projects of the "Transformative Research Areas Administrative Group" should check the restriction on the **participation as PI or Co-I to the "Planned Research (Planned Research other than the research projects of the "Administrative　Group") and the parallel submission of proposal as PI or Co-I of other research proposals they intend to submit in parallel** by referring to the relevant entries of the "Attached Table 4 Table of Restriction on Parallel Grant Application/Receipt."

vi) In regard to the Restrictions on Parallel Grant Application/Receipt relevant to "the researcher submitting a research proposal as PI or Co-I" or "the PI or Co-I of the prospected on-going project in FY2024" for the research categories for which the call for proposals is announced by JSPS, applicants should refer to the "Attached Table 4 Table of Restriction on Parallel Grant Application/Receipt.".

vii)As for the restrictions on parallel grant application/receipt for JSPS Fellows (SPD, PD, RPD, or CPD), the applicant should read the description in the section "Grant-in-Aid for JSPS Fellows (JSPS Research Fellow)" of the "Attached Table 4 Table of Restriction on Parallel Grant Application/Receipt," even if he/she does not receive the "Grant-in-Aid for JSPS Fellows."

viii)If an individual is granted his/her application in those research categories for which the rule of restrictions on parallel grant application/receipt applies ("Specially Promoted Research," "Planned Research" of the "Transformative Research Areas" (including the research projects of the "Administrative Group")," "Scientific Research (S/A)," "Challenging Research (Pioneering)" and "Grant-in-Aid for Research Activity Start-up", International Collaborative Research), and if subsequently he/she is adopted as JSPS Fellow, he/she has to choose either the JSPS fellowship or the KAKENHI project.

A JSPS Research Fellow (SPD, PD, RPD, or CPD), during the period of his/her term, cannot submit any research proposals to those research categories for which the rules of restrictions on parallel grant application/receipt applies.

Therefore, even after a submitted proposal has been duly filed in the Electronic Application System, it may be eliminated from the subsequent review process by the rules of restrictions on parallel grant application/receipt. The applicant should check against such possibility before submitting the research proposal document.

ix)**There are no restrictions on parallel grant application/receipt between KAKENHI and other competitive research funds schemes.** Still, applicants should read the description in the column "Elimination Unreasonable Duplication and/or Excessive Overconcentration in the Grant Allocation" (see "I. Outline of the Grants-in-Aid for Scientific Research-KAKENHI 5. "Guidelines on the Proper Implementation of Competitive Research Funds," etc."). **Particularly in the review process of "Specially Promoted Research," such research projects that are deemed as more suitable for funding schemes aiming at promoting strategic and creative research (such as JST Strategic Basic Research Programs) will, in principle, not be adopted. The applicant should give a careful consideration on this point.**

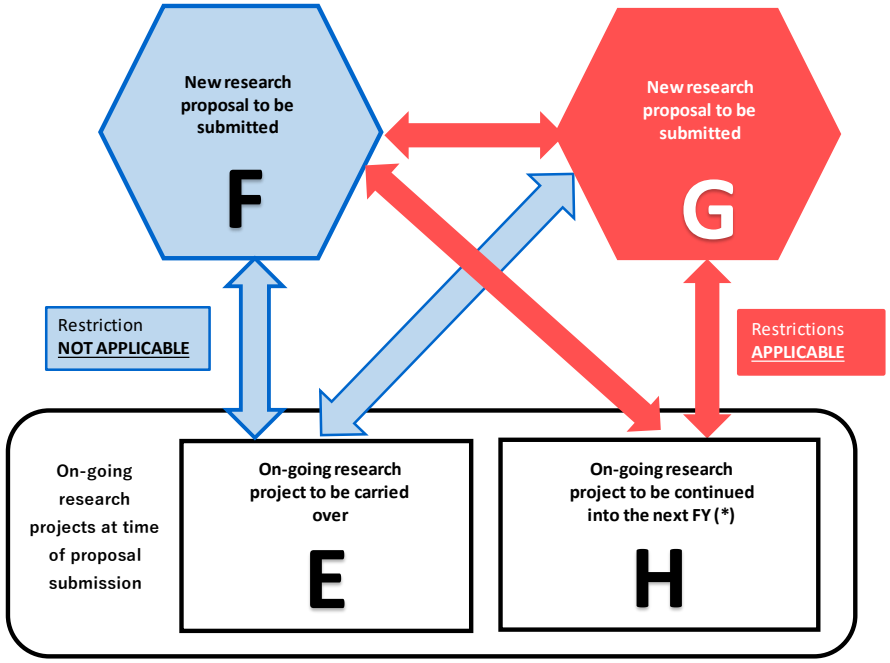
(5) Special Provisions for the Restriction on Parallel Grant Application/Receipt

(Handling of the Restrictions on Parallel Grant Application/Receipt in Relation to carry-over of KAKENHI (Series of Single-year Grants) to the following fiscal year)

(i) When a PI of an on-going project of KAKENHI (Series of Single-year Grants) carries over all or parts of the grant to be used in the following fiscal year, **the restriction on parallel grant application/receipt does not apply** between the project approved for carry-over and the new research proposal he/she intends to submit.

(ii) On the other hand, the restriction on parallel grant application/receipt does apply between the new research proposal and other new research proposal(s) (including the on-going project(s)) to be submitted by the same PI.

Figure 2: Image of restrictions on parallel grant application/receipt in relation to carry-over of Kakenhi (Series of Single-year Grants) to the following fiscal year



Whereas: "E" is an on-going research project to be carried over to the next fiscal year; and "F" is a new research proposal to be submitted. In this case, the restriction on parallel grant application/receipt does not apply between E and F. However, if the researcher intends to submit a research proposal for a different research proposal "G" (in addition to F) for this call for proposals, the restriction on parallel grant application/receipt does not apply between E and G, but shall apply between F and G. Furthermore, if the researcher has an on-going research project "H" (in addition to E) which will be continued into the next fiscal year, restrictions on parallel grant application/receipt shall apply between F and H. Similarly, if the researcher intends to submit a research proposal for G, restrictions on parallel grant application/receipt shall also apply between G and H.

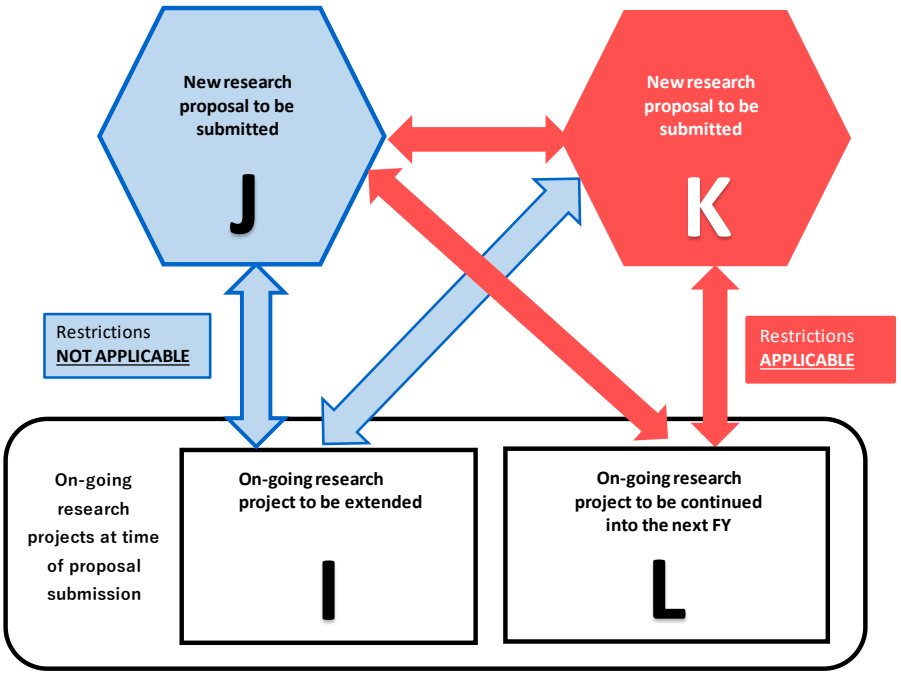
* Here, the same research project as E to be conducted in the fiscal year following the fiscal year in which it is to be carried over will fall under H. (For example, if a research project is an on-going project that will be continued into FY2024, the research project to be carried over will fall under E in Figure 2 during FY2023, and will fall under H in FY2024.)

(Handling of the Restrictions on Parallel Grant Application/Receipt in Relation to Extension of the Research Period of KAKENHI (Multi-year Fund))

(i) When a PI of an on-going project of KAKENHI (Multi-year Fund) extends the research period in the final fiscal year (except the case with the interruption of the research due to maternity/childcare leave, research stay abroad, etc.), **the restriction on parallel grant application/receipt does not apply** between the on-going project and a new research proposal he/she intends to submit.

(ii) On the other hand, the restriction on parallel grant application/receipt does apply between the new research proposal and other new research proposal(s) (including the on-going project(s)) to be submitted by the same PI.

Figure 3: Image of restrictions on parallel grant application/receipt in relation to extension of the research period of KAKENHI (Multi-year Fund))



Whereas: "I" is an on-going research project in the final fiscal year of the research period, and the researcher intends to extend the research period (not including cases where researcher suspends the research for maternity/childcare leave, etc.) ; and "J" is a new research proposal to be submitted. In this case, the restriction on parallel grant application/receipt does not apply between I and J . However, if the researcher intends to submit a research proposal for a different research proposal "K" (in addition to J) for this call for proposals, the restriction on parallel grant application/receipt does not apply between I and K, but shall apply between J and K. Furthermore, if the researcher has an on-going research project "L" (in addition to I) which will be continued into the next fiscal year, restrictions on parallel grant application/receipt shall apply between J and L. Similarly, if the researcher intends to submit a research proposal for K, restrictions on parallel grant application/receipt shall also apply between K and L.

Attached Table 4　Table of Restrictions on Parallel Grant Application/Receipt for "Grant-in-Aid for Transformative Research Areas（A/B）"

1) Type "Principal Investigator (New Proposal/Continued) (Column A) → Principal Investigator (Column B)"

This table shows the restrictions on parallel grant application/receipt in case of "a person who tries to apply as Principal Investigator for a research project mentioned in Column A (research categories for which MEXT organizes a call for proposals), or a person who has already become Principal Investigator of a research project that is scheduled to be continued in FY2024(continued research project) mentioned in Column A" applies as Principal Investigator for mentioned in Column B.

Column A				Column B	Scientific Research on Innovative Areas (Research in a proposed research area)		Transformative Research Areas (A)						Transformative Research Areas (B)				Specially Promoted Research	Scientific Research (S)	Scientific Research (A)	Scientific Research (B)	Scientific Research (C)	Early-Career Scientists	Challenging Research	
					Research area same as the one in Column A	Research area different from the one in Column A	Research area same as the one in Column A				Research area different from the one in Column A		Research area same as the one in Column A			Research area different from the one in Column A								
							New Research Area		Continued				New Research Area		Continued									
					Publicly offered research	Publicly offered research	Administrative group	Planned research	Planned research *2	Publicly offered research	Planned research *2	Publicly offered research	Administrative group	Planned research	Planned research *2	Planned research *2			General	General	General		Pioneering	Exploratory
					New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal
			PI		PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI
Transformative Research Areas (A)	Administrative group	New Proposal	PI		■	—			—	×	■				×	×	■						×	
		Continued	PI		▲				—	▲	▲				▲	▲	▲						▲	
	Planned research	New Proposal	PI		■		—	—	—	×	■				×	□							×	
		Continued	PI		▲				—	▲	▲				▲	□							▲	
	Publicly offered research	New Proposal	PI						—	□	◆				□	□							×	
		Continued *1	PI		◆				—	□	◆				□	□							▲	
Transformative Research Areas (B)	Administrative group	New Proposal	PI		■					×	■	—			×	×								
		Continued	PI		▲					▲	▲				▲	▲								
	Planned research	New Proposal	PI		■					×	■		—	—	×	□								
		Continued	PI		▲					▲	▲			—	▲	□								

Blank cell:The researcher can apply for both research projects.
—:A researcher can only apply for one research project (except for the research project of "Administrative Group") in one and the same research area regardless of Principal Investigators or Co-Investigators.
(In case he or she has a continued research project mentioned in Column A, he or she cannot apply for a research project mentioned in Column B)
×:The researcher can only apply for one research project (in case he or she applied for a research project mentioned in Column A, he or she cannot apply for a research project mentioned in Column B).
▲:The researcher cannot apply for a research project mentioned in Column B (He or she only implements the research of a continued research project mentioned in Column A).
■:The researcher can apply for both research projects. However, in case both are adopted, he or she only implements the research of the research project in Column A.
□:The researcher can apply for both research projects. However, in case both are adopted, he or she only implements the research of the research project in Column B.
◆:The researcher can only apply for one reserch project mentioned in Column B in addition to the research project mentioned in Column A.
Shaded cell: There are not cases that the researcher apply for both research projects mentioned in Column A and Column B.
Note that if a PI of a Planned Research project in the Transformative Research Areas is selected as PI for a Specially Promoted Research, such Planned Research project is not allowed to replace its PI and must be abolished.
*1 Research projects in Innovative Areas (Publicly Offered Research) are subject to the restriction on parallel grant application/receipt similar to the restriction which applies to those in Transformative Research Areas (A) (Publicly Offered Research).
*2 In regards to the "continued research area" under "Research area same as the one in Column A" and the "research area different from the one in Column A", the Administrative Group has the same restrictions on duplication as for "Planned research."

2) Type "Principal Investigator (New Proposal/Continued) (Column A) → Co-Investigator (Column B)"

This table shows the restrictions on parallel grant application/receipt in case of "a person who tries to apply as Principal Investigator for a research project mentioned in Column A (research categories for which MEXT organizes a call for proposals), or a person who has already become Principal Investigator of a research project that is scheduled to be continued in FY2024 (continued research project) mentioned in Column A" participates in a research project mentioned in Column B as Co-Investigator.

Column A				Column B: Scientific Research on Innovative Areas (Research in a proposed research area)		Transformative Research Areas (A)				Transformative Research Areas (B)				Specially Promoted Research	Scientific Research (S)	Scientific Research (A)	Scientific Research (B)	Scientific Research (C)	Challenging Research	
				Research area same as the one in Column A	Research area different from the one in Column A	Research area same as the one in Column A			Research area different from the one in Column A	Research area same as the one in Column A			Research area different from the one in Column A							
						New Research Area		Continued		New Research Area		Continued								
				Planned research *2	Planned research *2	Administrative group	Planned research	Planned research *2	Planned research *2	Administrative group	Planned research	Planned research *2	Planned research *2			General	General	General	Pioneering	Exploratory
				New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal
				Co-I	**Co-I**	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I
Transformative Research Areas (A)	Administrative group	New Proposal	PI		×	—		—	×				×	×						
		Continued	PI		▲				▲				▲	▲						
	Planned research	New Proposal	PI		×		—	—	×				×							
		Continued	PI		▲			—	▲				▲							
	Publicly offered research	New Proposal	PI					—												
		Continued *1						—												
Transformative Research Areas (B)	Administrative group	New Proposal	PI		×				×	—		—	×							
		Continued	PI		▲				▲				▲							
	Planned research	New Proposal	PI		×				×		—	—	×							
		Continued	PI		▲				▲			—	▲							

Blank cell:The researcher can apply for both research projects.
－:A researcher can only apply for one research project (except for the research project of "Administrative Group") in one and the same research area regardless of Principal Investigators or Co-Investigators.
(In case he or she has a continued research project mentioned in Column A, he or she cannot apply for a research project mentioned in Column B)
×:The researcher can only apply for one research project (in case he or she applied for a research project mentioned in Column A, he or she cannot apply for a research project mentioned in Column B).
▲:The researcher cannot apply for a research project mentioned in Column B (He or she only implements the research of a continued research project mentioned in Column A).
Shaded cell: There are not cases that the researcher apply for both research projects mentioned in Column A and Column B.

*1 Research projects in Innovative Areas (Publicly Offered Research) are subject to the restriction on parallel grant application/receipt similar to the restriction which applies to those in Transformative Research Areas (A) (Publicly Offered Research).
*2 In rerards to the "continued research area" under "Research area same as the one in Column A" and the "research area different from the one in Column A", the Administrative Group has the same restrictions on duplication as for "Planned research."

3) Type "Co-Investigator (NewProposal/Continued) (Column A) → Principal Investigator (Column B)"

This table shows the restrictions on parallel grant application/receipt in case of "a person who tries to participate as Co-Investigator in a research project mentioned in Column A (research categories for which MEXT organizes a call for proposals), or a person who has already become Co-Investigator of a research project that is scheduled to be continued in FY2024 (continued research project) mentioned in Column A" applies as Principal Investigator for mentioned in Column B.

Column A \ Column B			Transformative Research Areas (A)						Transformative Research Areas (B)				Specially Promoted Research	Scientific Research (S)	Scientific Research (A)	Scientific Research (B)	Scientific Research (C)	Early-Career Scientists	Challenging Research	
			Research area same as the one in Column A				Research area different from the one in Column A		Research area same as the one in Column A			Research area different from the one in Column A								
			New Research Area		Continued				New Research Area		Continued				General	General	General		Pioneering	Exploratory
			Administrative group	Planned research	Planned research +1	Publicly offered research	Planned research +1	Publicly offered research	Administrative group	Planned research	Planned research +1	Planned research +1								
			New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal
			PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI	PI
Transformative Research Areas (A)	Planned research	New Proposal	Co-I		—	—	—	×					×	□						
		Continued	Co-I			—	—	▲					▲	□						
Transformative Research Areas (B)	Planned research	New Proposal	Co-I					×		—	—	×		□						
		Continued	Co-I					▲			—	▲		□						

4) Type "Co-Investigator (New/Continued) (Column A) → Co-Investigator (Column B)"

This table shows the restrictions on parallel grant application/receipt in case of "a person who tries to participate as Co-Investigator in a research project mentioned in Column A (research categories for which MEXT organizes a call for proposals), or a person who has already become Co-Investigator of a research project that is scheduled to be continued in FY2024 (continued research project) mentioned in Column A" participates in a research project mentioned in Column B as Co-Investigator.

Column A \ Column B			Scientific Research on Innovative Areas (Research in a proposed research area)		Transformative Research Areas (A)				Transformative Research Areas (B)				Specially Promoted Research	Scientific Research (S)	Scientific Research (A)	Scientific Research (B)	Scientific Research (C)	Challenging Research	
			Research area same as the one in Column A	Research area different from the one in Column A	Research area same as the one in Column A			Research area different from the one in Column A	Research area same as the one in Column A			Research area different from the one in Column A							
			Continued Research Area		New Research Area		Continued		New Research Area		Continued				General	General	General	Pioneering	Exploratory
			Planned research*1	Planned research*1	Administrative group	Planned research	Planned research +1	Planned research +1	Administrative group	Planned research	Planned research +1	Planned research +1							
			New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal	New Proposal
			Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	Co-I	**Co-I**	**Co-I**	**Co-I**	**Co-I**	**Co-I**	**Co-I**	**Co-I**
Transformative Research Areas (A)	Planned research	New Proposal	Co-I	×		—	—	×				×							
		Continued	Co-I	▲			—	▲				▲							
Transformative Research Areas (B)	Planned research	New Proposal	Co-I	×				×		—	—	×							
		Continued	Co-I	▲				▲			—	▲							

Black cell: The researcher can apply for both research projects
—: A researcher can only apply for one research project (except for the research project of "Administrative Group") in one and the same research area regardless of Principal Investigators or Co-Investigators.
(In case he or she has a continued research project mentioned in Column A, he or she cannot apply for a research project mentioned in Column B)
×: The researcher can only apply for one research project (in case he or she applied for a research project mentioned in Column A, he or she cannot apply for a research project mentioned in Column B).
▲: The researcher cannot apply for a research project mentioned in Column B (He or she only implements the research of a continued research project mentioned in Column A).
□: The researcher can apply for both research projects. However, in case both are adopted, he or she only implements the research of the research project in Column B.
Shaded cell: There are no cases that the researcher apply for both research projects mentioned in Column A and Column B

*1 In regards to the "continued research area" under "Research area same as the one in Column A" and the "research area different from the one in Column A", the Administrative Group has the same restrictions on duplication as for "Planned research."

5) Type "Research categories for which JSPS organizes a call for proposals (Column A) → Principal Investigator (Column B)"

This table shows the restrictions on parallel grant application/receipt in case of "a person who as Principal Investigator tries to apply for or as Co-Investigator particiapte in a research project mentioned in Column A (research categories for which JSPS organizes a call for proposals), or a person who has already become Principal Investigator or Co-Investigator of a research project that is scheduled to be continued in FY2024 (continued research project) mentioned in Column A" applies as Principal Investigator for mentioned in Column B.
There is no restriction on parallel grant application/receipt between a research category, which JSPS organizes a call for proposals and which this table does not describe, and a research project mentioned in Column B.

Column A				Column B: Transformative Research Areas (A)			Column B: Transformative Research Areas (B)	
				Administrative group	Planned Research	Publicly offered research	Administrative group	Planned Research
				New Proposal	New Proposal	New Proposal	New Proposal	New Proposal
				PI	PI	PI	PI	PI
Specially Promoted Research		New Proposal	PI	×	■	■	×	■
		Continued	PI	▲	▲	▲	▲	▲
		New Proposal	Co-I	×				
		Continued	Co-I	▲				
Scientific Research (S)		New Proposal	PI	□				
		Continued	PI	▲				
Scientific Research (B)	Generative Research Fields	Continued	PI	□	□		□	□
Scientific Research (C)	Generative Research Fields	Continued	PI	□	□		□	□
Challenging Research (Pioneering)		New Proposal	PI	×	×	×		
		Continued	PI	▲	▲	▲		
JSPS Fellows (JSPS Research Fellow)*1		Continued	PI	▲	▲		▲	▲
Home-Returning Researcher Development Research		Continued	PI	□	□	□	□	□

6) Type "Research categories for which JSPS organizes a call for proposals (Column A) → Co-Investigator (Column B)"

This table shows the restrictions on parallel grant application/receipt in case of "a person who as Principal Investigator tries to apply for in a research project mentioned in Column A (research categories for which JSPS organizes a call for proposals), or a person who has already become Principal Investigator of a research project that is scheduled to be continued in FY2024 (continued research project) mentioned in Column A" participates in a research project mentioned in Column B as Co-Investigator.
There is no restriction on parallel grant application/receipt between a research category, which JSPS organizes a call for proposals and which this table does not describe, and a research project mentioned in Column B.

Column A				Column B: Transformative Research Areas (A)	Column B: Transformative Research Areas (B)
				Planned Research*2	Planned Research*2
				New Proposal	New Proposal
				Co-I	Co-I
Specially Promoted Research		New Proposal	PI	■	■
		Continued	PI	▲	▲

Blank cell:The researcher can apply for both research projects.
×:The researcher can only apply for one research project (in case he or she applied for a research project mentioned in Column A, he or she cannot apply for a research project mentioned in Column B).
▲:The researcher cannot apply for a research project mentioned in Column B (He or she only implements the research of a continued research project mentioned in Column A).
■:The researcher can apply for both research projects. However, in case both are adopted, he or she only implements the research of the research project in Column A.
□:The researcher can apply for both research projects. However, in case both are adopted, he or she only implements the research of the research project in Column B.

*1 This restriction on parallel grant application/receipt does not apply if the researcher continues to use the Grant-in-Aid for JSPS Fellows (JSPS Research Fellow) in the case that he/she has declined a JSPS Research Fellowship and become disqualified and thus he/she remains eligible to apply for KAKENHI grants.
*2 The Administrative Group has the same restrictions on duplication as for "Planned research."

3. Preparation of the KAKENHI Application Form (Research Proposal Document), etc.

Grants-in-Aid for Scientific Research is a competitive research funds intended to provide financial support for creative and pioneering research conducted by individual researchers. Therefore, the contents of the Research Proposal Document must be original planned by the applicant.
In preparing Research Proposal Document, plagiarism and/or misappropriation of the research contents of others are strictly impermissible. Applicants must comply with research ethics.
In addition, if the research plan involves traveling abroad, etc., applicants should carefully determine the feasibility of the plan.
Applicants should note that the entire Research Proposal Document, including the title of the research project will be reviewed, and will be publicized widely in the Grants-in-Aid for Scientific Research (KAKENHI) Database (KAKEN) if the research proposal is adopted. Therefore, make sure to select a title that effectively reflects the content of the research project.

For submission of a research proposal, the applicant (PI) has to complete the relevant Research Proposal Document. The Research Proposal Document consists of two parts: "Items to be entered in the Website" and "Forms to be uploaded as an attached file."
The PI (applicant) should complete the Research Proposal Document (PDF file) by entering the "Items to be entered in the Website" and by uploading the "Forms to be uploaded as an attached file" to the Electronic Application System. Then he/she should submit the Research Proposal Document to the administrative section of his/her research institution, by the deadline set by the institution.
Preparation and submission of the KAKENHI Research Proposal Document should follow the procedures detailed below.

(1) Preparation of KAKENHI Research Proposal Document

For the preparation of the KAKENHI research proposal document, **the applicant must first access the Electronic Application System using his/her e-Rad ID and Password.**

On the Research Proposal Document

The KAKENHI Research Proposal Document consists of the following two parts:

Items to be entered in the Website:

Items to be directly entered by the PI (applicant) on the website of the KAKENHI Electronic Application System

Forms to be uploaded:

A part containing such entries as "Research Objectives, Research Method, etc." to be prepared by downloading the form from the "Grants-in-Aid for Scientific Research-KAKENHI-" page within the MEXT website (URL: http://www.mext.go.jp/a_menu/shinkou/hojyo/boshu/1351544.htm), and by uploading the filled form to the KAKENHI Electronic Application System so as to compile a PDF file of the research proposal document. **(Paper-based applications will not be accepted.)**

Research category Application Section	Research Proposal Document		
	Items to be entered in the Website (First part)	Forms to be uploaded (File ID)	Items to be entered in the Website (Second part)
Transformative Research Areas (A)(Publicly Offered Research)	To be entered in the electronic application system (title of research project, fundamental data on the research project such as total budget, etc.)	S-74	To be entered in the electronic application system (details of research expenditure and their necessity, status of application and acquisition of research grants, etc.)

* Forms can be downloaded from the "Grants-in-Aid for Scientific Research-KAKENHI-" page within the MEXT website (URL: http://www.mext.go.jp/a_menu/shinkou/hojyo/boshu/1351544.htm) even before the obtaining of the e-Rad ID and password.

(Reference)Revision of the Research Proposal Document

As for the Research Proposal Document, in the Reform of the KAKENHI Review System, since April 2018, the definition of the "Collaborating Researcher" has been abolished as a revision of the definition of the research members in conjunction with some revisions such as the disapproval of the description on the research achievements by the "Collaborating Researcher" on and after the FY2018 call for proposals in September 2017. In addition, on and after the FY2019 call for proposals in September 2018, the revision including the way to describe the achievements in the column of research achievements has been made, and with the Research Proposal Document some changes such as followings have been applied. When preparing the Document, your careful confirmation is requested on the contents of the booklet, the Application Procedures for Grants-in-Aid for Scientific Research-KAKENHI- (Supplement) "Forms/Procedures for Preparing and Entering a Research Proposal Document."

・The "Research Achievements of the Principal Investigator (PI) and Co-Investigator(s) (Co-I(s))" column in the Research Proposal Document is to be revised as the "Applicant's Ability to Conduct the Research and the Research Environment" column in accordance with the rating elements.

Furthermore, the summary on the discussion related to this revision such as in the Subdivision on Research Grant Screening Section of the Academic Deliberation in the Science Division, Council for Science and Technology is as follows.

(Reference) The summary on the discussion including in the Subdivision on Research Grant Screening Section of the Academic Deliberation in the Science Division, Council for Science and Technology

(Problem recognition, etc.)

- ○ During the review process, there seems to be a reality which is easily enable to distort what an application and a review per se should be, including the possibility to enumerate unnecessarily the achievements irrelevant to the research project in the "Research Achievements" column.
- ○ There seems to be a possibility that the "Research Achievements" column gives a wrong recognition that without filling in the column spaces with many of research achievements as possible, it might be disadvantage for applicants at the review.
- ○ There is still a room for consideration on the "way to make applicants describe" their research achievements and so on although it is necessary to verify them to assess their ability to conduct the research corresponding to the shared responsibility of the Principal Investigator and the Co-Investigators.
- ○ If there might be a possibility to provide applicants and others with a recognition that as if a performance over-emphasis principle be prevailing at the review in the KAKENHI, a rectification of it should be attempted as far as possible and a consideration to contrive to do so is required.
- ○ In case making continuous use of the "Research Achievements" column, a consideration enabling applicants to properly describe information necessary to assess their ability to conduct the research is required. (An impression as if the "filling in the column is just an important thing" should be dispelled.)
- ○ Regarding the assessment on the ability to conduct the research by using such as the research achievements, an attempt to foster a correct recognition for both sides of applicants and reviewers is required.

(Basic policy, etc. for the revision of the Research Proposal Document)

- ○ At the review of the KAKENHI, as for research projects proposed by the Principal Investigator, in association with considering a scientific significance and creativity, a clarification of research objectives and so on, it is also intended to assess the researchers' ability to conduct the research strictly and to select appropriate research projects.
- ○ The positioning of the research achievements in the Research Proposal Document is for judging a practical feasibility of the research described in the Research Proposal Document before rolling out the research.
- ○ Based on the understandings above, the research achievements should be clearly defined that they are regarded as verifying the ability to conduct the research for the research plan.

Starting from the FY2022 Call for Proposals, the forms to be uploaded as an attached file in the Research Proposal Document has been amended.

In addition, it has been made clear that, starting from the FY2024 Call for Proposals, the applicant can include any international efforts related to his/her research plan (such as his/her records of joint international research and research history in overseas institutions) as necessary in the Applicant's Ability to Conduct the Research and the Research Environment column of the Research Proposal Document form, from the perspective of encouraging researchers to conduct international research activities.

Please read the Supplement to the Application Procedures "Forms/Procedures for Preparing and Entering a Research Proposal Document" carefully.

(2) Electronic Submission of the Research Proposal Document

i) An applicant should prepare his/her Research Proposal Document (PDF file) by entering the "Items to be entered in the Website" and by uploading the separately prepared "Forms to be uploaded as an attached file" to the Electronic Application System, following the instructions in the "FY2024 Procedures for Preparing and Entering a Research Proposal Document" and "FY2024 Procedures for Preparing and Entering a Research Proposal Document (Items to be entered in the Website)."

ii) The compiled books of the submitted KAKENHI Research Proposal Document to be sent to the reviewers are in black-and-white (gray scale) print. Therefore, in preparing the Research Proposal Document, the applicant should pay attention to the clarity of the figures when printed in gray scale.

iii) The Research Proposal Documents are collected and submitted to JSPS by the research institution to which the PIs (applicant) belong. Therefore, the applying PI **should submit his/her Research Proposal Document to the administrative section of his/her research institution by the deadline set by the institution. (It is not allowed to submit the Research Proposal Document directly to JSPS.)**

Before submission, the applying PI should carefully check the contents of the Research Proposal Document (PDF file) he/she prepared, and subsequently proceed to the "Check Completed and Submission" stage of the submission process. (This amounts to submitting the Research Proposal Document (PDF file) to the administrative section of his/her research institution.) After the "Approval" process by his/her institution, no further corrections or modifications to the submitted Research Proposal Document (PDF file) are possible after the due date of submission (transmission) to JSPS. (See "IV. Instructions for Administrative Staff of Research Institution 4. Submission and Other Matters of the Research Proposal Document (Preparing the Research Proposal Document).")

iv) The personal information contained in the Research Proposal Document and any personal information registered in Electronic Application System will be used for purposes such as the elimination of unreasonable duplication and/or excessive concentration in the allocation of competitive research funds, the appropriate funding of KAKENHI grants, and to conduct questionnaires on scientific technology policies including KAKENHI grants (this includes providing the data to external contractor(s) in charge of electronic processing and management of the KAKENHI data). Any such information will also be provided to the e-Rad system. (The information registered in the e-Rad system is utilized for proper assessment of research and development by national funding, development of effective and efficient comprehensive strategy, planning and development of resource allocation policy, etc. Therefore, the information will be supplied to the Cabinet Office through the e-Rad system. The applicant may be requested to cooperate in verification of the information and other related works.)

The information on the adopted KAKENHI projects (the title of research project, the name of PI and his/her affiliated research institution, the grant to be delivered, research period, etc.) is categorized as "information planned to be made public," as laid down in Article 5, paragraph 1, item 1 of the "Act on Access to Information Held by Incorporated Administrative Agencies" (Act No. 140 of 2001). The information will be made public through press release materials, the Grants-in-Aid for Scientific Research Database (KAKEN) of the National Institute of Informatics, and other means.

The researchers and their affiliated research institutions are requested to carry out the application procedures (including iii) above) with full understanding of the information handling (utilization, provision and disclosure) stated above.

(3) Important Checkpoints of the Research Proposal Document

In preparing a Research Proposal Document, the applicant should pay attention to the following points among others, so as to avoid "outright rejection by incompleteness of the research proposal document."

1. Qualification as a KAKENHI Project

The following kinds of research plans fall outside the scope of funding target:

A) A research plan which merely aims at purchasing ready-made research equipment.
B) A research plan whose purpose is to build a large-size research facility or equipment which is more appropriate to be funded by other resources.
C) A research plan whose purpose lies at developing and selling goods and/or services (including market research associated with such as them).
D) An entrusted research conducted as regular business.
E) A research plan with a yearly research expenditure for any of the fiscal years in its research period **less than 100,000 yen**.

2. Eligibility of the Project Members

The PI may organize a research team with appropriate combination of Co-Investigator(s) (Co-I) , and Research Collaborator(s), as needed by the nature of the research project. (In the case of Publicly Offered Research, the Principal Investigator cannot set up a team of project members together with a Co-Investigator.) When organizing a research team comprised of multiple members, the PI should ensure that the team has an appropriate system toward the achievement of research objectives, for example by giving due consideration to diversity.
As is the case for PI, **Co-Investigator(s) is also subject to verification of their KAKENHI eligibility by their respective research institutions by the time of proposal submission (see "Ⅲ. Instructions for Prospective Applicants 1. Procedures to Be Completed Prior to Application (1) Ascertainment of the Eligibility for KAKENHI Application").**
On the other hand, to be a Research Collaborator(s), registration to the e-Rad system is not a requirement.

1) Principal Investigator (PI) (Applicant)

(A) Principal Investigator is the main recipient of the grant who bears full responsibility for the implementation of the research project (including compiling the research achievements).
An individual who is anticipated to become unable to carry through the PI's responsibility over the entire research period due to, for example, loss of the KAKENHI eligibility caused by PI's own accord, should refrain from becoming a PI. (See note below.)

(Note)
The Principal Investigator is the researcher who plays the central role in the implementation of the research plan and thus bears a heavy responsibility. An individual who is anticipated to lose his/her

eligibility for KAKENHI application during the research period due to his/her own accord so that is anticipated to be unable to carry through the responsibility, should refrain from becoming a Principal Investigator. Substitutions of the PI of an on-going KAKENHI project are not permitted.
As an exception, for the "Planned Research" of "Transformative Research Areas", "Scientific Research on Innovative Areas (Research in a Proposed Research Area)" and "International Leading Research" replacements of PI may be accepted by going through required procedures.

(B) **When organizing project members, the Principal Investigator must obtain a consent to become a Co-Investigator from the researcher via electronic application system in advance.**

(C) The PI must be registered in the e-Rad system as "Eligible for KAKENHI Application." It is also required that he/she is *not* designated as "ineligible for grant receipt" in the fiscal year covered by a call for proposals (suspension of eligibility), as a penalty for such misconducts as improper grant spending, fraudulent grant acquisition or research misconduct associated with KAKENHI or any other competitive research funds.

2) Co-Investigator (Co-I) (*In the case of Publicly Offered Research, the Principal Investigator cannot set up a team of project members together with a Co-Investigator.)

(A)The Co-Investigator is a recipient of the grant who, in cooperation with the PI, bears responsibility for the implementation of the research project in accordance with the clear share of his/her roles. The Co-I must be a member of the project who receives a share of the grant based on the contents of the share as a recipient of the grant. (This rule applies even when the Co-I belongs to the same institution as the PI.)
An individual who is anticipated to become unable to carry through the Co-I's responsibility over the entire research period due to, for example, the loss of the KAKENHI eligibility caused by Co-I's own accord, should refrain from becoming a Co-I.

(B) The Co-I must be registered in the e-Rad system as being "Eligible for KAKENHI Application." It is also required that he/she is *not* designated as being "ineligible for grant receipt" in the fiscal year covered by a call for proposals (a suspension of eligibility), as a penalty for such misconducts as an improper grant spending, a fraudulent grant acquisition or a research misconduct associated with the KAKENHI or any other competitive research funding.

About the Process of Participation of Co-Investigator in Project Members

A consent process to become a Co-Investigator is conducted via the electronic application system if the applicant adds a Co-Investigator to project members. Following processes for both Principal Investigator and Co-Investigator(s) are necessary in the application process.

[Actions to be taken by the Principal Investigator]

- The Principal Investigator must enter the information on the researcher whom he/she wants to add to the project members in the "Project Members List" column on the "Application Information Input" screen, request the researcher to become a Co-Investigator, and obtain a consent from the Co-Investigator-to-be by the time of submitting (sending) the Research Proposal Document to his/her research institution.

[Actions to be taken by the researcher who is requested to become a Co-Investigator]

・If the researcher is requested to become a Co-Investigator by the Principal Investigator via the electronic application system, the researcher must select "Consent" or "Dissent" after confirming the contents to be consented.

Procedures to be Performed by the Principal Investigator	**Procedures to be Performed by the Co-Investigator-to-be**	**Procedures to be Performed by the Research Institution to which Co-Investigator-to-be belongs**
① Request to become a Co-Investigator →	② Give a consent to become a Co-Investigator →	③ Give a consent to become a Co-Investigator as a standpoint of the research institution
The Principal Investigator requests to the researcher who is to be requested to become a Co-Investigator to participate in the project as a Co-Investigator via the electronic application system.	The Co-Investigator-to-be is requested to participate in the project as a Co-Investigator from the Principal Investigator via the electronic application system and then the Co-Investigator-to-be selects a consent (or a dissent).	The information consented by the Co-Investigator-to-be is shown via the electronic application system and then the research institution also conducts the process such as giving consent to him/her.

・The organization of the project members should be completed through all necessary procedures mentioned above to be carried out with the approximate target of **two weeks prior to the deadline for the submission of the application documents set by JSPS**. (All application procedures are workable on the system after two weeks prior to the deadline for the submission of the application documents. To submit (send) application documents to the research institution to which the Principal Investigator belongs, it is necessary to obtain consents from all the Co-Investigators-to-be.

* Please refer to the KAKENHI (Grants-in-Aid for Scientific Research) Electronic Application System Operation Manual for the detailed information such as operating environments, operating methods, and so on.
URL: https://www-shinsei.jsps.go.jp/kaken/topkakenhi/shinsei_ka.html

* After the researcher has given a consent to become a Co-Investigator, the information on the Co-Investigator-to-be will be shown to the research institution to which he/she belongs via the electronic application system, and then it will be necessary to obtain a consent, etc. from the research institution as well.

*Since the Principal Investigator cannot submit (send) the Research Proposal Document to his/her research institution until the research institution to which the Co-Investigator-to-be belongs gives the consent, etc., be sure to finish the process in time for the deadline of the submission.

3) Research Collaborator

(A) Research Collaborator is an individual who cooperates in the implementation of a research project other than the PI and the Co-I(s).

(B) Registration as "Eligible for KAKENHI application" in the e-Rad system is *not* a requirement for becoming a Research Collaborator.
For example, the following people can also participate in the research project as a Research Collaborator: a postdoctoral researcher, a graduate student, a research assistant (RA), JSPS

Research Fellows (SPD, PD, RPD, CPD or DC) who are not registered as eligible for KAKENHI application in their host research institution, a researcher belonging to an overseas research institution, a researcher belonging to a corporation not designated as a research institution according to Article 2 of the Rules for the Handling of Grants-in-Aid for Scientific Research, and an individual offering research support such as technician and intellectual property specialist.

3. Requirements for the Appropriation of Research Expenditure

1) Expenditures that can be covered by direct expense

Expenditures necessary for the implementation of the research plan (including those necessary for compiling the research achievements)

* If any of the expenditure categories (equipment costs, travel expenses, or personnel cost/honoraria) exceeds 90% of the total yearly expenditure in any fiscal year of the research period, or if the expenditure in category Consumables or Miscellaneous constitutes a significant portion of the total expenditure, the necessity of that spending should be clarified in Research Proposal Document.

[Direct Expense of Competitive Research Funds to Cover the Costs of Assignments Other Than Research]

The cost of "buyout" (*i.e.*, the cost for hiring someone taking over a part of the duties other than research (*) of the Principal Investigator or Co-Investigator(s)) can be covered by the direct expense so that they can secure ample amount of time for research projects (the buyout system).
* The kinds of duties that can be covered by the buyout system are those authorized as proper jobs of the researcher at his/her research institution, excluding (i) research activities, and (ii) administrative work for institutional management. They include educational and related activities, e.g., educational activities (teaching and preparation for teaching, supervising students) and social engagement activities (medical practices, outreach activities). Activities associated with business profit are excluded.

Starting from the FY2021 Call for Proposals, the buyout system is applicable in the research categories listed below. A KAKENHI applicant who wish to use the buyout system should do so according to the buyout scheme agreed upon between him/her and his/her research institution.
When an applicant wishes to use the buyout system, enter the cost of the buyout in the "Miscellaneous expense" column, and enter the word "buyout" in the "Item" column of the Research Proposal Document form. (Please refer to the supplementary volume of "Application Procedures for Grants-in-Aid for Scientific Research—KAKENHI—" (Forms/Procedures for Preparing and Entering a Research Proposal Document).

[Research categories subject to the buyout system]
Specially Promoted Research, Transformative Research Areas (excluding "Platforms for Advanced Technologies and Research Resources"), Scientific Research on Innovative Areas (Research in a Proposed Research Area) (excluding "Platforms for Advanced Technologies and Research Resources"), Scientific Research, Challenging Research (including "Challenging Exploratory Research"), Early-Career Scientists (including "Young Scientists (A/B)"), Research Activity Start-up, International Leading Research , International Collaborative Research(including the Fostering Joint International Research (B) before name change), Home-Returning Researcher Development Research (limited to those who belongs to the domestic research institutions), Special Purposes.

[Research categories ***not*** subject to the buyout system]
Encouragement of Scientists, Publication of Scientific Research Results, JSPS Fellows, Transformative Research Areas (Platforms for Advanced Technologies and Research Resources), Scientific Research on Innovative Areas (Research in a Proposed Research Area) (Platforms for Advanced Technologies and Research Resources), Fostering Joint International Research (including the Joint International Research(A) before name change). As for the research category of Fostering Joint International Research (including the Joint International Research(A) before name change) it is possible to budget the cost for hiring replacements.

As for the details of the expenses covered by the buyout system and matters to be done by the research institution refer to the following.
"Amendment Enabling Direct Expense of Competitive Research Funds to Cover the Costs of Duties Other Than Research (Introduction of Buyout System)" (October 9, 2020, Agreement of the Liaison Meeting of Related Offices and Ministries on Competitive Research Funds)

URL: https://www.mext.go.jp/a_menu/shinkou/torikumi/1385716_00003.htm

The objective of the buyout system is to increase the number of hours the PI (or Co-I) can devote to the funded project on the basis of his/her own needs and request. Accordingly, items such as the actual presence of the PI's (or Co-I's) needs and request, and the resulting expansion of research time devoted to the funded project (increased number of hours for research) may be subject to later inspection in relation to the grant spending. In the event that the buyout expenditure is found to be used improperly (e.g., the increase in hours devoted to the funded project is not verified), an order to return the delivered grant may be issued. Therefore, the research institution should ensure the appropriate implementation of the buyout system.

2) Expenditures that cannot be covered by KAKENHI

A. Costs associated with buildings and other facilities (excluding expenditure for installations necessary for installation of research equipment purchased by the KAKENHI direct expense).

B. Expenditures for measures to deal with accidents or disasters that occurred during the implementation of funded project

C. Personnel cost/honoraria for the PI or Co-I(s)

D. Other expenditures that are apt to be covered by indirect expense*

* Indirect expense which amounts to 30% of the direct expense, is intended for use by the research institution in covering expenditures needed by the research institution for the management and other things associated with the implementation of the funded project. Indirect expense will be placed for all the research categories of this call for proposals. Applicant does not need to state the indirect expense in his/her Research Proposal Document.

4. No mistakes in the format, etc. of the Research Proposal

(i) No garbled characters and so on.

The electronic form of the Research Proposal Document (PDF files) submitted through the electronic application system will be printed as they appear in black and white (greyscale) and used in the review. It is the PI's responsibility to check without fail whether the content of the Research Proposal Document converted to the PDF file is complete (missing characters, charts, garbled characters, etc.) before submitting (sending).

(ii)Verification of the Application Forms

It should be verified whether the application format is in conformity with the prescribed format. As for the forms to be uploaded, in particular, verify not only the total number of pages but also the number of pages instructed for each column is met. For example neither following case 1 in which the total number of pages is different nor following case 2 in which the total number of pages is same but the number of pages instructed for each column are different are inconformity with prescribed format.

(Example) Forms to be Uploaded : Grant-in-Aid for Transformative Research Areas (A)(Publicly Offered Research) (Form S-74)

	Number of page(s) of each column			Total Number of Pages
	"Research Objectives, Research Method, etc." Column	"Applicant's Ability to Conduct the Research and the Research Environment" Column	"Issues Relevant to the Protection of Human Right and Compliance with Laws and Regulations" Column	
Correct Number of Pages	**5**	**2**	**1**	**8**
Incorrect Number Case 1	4	2	1	7
Incorrect Number Case 2	6	1	1	8

For application forms, etc. under each research category, see "III. Instructions for Prospective Applicants 3. Preparation of the KAKENHI Application Form (Research Proposal Document), etc. (1) Preparation of KAKENHI Research Proposal Document."

4. Completion of Research Ethics Education Coursework, etc.

Principal Investigator (PI) and Co-Investigator(Co-I) taking part in a research funded by KAKENHI, are requested to have completed properly the following procedures including research ethics, by the time they submit the formal application for grant delivery of a newly adopted research project in the FY2024 Grants-in-Aid for Scientific Research, and upon the formal application for a grant delivery, it shall be confirmed through the electronic application system whether they will have taken the research ethics education coursework, etc.

If a PI or Co-I completed the research ethics related procedures in the past, or has moved from the research institution at which he/she completed the procedure, he/she should check with the administrative section of his/her current institution for the validity of the procedure he/she conducted in the past.

[Actions to be taken by the Principal Investigator]

- The PI must either read through and learn the teaching materials by him/herself concerning the research ethics education coursework such as "For the Sound Development of Science - The Attitude of a Conscientious Scientist" published by the JSPS Editorial Committee of "For the Sound Development of Science, the "e-Learning Course on Research Ethics [eL CoRE] or "APRIN e-learning program (eAPRIN)," etc., or attend a lecture on research ethics conducted by research institutions based on the "Guidelines for Responding to Misconduct in Research" (adopted by MEXT on August 26, 2014), by the time of the formal application for grant delivery.
- The PI must understand thoroughly and exercise the proper research practices in conducting

his/her research, from amongst the contents of both the Statement "Code of Conduct for Scientists -Revised Version-" by the Science Council of Japan and the booklet "For the Sound Development of Science -The Attitude of a Conscientious Scientist-" issued by JSPS, by the time of the formal application for grant delivery.

・From each Co-Investigator-to-be, the PI must

(i) obtain a consent of participation in the research project as a Co-I through the electronic application system and also a consent expressing "the completion of a seminar attendance or other kinds of coursework relevant to research ethics by the time of the formal application for the grant delivery of the research project in question," by the time of submitting (sending) the Research Proposal Document to the research institution which the PI belongs to, and;

(ii) ascertain that the Co-I has actually completed the coursework such as an attendance at the lecture on research ethics by the time of the formal application for the grant delivery.

[Actions to be taken by the Co-Investigator-to-be]

・The Co-I must provide the PI with both a consent of the participation in the research project as a Co-I via the electronic application system and a consent expressing "the completion of a seminar attendance or other kinds of coursework relevant to research ethics by the time of the formal application for the grant delivery of the research project in question."

・The Co-I must either read through and learn the teaching materials by him/herself concerning the research ethics education coursework such as "For the Sound Development of Science - The Attitude of a Conscientious Scientist" published by the JSPS Editorial Committee of "For the Sound Development of Science," the "e-Learning Course on Research Ethics [eL CoRE]" or "APRIN e-learning program (eAPRIN)," etc., or attend a lecture on research ethics conducted by research institutes based on "Guidelines for Responding to Misconduct in Research" (adopted by MEXT on August 26, 2014), and report the PI to the effect by the time of the formal application for the grant delivery by the PI.

・The Co-I must understand thoroughly and exercise the proper research practices in conducting their research, from amongst the contents of both the statement "Code of Conduct for Scientists - Revised Version-" by the Science Council of Japan and the booklet "For the Sound Development of Science - The Attitude of a Conscientious Scientist-" issued by JSPS, and report the PI to the effect that he/she has done, by the time of the formal application for the grant delivery by the PI.

5. Registration of the Researcher Information in "Researchmap"

The "researchmap (URL: https://researchmap.jp/)" is the Japan's largest researcher information database as a general guide to Japanese researchers. The information on the research achievements registered in the researchmap is ready to be openly available over the Internet and the database itself is linked to the e-Rad, many university faculty databases and so on. The Japanese Government as a whole is going to further utilize the researchmap.

Furthermore, since the posted information in the researchmap and/or the Grants-in-Aid for Scientific Research Database (KAKEN) is to be handled as a reference according to the necessity in the review of the KAKENHI applications, the registration of the researcher information into the researchmap is encouraged. In addition, when doing so, make sure to register the "Researcher

Number" because the posted information is to be searched with the "Researcher Number" when referring to the posted information in the researchmap in the course of the review.

< Inquiries >

Service Support Center (in charge of the "researchmap")

Department for Information Infrastructure

Japan Science and Technology Agency

Web inquiry form: https://researchmap.jp/public/inquiry/

6. Cooperation to Review

The Grants-in-Aid for Scientific Research-KAKENHI- adopts a peer-review process in which the researchers selected from their own community engaged themselves in the assessment and reviewing of each research proposals on the basis of its scientific merit. The KAKENHI review is conducted thanks to the participation of more than 8,000 researchers as reviewers. The peer review forms the basis of the autonomy of academic community and plays an important role in ensuring quality of scientific research and its improvement. The review of applications is carried out with the constructive and mutually critical spirit of scientists and based on the purely academic value. It is no exaggeration to say that the KAKENHI review system is indispensable in supporting Japan's scientific research into the future among other research funds.

The Grants-in-Aid for Scientific Research (KAKENHI) program is supported by researchers who have responsibilities not only to conduct the funded research projects as applicants and grant recipients but also as a reviewers. It is important for researchers to find out excellent research proposals as reviewers in order to support the scientific research as is the case of putting out excellent research results with KAKENHI funds. It is expected that the above-stated understanding is share in the academic community. Furthermore, participating to the review process has an aspect of fostering researchers through enhancing their capability to conduct the objective and academic assessments based on the various views of fellow reviewers leading up to broaden their horizons.

In order to support the peer-review system of KAKENHI by the whole body of researchers by appropriately sharing the burden of proposal review without putting an extra load on some researchers. The researchers' positive participation in the review process is well appreciated when they are requested to become the KAKENHI reviewer by JSPS or MEXT in the future. JSPS has registered the Principal Investigators' information including their names and affiliated research institutions in the Database of Review Committee Candidate (148,000 entries as of FY2022) and has utilized it so as to select the fair and reviewers. In order to keep the information in this Database updated at all times, JSPS makes a request every year to update the registered information through your affiliated research institutions. Kindly cooperate in updating the information in accordance with the Spending Rules for researchers (supplementary conditions or funding conditions).

IV. Instructions for Administrative Staff of Research Institution (Omitted)

V. Other Relevant Issues

1. Support through Platforms for Advanced Technologies and Research Resources

In order to respond effectively to the diverse needs of researchers of KAKENHI research projects, the Grant-in-Aid for Transformative Research Areas - Platforms for Advanced Technologies and Research Resources forms a resource and technical support platform for research (hereinafter referred to as "Platform") under the close cooperation of relevant institutes with inter-university research institutes and Joint Usage/Research Centers, or International Joint Usage / Research Center as core institutes. Together with providing technical support towards individual research projects and providing advanced problem solving methods to researchers, it provides an integral promotion of cooperation between researchers, interdisciplinary integration, and human resources development.
Applications for technical support, etc. are open for each of the Platforms below where it concerns research projects carried out through KAKENHI. Researchers desiring technical support, etc. from each of the Platforms are requested to check their respective websites, etc. and actively apply.

* "Technical Support, etc." points to the sharing of equipment with researchers from a wide range of research fields, technical support and the collecting, conservation, and providing of resources (documents, data, experiment samples, specimen, etc.), and support for conservation techniques, etc.

"Advanced Technology Support Platform Program" has scientific value and an advanced nature through the combination of multiple facilities and equipment, and provides shared use of equipment and technical support to researchers in a wide variety of research areas.

"Research Platform Resource Support Program" collects, conserves, and supplies the resources that are the basis of research (documents, data, experiment samples, specimen, etc.) and also conducts support for conservation techniques, etc.

Area	Platform Name	Core Institution	Support Function
Advanced Technology Support Platform Program	Platform of Advanced Bioimaging Support (*)	National Institute for Physiological Sciences National Institute for Basic Biology	Advanced technical support and user training for: ・ Light microscopy ・ Electron microscopy ・ Magnetic resonance imaging ・ Imaging analysis
	Platform of Advanced Animal Model Support(*)	The Institute of Medical Science The University of Tokyo	Support for constructing animal models, Support for pathological analysis, Support for physiological analysis, and Support for molecular profiling
	Platform for Advanced Genome Science (*)	National Institute of Genetics	Advanced genome analysis (de novo genome sequencing; re-sequencing for genome variation detection; analysis of transcriptome, epigenome and metagenome; ultra-high sensitivity analysis for single cells, single molecules, etc.; big-data analysis and advanced bioinformatics; by using of the latest facilities and technologies)
Area	Platform Name	Core Institution	Support Function

Research Platform Resource Support Program	Platform of Supporting Cohort Study and Biospecimen Analysis (*)	The Institute of Medical Science, The University of Tokyo	Support for cohort study using bioresources, Support for maintaining and utilizing human brain resources, and Support using biospecimen
	Supply Platform of Short-lived Radioisotopes for Fundamental Research	Research Center for Nuclear Physics, Osaka University	Supply short-lived radioisotopes produced by accelerators for fundamental research in various scientific fields.

Also, Committee on Promoting Collaboration in Life Sciences that functions as a general information point and coordinator across the four Platforms marked with an asterisk (*) above is set up. (Core Institution: The Institute of Medical Science, The University of Tokyo)

Each Platform's website can be found in the links on the site below:
URL : https://www.mext.go.jp/a_menu/shinkou/hojyo/mext_01901.html

2. Promotion of the Shared Use of Research Equipment

In "Reform of Competitive Research Funds: Towards a Sustained Output of Research Achievements (Interim Summary)" (June 24, 2015, Competitive Research Fund Reform Review meeting) it was decided that, when the original research objectives were fully achieved, versatile and large equipment should, in principle, be shared.
The government also addresses the need to promote the implementation and common use of research facilities and equipment, to establish a framework for the introduction, renewal, and utilization of organizational research facilities (core facilities), and to formulate and publicize policies for the internal and external sharing of research facilities and equipment in the Comprehensive Package to Strengthen Research Capacity and Support Young Researchers (January 23, 2020, Council for Science, Technology, and Innovation) and the Sixth Science, Technology, and Innovation Basic Plan (Cabinet Decision on March 26, 2021).
With this in mind, when purchasing equipment with competitive research funds, please actively work on the use of equipment purchased with other research funds, and the purchase and shared use of equipment from several research funds where it concerns especially large and versatile equipment. Please also make ensure that sharing is possible within the rules of the said competitive research funds, and no obstacle is made to the execution of the research project.

○ "Reform of Competitive Research Funds: Towards a Sustained Output of Research Achievements (Interim Report)"
(June 24, 2015, Competitive Research Fund Reform Review meeting)
URL: https://www.mext.go.jp/b_menu/shingi/chousa/shinkou/039/gaiyou/1359306.htm

○ "The Sixth Science, Technology, and Innovation Basic Plan (Cabinet Decision on March 26, 2021)"
URL: https://www8.cao.go.jp/cstp/kihonkeikaku/6honbun.pdf

○ Unified Rules for Administrative Procedures, Etc. Pertaining to Competitive Research Funds
(March 5, 2021, Agreement of the Liaison Meeting of Related Offices and Ministries on Competitive Research Funds)
URL: https://www8.cao.go.jp/cstp/compefund/toitsu_rule_r50524.pdf

3. Promotion of the 'Dialogue on Science and Technology with Citizens' (A Basic Approach Policy)

In the “Promotion of the ‘Dialogue on Science and Technology with Citizens’ (A Basic Course of Action)” (Adopted by the Minister of State for Science and Technology Policy and the Executive Members of the Council for Science and Technology Policy on June 19, 2010) which was compiled in June 2010, the activity in which researchers explain the content and achievements of their research activities to society and citizens in an easy-to-understand form is placed in the above-mentioned ”Dialogue on Science and Technology with Citizens.” Researchers who have received an allotment of public research funds amounting more than 30 million yen per year per case are requested to positively work on the ”Dialogue on Science and Technology with Citizens.” Universities and other research institutions are also requested to make positive efforts in order for researchers who have received public research funds to ensure the proper implementation of the “Dialogue on Science and Technology with Citizens,” for example, by setting up support systems.

For KAKENHI, there is the question “Are you positively trying to publicize and disseminate the research content and research achievements?” especially in the research progress assessment of Specially Promoted Research, for which researchers receive a relatively high amount of research funds, and the interim/ex-post assessment of Scientific Research on Innovative Areas (Research in a Proposed Research Area). Therefore, based on the above-mentioned basic policy, researchers should disseminate the achievements of research funded with KAKENHI to society and citizens in an even more positive way.

4. Cooperation with the National Bioscience Database Center

The National Bioscience Database Center (URL: https://biosciencedbc.jp/) has been established in the Japan Science and Technology Agency (JST, a national research and development agency), in order to promote the integrated use of databases in the area of life science that have been created by various research institutions and other institutions.

This Center spurs the active participation of related institutions, and based on four pillars, namely (1) the planning of strategies, (2) creation and operation of portal websites, (3) research on and development of core technology for the integration of databases and (4) the promotion of the integration of biotechnology-related databases, it is promoting projects aiming at the integration of databases in the area of life science. In this way, through wide sharing and utilization of the research achievements in the area of life science produced in Japan in the researcher community, the Center aims at invigorating overall research in the area of life science, including research and development connected to basic research and industrial applied research.

JSPS would like to request researchers to cooperate by providing to the Center copies of raw data related to achievements published in research papers and other output in the area of life science, or copies of created open databases.

Moreover, the copies provided will be able to be utilized on a non-exclusive basis as reproductions, alterations, or in other necessary forms. JSPS would like researchers to understand in advance that, in response to the requests of the institutions that received copies, it would also like request researchers to cooperate by providing all the information necessary for utilizing the copies.

Furthermore, the National Bioscience Database Center has developed guidelines for data on humans, in order to promote the sharing and use of data related to research in the area of life science, with due considerations to the protection of personal information.

NBDC Human Data Sharing Guidelines

URL: https://humandbs.biosciencedbc.jp/guidelines/

5. Inter-University Bio-Backup Project

The purpose of the Inter-University Bio-Backup Project (IBBP) is to “back up” biological genetic resources, which are indispensable research resources in various research areas, and to avoid damage or loss of biological genetic resources due to unforeseen accidents, disasters, etc. The project newly commenced from 2012.

In the National Institute for Basic Biology of the Inter-University Research Institute Corporation National Institutes of Natural Sciences, which is the core of this project, the Inter-University Bio-Backup Project for Basic Biology (IBBP Center, URL: http://www.nibb.ac.jp/ibbp/) has been established as a backup center for biological genetic resources. It is equipped with the newest equipment necessary for the backup of biological genetic resources.

Any researcher who belongs to a university or a research institution may apply for storage. Biological genetic resources that can be stored in the IBBP Center are samples that can be proliferated (amplified) or cryopreserved (for vegetable seeds, the refrigeration or deep-freezing preservation condition needs to be definite), and being not pathogenic is also a condition. Since backup is provided free of charge, researchers should make use of the IBBP Center.

6. National BioResource Project

The National BioResource Project (NBRP) strategically collects and preserves important bioresources that are the basic and foundation of life science research at the core bases of this project and provides them to universities and research institutes, thereby contributing to the development of life science research in Japan. In the future, in order to contribute to the development of life science research in Japan, it is necessary to continually collect useful bioresources.

For that matter, please deposit(*) available bioresources among bioresources developed by Grants-in-Aid for Scientific Research (limited to the bioresource targeted for NBRP). Please cooperate with the NBRP collecting activities.

It is recommended to utilize the resources already collected in NBRP from the viewpoint such as efficient implementation of research.

(*) Deposit: This is a procedure to approve the use (preservation/provision) in this project without transferring the various rights related to the resource. By specifying specific conditions in the deposit agreement, you can add usage conditions such as restrictions on usage and quotation of articles to users.

List of NBRP core bases upgrading program representative agencies

URL: https://nbrp.jp/resource/

7. Security Export Control Policy (Coping with Technology Leakage Overseas)

In implementing various research activities including research projects funded with KAKENHI, research institutions are asked to take systematic measures to ensure that the research achievements which have potential risks of being diverted to military use are not transferred to WMD developers, terrorist organizations, or people carrying out other dubious activities.

In Japan, export controls (*1) are carried out under the Foreign Exchange and Foreign Trade Act (Act No. 228 of 1949) (hereinafter referred to as "Foreign Exchange Act"). Therefore, in principle, in order to export (provide) cargo and technology regulated by the Foreign Exchange Act, it is necessary to obtain permission of the Minister of Economy, Trade and Industry. It is reminded that KAKENHI grantees must observe the Foreign Exchange Act as well as other laws, guidelines and circular notices issued by the government.

(*1) Japan's Security Export Control System established on the basis of international agreements mainly consists of (i) "List rules" which require permission of the Minister of Economy, Trade and Industry in principle when exporting cargo or providing technology that carry specifications and/or functions higher than certain levels, such as carbon fiber and numerically controlled machine tool etc., and (ii) "Catch-all regulation" which requires permission of the Minister of Economy, Trade and Industry when exporting cargo or providing technology that are not subject to regulation under the List rules but do fall under certain regulatory requirements (application requirements, consumer requirements and/or informed requirements).

Please note in particular that not only export of cargo but also provision of technology will be subject to the regulation by the Foreign Exchange Act. When providing a "List rules" technology to non-residents or providing it in a foreign country, prior permission for provision is required. "Provision of technology" includes not only providing technical information such as design drawings, specifications, manuals, samples, and prototypes via storage media such as paper, mail, CD, USB memory, but also providing work knowledge and technical assistance at seminars through technical instruction, skill training, etc. Researchers should be aware that there may be case in which technologies subject to regulation by the Foreign Exchange Act are involved when mentoring foreign students and/or joint research activities with oversea groups. Please also bear in mind that the provision of technologies, etc. acquired in KAKENHI-funded projects or the provision of technologies, etc. already in possession with the use of KAKENHI may also be subject to restrictions.

Details of the security trade control are published on the websites including the Ministry of Economy, Trade and Industry website.

○Ministry of Economy, Trade and Industry: Security Trade Control (General)
URL: http://www.meti.go.jp/policy/anpo/

○Ministry of Economy, Trade and Industry: “Handbook on Security Trade Control”
URL: https://www.meti.go.jp/policy/anpo/seminer/shiryo/handbook.pdf

○Center for Information on Security Trade Controls
URL: https://www.cistec.or.jp/index.html

○“Guidance for the Control of Sensitive Technologies for Security Export for Academic and Research Institutions 3rd Edition”
URL:
https://www.meti.go.jp/policy/anpo/law_document/tutatu/t07sonota/t07sonota_jishukanri03.pdf

8. Strict Implementation of United Nations Security Council Resolution 2321

In the face of the nuclear test by Democratic People’s Republic of Korea (DPRK) in September 2016 and repeated launches of ballistic missiles, the United Nations Security Council adopted the United Nations Security Council Resolution 2321 on November 30, 2016 (ET, New York) deciding to impose additional and stronger sanctions on DPRK. In this regard, MEXT issued a letter of request entitled, “Strict Implementation of United Nations Security Council Resolution 2321 (Request)” (28 受文科際第 98 号) to relevant organizations as of February 17, 2017.

“Scientific and technical cooperation” as set forth in Paragraph 11 in the main text of the Resolution not only includes technologies regulated by the Foreign Exchange and Foreign Trade Act of Japan, but all cooperative activities except for medical exchanges. Therefore, it is critical that research institutions exercise strict implementation of the Resolution when conducting various research activities including said sponsored research.
The UNSC Resolution 2321 can be found at:
○ MOFA: United Nations Security Council Resolution 2321, Japanese translation (MOFA Notice No. 463 (issued on December 9, 2016)
URL: https://www.mofa.go.jp/mofaj/files/000211409.pdf

9. Improvement of Treatment of Students in the Doctoral Course

“The 6th Science, Technology, and Innovation Basic Plan (Cabinet Decision on March 26, 2021)” addresses the need to enhance financial support for doctoral students in particular, in order to attract outstanding talents from home and abroad, and calls for research institutions to provide greater employment opportunities for doctoral students as research assistants (RAs) and to improve their treatment. To this end, the Basic Plan, for example, sets a numerical target to triple the number of doctoral students to receive subsidy roughly equivalent to their living cost (which is equivalent to about 30% of students enrolling in doctoral courses to receive such subsidy).

Furthermore, the “Guideline on Recruiting and Fostering Postdoctoral Fellows, Etc. (December 3, 2020, Committee on Human Resources, the Council for Science and Technology)” states that doctoral students “are students, but at the same time, also researchers in a certain way, and therefore

it is the key responsibility of universities that foster researchers to provide the environment for research activities and to ensure proper treatment…It is of particular importance to treat them based on appropriate assessment of their contribution, by establishing compensations that meet the nature and content of their jobs and paying hourly wages according to the actual work hours under the proper labor management…When submitting applications to competitive research funds and other grants, universities and institutions must record the expenditures necessary to employ RAs as direct expense, and revise the school rules as necessary to make sure that the RAs are paid proper compensations."

Based on the above, when employing a doctoral student as RA, etc. for a KAKENHI project, set the hourly wage according to the nature and content of his/her job based on the standard of each research institution and pay the wage according to the actual work hours under the proper labor management.

Furthermore, when employing a doctoral student as RA, etc., be mindful not to overload him/her with excessive work hours and make sure that he/she can maintain a good balance between the work and his/her own research and study hours.

10. Securing University Research Administrators (URAs) and other Management Personnel

The Sixth Science, Technology, and Innovation Basic Plan (Cabinet Decision on March 26, 2021) identifies the importance of efforts to improve the security of professional quality and treatment so that the positions of University Research Administrators (URAs) and other management personnel will become attractive. The Comprehensive Package to Strengthen Research Capacity and Support Young Researchers (January 23, 2020, Council for Science, Technology, and Innovation) also addresses the need to establish career paths for management personnel, URAs, engineers, etc. In light of these initiatives, research institutions are encouraged, to the extent possible, to secure certain lengths of fixed-term employment (of about five years or longer) for URAs and other management personnel (who are currently hired or will be hired newly by research institutions) when engaging them in the management of KAKENHI research programs, by using not only KAKENHI, but also funds such as indirect expenses and basic costs under other external funds, and donations, for example.
In addition, please make active efforts to provide support in securing career paths for these management personnel, for example, enrolling them in URA training, etc. Also consider utilizing the indirect expenses for such efforts.

11. Promoting Efforts to Support Gender Equality and Foster Human Resources

The Science, Technology, and Innovation Basic Plan (Cabinet Decision on March 26, 2021), the Basic Plan for Gender Equality (Cabinet Decision on December 25, 2020), and Education and Human Resource Development Policy Package toward the Realization of Society 5.0 (Decision by

the Council for Science, Technology and Innovation on June 2, 2022) aim to create research environments that make it easier for both men and women to continue their research activities when life events occur, such as childbirth, childcare, and nursing care, as well as to promote the appointment of excellent female researchers as project leaders, among other measures. Another goal is to increase the proportion of female students in middle and high school who advance to master's and doctoral courses especially in the science and engineering fields through initiatives to communicate the fascination of these areas to female students in middle and high school, their parents, and their teachers, thereby overcoming the current situation with a low percentage of female students going to doctoral courses in natural science and increasing the number of potential bearers of knowledge in Japan.

In addition, if due consideration is not paid to sexual differences in research and development processes that require such consideration, it may cause inappropriate impact at the stage of social implementation. As such, research and technological development that properly give attention to sexual differences, such as those in physique and the structure and functioning of bodies, are needed.

In light of these points, in KAKENHI-funded projects, JSPS will take into account efforts to promote the participation and advancement of female researchers and expand the range of human resources that will play a role in science and technology in the future.

To advance science, it is important to secure an environment that allows diverse researchers to exercise their potentials and advance their activities. In March 2020, JSPS established the “Basic Guidelines for Promoting Gender Equality in JSPS Programs” to promote gender equal participation in areas of science.

As part of this initiative, JSPS opened a new website CHEERS! (URL: https://cheers.jsps.go.jp/) in an aim to support the diverse careers of all researchers, such as balancing research and life events. JSPS will release useful information on, for example, how to balance research and childcare and actively carry out various initiatives through CHEERS! to create a network among researchers. Researchers are encouraged to visit the website.

12. ”HIRAMEKI☆TOKIMEKI SCIENCE – Welcome to a University Lab – Science That Inspires and Inspirits”

The “HIRAMEKI☆TOKIMEKI SCIENCE” program is designed to offer opportunities to gain a deeper understanding of the meaning of science and its roles in daily life to society, as part of efforts to give back to society and promote KAKENHI-funded research achievements.

Based on their KAKENHI-funded academic studies, researchers themselves communicate the fun and fascination of scientific pursuit directly to the younger generation in an easy-to-understand manner. They thus instill intellectual curiosity and a rich sense of creativity in pupils in their fifth and sixth years of elementary school and students in middle and high school, who will go on to shoulder the future of Japan. As we are looking for such experience-based programs, regardless of areas of research, please take advantage of this opportunity.

URL: https://www.jsps.go.jp/j-hirameki/

Attached Table 5

Grants-in-Aid for Scientific Research-KAKENHI-

“Review Section Table”

March 9, 2022

Subdivision on Research Grant Screening Section of the Academic Deliberation
in the Subdivision on Science, Council for Science and Technology

About the Review Section Table

○The Review Section Table is classified by sections for the KAKENHI's review criteria. Applicants should select a review section that is most suitable for their own research proposal.

○There are three review sections: Basic, Medium-sized and Broad. The Review Section Table contains 1) Overview, 2) Table for Basic Section, 3) Table for Medium-sized and Broad Sections. Looking at the Overview, the applicants can understand an overall picture of sections. In addition, check the each Review Section Table for the detailed contents of each section and select a review section for their research proposal.

○The Basic Section is the fundamental unit. The Basic Section applies to "Grant-in-Aid for Scientific Research (B/C) (application section "General")" and for "Grant-in-Aid for Early-Career Scientists." Each Basic Section offers some examples related to the research contents. They are to help applicants understand the content of the Basic Section, so applicants are allowed to submit proposals even if the content is not given as examples.

○The Medium-sized Section applies to "Grant-in-Aid for Scientific Research (A) (application section "General")" and "Grant-in-Aid for Challenging Research (Pioneering/Exploratory)." Several Basic Sections are attached to indicate the scope of review for the Medium-sized Section. However, applicants are allowed to submit proposals even if the content does not fall under the Basic Sections included in the Medium-sized Section. It should be noted that some Basic Sections are included in several Medium-sized Sections, so applicants can select the Medium-sized Section that they consider most suitable for their own research proposal.

○The Broad Section applies to "Grant-in-Aid for Scientific Research (S)."
Several Medium-sized Sections are attached to indicate the scope of review of the Broad Section. However, applicants are allowed to submit proposals even if the content does not fall under the Medium-sized Sections included in the Broad Section. It should be noted that some Medium-sized Sections are included in several Broad Sections, so applicants can select the Broad Section that they consider most suitable for their own research proposal.

○To respond flexibly to research diversity in the review process, application in the Basic, Medium-sized and Broad Sections is made in the following formats: Basic Section: "○○ -related"; Medium-sized Section: "○○ and related fields," and Broad Section: listed alphabetically.

The Review Section Table (Overview)

Broad Section A		
Medium-sized Section 1 : Philosophy, art, and related fields		
	Basic Section	
	01010	Philosophy and ethics-related
	01020	Chinese philosophy, Indian philosophy and Buddhist philosophy-related
	01030	Religious studies-related
	01040	History of thought-related
	01050	Aesthetics and art studies-related
	01060	History of arts-related
	01070	Theory of art practice-related
	01080	Sociology of science, history of science and technology-related
	90010	Design-related
Medium-sized Section 2 : Literature, linguistics, and related fields		
	Basic Section	
	02010	Japanese literature-related
	02020	Chinese literature-related
	02030	English literature and literature in the English language-related
	02040	European literature-related
	02050	Literature in general-related
	02060	Linguistics-related
	02070	Japanese linguistics-related
	02080	English linguistics-related
	02090	Japanese language education-related
	02100	Foreign language education-related
	90020	Library and information science, humanistic and social informatics-related
Medium-sized Section 3 : History, archaeology, museology, and related fields		
	Basic Section	
	03010	Historical studies in general-related
	03020	Japanese history-related
	03030	History of Asia and Africa-related
	03040	History of Europe and America-related
	03050	Archaeology-related
	03060	Cultural assets study-related
	03070	Museology-related
Medium-sized Section 4 : Geography, cultural anthropology, folklore, and related fields		
	Basic Section	
	04010	Geography-related
	04020	Human geography-related
	04030	Cultural anthropology and folklore-related
	80010	Area studies-related
	80020	Tourism studies-related
	80030	Gender studies-related

Broad Section A (continued)		
Medium-sized Section 5 : Law and related fields		
	Basic Section	
	05010	Legal theory and history-related
	05020	Public law-related
	05030	International law-related
	05040	Social law-related
	05050	Criminal law-related
	05060	Civil law-related
	05070	New fields of law-related
Medium-sized Section 6 : Political science and related fields		
	Basic Section	
	06010	Politics-related
	06020	International relations-related
	80010	Area studies-related
	80030	Gender studies-related
Medium-sized Section 7 : Economics, business administration, and related fields		
	Basic Section	
	07010	Economic theory-related
	07020	Economic doctrines and economic thought-related
	07030	Economic statistics-related
	07040	Economic policy-related
	07050	Public economics and labor economics-related
	07060	Money and finance-related
	07070	Economic history-related
	07080	Business administration-related
	07090	Commerce-related
	07100	Accounting-related
	80020	Tourism studies-related
Medium-sized Section 8 : Sociology and related fields		
	Basic Section	
	08010	Sociology-related
	08020	Social welfare-related
	08030	Family and consumer sciences, and culture and living-related
	80020	Tourism studies-related
	80030	Gender studies-related

Broad Section A (continued)		
Medium-sized Section 9 : Education and related fields		
	Basic Section	
	09010	Education-related
	09020	Sociology of education-related
	09030	Childhood and nursery/pre-school education-related
	09040	Education on school subjects and primary/ secondary education-related
	09050	Tertiary education-related
	09060	Special needs education-related
	09070	Educational technology-related
	09080	Science education-related
	02090	Japanese language education-related
	02100	Foreign language education-related
Medium-sized Section 10 : Psychology and related fields		
	Basic Section	
	10010	Social psychology-related
	10020	Educational psychology-related
	10030	Clinical psychology-related
	10040	Experimental psychology-related
	90030	Cognitive science-related

Broad Section B		
Medium-sized Section 11 : Algebra, geometry, and related fields		
	Basic Section	
	11010	Algebra-related
	11020	Geometry-related
Medium-sized Section 12 : Analysis, applied mathematics, and related fields		
	Basic Section	
	12010	Basic analysis-related
	12020	Mathematical analysis-related
	12030	Basic mathematics-related
	12040	Applied mathematics and statistics-related
Medium-sized Section 13 : Condensed matter physics and related fields		
	Basic Section	
	13010	Mathematical physics and fundamental theory of condensed matter physics-related
	13020	Semiconductors, optical properties of condensed matter and atomic physics-related
	13030	Magnetism, superconductivity and strongly correlated systems-related
	13040	Biophysics, chemical physics and soft matter physics-related
Medium-sized Section 14 : Plasma science and related fields		
	Basic Section	
	14010	Fundamental plasma-related
	14020	Nuclear fusion-related
	14030	Applied plasma science-related
	80040	Quantum beam science-related
Medium-sized Section 15 : Particle-, nuclear-, astro-physics, and related fields		
	Basic Section	
	80040	Quantum beam science-related
	15010	Theoretical studies related to particle-, nuclear-, cosmic ray and astro-physics
	15020	Experimental studies related to particle-, nuclear-, cosmic ray and astro-physics
Medium-sized Section 16 : Astronomy and related fields		
	Basic Section	
	16010	Astronomy-related
Medium-sized Section 17 : Earth and planetary science and related fields		
	Basic Section	
	17010	Space and planetary sciences-related
	17020	Atmospheric and hydrospheric sciences-related
	17030	Human geosciences-related
	17040	Solid earth sciences-related
	17050	Biogeosciences-related

Broad Section C

Medium-sized Section 18: Mechanics of materials, production engineering, design engineering, and related fields

Basic Section	
18010	Mechanics of materials and materials-related
18020	Manufacturing and production engineering-related
18030	Design engineering-related
18040	Machine elements and tribology-related

Medium-sized Section 19: Fluid engineering, thermal engineering, and related fields

Basic Section	
19010	Fluid engineering-related
19020	Thermal engineering-related

Medium-sized Section 20: Mechanical dynamics, robotics, and related fields

Basic Section	
20010	Mechanics and mechatronics-related
20020	Robotics and intelligent system-related

Medium-sized Section 21: Electrical and electronic engineering and related fields

Basic Section	
21010	Power engineering-related
21020	Communication and network engineering-related
21030	Measurement engineering-related
21040	Control and system engineering-related
21050	Electric and electronic materials-related
21060	Electron device and electronic equipment-related

Medium-sized Section 22: Civil engineering and related fields

Basic Section	
22010	Civil engineering material, execution and construction management-related
22020	Structure engineering and earthquake engineering-related
22030	Geotechnical engineering-related
22040	Hydroengineering-related
22050	Civil engineering plan and transportation engineering-related
22060	Environmental systems for civil engineering-related

Medium-sized Section 23: Architecture, building engineering, and related fields

Basic Section	
23010	Building structures and materials-related
23020	Architectural environment and building equipment-related
23030	Architectural planning and city planning-related
23040	Architectural history and design-related
90010	Design-related

Medium-sized Section 24: Aerospace engineering, marine and maritime engineering, and related fields

Basic Section	
24010	Aerospace engineering-related
24020	Marine engineering-related

Medium-sized Section 25: Social systems engineering, safety engineering, disaster prevention engineering, and related fields

Basic Section	
25010	Social systems engineering-related
25020	Safety engineering-related
25030	Disaster prevention engineering-related

Broad Section D

Medium-sized Section 26: Materials engineering and related fields

Basic Section	
26010	Metallic material properties-related
26020	Inorganic materials and properties-related
26030	Composite materials and interfaces-related
26040	Structural materials and functional materials-related
26050	Material processing and microstructure control-related
26060	Metals production and resources production-related

Medium-sized Section 27: Chemical engineering and related fields

Basic Section	
27010	Transport phenomena and unit operations-related
27020	Chemical reaction and process system engineering-related
27030	Catalyst and resource chemical process-related
27040	Biofunction and bioprocess engineering-related

Medium-sized Section 28: Nano/micro science and related fields

Basic Section	
28010	Nanometer-scale chemistry-related
28020	Nanostructural physics-related
28030	Nanomaterials-related
28040	Nanobioscience-related
28050	Nano/micro-systems-related

Medium-sized Section 29: Applied condensed matter physics and related fields

Basic Section	
29010	Applied physical properties-related
29020	Thin film/surface and interfacial physical properties-related
29030	Applied condensed matter physics-related

Medium-sized Section 30: Applied physics and engineering and related fields

Basic Section	
30010	Crystal engineering-related
30020	Optical engineering and photon science-related

Medium-sized Section 31: Nuclear engineering, earth resources engineering, energy engineering, and related fields

Basic Section	
31010	Nuclear engineering-related
31020	Earth resource engineering, Energy sciences-related

Medium-sized Section 90: Biomedical engineering and related fields

Basic Section	
90110	Biomedical engineering-related
90120	Biomaterials-related
90130	Medical systems-related
90140	Medical technology assessment-related
90150	Medical assistive technology-related

Broad Section E

Medium-sized Section 32: Physical chemistry, functional solid state chemistry, and related fields

Basic Section	
32010	Fundamental physical chemistry-related
32020	Functional solid state chemistry-related

Medium-sized Section 33: Organic chemistry and related fields

Basic Section	
33010	Structural organic chemistry and physical organic chemistry-related
33020	Synthetic organic chemistry-related

Medium-sized Section 34: Inorganic/coordination chemistry, analytical chemistry, and related fields

Basic Section	
34010	Inorganic/coordination chemistry-related
34020	Analytical chemistry-related
34030	Green sustainable chemistry and environmental chemistry-related

Medium-sized Section 35: Polymers, organic materials, and related fields

Basic Section	
35010	Polymer chemistry-related
35020	Polymer materials-related
35030	Organic functional materials-related

Medium-sized Section 36 : Inorganic materials chemistry, energy-related chemistry, and related fields

Basic Section	
36010	Inorganic compounds and inorganic materials chemistry-related
36020	Energy-related chemistry

Medium-sized Section 37: Biomolecular chemistry and related fields

Basic Section	
37010	Bio-related chemistry
37020	Chemistry and chemical methodology of biomolecules-related
37030	Chemical biology-related

Broad Section F

Medium-sized Section 38 : Agricultural chemistry and related fields

Basic Section	
38010	Plant nutrition and soil science-related
38020	Applied microbiology-related
38030	Applied biochemistry-related
38040	Bioorganic chemistry-related
38050	Food sciences-related
38060	Applied molecular and cellular biology-related

Medium-sized Section 39: Agricultural and environmental biology and related fields

Basic Section	
39010	Science in plant genetics and breeding-related
39020	Crop production science-related
39030	Horticultural science-related
39040	Plant protection science-related
39050	Insect science-related
39060	Conservation of biological resources-related
39070	Landscape science-related

Medium-sized Section 40: Forestry and forest products science, applied aquatic science, and related fields

Basic Section	
40010	Forest science-related
40020	Wood science-related
40030	Aquatic bioproduction science-related
40040	Aquatic life science-related

Medium-sized Section 41: Agricultural economics and rural sociology, agricultural engineering, and related fields

Basic Section	
41010	Agricultural and food economics-related
41020	Rural sociology and agricultural structure-related
41030	Rural environmental engineering and planning-related
41040	Agricultural environmental engineering and agricultural information engineering-related
41050	Environmental agriculture-related

Medium-sized Section 42: Veterinary medical science, animal science, and related fields

Basic Section	
42010	Animal production science-related
42020	Veterinary medical science-related
42030	Animal life science-related
42040	Laboratory animal science-related

Broad Section G		
Medium-sized Section 43 : Biology at molecular to cellular levels, and related fields		
	Basic Section	
	43010	Molecular biology-related
	43020	Structural biochemistry-related
	43030	Functional biochemistry-related
	43040	Biophysics-related
	43050	Genome biology-related
	43060	System genome science-related
Medium-sized Section 44 : Biology at cellular to organismal levels, and related fields		
	Basic Section	
	44010	Cell biology-related
	44020	Developmental biology-related
	44030	Plant molecular biology and physiology-related
	44040	Morphology and anatomical structure-related
	44050	Animal physiological chemistry, physiology and behavioral biology-related
Medium-sized Section 45 : Biology at organismal to population levels and anthropology, and related fields		
	Basic Section	
	45010	Genetics-related
	45020	Evolutionary biology-related
	45030	Biodiversity and systematics-related
	45040	Ecology and environment-related
	45050	Physical anthropology-related
	45060	Applied anthropology-related
Medium-sized Section 46 : Neuroscience and related fields		
	Basic Section	
	46010	Neuroscience-general-related
	46020	Anatomy and histopathology of nervous system-related
	46030	Function of nervous system-related

Broad Section H		
Medium-sized Section 47 : Pharmaceutical sciences and related fields		
	Basic Section	
	47010	Pharmaceutical chemistry and drug development sciences-related
	47020	Pharmaceutical analytical chemistry and physicochemistry-related
	47030	Pharmaceutical hygiene and biochemistry-related
	47040	Pharmacology-related
	47050	Environmental and natural pharmaceutical resources-related
	47060	Clinical pharmacy-related
Medium-sized Section 48 : Biomedical structure and function and related fields		
	Basic Section	
	48010	Anatomy-related
	48020	Physiology-related
	48030	Pharmacology-related
	48040	Medical biochemistry-related
Medium-sized Section 49 : Pathology, infection/immunology, and related fields		
	Basic Section	
	49010	Pathological biochemistry-related
	49020	Human pathology-related
	49030	Experimental pathology-related
	49040	Parasitology-related
	49050	Bacteriology-related
	49060	Virology-related
	49070	Immunology-related

Broad Section I		
Medium-sized Section 50 : Oncology and related fields		
	Basic Section	
	50010	Tumor biology-related
	50020	Tumor diagnostics and therapeutics-related
Medium-sized Section 51 : Brain sciences and related fields		
	Basic Section	
	51010	Basic brain sciences-related
	51020	Cognitive and brain science-related
	51030	Pathophysiologic neuroscience-related
Medium-sized Section 52 : General internal medicine and related fields		
	Basic Section	
	52010	General internal medicine-related
	52020	Neurology-related
	52030	Psychiatry-related
	52040	Radiological sciences-related
	52050	Embryonic medicine and pediatrics-related
Medium-sized Section 53 : Organ-based internal medicine and related fields		
	Basic Section	
	53010	Gastroenterology-related
	53020	Cardiology-related
	53030	Respiratory medicine-related
	53040	Nephrology-related
	53050	Dermatology-related
Medium-sized Section 54 : Internal medicine of the bio-information integration and related fields		
	Basic Section	
	54010	Hematology and medical oncology-related
	54020	Connective tissue disease and allergy-related
	54030	Infectious disease medicine-related
	54040	Metabolism and endocrinology-related
Medium-sized Section 55 : Surgery of the organs maintaining homeostasis and related fields		
	Basic Section	
	55010	General surgery and pediatric surgery-related
	55020	Digestive surgery-related
	55030	Cardiovascular surgery-related
	55040	Respiratory surgery-related
	55050	Anesthesiology-related
	55060	Emergency medicine-related
Medium-sized Section 56 : Surgery related to the biological and sensory functions and related fields		
	Basic Section	
	56010	Neurosurgery-related
	56020	Orthopedics-related
	56030	Urology-related
	56040	Obstetrics and gynecology-related
	56050	Otorhinolaryngology-related
	56060	Ophthalmology-related
	56070	Plastic and reconstructive surgery-related

Broad Section I (continued)		
Medium-sized Section 57 : Oral science and related fields		
	Basic Section	
	57010	Oral biological science-related
	57020	Oral pathobiological science-related
	57030	Conservative dentistry-related
	57040	Regenerative dentistry and dental engineering-related
	57050	Prosthodontics-related
	57060	Surgical dentistry-related
	57070	Developmental dentistry-related
	57080	Social dentistry-related
Medium-sized Section 58 : Society medicine, nursing, and related fields		
	Basic Section	
	58010	Medical management and medical sociology-related
	58020	Hygiene and public health-related: including laboratory approach
	58030	Hygiene and public health-related: excluding laboratory approach
	58040	Forensics medicine-related
	58050	Fundamental of nursing-related
	58060	Clinical nursing-related
	58070	Lifelong developmental nursing-related
	58080	Gerontological nursing and community health nursing-related
Medium-sized Section 59 : Sports sciences, physical education, health sciences, and related fields		
	Basic Section	
	59010	Rehabilitation science-related
	59020	Sports sciences-related
	59030	Physical education, and physical and health education-related
	59040	Nutrition science and health science-related
Medium-sized Section 90 : Biomedical engineering and related fields		
	Basic Section	
	90110	Biomedical engineering-related
	90120	Biomaterials-related
	90130	Medical systems-related
	90140	Medical technology assessment-related
	90150	Medical assistive technology-related

Broad Section J

Medium-sized Section 60 : Information science, computer engineering, and related fields

Basic Section	
60010	Theory of informatics-related
60020	Mathematical informatics-related
60030	Statistical science-related
60040	Computer system-related
60050	Software-related
60060	Information network-related
60070	Information security-related
60080	Database-related
60090	High performance computing-related
60100	Computational science-related

Medium-sized Section 61 : Human informatics and related fields

Basic Section	
61010	Perceptual information processing-related
61020	Human interface and interaction-related
61030	Intelligent informatics-related
61040	Soft computing-related
61050	Intelligent robotics-related
61060	Kansei informatics-related
90010	Design-related
90030	Cognitive science-related

Medium-sized Section 62 : Applied informatics and related fields

Basic Section	
62010	Life, health and medical informatics-related
62020	Web informatics and service informatics-related
62030	Learning support system-related
62040	Entertainment and game informatics-related
90020	Library and information science, humanistic and social informatics-related

Broad Section K

Medium-sized Section 63 : Environmental analyses and evaluation and related fields

Basic Section	
63010	Environmental dynamic analysis-related
63020	Radiation influence-related
63030	Chemical substance influence on environment-related
63040	Environmental impact assessment-related

Medium-sized Section 64 : Environmental conservation measure and related fields

Basic Section	
64010	Environmental load and risk assessment-related
64020	Environmental load reduction and remediation-related
64030	Environmental materials and recycle technology-related
64040	Social-ecological systems-related
64050	Sound material-cycle social systems-related
64060	Environmental policy and social systems-related

The Review Section Table (Table for Basic Section)

When selecting a review section, applicants should first acquire an overall picture of the review sections based on the Review Section Table (Overview). In addition, check the Review Section Table (Table for Basic Section) for the detailed contents of each section and select a review section for their research proposal.

Also, some items of Basic Section may be presented in plural Medium-sized and Broad Sections. The items of Basic Section presented in plural Medium-sized Section are 9 and 3 items among 9 are presented in plural Medium-sized and Broad Sections (as shown below).

In addition, five other Basic Sections (90110-90150) may be presented in only one Medium-sized Section and two Broad Sections.

When selecting a Medium-sized or Broad Section, applicants should refer to the Attachment 2 “Review Section Table (Table for Medium-sized and Broad Sections), and select the one that seems to be most suitable for their own research proposal.

【Basic sections may be presented in plural Medium-sized and Broad Section】

Basic Section Item	Basic Section Description	Medium-sized Sections corresponding Basic Sections	Broad Sections corresponding Basic Sections
02090	Japanese language education-related	２，９	A
02100	Foreign language education-related	２，９	A
80010	Area studies-related	４，６	A
80020	Tourism studies-related	４，７，８	A
80030	Gender studies-related	４，６，８	A
80040	Quantum beam science-related	１４，１５	B
90010	Design-related	１，２３，６１	A，C，J
90020	Library and information science, humanistic and social informatics-related	２，６２	A，J
90030	Cognitive science-related	１０，６１	A，J
90110	Biomedical engineering-related	９０	D，I
90120	Biomaterials-related	９０	D，I
90130	Medical systems-related	９０	D，I
90140	Medical technology assessment-related	９０	D，I
90150	Medical assistive technology-related	９０	D，I

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
01010	Philosophy and ethics-related Philosophy in general, Ethics in general, Western philosophy, Western ethics, Japanese philosophy, Japanese ethics, Applied ethics, etc.	1	A
01020	Chinese philosophy, Indian philosophy and Buddhist philosophy-related Chinese philosophy/thought, Indian philosophy/thought, Buddhist philosophy, Bibliography, Philology, etc.	1	A
01030	Religious studies-related History of religions, Philosophy of religion, Theology, Sociology of religion, Psychology of religion, Anthropology of religion,Studies of religious folklore, Mythology, Bibliography, Philology, etc.	1	A
01040	History of thought-related History of thought in general, History of Western thought, History of Eastern thought, History of Japanese thought, History of Islamic thought, etc.	1	A
01050	Aesthetics and art studies-related Philosophy of art, Aesthetics, Music theory, Theatrical theory, Miscellaneous art studies, etc.	1	A
01060	History of arts-related Japanese art, Eastern art, Western art, Contemporary art, Craft, Design, Architecture, Costume, Photography, etc.	1	A
01070	Theory of art practice-related Art expression, Arts management, Art policy, Art production, etc.	1	A
01080	Sociology of science, history of science and technology-related Sociology of science, History of science, History of technology, History of medicine, Industrial archeology, Philosophy of science, Foundation of science, STS (Science, technology and society), etc.	1	A
02010	Japanese literature-related Japanese literature in general, Ancient literature, Medieval literature, Chinese classics in Japan, Bibliography, Philology, Premodern literature, Modern literature, Contemporary literature, Literary theory, etc.	2	A
02020	Chinese literature-related Chinese literature, Bibliography, Philology, Literary theory, etc.	2	A
02030	English literature and literature in the English language-related English literature, American literature, Literature in the English language, Literary theory, Bibliography, Philology, etc.	2	A
02040	European literature-related French literature, Literature in the French language, German literature, Literature in the German language, Classics, Russian and East European literature, Literature in other European languages, Literary theory, Bibliography, Philology, etc.	2	A
02050	Literature in general-related Literature in other languages and areas, Literary theory, Comparative literature, Bibliography, Philology, Literature education, etc.	2	A
02060	Linguistics-related Phonetics/phonology, Semantics/pragmatics, Morphosyntax, Sociolinguistics, Contrastive linguistics, Psycholinguistics, Neurolinguistics, Historical linguistics, Corpus linguistics, Endangered and minority languages, etc.	2	A

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
02070	Japanese linguistics-related Phonetics/phonology, Writing systems, Lexicon and semantics, Grammar, Stylistics, Pragmatics, Language life, Dialect, History of the Japanese language, History of Japanese linguistics, etc.	2	A
02080	English linguistics-related Phonetics/phonology, Lexicon and semantics, Grammar, Stylistics, Pragmatics, Sociolinguistics, Diversity of the English language, Corpus linguistics, History of the English language, History of English linguistics, etc.	2	A
02090	Japanese language education-related Research on learners, Language acquisition, Teaching material, Curriculum evaluation, Japanese language education for specific purposes, Bilingual education, Research on teachers, Japanese language for Japanese language education, History of Japanese language education, Cross-cultural understanding, etc.	2, 9	A
02100	Foreign language education-related Learning method, Computer-assisted language learning (CALL), Teaching material, Language testing, Theory of second language acquisition, Early English education, History of foreign language education and language policies, Curriculum evaluation, Training foreign language teachers, Cross-cultural understanding, etc.	2, 9	A
03010	Historical studies in general-related Historical theory, Historical methodology, Research in historical materials, Memory and medium, World history, History of cultural and diplomatic exchange, Comparative history, Global history, Environmental history, History of emotions, etc.	3	A
03020	Japanese history-related History of ancient Japan, History of medieval Japan, History of early modern Japan, History of modern Japan, History of local Japan, History of external relations, History of culture and religion, History of Japanese environment, History of Japanese city, Research in historical materials, etc.	3	A
03030	History of Asia and Africa-related Chinese history, East Asian history, Central Eurasian history, Southeast Asian history, Oceanian history, South Asian history, West Asian history, African history, History of cultural and diplomatic exchange, Research in historical materials, etc.	3	A
03040	History of Europe and America-related Ancient European history, Medieval European history, Modern and contemporary West European history, Modern and contemporary East European history, North and South American history, History of cultural and diplomatic exchange, Comparative history, Research in historical materials, etc.	3	A
03050	Archaeology-related Archaeology in general, Prehistoric archaeology, Historical archaeology, Japanese archaeology, Ancient civilizations, History of material culture, Experimental archaeology, Information archaeology, Study of buried cultural property, Ecological archeology, etc.	3	A
03060	Cultural assets study-related Dating methods, Material analysis, Production techniques, Conservation science, Archaeological prospection, Plant and animal residues, Human remains, Cultural heritage, Cultural property policy, Restoration of cultural properties, etc.	3	A

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
03070	Museology-related Museum displays and exhibitions, Museum management, Museum collections and documentation, Museum conservation and preservation, Museum education and learning, Museum informatics and media studies, Museum finance and administration, History of museums and museology, etc.	3	A
04010	Geography-related Geography in general, Land use, Landscape, Environmental system, Geomorphology, Climatology, Hydrology, Cartography, Geographic information system, Regional planning, etc.	4	A
04020	Human geography-related Human geography in general, Economic geography, Social geography, Political geography, Cultural geography, Urban geography, Rural geography, Historical geography, Regional geography, Geography education, etc.	4	A
04030	Cultural anthropology and folklore-related Cultural anthropology in general, Folklore in general, Material culture, Ecology, Social relationship, Religion, Arts, Health care, Border crossing, Minority, etc.	4	A
80010	Area studies-related Area studies in general, Cross-regional comparative studies, Aid, Social development, Interregional exchange, Environment, Transnationalism, Globalization, Refugees, Conflict, etc.	4, 6	A
80020	Tourism studies-related Tourism studies in general, Tourism resources, Tourism policy, Tourism industry, Tourist area, Tourists, Tourism culture, Tourism media, Sustainable tourism, Tourism ethics, etc.	4, 7, 8	A
80030	Gender studies-related Gender studies in general, Feminism, Men's studies, Sexuality, Queer studies, Labor, Violence, Prostitution, Reproductive technology, Gender equality, etc.	4, 6, 8	A
05010	Legal theory and history-related Legal philosophy, Roman law, Legal history, Sociology of law, Comparative law, Foreign law, Law and policy, Law and economics, Judicial system, etc.	5	A
05020	Public law-related Constitutional law, Administrative law, Tax law, etc.	5	A
05030	International law-related Public international law, Private international law, International human rights law, International economic law, EU law, etc.	5	A
05040	Social law-related Labor law, Economic law, Social security law, Education law, etc.	5	A
05050	Criminal law-related Criminal law, Criminal procedure, Criminology, Criminal justice policy, Juvenile law, Law and psychology, etc.	5	A
05060	Civil law-related Civil law, Commercial law, Civil procedure, Insolvency law, Alternative dispute resolution, etc.	5	A
05070	New fields of law-related Environmental law, Medical law, Information law, Consumer law, Intellectual property law, Law and gender, Legal profession, etc.	5	A

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
06010	Politics-related Political theory, History of political thought, Political history, Political process, Political participation, Political economy, Public administration, Local government, Comparative politics, Public policy, etc.	6	A
06020	International relations-related Theory of international relations, International history, Foreign policy, International security, International political economy, Global governance, International cooperation, Peace research, etc.	6	A
07010	Economic theory-related Microeconomics, Macroeconomics, Game theory, Behavioral economics, Experimental economics, Economic theory, Evolutionary economics, Economic institutions, Economic systems, etc.	7	A
07020	Economic doctrines and economic thought-related Economic doctrines, Economic thought, Social thought, Economic philosophy, etc.	7	A
07030	Economic statistics-related Statistical system, Statistical research, Economic statistics, Big data, Econometrics, Financial econometrics, etc.	7	A
07040	Economic policy-related Economic policy, Industrial organization, International economics, Development economics, Environmental and resource economics, Japanese economy, Regional economy, Urban economics, Transportation economics, Spatial economics, etc.	7	A
07050	Public economics and labor economics-related Public finance, Public economics, Health economics, Labor economics, Social security, Education economics, Law and economics, Political economy, Demography, etc.	7	A
07060	Money and finance-related Monetary economics, Finance, International finance, Corporate finance, Financial engineering, Insurance, etc.	7	A
07070	Economic history-related Economic history, Business history, Industrial history, etc.	7	A
07080	Business administration-related Organization theory, Corporate strategy, Organizational behavior, Corporation theory, Corporate governance theory, Human resource management, Technology/Innovation management theory, International business, Management information, Business administration in general, etc.	7	A
07090	Commerce-related Marketing, Consumer behavior, Distributive sciences, Logistics, Commerce in general, etc.	7	A
07100	Accounting-related Financial accounting, Management accounting, Auditing, Accounting in general, etc.	7	A
08010	Sociology-related Sociology in general, Community, Family, Labor, Stratification, Culture, Media, Ethnicity, Social movements, Social research, etc.	8	A

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
08020	Social welfare-related Social work, Social policy, Social welfare history, Child welfare, Social welfare for people with disabilities, Social welfare for aging, Community welfare, Poverty, Volunteerism, Social welfare in general, etc.	8	A
08030	Family and consumer sciences, and culture and living-related Dress and fashion, Diet habits, Housing, Family resource management, Family relations, Lifestyle, Culture and living, Family and consumer education, Family and consumer sciences in general, etc.	8	A
09010	Education-related History of education, Philosophy of education, Curriculum and pedagogy, Teacher and trainer, School education, Social and community education, Institutions and administration, Comparative education, Educational administration, etc.	9	A
09020	Sociology of education-related Sociology of education, Socialization, Educational community, Destination and career formation, Class disparities, Gender, Education policy, Globalization and development, etc.	9	A
09030	Childhood and nursery/pre-school education-related Childhood, Nursery/pre-school education, Right of child, Development, Contents and methods of child care, Childcare facilities and kindergarten, Caregiver and pre-school teacher, Child care support, Childhood culture, History and thought, etc.	9	A
09040	Education on school subjects and primary/secondary education-related Education of individual subjects, Lessons of each subject area, Instructional guidance, Teacher education, Special activities, Integrated studies, Moral education, etc.	9	A
09050	Tertiary education-related Policy, Admission and articulation, Curriculum, Career guidance, Teacher and staff, Scientific research, Regional link and contribution, Globalization, Management and governance, Non-university higher education, etc.	9	A
09060	Special needs education-related Philosophy and history, Inclusion and cohesive society, Instructions and supports, Developmental disabilities, Emotional disturbance, Intellectual disabilities, Language disorders, Physical disabilities, Career education, etc.	9	A
09070	Educational technology-related Curriculum development, Teaching-learning support systems, Utilization of media, Utilization of ICT, Teacher's education, Information literacy, etc.	9	A
09080	Science education-related Science education, Science communication, Scientific literacy, Science and society, STEM education, etc.	9	A
10010	Social psychology-related Social psychology in general, Self, Group, Attitude and behavior, Affection/emotion, Interpersonal relation, Social issues, Culture, etc.	10	A
10020	Educational psychology-related Educational psychology in general, Development, Family, School, Clinical practice, Personality, Learning, Assessment and evaluation, etc.	10	A

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
10030	Clinical psychology-related Clinical psychology in general, Psychological disorder, Assessment, Psychological intervention, Training, Mental health, Crime and delinquency, Community, etc.	10	A
10040	Experimental psychology-related Experimental psychology in general, Sensation, Perception, Attention, Memory, Language, Emotion, Learning, etc.	10	A
11010	Algebra-related Group theory, Ring theory, Representation theory, Algebraic combinatorics, Number theory, Arithmetic geometry, Algebraic geometry, Algebraic analysis, etc.	11	B
11020	Geometry-related Differential geometry, Riemannian geometry, Symplectic geometry, Complex geometry, Topology, Differential topology, Low dimensional topology, etc.	11	B
12010	Basic analysis-related Functional analysis, Complex analysis, Probability theory, Harmonic analysis, Operator theory, Spectral analysis, Operator algebras, Algebraic analysis, Representation theory, etc.	12	B
12020	Mathematical analysis-related Functional equations, Real analysis, Dynamical system, Variational method, Nonlinear analysis, Applied analysis, etc.	12	B
12030	Basic mathematics-related Mathematical logic and foundations, Information theory, Discrete mathematics, Computer mathematics, History of mathematics, etc.	12	B
12040	Applied mathematics and statistics-related Numerical analysis, Mathematical modelling, Optimal control, Game theory, Statistical mathematics, etc.	12	B
13010	Mathematical physics and fundamental theory of condensed matter physics-related Statistical physics, Fundamental theory of condensed matter physics, Mathematical physics, Nonequilibrium nonlinear physics, Fluid dynamics, Computational physics, Quantum information theory, etc.	13	B
13020	Semiconductors, optical properties of condensed matter and atomic physics-related Semiconductors, Dielectrics, Atoms and molecules, Mesoscopic systems, Crystals, Surfaces and interfaces, Optical properties of condensed matter, Quantum electronics, Quantum information, etc.	13	B
13030	Magnetism, superconductivity and strongly correlated systems-related Magnetism, Strongly correlated electron systems, Superconductivity, Quantum fluids and solids, Molecular solids, etc.	13	B
13040	Biophysics, chemical physics and soft matter physics-related Physics of biological phenomena, Physics of biological matters, Liquids and glasses, Soft matters, Rheology, etc.	13	B
14010	Fundamental plasma-related Basic plasmas, Magnetized plasmas, Laser plasmas, Strongly coupled plasmas, Plasma diagnostics, Astrophysical and space plasmas, etc.	14	B
14020	Nuclear fusion-related Plasma confinement, Plasma control, Plasma heating, Plasma diagnostics, Edge plasma, Plasma wall interaction, Inertial fusion, Fusion material, Fusion system, etc.	14	B

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
14030	Applied plasma science-related Plasma processing, Plasma material science, General plasma applications, etc.	14	B
80040	Quantum beam science-related Accelerators, Beam physics, Radiation detectors, Beam control, Applied quantum beam science, etc.	14, 15	B
15010	Theoretical studies related to particle-, nuclear-, cosmic ray and astro-physics Particle physics, Nuclear physics, Cosmic-ray physics, Astrophysics, Relativity, Gravity, etc.	15	B
15020	Experimental studies related to particle-, nuclear-, cosmic ray and astro-physics Particle physics, Nuclear physics, Cosmic-ray physics, Astrophysics, Relativity, Gravity, etc.	15	B
16010	Astronomy-related Theoretical astronomy, Radio astronomy, Optical/infrared astronomy, X-ray/γ-ray astronomy, Astrometry, Solar physics, Exoplanet astronomy, etc.	16	B
17010	Space and planetary sciences-related Solar-terrestrial physics, Aeronomy, Planetary science, Exoplanetary science, Extraterrestrial material science, etc.	17	B
17020	Atmospheric and hydrospheric sciences-related Climate system, Atmospheric science, Ocean science, Limnology, Glaciology, Paleoclimatology, etc.	17	B
17030	Human geosciences-related Geoenvironmental science, Natural disaster science, Geospatial information science, Quaternary research, Earth resources science, etc.	17	B
17040	Solid earth sciences-related Solid earth geophysics, Geology, Earth's interior material science, Solid earth geochemistry, etc.	17	B
17050	Biogeosciences-related Origin and evolution of life, Extremophile biology, Biogeochemistry, Paleoenvironmental science, Paleontology, etc.	17	B
18010	Mechanics of materials and materials-related Structural mechanics, Fatigue, Fracture, Biomaterials, Material design, Material characteristics, Material evaluation, etc.	18	C
18020	Manufacturing and production engineering-related Machining, Non-traditional machining, Ultraprecision machining, Machine tools, Manufacturing systems, Precision metrology, Process planning, etc.	18	C
18030	Design engineering-related Mechanical design, Product design, Design theory, Design for reliability, Optimal design, Computer-aided design, etc.	18	C
18040	Machine elements and tribology-related Machine elements, Mechanisms, Tribology, Actuators, Micromachines, etc.	18	C
19010	Fluid engineering-related Fluid machinery, Flow measurement, Computational fluid dynamics, Turbulence, Multiphase flow, Compressible flow, Incompressible flow, etc.	19	C

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
19020	Thermal engineering-related Heat transfer, Convection, Combustion, Thermophysical properties, Refrigeration and air-conditioning, Heat engine, Energy conversion, etc.	19	C
20010	Mechanics and mechatronics-related Kinematics, Kinetics, Vibration, Acoustics, Automation, Biomechanics, Instrument and control applications, Mechatronics applications, etc.	20	C
20020	Robotics and intelligent system-related Robotics, Intelligent system, Human mechanical system, Human interface, Planning, Intelligent spatial system, Virtual reality, Augmented reality, etc.	20	C
21010	Power engineering-related Electrical energy-related, Energy conservation, Power system engineering, Electric machinery, Power electronics, Effective utilization of electric energy, Electromagnetic compatibility, Wireless power transfer, etc.	21	C
21020	Communication and network engineering-related Information theory, Nonlinear theory, Signal processing, Communication systems, Modulation/demodulation, Antennas, Networks, Multimedia, Cryptography/security, etc.	21	C
21030	Measurement engineering-related Measurement theory, Measuring instruments, Applied wave metrology, Measurement systems, Signal processing, Sensing, etc.	21	C
21040	Control and system engineering-related Control theory, System theory, Control systems, Knowledge-based control systems, System information processing, System control applications, Biosystems engineering, etc.	21	C
21050	Electric and electronic materials-related Semiconductor, Dielectric materials, Magnetic materials, Organic materials, Superconductor, Composite materials, Thin films, Functional materials, Thick films, Fabrication/characterization methods, etc.	21	C
21060	Electron device and electronic equipment-related Electron devices, Circuit design, Optical devices, Spintronic devices, Millimeter wave/terahertz wave, Applied wave devices, Storage devices, Displays, Process technology, Implementation technology, etc.	21	C
22010	Civil engineering material, execution and construction management-related Concrete, Steel, Composite material, Wood, Pavement material, Repair and reinforce material, Execution, Maintenance, Construction management, etc.	22	C
22020	Structure engineering and earthquake engineering-related Applied mechanics, Structure engineering, Steel structure, Concrete structure, Composite structure, Wind engineering, Earthquake engineering, Aseismatic structure, Earthquake prevention, etc.	22	C
22030	Geotechnical engineering-related Soil mechanics, Foundation engineering, Rock engineering, Engineering Geology, Ground behavior, Geotechnical structures, Geo-disaster prevention, Geo-environment, Tunnel engineering, etc.	22	C
22040	Hydroengineering-related Hydraulics, Environmental hydraulics, Hydrology, River engineering, Water resource engineering, Coastal engineering, Port and harbor engineering, Ocean engineering, etc.	22	C
22050	Civil engineering plan and transportation engineering-related Civil engineering plan, Regional urban planning, Spatial planning, Disaster prevention plan, Transportation plan, Transportation engineering, Railway engineering, Surveying and remote sensing, Landscape design, Civil engineering history, etc.	22	C

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
22060	Environmental systems for civil engineering-related Environment plan, Environmental system, Environment conservation, Water serve and drainage systems, Waste, Water environment, Atmospheric circulation, Noise and vibration, Environment ecology, Environmental monitoring, etc.	22	C
23010	Building structures and materials-related Load theory, Structural analysis, Structural design, Structures, Earthquake resistant design, Foundation, Geotechnics, Structural material, Maintenance, Building construction method, etc.	23	C
23020	Architectural environment and building equipment-related Sound environment, Vibration environment, Light environment, Heat environment, Air environment, Environmental psychology/physiology, Building equipment, Fire engineering, Urban environment, Environment design, etc.	23	C
23030	Architectural planning and city planning-related Planning theory, Design theory, Housing theory, Buildings, Urban/regional planning, Administration, Building economics, Production management, Disaster prevention planning, Landscape, etc.	23	C
23040	Architectural history and design-related Architectural history, Urban history, Architectural theory, Design, Landscape, Preservation, Renovation, etc.	23	C
24010	Aerospace engineering-related Thermo-fluid dynamics, Structural mechanics, Propulsion, Aerospace craft design, Production engineering, Aircraft system, Aerodynamics, Spacecraft system, Space utilization, etc.	24	C
24020	Marine engineering-related Navigation, Structural mechanics, Structural design, Production technology, Marine propulsion, Marine transport, Marine development, Underwater engineering, Polar engineering, Marine environmental technology, etc.	24	C
25010	Social systems engineering-related Social systems, Industrial engineering, Operations research, Industrial management, Reliability engineering, Policy science, Regulatory science, Quality control, etc.	25	C
25020	Safety engineering-related Safety engineering, Safety system, Risk engineering, Risk management, Work safety, Industrial safety, Product safety, Safety information, Human engineering, Liability engineering, etc.	25	C
25030	Disaster prevention engineering-related Disaster prediction, Hazard map, Building prevention against disaster, Lifeline prevention against disaster, Regional disaster prevention planning, Risk evaluation of disaster, Disaster prevention policy, Disaster resilience, etc.	25	C
26010	Metallic material properties-related Electric and magnetic properties, Metastable states, Diffusion, Phase transformation, Phase diagram, Lattice defect, Mechanical properties, Thermal and optical properties, Materials computational science, Microstructure analysis, etc.	26	D
26020	Inorganic materials and properties-related Functional ceramics, Glass, Engineering ceramics, Carbon-based materials, Crystal structure analysis, Microstructure, Electric properties, Mechanical properties, Physical and chemical properties, Grain boundary, etc.	26	D

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
26030	Composite materials and interfaces-related Functional composite materials, Structural composite materials, Biocompatible composite materials, Polymer composite, Surface treatment, Bonding and joining, Interface properties, Gradient function, etc.	26	D
26040	Structural materials and functional materials-related Infrastructural materials, Structural materials, Functional materials, Medical welfare materials, Reliability, Sensor materials, Energy materials, Battery materials, Environmental materials, etc.	26	D
26050	Material processing and microstructure control-related Processing and molding, Molding, Weld joining, Crystal microstructure control, Laser processing, Precision processing, Polishing, Powder metallurgy, Coating, Corrosion and protection, etc.	26	D
26060	Metals production and resources production-related Separation and purification, Melting and solidifying, Crystal growth, Casting, Scarce resources substitution, Low environment impact, Recycle, etc.	26	D
27010	Transport phenomena and unit operations-related Phase equilibrium, Transport properties, Fluid-phase unit operation, Adsorption, Membrane separation, Stir mixing, Powder and particle, Crystallization, Film formation, Supercritical, etc.	27	D
27020	Chemical reaction and process system engineering-related Reaction operation, Novel reaction process, Reaction mechanism, Reactor design, Materials synthesis process, Microreactor, Process control, Process system design, Process informatics, etc.	27	D
27030	Catalyst and resource chemical process-related Catalyst preparation, Catalytic function, Energy conversion process, Energy technology, Resources effective utilization technology, Catalytic material, Active site analysis, etc.	27	D
27040	Biofunction and bioprocess engineering-related Biocatalyst engineering, Biofunction engineering, Food engineering, Medicochemical engineering, Bioproduction process, Bioreactor, Bioseparation, Biosensor, Biorefinery, etc.	27	D
28010	Nanometer-scale chemistry-related Nanoparticle chemistry, Mesoscopic chemistry, Nanostructure control, Self-assembly, Nanocarbons, Molecular devices, Nanointerface function, Nanospace function, etc.	28	D
28020	Nanostructural physics-related Physics in nanoscale materials and structures, Nanoprobes, Quantum dots, Quantum devices, Electron devices, Spin devices, Nano optical device, Nanotribology, Nanocarbon physics, etc.	28	D
28030	Nanomaterials-related Creation of nanomaterials, Analysis of nanomaterials, Nanosurfaces and nanointerfaces, Functional nanomaterials, Nanoparticles, Carbon nanomaterials, Two-dimensional materials, Nanocrystalline materials, Nanocomposites, Nanofabrication process, etc.	28	D
28040	Nanobioscience-related Biomolecular devices, Molecular manipulation, Molecular imaging, Nanomeasurements, Nanosynthesis, Single molecule science, Nano-bio interfaces, Biomolecular array, Genome engineering, etc.	28	D
28050	Nano/micro-systems-related MEMS, NEMS, BioMEMS, Nano/micro-fabrication, Nano/micro-chemical systems, Nano/micro-biosystems, Nano/micro-mechanics, Nano/micro-sensors, etc.	28	D

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
29010	Applied physical properties-related Magnetic materials, Superconductors, Dielectrics, Fine particles, Liquid crystals, New functional materials, Molecular electronics, Bioelectronics, Spintronics, etc.	29	D
29020	Thin film/surface and interfacial physical properties-related Thin-film engineering, Surface and interfacial engineering, Surface science, Vacuum, Measurement, Analysis, Nanoscopic technology, Advanced equipment, Electronics application, etc.	29	D
29030	Applied condensed matter physics-related Elementary quantities, Standards, Units, Physical quantity measurements and detection, Energy conversion, etc.	29	D
30010	Crystal engineering-related Metal, Semiconductor, Ceramics, Amorphous, Crystal growth, Artificial structures, Device structure, Crystal characterization, Plasma process, etc.	30	D
30020	Optical engineering and photon science-related Optical materials, Optical elements, Optical properties, Optical information processing, Laser, Optical sensing, Optical recording, Opto-electronics, Nonlinear optics, Quantum optics, etc.	30	D
31010	Nuclear engineering-related Reactor physics, Nuclear safety, Thermal-hydraulics and structure, Fuel material, Nuclear chemistry, Nuclear life cycle, Radiation safety, Radiation engineering, Fusion reactor engineering, Nuclear social environment, etc.	31	D
31020	Earth resource engineering, Energy sciences-related Resource prospecting, Resource development, Resource cycle, Resource economy, Energy system, Environmental load, Renewable energy, Natural resources and energy policy, etc.	31	D
32010	Fundamental physical chemistry-related Gas, Liquid, Solid, Nanomaterials, Bio-related materials, Structure and properties, Chemical reactions, Spectroscopy, Theoretical calculation, Data science, etc.	32	E
32020	Functional solid state chemistry-related Molecular materials, Inorganic compounds, Hybrid compounds, Colloids, Surface/interface, Electrical properties, Optical properties, Magnetic properties, Energy conversion, Catalysis, etc.	32	E
33010	Structural organic chemistry and physical organic chemistry-related Chemistry of organic crystals, Molecular recognition, Supermolecules, Functional organic molecules, Extended π-electron molecules, Organoelement chemistry, Reaction mechanism, Molecular chirality, Theoretical organic chemistry, etc.	33	E
33020	Synthetic organic chemistry-related Development of reactions, Reaction mechanism, Selective reactions, Asymmetric synthesis, Development of catalysts, Biocatalysis, Sustainable organic synthesis, Natural product synthesis, Process chemistry, etc.	33	E
34010	Inorganic/coordination chemistry-related Coordination chemistry, Organometallic chemistry, Inorganic solid-state chemistry, Bioinorganic chemistry, Solution chemistry, Clusters, Supramolecular complexes, Coordination polymers, Typical elements, Physical properties and functions, etc.	34	E

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
34020	Analytical chemistry-related Spectrometric analysis, Advanced measurements, Surface/interface analysis, Separation analysis, Analytical reagents, Radiochemical analysis, Electrochemical analysis, Bioanalysis, New analysis methods, etc.	34	E
34030	Green sustainable chemistry and environmental chemistry-related Green process, Green catalysts, Recycle, Environmental assessment, Environmentally conscious materials, Reduction of environmental load, Environmental restoration, Resource saving, Geochemistry, Environmental radioactivity, etc.	34	E
35010	Polymer chemistry-related Polymer synthesis, Polymer reactions, Functional polymers, Self-assembled polymers, Non-covalent polymers, Chiral polymers, Bio-related polymers, Polymer properties, Polymer structures, Polymer interface, etc.	35	E
35020	Polymer materials-related Properties of polymer materials, Synthesis of polymer materials, Functional polymer materials, Environmentally friendly polymer materials, Liquid crystal polymers, Gel, Biopolymers, Polymer composites, Polymer processing, etc.	35	E
35030	Organic functional materials-related Organic semiconductors, Liquid crystals, Optical materials, Device-related materials, Electrically conductive materials, Hybrid materials, Molecular functional materials, Organic hybrid materials, Materials for energy conversion, etc.	35	E
36010	Inorganic compounds and inorganic materials chemistry-related Crystals, Amorphous, Ceramics, Semiconductors, Inorganic device-related materials, Low-dimensional compounds, Porous materials, Nanoparticles, Multicomponent compounds, Hybrid materials, etc.	36	E
36020	Energy-related chemistry Energy resources, Energy conversion materials, Energy carriers, Solar energy utilization, Material separation, Catalytic transformation, Battery and electrochemical materials, Energy-saving materials, Renewable energy, Unused energy, etc.	36	E
37010	Bio-related chemistry Bioorganic chemistry, Bioinorganic chemistry, Biological reaction engineering, Biofunctional chemistry, Biofunctional materials, Biotechnology, etc.	37	E
37020	Chemistry and chemical methodology of biomolecules-related Natural product chemistry, Biologically active compounds, Molecular mechanism of biological activities, Biofunctional molecules, Combinatorial chemistry, Metabolomic analysis, etc.	37	E
37030	Chemical biology-related In vivo functional expression, Intracellular chemical reactions, Drug discovery science, Chemical library, Structure-activity relationship, Chemical probes, Biomolecular measurements, Molecular imaging, Proteomics, etc.	37	E
38010	Plant nutrition and soil science-related Plant metabolism and physiology, Nutritional elements in plants, Soil classification, Soil physical chemistry, Soil organisms, etc.	38	F
38020	Applied microbiology-related Microbial genetics/breeding, Microbial function, Microbial metabolism and physiology, Microbial applications, Control of microbes, Microbial ecology, Production of useful materials, etc.	38	F

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
38030	Applied biochemistry-related Cellular biochemistry, Applied biochemistry, Structural biology, Regulation of bioactivity, Metabolism and physiology, Cellular function, Molecular function, Production of useful materials, etc.	38	F
38040	Bioorganic chemistry-related Bioactive substances, Signal molecules, Natural products chemistry, Biosynthesis, Structure-activity relationship, Synthetic organic chemistry, Chemical biology, etc.	38	F
38050	Food sciences-related Food function, Food chemistry, Nutritional chemistry, Food analysis, Food engineering, Food safety, Functional food, Nutritional epidemiology, Clinical nutrition, etc.	38	F
38060	Applied molecular and cellular biology-related Molecular cell biology, Cellular bioengineering, Molecular engineering, Gene expression control, Cell-cell/intermolecular interactions, Cellular function, Production of useful materials, etc.	38	F
39010	Science in plant genetics and breeding-related Genetic resources, Breeding theories, Genomic breeding, Plants with novel traits, Quality components, Stress tolerance, Yielding ability, Reproduction and multiplication, Growth physiology, Development, etc.	39	F
39020	Crop production science-related Field crops, Crop yield, Crop product quality, Crop morphology, Growth prediction, Crop physiology, Field management, Low-cost cultivation techniques, Environmentally friendly agriculture, Field ecosystem, etc.	39	F
39030	Horticultural science-related Plant growth, flowering, and fruit development, Nursery plant propagation and production, Crop production systems, Cultivation techniques, Protected horticulture, Controlled environment systems, Breeding and development of new cultivars, Quality of horticultural products, Postharvest physiology and management, Socio-horticulture, etc.	39	F
39040	Plant protection science-related Plant pathology, Clinical plant science, Agricultural insect pest, Natural enemy, Weed, Agricultural chemicals, Integrated pest management, etc.	39	F
39050	Insect science-related Sericulture insect technology, Insect genetics, Insect pathology, Insect physiology and biochemistry, Insect ecology, Chemical ecology, Systematics, Symbiosis and parasitism, Social insects, Medical entomology, etc.	39	F
39060	Conservation of biological resources-related Conservation biology, Biodiversity conservation, Conservation of phylogenetic diversity, Genetic resources conservation, Ecosystem conservation, Conservation of microorganisms, Impacts of non-native species, etc.	39	F
39070	Landscape science-related Landscape architecture, Parks and open space planning, Landscape planning, Cultural landscape, Nature conservation, Landscape ecology, Parks and open space management, Parks, Environmental greening, Participatory community design, etc.	39	F
40010	Forest science-related Forest ecology, Forest biodiversity, Forest genetics and breeding, Silviculture, Forest protection, Forest environments, Erosion control, Forest utilization, Forest planning, Forest policy, etc.	40	F
40020	Wood science-related Wood structure, Wood property, Lignocellulose, Trace element, Fungus, Wood processing, Biomass-refinery, Wood based material, Wooden building, Forest products education, etc.	40	F

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
40030	Aquatic bioproduction science-related Aquatic environment, Fisheries, Aquatic resource management, Aquatic organisms, Aquatic ecosystem, Aquaculture, Fisheries engineering, Fishing community/fisheries policy, Fisheries economics/management/marketing, Fisheries education, etc.	40	F
40040	Aquatic life science-related Aquatic nutrition, Aquatic pathology, Aquatic genetics/heredity/breeding, Aquatic physiology, Utilization of aquatic organisms and biomass, Aquatic biological chemistry, Aquatic biotechnology, Aquatic food sciences, etc.	40	F
41010	Agricultural and food economics-related Food economy, Agricultural production economy, Agricultural policy, Food system, Food marketing, International agricultural development, Trade of agricultural commodities and livestock products, Rural resources and environment, etc.	41	F
41020	Rural sociology and agricultural structure-related Farm organization, Farm management, Agricultural structure, Agricultural market, Agricultural history, Rural society, Rural life, Agricultural cooperative, etc.	41	F
41030	Rural environmental engineering and planning-related Irrigation and drainage, Reclamation and conservation of agricultural land, Rural planning, Rural environment, Circulation of resources and energy, Disaster prevention in rural area, Stock management of agricultural infrastructures, Hydrodynamics and hydrology, Soil physics, Design and construction materials, etc.	41	F
41040	Agricultural environmental engineering and agricultural information engineering-related Agricultural production facilities, Bioproduction machinery, Environmental control, Agricultural meteorology and micrometeorology, Agricultural information, Greenhouse horticulture, Plant factory, Postharvest and supply chain, Nondestructive measurement, Remote sensing and geographic information system, etc.	41	F
41050	Environmental agriculture-related Biomass, Environmental manipulation, Biodiversity, Environmental analysis, Ecosystem services, Resources circulation system, Low-carbon societies, Life-cycle assessment, Environmental friendly agriculture, Watershed management, etc.	41	F
42010	Animal production science-related Breeding/genetics, Reproduction, Nutrition/feeding, Anatomy/physiology, Product, Environment, Behavior, Therapy, Grassland, Grazing, etc.	42	F
42020	Veterinary medical science-related Basic veterinary science, Pathological veterinary science, Applied veterinary science, Clinical veterinary science, Animal nursing, Animal welfare, Wildlife, etc.	42	F
42030	Animal life science-related Homeostasis, Cellular function, Biological defense, Integrated genetics, Development/differentiation, Biotechnology, etc.	42	F
42040	Laboratory animal science-related Genetic engineering, Developmental engineering, Animal models of disease, Facility management, Laboratory animal welfare, Laboratory animal-related technology, Bioresource, etc.	42	F
43010	Molecular biology-related Chromosome function, Chromatin, Epigenetics, Genome maintenance, Genome transmission, Chromosome re-organization, Gene expression, Non-coding RNA, Regulation of protein function, Molecular genetics, Regulation of RNA function, etc.	43	G

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
43020	Structural biochemistry-related Proteins, Nucleic acids, Lipids, Carbohydrates, Biological membrane, Molecular recognition, Denaturation, Three-dimensional structural analysis, Three-dimensional structural prediction, Molecular dynamics, etc.	43	G
43030	Functional biochemistry-related Enzymes, Sugar chain, Bioenergy conversion, Biological trace elements, Physiologically active substances, Cell signaling, Membrane transport, Proteolysis, Molecular recognition, Organelle, etc.	43	G
43040	Biophysics-related Structure biology, Physical property of biomolecules, Biomembrane, Photobiology, Molecular motor, Biometrics, Bioimaging, Systems biology, Synthetic biology, Theoretical biology, etc.	43	G
43050	Genome biology-related Genome organization, Genome function, Genome diversity, Molecular evolution of genome, Genome repair/maintenance, Trans-omics, Epigenome, Gene resource, Genome dynamics, etc.	43	G
43060	System genome science-related Network analyses, Synthetic biology, Biological databases, Bioinformatics, Genome analysis technology, Genome biotechnology, etc.	43	G
44010	Cell biology-related Cytoskeleton, Proteolysis, Organelle, Nuclear structure and function, Extracellular matrix, Signal transduction, Cell cycle, Cell motility, Cell-cell interaction, Cellular genetics, etc.	44	G
44020	Developmental biology-related Cell differentiation, Stem cells, Regeneration, Germ layer formation, Morphogenesis, Organogenesis, Fertilization, Germ cells, Developmental genetics, Evolution and development, etc.	44	G
44030	Plant molecular biology and physiology-related Photosynthesis, Growth physiology, Plant development, Organelle, Cell wall, Responses to environment, Plant-microbe interaction, Metabolism, Plant molecular function, etc.	44	G
44040	Morphology and anatomical structure-related Morphology, Comparative morphology, Morphological modeling, Ultrastructure, Morphological image analysis, Tissue organization, Microscopic technology, Imaging, etc.	44	G
44050	Animal physiological chemistry, physiology and behavioral biology-related Metabolic physiology, Neurophysiology, Neuroethology, Behavioral physiology, Animal physiological chemistry, Chronobiology, Comparative physiology, Comparative endocrinology, Behavioral genetics, etc.	44	G
45010	Genetics-related Molecular genetics, Cellular genetics, Developmental genetics, Behavioral genetics, Population genetics, Quantitative trait, Population genomics, Genome-wide association study, Genetic diversity, Epigenome diversity, etc.	45	G
45020	Evolutionary biology-related Molecular evolution, Evolutionary genetics, Phenotypic evolution, Evolutionary developmental biology, Evolution of ecological traits, Evolution of behaviors, Experimental evolution, Coevolution, Speciation, Evolutionary theory, etc.	45	G
45030	Biodiversity and systematics-related Taxonomic characters, Taxon, Classification system, Molecular phylogeny, Phyletic evolution, Speciation, Natural history, Biogeography, Rare species conservation, Biodiversity, etc.	45	G

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
45040	Ecology and environment-related Chemical ecology, Molecular ecology, Physiological ecology, Evolutionary ecology, Behavioral ecology, Population ecology, Community ecology, Conservation ecology, Biological interactions, Material cycles in ecosystems, etc.	45	G
45050	Physical anthropology-related Morphology and function, Bioarchaeology, Biological mechanism, Genome, Evolutionary genetics, Behavior, Ecology, Comparative cognition, Primates, Growth and aging, etc.	45	G
45060	Applied anthropology-related Physiological anthropology, Ergonomics, Forensic anthropology, Medical anthropology, Physiological polymorphisms, Environmental adaptability, Somatic and physiological function, Anthropometry and bioengineering, Lifestyle, etc.	45	G
46010	Neuroscience-general-related Neurochemistry, Neuron, Glia, Genome, Epigenetics, Neurobiology, Information processing, Synapse, Neurogenesis, etc.	46	G
46020	Anatomy and histopathology of nervous system-related Neural development, Anatomy of nervous system, Neural network structure, Neuropathology, etc.	46	G
46030	Function of nervous system-related Neurophysiology, Neuropharmacology, Neurotransmission, Neuroinformatics, Behavioral neuroscience, Neural system physiology, Cerebral blood flow, Autonomic nervous system, etc.	46	G
47010	Pharmaceutical chemistry and drug development sciences-related Inorganic chemistry, Organic chemistry, Medicinal chemistry, Medicinal molecular design, Drug discovery, Bio-related materials, Chemical biology, etc.	47	H
47020	Pharmaceutical analytical chemistry and physicochemistry-related Environmental analysis, Bioanalysis, Physicochemistry, Biophysics, Structural biology, Radiochemistry, Bioimaging, Drug formulation design, Computer science, Information science, etc.	47	H
47030	Pharmaceutical hygiene and biochemistry-related Environmental hygiene, Healthful nutrition, Disease prevention, Toxicology, Drug metabolism, Host defense, Molecular biology, Cell biology, Biochemistry, etc.	47	H
47040	Pharmacology-related Pharmacology, Pharmacogenomics, Applied pharmacology, Signal transduction, Drug interactions, Drug response, Pharmacotherapy, Pharmacotoxicology, etc.	47	H
47050	Environmental and natural pharmaceutical resources-related Environmental resource science, Natural products chemistry, Bioactive natural compounds, Medicinal resources, Medicinal foods, Pharmaceutical microbiology, etc.	47	H
47060	Clinical pharmacy-related Pharmacokinetics, Medical informatics, Social pharmacy, Clinical pharmacy, Pharmaceutics, Regulatory science, Education for the pharmacist, etc.	47	H
48010	Anatomy-related Macroscopic anatomy, Histology, Embryology, etc.	48	H
48020	Physiology-related General physiology, Pathophysiology, Comparative physiology, Environmental physiology, etc.	48	H

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
48030	Pharmacology-related Genomic pharmacology, Molecular and cellular pharmacology, Pathological pharmacology, Behavioral pharmacology, Pharmacology for drug discovery, Clinical pharmacology, etc.	48	H
48040	Medical biochemistry-related Biofunctional molecular and medical biochemistry, Genome medical sciences, Human genetics, Disease model, etc.	48	H
49010	Pathological biochemistry-related Molecular pathology, Metabolic disorders, Molecular diagnosis, etc.	49	H
49020	Human pathology-related Molecular pathology, Cyto- and histo-pathology, Diagnostic pathology, etc.	49	H
49030	Experimental pathology-related Disease models, Pathological regulation, Tissue regeneration, etc.	49	H
49040	Parasitology-related Parasite, Vector organism, Parasite pathogenicity, Epidemiology of parasites, Control of parasite infections, etc.	49	H
49050	Bacteriology-related Bacterium, Fungus, Antimicrobial resistance, Bacterial pathogenicity, Epidemiology of bacteria, Control of bacterial infections, etc.	49	H
49060	Virology-related Virus, Prion, Viral pathogenicity, Epidemiology of viruses, Control of viral infections, etc.	49	H
49070	Immunology-related Immune system, Immune response, Inflammation, Immune-related disorder, Immune regulation, etc.	49	H
50010	Tumor biology-related Cancer and gene, Tumor development, Invasion, Metastasis, Cancer microenvironment, Cancer and signal transduction, Characteristics of cancer cells, Cancer and immune cells, etc.	50	I
50020	Tumor diagnostics and therapeutics-related Genome analysis, Diagnostic markers, Molecule imaging, Chemotherapy, Nucleic acid therapy, Gene therapy, Immunotherapy, Molecular targeted therapy, Physical therapy, Radiation therapy, etc.	50	I
51010	Basic brain sciences-related Brain-machine interface, Model animal, Computational brain science, Brain information decoding, Control technologies, Brain imaging, Brain biometrics, etc.	51	I
51020	Cognitive and brain science-related Social behavior, Communication, Emotion, Decision making, Consciousness, Learning, Neuroeconomics, Neuropsychology, etc.	51	I
51030	Pathophysiologic neuroscience-related Clinical neuroscience, Dolorology, Sensory impairment, Movement disorder, Neurological disorder, Neurogenesis, Neuroimmunology, Cellular degeneration, Disease model, etc.	51	I
52010	General internal medicine-related Psychosomatic medicine, Laboratory medicine, General practice, Geriatrics, Psychosomatic internal medicine, Oriental medicine, Palliative medicine, etc.	52	I

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
52020	Neurology-related Neurology, Neurofunctional imaging, etc.	52	I
52030	Psychiatry-related Clinical psychiatry, Biological psychiatry, Forensic mental health, etc.	52	I
52040	Radiological sciences-related Diagnostic radiology, Therapeutic radiology, Radiation biology, Radiological technology, etc.	52	I
52050	Embryonic medicine and pediatrics-related Fetal medicine, Neonatal medicine, Pediatrics, etc.	52	I
53010	Gastroenterology-related Upper digestive tract, Lower digestive tract, Liver, Biliary tract, Pancreas, etc.	53	I
53020	Cardiology-related Ischemic heart disease, Valvular heart disease, Arrhythmia, Cardiomyopathy, Heart failure, Peripheral arterial disease, Arteriosclerosis, Hypertension, etc.	53	I
53030	Respiratory medicine-related Respiratory medicine, Asthma, Diffusive lung disease, COPD, Lung cancer, Pulmonary hypertension, etc.	53	I
53040	Nephrology-related Acute renal failure, Chronic kidney disease, Diabetic nephropathy, Hypertension, Aqueous electrolyte metabolism, Artificial dialysis, etc.	53	I
53050	Dermatology-related Dermatology, Cutaneous immune disease, Cutaneous infection, Cutaneous tumor, etc.	53	I
54010	Hematology and medical oncology-related Hematological oncology, Medical oncology, Hematological immunology, Anemia, Thrombosis and hemostasis, Chemotherapy, etc.	54	I
54020	Connective tissue disease and allergy-related Connective tissue disease, Allergy, Clinical immunology, Inflammation, etc.	54	I
54030	Infectious disease medicine-related Infection diagnostics, Infection therapeutics, Host defense, International infection science, etc.	54	I
54040	Metabolism and endocrinology-related Energy balance, Glucose metabolism, Lipid metabolism, Purine metabolism, Bone metabolism, Electrolyte balance, Endocrinology, Neuroendocrinology, Reproductive endocrinology, etc.	54	I
55010	General surgery and pediatric surgery-related Surgical basic principles, Breast surgery, Endocrine surgery, Pediatric surgery, Transplant surgery, Artificial organs science, Regeneration, Operation support, etc.	55	I
55020	Digestive surgery-related Upper gastrointestinal surgery, Lower gastrointestinal surgery, Hepatic surgery, Biliary surgery, Pancreatic surgery, etc.	55	I

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
55030	Cardiovascular surgery-related Coronary artery surgery, Heart valve surgery, Surgery for myocardial disease, Aortic surgery, Vascular surgery, Congenital heart surgery, etc.	55	I
55040	Respiratory surgery-related Lung surgery, Mediastinal surgery, Chest wall surgery, Respiratory tract surgery, etc.	55	I
55050	Anesthesiology-related Anesthesiology, Perioperative management, Pain management, Resuscitology, Palliative medicine, etc.	55	I
55060	Emergency medicine-related Intensive care medicine, Emergency resuscitation science, Trauma surgery, Disaster medicine, Disaster medical care, etc.	55	I
56010	Neurosurgery-related Neurosurgery, Spine and spinal cord diseases, etc.	56	I
56020	Orthopedics-related Orthopedics, Rehabilitation medicine, Sports medicine, etc.	56	I
56030	Urology-related Urology, Male genitalia science, etc.	56	I
56040	Obstetrics and gynecology-related Obstetrics, Reproductive endocrinology, Gynecologic oncology, Female health care medicine, etc.	56	I
56050	Otorhinolaryngology-related Otorhinolaryngology, Head and neck surgery, etc.	56	I
56060	Ophthalmology-related Ophthalmology, Ophthalmological optics, etc.	56	I
56070	Plastic and reconstructive surgery-related Plastic surgery, Reconstructive surgery, Aesthetic plastic surgery, etc.	56	I
57010	Oral biological science-related Oral anatomy, Oral histology and embryology, Oral physiology, Oral biochemistry, Pharmacology for hard tissues, etc.	57	I
57020	Oral pathobiological science-related Oral infectious diseases, Oral pathology, Oral experimental oncology, Immunity and inflammation, Laboratory medicine, etc.	57	I
57030	Conservative dentistry-related Operative dentistry, Endodontology, Periodontology, etc.	57	I
57040	Regenerative dentistry and dental engineering-related Regenerative dentistry, Biomaterial science, Dental materials science, Oral and maxillofacial prosthetics, Oral implantology, etc.	57	I

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
57050	Prosthodontics-related Prosthodontics, Oral rehabilitation, Gerodontology, etc.	57	I
57060	Surgical dentistry-related Oral and maxillofacial surgery, Oral maxillofacial reconstructive surgery, Dental anesthesiology, Psychosomatic medicine dentistry, Dental radiology, etc.	57	I
57070	Developmental dentistry-related Orthodontics, Pediatric dentistry, etc.	57	I
57080	Social dentistry-related Dental hygiene, Preventive dentistry, Oral health administration and management, Dental education, Forensic odontology, etc.	57	I
58010	Medical management and medical sociology-related Medical management, Medical social science, Ethics for medical science, Ethics for medical care, Biomedical education, History of medical science, Health policy and economics, Clinical trials, Health and medical services administration, Disaster medical science, etc.	58	I
58020	Hygiene and public health-related: including laboratory approach Hygiene, Public health, Epidemiology, Global health, etc.	58	I
58030	Hygiene and public health-related: excluding laboratory approach Hygiene, Public health, Epidemiology, Global health, etc.	58	I
58040	Forensics medicine-related Forensic medicine, Forensic pathology, Forensic toxicology, Forensic genetics, Suicide, Abuse, Clinical forensic medicine, Sudden death, etc.	58	I
58050	Fundamental of nursing-related Fundamental of nursing, Nursing education, Nursing administration, Nursing ethics, Global nursing, etc.	58	I
58060	Clinical nursing-related Critical care and emergency nursing, Perioperative nursing, Nursing of chronic illness, Oncology nursing, Psychiatric nursing, Palliative care nursing, etc.	58	I
58070	Lifelong developmental nursing-related Women's health nursing, Maternal nursing, Midwifery, Family health nursing, Child health nursing, School nursing, etc.	58	I
58080	Gerontological nursing and community health nursing-related Gerontological nursing, Community health nursing, Public health nursing, Disaster nursing, Home care nursing, etc.	58	I
59010	Rehabilitation science-related Rehabilitation medicine, Rehabilitation nursing, Rehabilitation medical care, Physicotherapeutics, Occupational therapy, Assistive technology, Speech and language therapy, etc.	59	I
59020	Sports sciences-related Sports physiology, Sports biochemistry, Sports medicine, Sports sociology, Sports management, Sports psychology, Sports education, Training science, Sports biomechanics, Adapted sports science, etc.	59	I

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
59030	Physical education, and physical and health education-related Growth developmental science, Physical and health education, Physical education in school, Educational physiology, Physical systems science, Higher brain function science, Martial arts theory, Outdoor education, etc.	59	I
59040	Nutrition science and health science-related Nutritional physiology, Nutritional biochemistry, Nutritional education, Clinical nutrition, Functional food, Lifestyle-related disease, Health promotion, Aging, etc.	59	I
60010	Theory of informatics-related Discrete structure, Mathematical logic, Theory of computation, Mathematical theory of programs, Computational complexity theory, Algorithm theory, Information theory, Coding theory, Theory of cryptography, Learning theory, etc.	60	J
60020	Mathematical informatics-related Optimization theory, Mathematical systems theory, System control theory, System analysis, System methodology, System modeling, System simulation, Combinatorial optimization, Queueing theory, Mathematical finance, etc.	60	J
60030	Statistical science-related Statistics, Data science, Modeling, Statistical inference, Multivariate analysis, Time series analysis, Statistical quality control, Applied statistics, etc.	60	J
60040	Computer system-related Computer architecture, Circuit and system, LSI design, LSI testing, Reconfigurable system, Dependable architecture, Low power technology, Hardware/software codesign, Embedded system, etc.	60	J
60050	Software-related Programming language, Programming methodology, Operating system, Parallel and distributed computing, Software engineering, Virtualization technology, Cloud computing, Software dependability, Software security, etc.	60	J
60060	Information network-related Network architecture, Network protocol, Internet, Mobile network, Pervasive computing, Sensor network, IoT, Traffic engineering, Network management, Service platform technology, etc.	60	J
60070	Information security-related Cryptography, Tamper resistance technology, Authentication, Biometrics, Access control, Malware countermeasure, Countermeasures against cyber attacks, Privacy protection, Digital forensics, Security evaluation and authorization, etc.	60	J
60080	Database-related Data model, Database system, Multimedia database, Information retrieval, Content management, Metadata, Big data, Geographic information system, etc.	60	J
60090	High performance computing-related Parallel processing, Distributed processing, Cloud computing, Numerical analysis, Visualization, Computer graphics, High performance computing application, etc.	60	J
60100	Computational science-related Mathematical engineering, Computational mechanics, Numerical simulation, Multi-scale modeling, Large-scale computing, Massively parallel computing, Numerical computing methods, Advanced algorithms, etc.	60	J
61010	Perceptual information processing-related Pattern recognition, Image processing, Computer vision, Visual media processing, Acoustic media processing, Media editing, Media database, Sensing, Sensor fusion, etc.	61	J

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
61020	Human interface and interaction-related Human interface, Multi-modal interface, Human-computer interaction, Computer supported cooperative work, Virtual reality, Augmented reality, Realistic communication, Wearable device, Usability, Ergonomics, etc.	61	J
61030	Intelligent informatics-related Search, Inference, Machine learning, Knowledge acquisition, Intelligent system, Intelligent information processing, Natural language processing, Data mining, Ontology, Agent system, etc.	61	J
61040	Soft computing-related Neural network, Evolutionary computation, Fuzzy theory, Chaos, Complex systems, Probabilistic information processing, etc.	61	J
61050	Intelligent robotics-related Intelligent robot, Behavior and environment recognition, Planning, Sensory behavior system, Autonomous system, Digital human, Real world information processing, Physical agents, Intelligent space, etc.	61	J
61060	Kansei informatics-related Kansei design, Kansei cognitive science, Kansei psychology, Kansei robotics, Kansei measurement evaluation, Kansei interface, Kansei physiology, Kansei material science, Kansei pedagogy, Kansei brain science, etc.	61	J
62010	Life, health and medical informatics-related Bioinformatics, Life informatics, Biological information, Neuroinformatics, Neural information processing, Molecular computing, DNA computing, Medical information, Health information, Medical image, etc.	62	J
62020	Web informatics and service informatics-related Web system, Semantic web, Web mining, Social network analysis, Service engineering, Educational service, Medical service, Welfare service, Social service, Information culture, etc.	62	J
62030	Learning support system-related Media literacy, Learning media, Social media, Learning content, Learning management, Learning support, Remote learning, e-Learning, etc.	62	J
62040	Entertainment and game informatics-related Music information processing, 3D content, Animation, Game programming, Network entertainment, Media art, Digital museum, Experience design, etc.	62	J
63010	Environmental dynamic analysis-related Global warming, Environmental change, Water and material cycle, Ocean, Land, Polar regions, Environmental measurements, Environmental model, Environmental information, Remote sensing, etc.	63	K
63020	Radiation influence-related Radiation, Measurement, Control, Repair, Biological effects, Risk, etc.	63	K
63030	Chemical substance influence on environment-related Toxicology, Toxic substance to human, Trace chemical substance, Endocrine disruptor, Repair, etc.	63	K
63040	Environmental impact assessment-related Atmosphere, Hydrosphere, Terrestrial impact, Impact assessment on human health, Social and economic impacts, Impact assessment on the future generation, Environmental impact assessment, Assessment methods, Monitoring, Simulation, etc.	63	K

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
64010	Environmental load and risk assessment-related Environmental analysis, Environmental load analysis, Environmental monitoring, Pollution dynamics assessment, Evaluation of radioactive substances dynamics, Environmental modeling, Exposure assessment, Toxicity evaluation, Environmental assessment, Chemical substance management, etc.	64	K
64020	Environmental load reduction and remediation-related Removal of contamination, Treatment of waste material, Control of contamination source, Disposal of waste material, Environmental load reduction, Remediation measure of contamination, Noise and vibration reduction, Countermeasure of ground settlement, Bioremediation, Radioactive decontamination, etc.	64	K
64030	Environmental materials and recycle technology-related Recycle materials, Valuable materials recovery, Separation, refining and purification, Environment-conscious design, Recycle chemistry, Green production, Zero emission, Resource circulation, Renewable energy, Biomass utilization, etc.	64	K
64040	Social-ecological systems-related Biodiversity, Conservation biology, Natural capital, Impact of climate change, Impact analysis on ecosystem, Ecosystem management, Ecosystem restoration, Ecosystem services, Natural tourism resources, Regional environmental planning, etc.	64	K
64050	Sound material-cycle social systems-related Sound material-cycle systems, Material and energy budget analysis, Low carbon society, Unused energy, Regional revitalization, Water use system, Industrial symbiosis, Life cycle assessment (LCA), Integrated environmental management, 3R (reduction, reuse, recycle) social systems, etc.	64	K
64060	Environmental policy and social systems-related Environmental philosophy and ethics, Environmental laws, Environmental economics, Environmental information, Environmental education, Environmental activities, Environmental management and governance, Social and public system, Consensus forming, Sustainable development, etc.	64	K
90010	Design-related Information design, Environmental design, Industrial design, Spatial design, Design history, Theory of design, Design standard, Design support, Evaluation of design, Design education, etc.	1, 23, 61	A, C, J
90020	Library and information science, humanistic and social informatics-related Library science, Information services, Information organizing, Information retrieval, Bibliometrics, Information resources, Information ethics, Digital humanities, Social Informatics, Digital archives, etc.	2, 62	A, J
90030	Cognitive science-related Cognitive science in general, Cognitive models, Kansei, Human factors, Cognitive and brain science, Comparative cognition, Cognitive linguistics, Cognitive engineering, etc.	10, 61	A, J
90110	Biomedical engineering-related Medical imaging, Medical modeling, Biological simulation, Biometrics, Artificial organs, Tissue engineering, Biophysical properties, Biocontrol, Biomechanics, Nanobio systems, etc.	90	D, I
90120	Biomaterials-related Biofunctional materials, Tissue engineering materials, Biocompatible materials, Nanobio materials, Drug delivery systems, Stimuli-sensitive materials, Genetic engineering material, etc.	90	D, I

Basic Section	Examples of related research content	Medium-sized Sections and Broad Section corresponding Basic Sections	
		Medium-sized Section	Broad Section
90130	Medical systems-related Medical ultrasound system, Diagnostic imaging system, Laboratory diagnosis systems, Minimally invasive treatment systems, Remote diagnosis and treatment systems, Organ preservation systems, Medical information systems, Computer-assisted surgery, Medical robot, etc.	90	D, I
90140	Medical technology assessment-related Regulatory science, Safety evaluation, Clinical study, Medical technology ethics, Medical devices, etc.	90	D, I
90150	Medical assistive technology-related Healthcare and rehabilitation engineering, Life assist technology, Care support technology, Accessibility design, Universal design, Rehabilitation and nursing robot, Assist device for artificial internal organ, Rehabilitation devices, Nursing science and engineering, etc.	90	D, I

The Review Section Table (Table for Medium-sized and Broad Sections)

When selecting a review section, applicants should first acquire an overall picture of the review sections based on the Review Section Table (Overview). In addition, check the Review Section Table (Table for Medium-sized and Broad Sections) for the detailed contents of each section and select a review section for their research proposal.

Also, some items of Basic Section may be presented in plural Medium-sized and Broad Sections. The items of Basic Section presented in plural Medium-sized Section are 9 and 3 items among 9 are presented in plural Medium-sized and Broad Sections (as shown below).

In addition, five other Basic Sections (90110-90150) may be presented in only one Medium-sized Section and two Broad Sections.

【Basic sections may be presented in plural Medium-sized and Broad Section】

Basic Section Item	Basic Section Description	Medium-sized Sections corresponding Basic Sections	Broad Sections corresponding Basic Sections
02090	Japanese language education-related	２，９	A
02100	Foreign language education-related	２，９	A
80010	Area studies-related	４，６	A
80020	Tourism studies-related	４，７，８	A
80030	Gender studies-related	４，６，８	A
80040	Quantum beam science-related	１４，１５	B
90010	Design-related	１，２３，６１	A，C，J
90020	Library and information science, humanistic and social informatics-related	２，６２	A，J
90030	Cognitive science-related	１０，６１	A，J
90110	Biomedical engineering-related	９０	D，I
90120	Biomaterials-related	９０	D，I
90130	Medical systems-related	９０	D，I
90140	Medical technology assessment-related	９０	D，I
90150	Medical assistive technology-related	９０	D，I

【Medium-sized section may be presented in plural Broad Section】

Medium-sized Section Item	Medium-sized section Description	Broad Sections corresponding Medium-sized Section
９０	Biomedical engineering and related fields	D，I

Broad Section A

Medium-sized Section 1 : Philosophy, art, and related fields

Basic Section	Examples of related research content
01010	Philosophy and ethics-related Philosophy in general, Ethics in general, Western philosophy, Western ethics, Japanese philosophy, Japanese ethics, Applied ethics, etc.
01020	Chinese philosophy, Indian philosophy and Buddhist philosophy-related Chinese philosophy/thought, Indian philosophy/thought, Buddhist philosophy, Bibliography, Philology, etc.
01030	Religious studies-related History of religions, Philosophy of religion, Theology, Sociology of religion, Psychology of religion, Anthropology of religion, Studies of religious folklore, Mythology, Bibliography, Philology, etc.
01040	History of thought-related History of thought in general, History of Western thought, History of Eastern thought, History of Japanese thought, History of Islamic thought, etc.
01050	Aesthetics and art studies-related Philosophy of art, Aesthetics, Music theory, Theatrical theory, Miscellaneous art studies, etc.
01060	History of arts-related Japanese art, Eastern art, Western art, Contemporary art, Craft, Design, Architecture, Costume, Photography, etc.
01070	Theory of art practice-related Art expression, Arts management, Art policy, Art production, etc.
01080	Sociology of science, history of science and technology-related Sociology of science, History of science, History of technology, History of medicine, Industrial archeology, Philosophy of science, Foundation of science, STS (Science, technology and society), etc.
90010	Design-related Information design, Environmental design, Industrial design, Spatial design, Design history, Theory of design, Design standard, Design support, Evaluation of design, Design education, etc.

Medium-sized Section 2 : Literature, linguistics, and related fields

Basic Section	Examples of related research content
02010	Japanese literature-related Japanese literature in general, Ancient literature, Medieval literature, Chinese classics in Japan, Bibliography, Philology, Premodern literature, Modern literature, Contemporary literature, Literary theory, etc.
02020	Chinese literature-related Chinese literature, Bibliography, Philology, Literary theory, etc.
02030	English literature and literature in the English language-related English literature, American literature, Literature in the English language, Literary theory, Bibliography, Philology, etc.
02040	European literature-related French literature, Literature in the French language, German literature, Literature in the German language, Classics, Russian and East European literature, Literature in other European languages, Literary theory, Bibliography, Philology, etc.
02050	Literature in general-related Literature in other languages and areas, Literary theory, Comparative literature, Bibliography, Philology, Literature education, etc.

(Broad Section A)

02060	Linguistics-related
	Phonetics/phonology, Semantics/pragmatics, Morphosyntax, Sociolinguistics, Contrastive linguistics, Psycholinguistics, Neurolinguistics, Historical linguistics, Corpus linguistics, Endangered and minority languages, etc.
02070	Japanese linguistics-related
	Phonetics/phonology, Writing systems, Lexicon and semantics, Grammar, Stylistics, Pragmatics, Language life, Dialect, History of the Japanese language, History of Japanese linguistics, etc.
02080	English linguistics-related
	Phonetics/phonology, Lexicon and semantics, Grammar, Stylistics, Pragmatics, Sociolinguistics, Diversity of the English language, Corpus linguistics, History of the English language, History of English linguistics, etc.
02090	Japanese language education-related
	Research on learners, Language acquisition, Teaching material, Curriculum evaluation, Japanese language education for specific purposes, Bilingual education, Research on teachers, Japanese language for Japanese language education, History of Japanese language education, Cross-cultural understanding, etc.
02100	Foreign language education-related
	Learning method, Computer-assisted language learning (CALL), Teaching material, Language testing, Theory of second language acquisition, Early English education, History of foreign language education and language policies, Curriculum evaluation, Training foreign language teachers, Cross-cultural understanding, etc.
90020	Library and information science, humanistic and social informatics-related
	Library science, Information services, Information organizing, Information retrieval, Bibliometrics, Information resources, Information ethics, Digital humanities, Social Informatics, Digital archives, etc.

Medium-sized Section 3：History, archaeology, museology, and related fields

Basic Section	Examples of related research content
03010	Historical studies in general-related
	Historical theory, Historical methodology, Research in historical materials, Memory and medium, World history, History of cultural and diplomatic exchange, Comparative history, Global history, Environmental history, History of emotions, etc.
03020	Japanese history-related
	History of ancient Japan, History of medieval Japan, History of early modern Japan, History of modern Japan, History of local Japan, History of external relations, History of culture and religion, History of Japanese environment, History of Japanese city, Research in historical materials, etc.
03030	History of Asia and Africa-related
	Chinese history, East Asian history, Central Eurasian history, Southeast Asian history, Oceanian history, South Asian history, West Asian history, African history, History of cultural and diplomatic exchange, Research in historical materials, etc.
03040	History of Europe and America-related
	Ancient European history, Medieval European history, Modern and contemporary West European history, Modern and contemporary East European history, North and South American history, History of cultural and diplomatic exchange, Comparative history, Research in historical materials, etc.
03050	Archaeology-related
	Archaeology in general, Prehistoric archaeology, Historical archaeology, Japanese archaeology, Ancient civilizations, History of material culture, Experimental archaeology, Information archaeology, Study of buried cultural property, Ecological archeology, etc.
03060	Cultural assets study-related
	Dating methods, Material analysis, Production techniques, Conservation science, Archaeological prospection, Plant and animal residues, Human remains, Cultural heritage, Cultural property policy, Restoration of cultural properties, etc.
03070	Museology-related
	Museum displays and exhibitions, Museum management, Museum collections and documentation, Museum conservation and preservation, Museum education and learning, Museum informatics and media studies, Museum finance and administration, History of museums and museology, etc.

(Broad Section A)

Medium-sized Section 4：Geography, cultural anthropology, folklore, and related fields

Basic Section	Examples of related research content
04010	Geography-related
	Geography in general, Land use, Landscape, Environmental system, Geomorphology, Climatology, Hydrology, Cartography, Geographic information system, Regional planning, etc.
04020	Human geography-related
	Human geography in general, Economic geography, Social geography, Political geography, Cultural geography, Urban geography, Rural geography, Historical geography, Regional geography, Geography education, etc.
04030	Cultural anthropology and folklore-related
	Cultural anthropology in general, Folklore in general, Material culture, Ecology, Social relationship, Religion, Arts, Health care, Border crossing, Minority, etc.
80010	Area studies-related
	Area studies in general, Cross-regional comparative studies, Aid, Social development, Interregional exchange, Environment, Transnationalism, Globalization, Refugees, Conflict, etc.
80020	Tourism studies-related
	Tourism studies in general, Tourism resources, Tourism policy, Tourism industry, Tourist area, Tourists, Tourism culture, Tourism media, Sustainable tourism, Tourism ethics, etc.
80030	Gender studies-related
	Gender studies in general, Feminism, Men's studies, Sexuality, Queer studies, Labor, Violence, Prostitution, Reproductive technology, Gender equality, etc.

Medium-sized Section 5 ：Law and related fields

Basic Section	Examples of related research content
05010	Legal theory and history-related
	Legal philosophy, Roman law, Legal history, Sociology of law, Comparative law, Foreign law, Law and policy, Law and economics, Judicial system, etc.
05020	Public law-related
	Constitutional law, Administrative law, Tax law, etc.
05030	International law-related
	Public international law, Private international law, International human rights law, International economic law, EU law, etc.
05040	Social law-related
	Labor law, Economic law, Social security law, Education law, etc.
05050	Criminal law-related
	Criminal law, Criminal procedure, Criminology, Criminal justice policy, Juvenile law, Law and psychology, etc.
05060	Civil law-related
	Civil law, Commercial law, Civil procedure, Insolvency law, Alternative dispute resolution, etc.
05070	New fields of law-related
	Environmental law, Medical law, Information law, Consumer law, Intellectual property law, Law and gender, Legal profession, etc.

(Broad Section A)

Medium-sized Section 6：Political science and related fields

Basic Section	Examples of related research content
06010	Politics-related Political theory, History of political thought, Political history, Political process, Political participation, Political economy, Public administration, Local government, Comparative politics, Public policy, etc.
06020	International relations-related Theory of international relations, International history, Foreign policy, International security, International political economy, Global governance, International cooperation, Peace research, etc.
80010	Area studies-related Area studies in general, Cross-regional comparative studies, Aid, Social development, Interregional exchange, Environment, Transnationalism, Globalization, Refugees, Conflict, etc.
80030	Gender studies-related Gender studies in general, Feminism, Men's studies, Sexuality, Queer studies, Labor, Violence, Prostitution, Reproductive technology, Gender equality, etc.

Medium-sized Section 7 ：Economics, business administration, and related fields

Basic Section	Examples of related research content
07010	Economic theory-related Microeconomics, Macroeconomics, Game theory, Behavioral economics, Experimental economics, Economic theory, Evolutionary economics, Economic institutions, Economic systems, etc.
07020	Economic doctrines and economic thought-related Economic doctrines, Economic thought, Social thought, Economic philosophy, etc.
07030	Economic statistics-related Statistical system, Statistical research, Economic statistics, Big data, Econometrics, Financial econometrics, etc.
07040	Economic policy-related Economic policy, Industrial organization, International economics, Development economics, Environmental and resource economics, Japanese economy, Regional economy, Urban economics, Transportation economics, Spatial economics, etc.
07050	Public economics and labor economics-related Public finance, Public economics, Health economics, Labor economics, Social security, Education economics, Law and economics, Political economy, Demography, etc.
07060	Money and finance-related Monetary economics, Finance, International finance, Corporate finance, Financial engineering, Insurance, etc.
07070	Economic history-related Economic history, Business history, Industrial history, etc.
07080	Business administration-related Organization theory, Corporate strategy, Organizational behavior, Corporation theory, Corporate governance theory, Human resource management, Technology/Innovation management theory, International business, Management information, Business administration in general, etc.
07090	Commerce-related Marketing, Consumer behavior, Distributive sciences, Logistics, Commerce in general, etc.
07100	Accounting-related Financial accounting, Management accounting, Auditing, Accounting in general, etc.

(Broad Section A)

80020	Tourism studies-related
	Tourism studies in general, Tourism resources, Tourism policy, Tourism industry, Tourist area, Tourists, Tourism culture, Tourism media, Sustainable tourism, Tourism ethics, etc.

Medium-sized Section 8 : Sociology and related fields

Basic Section	Examples of related research content
08010	Sociology-related
	Sociology in general, Community, Family, Labor, Stratification, Culture, Media, Ethnicity, Social movements, Social research, etc.
08020	Social welfare-related
	Social work, Social policy, Social welfare history, Child welfare, Social welfare for people with disabilities, Social welfare for aging, Community welfare, Poverty, Volunteerism, Social welfare in general, etc.
08030	Family and consumer sciences, and culture and living-related
	Dress and fashion, Diet habits, Housing, Family resource management, Family relations, Lifestyle, Culture and living, Family and consumer education, Family and consumer sciences in general, etc.
80020	Tourism studies-related
	Tourism studies in general, Tourism resources, Tourism policy, Tourism industry, Tourist area, Tourists, Tourism culture, Tourism media, Sustainable tourism, Tourism ethics, etc.
80030	Gender studies-related
	Gender studies in general, Feminism, Men's studies, Sexuality, Queer studies, Labor, Violence, Prostitution, Reproductive technology, Gender equality, etc.

Medium-sized Section 9 : Education and related fields

Basic Section	Examples of related research content
09010	Education-related
	History of education, Philosophy of education, Curriculum and pedagogy, Teacher and trainer, School education, Social and community education, Institutions and administration, Comparative education, Educational administration, etc.
09020	Sociology of education-related
	Sociology of education, Socialization, Educational community, Destination and career formation, Class disparities, Gender, Education policy, Globalization and development, etc.
09030	Childhood and nursery/pre-school education-related
	Childhood, Nursery/pre-school education, Right of child, Development, Contents and methods of child care, Childcare facilities and kindergarten, Caregiver and pre-school teacher, Child care support, Childhood culture, History and thought, etc.
09040	Education on school subjects and primary/secondary education-related
	Education of individual subjects, Lessons of each subject area, Instructional guidance, Teacher education, Special activities, Integrated studies, Moral education, etc.
09050	Tertiary education-related
	Policy, Admission and articulation, Curriculum, Career guidance, Teacher and staff, Scientific research, Regional link and contribution, Globalization, Management and governance, Non-university higher education, etc.
09060	Special needs education-related
	Philosophy and history, Inclusion and cohesive society, Instructions and supports, Developmental disabilities, Emotional disturbance, Intellectual disabilities, Language disorders, Physical disabilities, Career education, etc.
09070	Educational technology-related
	Curriculum development, Teaching-learning support systems, Utilization of media, Utilization of ICT, Teacher's education, Information literacy, etc.

(Broad Section A)

09080	Science education-related
	Science education, Science communication, Scientific literacy, Science and society, STEM education, etc.
02090	Japanese language education-related
	Research on learners, Language acquisition, Teaching material, Curriculum evaluation, Japanese language education for specific purposes, Bilingual education, Research on teachers, Japanese language for Japanese language education, History of Japanese language education, Cross-cultural understanding, etc.
02100	Foreign language education-related
	Learning method, Computer-assisted language learning (CALL), Teaching material, Language testing, Theory of second language acquisition, Early English education, History of foreign language education and language policies, Curriculum evaluation, Training foreign language teachers, Cross-cultural understanding, etc.

Medium-sized Section 10 : Psychology and related fields

Basic Section	Examples of related research content
10010	Social psychology-related
	Social psychology in general, Self, Group, Attitude and behavior, Affection/emotion, Interpersonal relation, Social issues, Culture, etc.
10020	Educational psychology-related
	Educational psychology in general, Development, Family, School, Clinical practice, Personality, Learning, Assessment and evaluation, etc.
10030	Clinical psychology-related
	Clinical psychology in general, Psychological disorder, Assessment, Psychological intervention, Training, Mental health, Crime and delinquency, Community, etc.
10040	Experimental psychology-related
	Experimental psychology in general, Sensation, Perception, Attention, Memory, Language, Emotion, Learning, etc.
90030	Cognitive science-related
	Cognitive science in general, Cognitive models, Kansei, Human factors, Cognitive and brain science, Comparative cognition, Cognitive linguistics, Cognitive engineering, etc.

Broad Section B

Medium-sized Section 11 : Algebra, geometry, and related fields

Basic Section	Examples of related research content
11010	Algebra-related
	Group theory, Ring theory, Representation theory, Algebraic combinatorics, Number theory, Arithmetic geometry, Algebraic geometry, Algebraic analysis, etc.
11020	Geometry-related
	Differential geometry, Riemannian geometry, Symplectic geometry, Complex geometry, Topology, Differential topology, Low dimensional topology, etc.

Medium-sized Section 12 : Analysis, applied mathematics, and related fields

Basic Section	Examples of related research content
12010	Basic analysis-related
	Functional analysis, Complex analysis, Probability theory, Harmonic analysis, Operator theory, Spectral analysis, Operator algebras, Algebraic analysis, Representation theory, etc.
12020	Mathematical analysis-related
	Functional equations, Real analysis, Dynamical system, Variational method, Nonlinear analysis, Applied analysis, etc.

(Broad Section B)

12030	Basic mathematics-related
	Mathematical logic and foundations, Information theory, Discrete mathematics, Computer mathematics, History of mathematics, etc.
12040	Applied mathematics and statistics-related
	Numerical analysis, Mathematical modelling, Optimal control, Game theory, Statistical mathematics, etc.

Medium-sized Section 13 : Condensed matter physics and related fields

Basic Section	Examples of related research content
13010	Mathematical physics and fundamental theory of condensed matter physics-related
	Statistical physics, Fundamental theory of condensed matter physics, Mathematical physics, Nonequilibrium nonlinear physics, Fluid dynamics, Computational physics, Quantum information theory, etc.
13020	Semiconductors, optical properties of condensed matter and atomic physics-related
	Semiconductors, Dielectrics, Atoms and molecules, Mesoscopic systems, Crystals, Surfaces and interfaces, Optical properties of condensed matter, Quantum electronics, Quantum information, etc.
13030	Magnetism, superconductivity and strongly correlated systems-related
	Magnetism, Strongly correlated electron systems, Superconductivity, Quantum fluids and solids, Molecular solids, etc.
13040	Biophysics, chemical physics and soft matter physics-related
	Physics of biological phenomena, Physics of biological matters, Liquids and glasses, Soft matters, Rheology, etc.

Medium-sized Section 14 : Plasma science and related fields

Basic Section	Examples of related research content
14010	Fundamental plasma-related
	Basic plasmas, Magnetized plasmas, Laser plasmas, Strongly coupled plasmas, Plasma diagnostics, Astrophysical and space plasmas, etc.
14020	Nuclear fusion-related
	Plasma confinement, Plasma control, Plasma heating, Plasma diagnostics, Edge plasma, Plasma wall interaction, Inertial fusion, Fusion material, Fusion system, etc.
14030	Applied plasma science-related
	Plasma processing, Plasma material science, General plasma applications, etc.
80040	Quantum beam science-related
	Accelerators, Beam physics, Radiation detectors, Beam control, Applied quantum beam science, etc.

Medium-sized Section 15 : Particle-, nuclear-, astro-physics, and related fields

Basic Section	Examples of related research content
80040	Quantum beam science-related
	Accelerators, Beam physics, Radiation detectors, Beam control, Applied quantum beam science, etc.
15010	Theoretical studies related to particle-, nuclear-, cosmic ray and astro-physics
	Particle physics, Nuclear physics, Cosmic-ray physics, Astrophysics, Relativity, Gravity, etc.
15020	Experimental studies related to particle-, nuclear-, cosmic ray and astro-physics
	Particle physics, Nuclear physics, Cosmic-ray physics, Astrophysics, Relativity, Gravity, etc.

(Broad Section B)

Medium-sized Section 16: Astronomy and related fields

Basic Section	Examples of related research content
16010	Astronomy-related Theoretical astronomy, Radio astronomy, Optical/infrared astronomy, X-ray/γ-ray astronomy, Astrometry, Solar physics, Exoplanet astronomy, etc.

Medium-sized Section 17: Earth and planetary science and related fields

Basic Section	Examples of related research content
17010	Space and planetary sciences-related Solar-terrestrial physics, Aeronomy, Planetary science, Exoplanetary science, Extraterrestrial material science, etc.
17020	Atmospheric and hydrospheric sciences-related Climate system, Atmospheric science, Ocean science, Limnology, Glaciology, Paleoclimatology, etc.
17030	Human geosciences-related Geoenvironmental science, Natural disaster science, Geospatial information science, Quaternary research, Earth resources science, etc.
17040	Solid earth sciences-related Solid earth geophysics, Geology, Earth's interior material science, Solid earth geochemistry, etc.
17050	Biogeosciences-related Origin and evolution of life, Extremophile biology, Biogeochemistry, Paleoenvironmental science, Paleontology, etc.

Broad Section C

Medium-sized Section 18: Mechanics of materials, production engineering, design engineering, and related fields

Basic Section	Examples of related research content
18010	Mechanics of materials and materials-related Structural mechanics, Fatigue, Fracture, Biomaterials, Material design, Material characteristics, Material evaluation, etc.
18020	Manufacturing and production engineering-related Machining, Non-traditional machining, Ultraprecision machining, Machine tools, Manufacturing systems, Precision metrology, Process planning, etc.
18030	Design engineering-related Mechanical design, Product design, Design theory, Design for reliability, Optimal design, Computer-aided design, etc.
18040	Machine elements and tribology-related Machine elements, Mechanisms, Tribology, Actuators, Micromachines, etc.

Medium-sized Section 19: Fluid engineering, thermal engineering, and related fields

Basic Section	Examples of related research content
19010	Fluid engineering-related Fluid machinery, Flow measurement, Computational fluid dynamics, Turbulence, Multiphase flow, Compressible flow, Incompressible flow, etc.

(Broad Section C)

19020	Thermal engineering-related
	Heat transfer, Convection, Combustion, Thermophysical properties, Refrigeration and air-conditioning, Heat engine, Energy conversion, etc.

Medium-sized Section 20 : Mechanical dynamics, robotics, and related fields

Basic Section	Examples of related research content
20010	Mechanics and mechatronics-related
	Kinematics, Kinetics, Vibration, Acoustics, Automation, Biomechanics, Instrument and control applications, Mechatronics applications, etc.
20020	Robotics and intelligent system-related
	Robotics, Intelligent system, Human mechanical system, Human interface, Planning, Intelligent spatial system, Virtual reality, Augmented reality, etc.

Medium-sized Section 21 : Electrical and electronic engineering and related fields

Basic Section	Examples of related research content
21010	Power engineering-related
	Electrical energy-related, Energy conservation, Power system engineering, Electric machinery, Power electronics, Effective utilization of electric energy, Electromagnetic compatibility, Wireless power transfer, etc.
21020	Communication and network engineering-related
	Information theory, Nonlinear theory, Signal processing, Communication systems, Modulation/demodulation, Antennas, Networks, Multimedia, Cryptography/security, etc.
21030	Measurement engineering-related
	Measurement theory, Measuring instruments, Applied wave metrology, Measurement systems, Signal processing, Sensing, etc.
21040	Control and system engineering-related
	Control theory, System theory, Control systems, Knowledge-based control systems, System information processing, System control applications, Biosystems engineering, etc.
21050	Electric and electronic materials-related
	Semiconductor, Dielectric materials, Magnetic materials, Organic materials, Superconductor, Composite materials, Thin films, Functional materials, Thick films, Fabrication/characterization methods, etc.
21060	Electron device and electronic equipment-related
	Electron devices, Circuit design, Optical devices, Spintronic devices, Millimeter wave/terahertz wave, Applied wave devices, Storage devices, Displays, Process technology, Implementation technology, etc.

Medium-sized Section 22 : Civil engineering and related fields

Basic Section	Examples of related research content
22010	Civil engineering material, execution and construction management-related
	Concrete, Steel, Composite material, Wood, Pavement material, Repair and reinforce material, Execution, Maintenance, Construction management, etc.
22020	Structure engineering and earthquake engineering-related
	Applied mechanics, Structure engineering, Steel structure, Concrete structure, Composite structure, Wind engineering, Earthquake engineering, Aseismatic structure, Earthquake prevention, etc.
22030	Geotechnical engineering-related
	Soil mechanics, Foundation engineering, Rock engineering, Engineering geology, Ground behavior, Geotechnical structures, Geo-disaster prevention, Geo-environment, Tunnel engineering, etc.
22040	Hydroengineering-related
	Hydraulics, Environmental hydraulics, Hydrology, River engineering, Water resource engineering, Coastal engineering, Port and harbor engineering, Ocean engineering, etc.

(Broad Section C)

22050	Civil engineering plan and transportation engineering-related
	Civil engineering plan, Regional urban planning, Spatial planning, Disaster prevention plan, Transportation plan, Transportation engineering, Railway engineering, Surveying and remote sensing, Landscape design, Civil engineering history, etc.
22060	Environmental systems for civil engineering-related
	Environment plan, Environmental system, Environment conservation, Water serve and drainage systems, Waste, Water environment, Atmospheric circulation, Noise and vibration, Environment ecology, Environmental monitoring, etc.

Medium-sized Section 23 : Architecture, building engineering, and related fields

Basic Section	Examples of related research content
23010	Building structures and materials-related
	Load theory, Structural analysis, Structural design, Structures, Earthquake resistant design, Foundation, Geotechnics, Structural material, Maintenance, Building construction method, etc.
23020	Architectural environment and building equipment-related
	Sound environment, Vibration environment, Light environment, Heat environment, Air environment, Environmental psychology/physiology, Building equipment, Fire engineering, Urban environment, Environment design, etc.
23030	Architectural planning and city planning-related
	Planning theory, Design theory, Housing theory, Buildings, Urban/regional planning, Administration, Building economics, Production management, Disaster prevention planning, Landscape, etc.
23040	Architectural history and design-related
	Architectural history, Urban history, Architectural theory, Design, Landscape, Preservation, Renovation, etc.
90010	Design-related
	Information design, Environmental design, Industrial design, Spatial design, Design history, Theory of design, Design standard, Design support, Evaluation of design, Design education, etc.

Medium-sized Section 24 : Aerospace engineering, marine and maritime engineering, and related fields

Basic Section	Examples of related research content
24010	Aerospace engineering-related
	Thermo-fluid dynamics, Structural mechanics, Propulsion, Aerospace craft design, Production engineering, Aircraft system, Aerodynamics, Spacecraft system, Space utilization, etc.
24020	Marine engineering-related
	Navigation, Structural mechanics, Structural design, Production technology, Marine propulsion, Marine transport, Marine development, Underwater engineering, Polar engineering, Marine environmental technology, etc.

Medium-sized Section 25 : Social systems engineering, safety engineering, disaster prevention engineering, and related fields

Basic Section	Examples of related research content
25010	Social systems engineering-related
	Social systems, Industrial engineering, Operations research, Industrial management, Reliability engineering, Policy science, Regulatory science, Quality control, etc.
25020	Safety engineering-related
	Safety engineering, Safety system, Risk engineering, Risk management, Work safety, Industrial safety, Product safety, Safety information, Human engineering, Liability engineering, etc.
25030	Disaster prevention engineering-related
	Disaster prediction, Hazard map, Building prevention against disaster, Lifeline prevention against disaster, Regional disaster prevention planning, Risk evaluation of disaster, Disaster prevention policy, Disaster resilience, etc.

Broad Section D

Medium-sized Section 26 : Materials engineering and related fields

Basic Section	Examples of related research content
26010	Metallic material properties-related
	Electric and magnetic properties, Metastable states, Diffusion, Phase transformation, Phase diagram, Lattice defect, Mechanical properties, Thermal and optical properties, Materials computational science, Microstructure analysis, etc.
26020	Inorganic materials and properties-related
	Functional ceramics, Glass, Engineering ceramics, Carbon-based materials, Crystal structure analysis, Microstructure, Electric properties, Mechanical properties, Physical and chemical properties, Grain boundary, etc.
26030	Composite materials and interfaces-related
	Functional composite materials, Structural composite materials, Biocompatible composite materials, Polymer composite, Surface treatment, Bonding and joining, Interface properties, Gradient function, etc.
26040	Structural materials and functional materials-related
	Infrastructural materials, Structural materials, Functional materials, Medical welfare materials, Reliability, Sensor materials, Energy materials, Battery materials, Environmental materials, etc.
26050	Material processing and microstructure control-related
	Processing and molding, Molding, Weld joining, Crystal microstructure control, Laser processing, Precision processing, Polishing, Powder metallurgy, Coating, Corrosion and protection, etc.
26060	Metals production and resources production-related
	Separation and purification, Melting and solidifying, Crystal growth, Casting, Scarce resources substitution, Low environment impact, Recycle, etc.

Medium-sized Section 27 : Chemical engineering and related fields

Basic Section	Examples of related research content
27010	Transport phenomena and unit operations-related
	Phase equilibrium, Transport properties, Fluid-phase unit operation, Adsorption, Membrane separation, Stir mixing, Powder and particle, Crystallization, Film formation, Supercritical, etc.
27020	Chemical reaction and process system engineering-related
	Reaction operation, Novel reaction process, Reaction mechanism, Reactor design, Materials synthesis process, Microreactor, Process control, Process system design, Process informatics, etc.
27030	Catalyst and resource chemical process-related
	Catalyst preparation, Catalytic function, Energy conversion process, Energy technology, Resources effective utilization technology, Catalytic material, Active site analysis, etc.
27040	Biofunction and bioprocess engineering-related
	Biocatalyst engineering, Biofunction engineering, Food engineering, Medicochemical engineering, Bioproduction process, Bioreactor, Bioseparation, Biosensor, Biorefinery, etc.

Medium-sized Section 28 : Nano/micro science and related fields

Basic Section	Examples of related research content
28010	Nanometer-scale chemistry-related
	Nanoparticle chemistry, Mesoscopic chemistry, Nanostructure control, Self-assembly, Nanocarbons, Molecular devices, Nanointerface function, Nanospace function, etc.

(Broad Section D)

28020	Nanostructural physics-related
	Physics in nanoscale materials and structures, Nanoprobes, Quantum dots, Quantum devices, Electron devices, Spin devices, Nano optical device, Nanotribology, Nanocarbon physics, etc.
28030	Nanomaterials-related
	Creation of nanomaterials, Analysis of nanomaterials, Nanosurfaces and nanointerfaces, Functional nanomaterials, Nanoparticles, Carbon nanomaterials, Two-dimensional materials, Nanocrystalline materials, Nanocomposites, Nanofabrication process, etc.
28040	Nanobioscience-related
	Biomolecular devices, Molecular manipulation, Molecular imaging, Nanomeasurements, Nanosynthesis, Single molecule science, Nano-bio interfaces, Biomolecular array, Genome engineering, etc.
28050	Nano/micro-systems-related
	MEMS, NEMS, BioMEMS, Nano/micro-fabrication, Nano/micro-chemical systems, Nano/micro-biosystems, Nano/micro-mechanics, Nano/micro-sensors, etc.

Medium-sized Section 29 : Applied condensed matter physics and related fields

Basic Section	Examples of related research content
29010	Applied physical properties-related
	Magnetic materials, Superconductors, Dielectrics, Fine particles, Liquid crystals, New functional materials, Molecular electronics, Bioelectronics, Spintronics, etc.
29020	Thin film/surface and interfacial physical properties-related
	Thin-film engineering, Surface and interfacial engineering, Surface science, Vacuum, Measurement, Analysis, Nanoscopic technology, Advanced equipment, Electronics application, etc.
29030	Applied condensed matter physics-related
	Elementary quantities, Standards, Units, Physical quantity measurements and detection, Energy conversion, etc.

Medium-sized Section 30 : Applied physics and engineering and related fields

Basic Section	Examples of related research content
30010	Crystal engineering-related
	Metal, Semiconductor, Ceramics, Amorphous, Crystal growth, Artificial structures, Device structure, Crystal characterization, Plasma process, etc.
30020	Optical engineering and photon science-related
	Optical materials, Optical elements, Optical properties, Optical information processing, Laser, Optical sensing, Optical recording, Opto-electronics, Nonlinear optics, Quantum optics, etc.

Medium-sized Section 31 : Nuclear engineering, earth resources engineering, energy engineering, and related fields

Basic Section	Examples of related research content
31010	Nuclear engineering-related
	Reactor physics, Nuclear safety, Thermal-hydraulics and structure, Fuel material, Nuclear chemistry, Nuclear life cycle, Radiation safety, Radiation engineering, Fusion reactor engineering, Nuclear social environment, etc.
31020	Earth resource engineering, Energy sciences-related
	Resource prospecting, Resource development, Resource cycle, Resource economy, Energy system, Environmental load, Renewable energy, Natural resources and energy policy, etc.

(Broad Section D)

Medium-sized Section 90: Biomedical engineering and related fields

Basic Section	Examples of related research content
90110	Biomedical engineering-related
	Medical imaging, Medical modeling, Biological simulation, Biometrics, Artificial organs, Tissue engineering, Biophysical properties, Biocontrol, Biomechanics, Nanobio systems, etc.
90120	Biomaterials-related
	Biofunctional materials, Tissue engineering materials, Biocompatible materials, Nanobio materials, Drug delivery systems, Stimuli-sensitive materials, Genetic engineering material, etc.
90130	Medical systems-related
	Medical ultrasound system, Diagnostic imaging system, Laboratory diagnosis systems, Minimally invasive treatment systems, Remote diagnosis and treatment systems, Organ preservation systems, Medical information systems, Computer-assisted surgery, Medical robot, etc.
90140	Medical technology assessment-related
	Regulatory science, Safety evaluation, Clinical study, Medical technology ethics, Medical devices, etc.
90150	Medical assistive technology-related
	Healthcare and rehabilitation engineering, Life assist technology, Care support technology, Accessibility design, Universal design, Rehabilitation and nursing robot, Assist device for artificial internal organ, Rehabilitation devices, Nursing science and engineering, etc.

Broad Section E

Medium-sized Section 32: Physical chemistry, functional solid state chemistry, and related fields

Basic Section	Examples of related research content
32010	Fundamental physical chemistry-related
	Gas, Liquid, Solid, Nanomaterials, Bio-related materials, Structure and properties, Chemical reactions, Spectroscopy, Theoretical calculation, Data science, etc.
32020	Functional solid state chemistry-related
	Molecular materials, Inorganic compounds, Hybrid compounds, Colloids, Surface/interface, Electrical properties, Optical properties, Magnetic properties, Energy conversion, Catalysis, etc.

Medium-sized Section 33: Organic chemistry and related fields

Basic Section	Examples of related research content
33010	Structural organic chemistry and physical organic chemistry-related
	Chemistry of organic crystals, Molecular recognition, Supermolecules, Functional organic molecules, Extended π-electron molecules, Organoelement chemistry, Reaction mechanism, Molecular chirality, Theoretical organic chemistry, etc.
33020	Synthetic organic chemistry-related
	Development of reactions, Reaction mechanism, Selective reactions, Asymmetric synthesis, Development of catalysts, Biocatalysis, Sustainable organic synthesis, Natural product synthesis, Process chemistry, etc.

(Broad Section E)

Medium-sized Section 34 : Inorganic/coordination chemistry, analytical chemistry, and related fields

Basic Section	Examples of related research content
34010	Inorganic/coordination chemistry-related
	Coordination chemistry, Organometallic chemistry, Inorganic solid-state chemistry, Bioinorganic chemistry, Solution chemistry, Clusters, Supramolecular complexes, Coordination polymers, Typical elements, Physical properties and functions, etc.
34020	Analytical chemistry-related
	Spectrometric analysis, Advanced measurements, Surface/interface analysis, Separation analysis, Analytical reagents, Radiochemical analysis, Electrochemical analysis, Bioanalysis, New analysis methods, etc.
34030	Green sustainable chemistry and environmental chemistry-related
	Green process, Green catalysts, Recycle, Environmental assessment, Environmentally conscious materials, Reduction of environmental load, Environmental restoration, Resource saving, Geochemistry, Environmental radioactivity, etc.

Medium-sized Section 35 : Polymers, organic materials, and related fields

Basic Section	Examples of related research content
35010	Polymer chemistry-related
	Polymer synthesis, Polymer reactions, Functional polymers, Self-assembled polymers, Non-covalent polymers, Chiral polymers, Bio-related polymers, Polymer properties, Polymer structures, Polymer interface, etc.
35020	Polymer materials-related
	Properties of polymer materials, Synthesis of polymer materials, Functional polymer materials, Environmentally friendly polymer materials, Liquid crystal polymers, Gel, Biopolymers, Polymer composites, Polymer processing, etc.
35030	Organic functional materials-related
	Organic semiconductors, Liquid crystals, Optical materials, Device-related materials, Electrically conductive materials, Hybrid materials, Molecular functional materials, Organic hybrid materials, Materials for energy conversion, etc.

Medium-sized Section 36 : Inorganic materials chemistry, energy-related chemistry, and related fields

Basic Section	Examples of related research content
36010	Inorganic compounds and inorganic materials chemistry-related
	Crystals, Amorphous, Ceramics, Semiconductors, Inorganic device-related materials, Low-dimensional compounds, Porous materials, Nanoparticles, Multicomponent compounds, Hybrid materials, etc.
36020	Energy-related chemistry
	Energy resources, Energy conversion materials, Energy carriers, Solar energy utilization, Material separation, Catalytic transformation, Battery and electrochemical materials, Energy-saving materials, Renewable energy, Unused energy, etc.

Medium-sized Section 37 : Biomolecular chemistry and related fields

Basic Section	Examples of related research content
37010	Bio-related chemistry
	Bioorganic chemistry, Bioinorganic chemistry, Biological reaction engineering, Biofunctional chemistry, Biofunctional materials, Biotechnology, etc.
37020	Chemistry and chemical methodology of biomolecules-related
	Natural product chemistry, Biologically active compounds, Molecular mechanism of biological activities, Biofunctional molecules, Combinatorial chemistry, Metabolomic analysis, etc.

37030	Chemical biology-related
	In vivo functional expression, Intracellular chemical reactions, Drug discovery science, Chemical library, Structure-activity relationship, Chemical probes, Biomolecular measurements, Molecular imaging, Proteomics, etc.

Broad Section F

Medium-sized Section 38 : Agricultural chemistry and related fields

Basic Section	Examples of related research content
38010	Plant nutrition and soil science-related
	Plant metabolism and physiology, Nutritional elements in plants, Soil classification, Soil physical chemistry, Soil organisms, etc.
38020	Applied microbiology-related
	Microbial genetics/breeding, Microbial function, Microbial metabolism and physiology, Microbial applications, Control of microbes, Microbial ecology, Production of useful materials, etc.
38030	Applied biochemistry-related
	Cellular biochemistry, Applied biochemistry, Structural biology, Regulation of bioactivity, Metabolism and physiology, Cellular function, Molecular function, Production of useful materials, etc.
38040	Bioorganic chemistry-related
	Bioactive substances, Signal molecules, Natural products chemistry, Biosynthesis, Structure-activity relationship, Synthetic organic chemistry, Chemical biology, etc.
38050	Food sciences-related
	Food function, Food chemistry, Nutritional chemistry, Food analysis, Food engineering, Food safety, Functional food, Nutritional epidemiology, Clinical nutrition, etc.
38060	Applied molecular and cellular biology-related
	Molecular cell biology, Cellular bioengineering, Molecular engineering, Gene expression control, Cell-cell/intermolecular interactions, Cellular function, Production of useful materials, etc.

Medium-sized Section 39 : Agricultural and environmental biology and related fields

Basic Section	Examples of related research content
39010	Science in plant genetics and breeding-related
	Genetic resources, Breeding theories, Genomic breeding, Plants with novel traits, Quality components, Stress tolerance, Yielding ability, Reproduction and multiplication, Growth physiology, Development, etc.
39020	Crop production science-related
	Field crops, Crop yield, Crop product quality, Crop morphology, Growth prediction, Crop physiology, Field management, Low-cost cultivation techniques, Environmentally friendly agriculture, Field ecosystem, etc.
39030	Horticultural science-related
	Plant growth, flowering, and fruit development, Nursery plant propagation and production, Crop production systems, Cultivation techniques, Protected horticulture, Controlled environment systems, Breeding and development of new cultivars, Quality of horticultural products, Postharvest physiology and management, Socio-horticulture, etc.
39040	Plant protection science-related
	Plant pathology, Clinical plant science, Agricultural insect pest, Natural enemy, Weed, Agricultural chemicals, Integrated pest management, etc.
39050	Insect science-related
	Sericulture insect technology, Insect genetics, Insect pathology, Insect physiology and biochemistry, Insect ecology, Chemical ecology, Systematics, Symbiosis and parasitism, Social insects, Medical entomology, etc.
39060	Conservation of biological resources-related
	Conservation biology, Biodiversity conservation, Conservation of phylogenetic diversity, Genetic resources conservation, Ecosystem conservation, Conservation of microorganisms, Impacts of non-native species, etc.

(Broad Section F)

39070	Landscape science-related
	Landscape architecture, Parks and open space planning, Landscape planning, Cultural landscape, Nature conservation, Landscape ecology, Parks and open space management, Parks, Environmental greening, Participatory community design, etc.

Medium-sized Section 40 : Forestry and forest products science, applied aquatic science, and related fields

Basic Section	Examples of related research content
40010	Forest science-related
	Forest ecology, Forest biodiversity, Forest genetics and breeding, Silviculture, Forest protection, Forest environments, Erosion control, Forest utilization, Forest planning, Forest policy, etc.
40020	Wood science-related
	Wood structure, Wood property, Lignocellulose, Trace element, Fungus, Wood processing, Biomass-refinery, Wood based material, Wooden building, Forest products education, etc.
40030	Aquatic bioproduction science-related
	Aquatic environment, Fisheries, Aquatic resource management, Aquatic organisms, Aquatic ecosystem, Aquaculture, Fisheries engineering, Fishing community/fisheries policy, Fisheries economics/management/marketing, Fisheries education, etc.
40040	Aquatic life science-related
	Aquatic nutrition, Aquatic pathology, Aquatic genetics/heredity/breeding, Aquatic physiology, Utilization of aquatic organisms and biomass, Aquatic biological chemistry, Aquatic biotechnology, Aquatic food sciences, etc.

Medium-sized Section 41 : Agricultural economics and rural sociology, agricultural engineering, and related fields

Basic Section	Examples of related research content
41010	Agricultural and food economics-related
	Food economy, Agricultural production economy, Agricultural policy, Food system, Food marketing, International agricultural development, Trade of agricultural commodities and livestock products, Rural resources and environment, etc.
41020	Rural sociology and agricultural structure-related
	Farm organization, Farm management, Agricultural structure, Agricultural market, Agricultural history, Rural society, Rural life, Agricultural cooperative, etc.
41030	Rural environmental engineering and planning-related
	Irrigation and drainage, Reclamation and conservation of agricultural land, Rural planning, Rural environment, Circulation of resources and energy, Disaster prevention in rural area, Stock management of agricultural infrastructures, Hydrodynamics and hydrology, Soil physics, Design and construction materials, etc.
41040	Agricultural environmental engineering and agricultural information engineering-related
	Agricultural production facilities, Bioproduction machinery, Environmental control, Agricultural meteorology and micrometeorology, Agricultural information, Greenhouse horticulture, Plant factory, Postharvest and supply chain, Nondestructive measurement, Remote sensing and geographic information system, etc.
41050	Environmental agriculture-related
	Biomass, Environmental manipulation, Biodiversity, Environmental analysis, Ecosystem services, Resources circulation system, Low-carbon societies, Life-cycle assessment, Environmental friendly agriculture, Watershed management, etc.

Medium-sized Section 42 : Veterinary medical science, animal science, and related fields

Basic Section	Examples of related research content
42010	Animal production science-related
	Breeding/genetics, Reproduction, Nutrition/feeding, Anatomy/physiology, Product, Environment, Behavior, Therapy, Grassland, Grazing, etc.
42020	Veterinary medical science-related
	Basic veterinary science, Pathological veterinary science, Applied veterinary science, Clinical veterinary science, Animal nursing, Animal welfare, Wildlife, etc.

42030	Animal life science-related
	Homeostasis, Cellular function, Biological defense, Integrated genetics, Development/differentiation, Biotechnology, etc.
42040	Laboratory animal science-related
	Genetic engineering, Developmental engineering, Animal models of disease, Facility management, Laboratory animal welfare, Laboratory animal-related technology, Bioresource, etc.

Broad Section G

Medium-sized Section 43 : Biology at molecular to cellular levels, and related fields

Basic Section	Examples of related research content
43010	Molecular biology-related
	Chromosome function, Chromatin, Epigenetics, Genome maintenance, Genome transmission, Chromosome re-organization, Gene expression, Non-coding RNA, Regulation of protein function, Molecular genetics, Regulation of RNA function, etc.
43020	Structural biochemistry-related
	Proteins, Nucleic acids, Lipids, Carbohydrates, Biological membrane, Molecular recognition, Denaturation, Three-dimensional structural analysis, Three-dimensional structural prediction, Molecular dynamics, etc.
43030	Functional biochemistry-related
	Enzymes, Sugar chain, Bioenergy conversion, Biological trace elements, Physiologically active substances, Cell signaling, Membrane transport, Proteolysis, Molecular recognition, Organelle, etc.
43040	Biophysics-related
	Structure biology, Physical property of biomolecules, Biomembrane, Photobiology, Molecular motor, Biometrics, Bioimaging, Systems biology, Synthetic biology, Theoretical biology, etc.
43050	Genome biology-related
	Genome organization, Genome function, Genome diversity, Molecular evolution of genome, Genome repair/maintenance, Trans-omics, Epigenome, Gene resource, Genome dynamics, etc.
43060	System genome science-related
	Network analyses, Synthetic biology, Biological databases, Bioinformatics, Genome analysis technology, Genome biotechnology, etc.

Medium-sized Section 44 : Biology at cellular to organismal levels, and related fields

Basic Section	Examples of related research content
44010	Cell biology-related
	Cytoskeleton, Proteolysis, Organelle, Nuclear structure and function, Extracellular matrix, Signal transduction, Cell cycle, Cell motility, Cell-cell interaction, Cellular genetics, etc.
44020	Developmental biology-related
	Cell differentiation, Stem cells, Regeneration, Germ layer formation, Morphogenesis, Organogenesis, Fertilization, Germ cells, Developmental genetics, Evolution and development, etc.
44030	Plant molecular biology and physiology-related
	Photosynthesis, Growth physiology, Plant development, Organelle, Cell wall, Responses to environment, Plant-microbe interaction, Metabolism, Plant molecular function, etc.
44040	Morphology and anatomical structure-related
	Morphology, Comparative morphology, Morphological modeling, Ultrastructure, Morphological image analysis, Tissue organization, Microscopic technology, Imaging, etc.
44050	Animal physiological chemistry, physiology and behavioral biology-related
	Metabolic physiology, Neurophysiology, Neuroethology, Behavioral physiology, Animal physiological chemistry, Chronobiology, Comparative physiology, Comparative endocrinology, Behavioral genetics, etc.

(Broad Section G)

Medium-sized Section 45: Biology at organismal to population levels and anthropology, and related fields

Basic Section	Examples of related research content
45010	Genetics-related Molecular genetics, Cellular genetics, Developmental genetics, Behavioral genetics, Population genetics, Quantitative trait, Population genomics, Genome-wide association study, Genetic diversity, Epigenome diversity, etc.
45020	Evolutionary biology-related Molecular evolution, Evolutionary genetics, Phenotypic evolution, Evolutionary developmental biology, Evolution of ecological traits, Evolution of behaviors, Experimental evolution, Coevolution, Speciation, Evolutionary theory, etc.
45030	Biodiversity and systematics-related Taxonomic characters, Taxon, Classification system, Molecular phylogeny, Phyletic evolution, Speciation, Natural history, Biogeography, Rare species conservation, Biodiversity, etc.
45040	Ecology and environment-related Chemical ecology, Molecular ecology, Physiological ecology, Evolutionary ecology, Behavioral ecology, Population ecology, Community ecology, Conservation ecology, Biological interactions, Material cycles in ecosystems, etc.
45050	Physical anthropology-related Morphology and function, Bioarchaeology, Biological mechanism, Genome, Evolutionary genetics, Behavior, Ecology, Comparative cognition, Primates, Growth and aging, etc.
45060	Applied anthropology-related Physiological anthropology, Ergonomics, Forensic anthropology, Medical anthropology, Physiological polymorphisms, Environmental adaptability, Somatic and physiological function, Anthropometry and bioengineering, Lifestyle, etc.

Medium-sized Section 46: Neuroscience and related fields

Basic Section	Examples of related research content
46010	Neuroscience-general-related Neurochemistry, Neuron, Glia, Genome, Epigenetics, Neurobiology, Information processing, Synapse, Neurogenesis, etc.
46020	Anatomy and histopathology of nervous system-related Neural development, Anatomy of nervous system, Neural network structure, Neuropathology, etc.
46030	Function of nervous system-related Neurophysiology, Neuropharmacology, Neurotransmission, Neuroinformatics, Behavioral neuroscience, Neural system physiology, Cerebral blood flow, Autonomic nervous system, etc.

Broad Section H

Medium-sized Section 47: Pharmaceutical sciences and related fields

Basic Section	Examples of related research content
47010	Pharmaceutical chemistry and drug development sciences-related Inorganic chemistry, Organic chemistry, Medicinal chemistry, Medicinal molecular design, Drug discovery, Bio-related materials, Chemical biology, etc.
47020	Pharmaceutical analytical chemistry and physicochemistry-related Environmental analysis, Bioanalysis, Physicochemistry, Biophysics, Structural biology, Radiochemistry, Bioimaging, Drug formulation design, Computer science, Information science, etc.
47030	Pharmaceutical hygiene and biochemistry-related Environmental hygiene, Healthful nutrition, Disease prevention, Toxicology, Drug metabolism, Host defense, Molecular biology, Cell biology, Biochemistry, etc.

(Broad Section H)

47040	Pharmacology-related
	Pharmacology, Pharmacogenomics, Applied pharmacology, Signal transduction, Drug interactions, Drug response, Pharmacotherapy, Pharmacotoxicology, etc.
47050	Environmental and natural pharmaceutical resources-related
	Environmental resource science, Natural products chemistry, Bioactive natural compounds, Medicinal resources, Medicinal foods, Pharmaceutical microbiology, etc.
47060	Clinical pharmacy-related
	Pharmacokinetics, Medical informatics, Social pharmacy, Clinical pharmacy, Pharmaceutics, Regulatory science, Education for the pharmacist, etc.

Medium-sized Section 48 : Biomedical structure and function and related fields

Basic Section	Examples of related research content
48010	Anatomy-related
	Macroscopic anatomy, Histology, Embryology, etc.
48020	Physiology-related
	General physiology, Pathophysiology, Comparative physiology, Environmental physiology, etc.
48030	Pharmacology-related
	Genomic pharmacology, Molecular and cellular pharmacology, Pathological pharmacology, Behavioral pharmacology, Pharmacology for drug discovery, Clinical pharmacology, etc.
48040	Medical biochemistry-related
	Biofunctional molecular and medical biochemistry, Genome medical sciences, Human genetics, Disease model, etc.

Medium-sized Section 49 : Pathology, infection/immunology, and related fields

Basic Section	Examples of related research content
49010	Pathological biochemistry-related
	Molecular pathology, Metabolic disorders, Molecular diagnosis, etc.
49020	Human pathology-related
	Molecular pathology, Cyto- and histo-pathology, Diagnostic pathology, etc.
49030	Experimental pathology-related
	Disease models, Pathological regulation, Tissue regeneration, etc.
49040	Parasitology-related
	Parasite, Vector organism, Parasite pathogenicity, Epidemiology of parasites, Control of parasite infections, etc.
49050	Bacteriology-related
	Bacterium, Fungus, Antimicrobial resistance, Bacterial pathogenicity, Epidemiology of bacteria, Control of bacterial infections, etc.
49060	Virology-related
	Virus, Prion, Viral pathogenicity, Epidemiology of viruses, Control of viral infections, etc.
49070	Immunology-related
	Immune system, Immune response, Inflammation, Immune-related disorder, Immune regulation, etc.

Broad Section I

Medium-sized Section 50 : Oncology and related fields

Basic Section	Examples of related research content
50010	Tumor biology-related
	Cancer and gene, Tumor development, Invasion, Metastasis, Cancer microenvironment, Cancer and signal transduction, Characteristics of cancer cells, Cancer and immune cells, etc.
50020	Tumor diagnostics and therapeutics-related
	Genome analysis, Diagnostic markers, Molecule imaging, Chemotherapy, Nucleic acid therapy, Gene therapy, Immunotherapy, Molecular targeted therapy, Physical therapy, Radiation therapy, etc.

Medium-sized Section 51 : Brain sciences and related fields

Basic Section	Examples of related research content
51010	Basic brain sciences-related
	Brain-machine interface, Model animal, Computational brain science, Brain information decoding, Control technologies, Brain imaging, Brain biometrics, etc.
51020	Cognitive and brain science-related
	Social behavior, Communication, Emotion, Decision making, Consciousness, Learning, Neuroeconomics, Neuropsychology, etc.
51030	Pathophysiologic neuroscience-related
	Clinical neuroscience, Dolorology, Sensory impairment, Movement disorder, Neurological disorder, Neurogenesis, Neuroimmunology, Cellular degeneration, Disease model, etc.

Medium-sized Section 52 : General internal medicine and related fields

Basic Section	Examples of related research content
52010	General internal medicine-related
	Psychosomatic medicine, Laboratory medicine, General practice, Geriatrics, Psychosomatic internal medicine, Oriental medicine, Palliative medicine, etc.
52020	Neurology-related
	Neurology, Neurofunctional imaging, etc.
52030	Psychiatry-related
	Clinical psychiatry, Biological psychiatry, Forensic mental health, etc.
52040	Radiological sciences-related
	Diagnostic radiology, Therapeutic radiology, Radiation biology, Radiological technology, etc.
52050	Embryonic medicine and pediatrics-related
	Fetal medicine, Neonatal medicine, Pediatrics, etc.

Medium-sized Section 53 : Organ-based internal medicine and related fields

Basic Section	Examples of related research content
53010	Gastroenterology-related
	Upper digestive tract, Lower digestive tract, Liver, Biliary tract, Pancreas, etc.
53020	Cardiology-related
	Ischemic heart disease, Valvular heart disease, Arrhythmia, Cardiomyopathy, Heart failure, Peripheral arterial disease, Arteriosclerosis, Hypertension, etc.

(Broad Section I)

53030	Respiratory medicine-related
	Respiratory medicine, Asthma, Diffusive lung disease, COPD, Lung cancer, Pulmonary hypertension, etc.
53040	Nephrology-related
	Acute renal failure, Chronic kidney disease, Diabetic nephropathy, Hypertension, Aqueous electrolyte metabolism, Artificial dialysis, etc.
53050	Dermatology-related
	Dermatology, Cutaneous immune disease, Cutaneous infection, Cutaneous tumor, etc.

Medium-sized Section 54 : Internal medicine of the bio-information integration and related fields

Basic Section	Examples of related research content
54010	Hematology and medical oncology-related
	Hematological oncology, Medical oncology, Hematological immunology, Anemia, Thrombosis and hemostasis, Chemotherapy, etc.
54020	Connective tissue disease and allergy-related
	Connective tissue disease, Allergy, Clinical immunology, Inflammation, etc.
54030	Infectious disease medicine-related
	Infection diagnostics, Infection therapeutics, Host defense, International infection science, etc.
54040	Metabolism and endocrinology-related
	Energy balance, Glucose metabolism, Lipid metabolism, Purine metabolism, Bone metabolism, Electrolyte balance, Endocrinology, Neuroendocrinology, Reproductive endocrinology, etc.

Medium-sized Section 55 : Surgery of the organs maintaining homeostasis and related fields

Basic Section	Examples of related research content
55010	General surgery and pediatric surgery-related
	Surgical basic principles, Breast surgery, Endocrine surgery, Pediatric surgery, Transplant surgery, Artificial organs science, Regeneration, Operation support, etc.
55020	Digestive surgery-related
	Upper gastrointestinal surgery, Lower gastrointestinal surgery, Hepatic surgery, Biliary surgery, Pancreatic surgery, etc.
55030	Cardiovascular surgery-related
	Coronary artery surgery, Heart valve surgery, Surgery for myocardial disease, Aortic surgery, Vascular surgery, Congenital heart surgery, etc.
55040	Respiratory surgery-related
	Lung surgery, Mediastinal surgery, Chest wall surgery, Respiratory tract surgery, etc.
55050	Anesthesiology-related
	Anesthesiology, Perioperative management, Pain management, Resuscitology, Palliative medicine, etc.
55060	Emergency medicine-related
	Intensive care medicine, Emergency resuscitation science, Trauma surgery, Disaster medicine, Disaster medical care, etc.

(Broad Section I)

Medium-sized Section 56: Surgery related to the biological and sensory functions and related fields

Basic Section	Examples of related research content
56010	Neurosurgery-related Neurosurgery, Spine and spinal cord diseases, etc.
56020	Orthopedics-related Orthopedics, Rehabilitation medicine, Sports medicine, etc.
56030	Urology-related Urology, Male genitalia science, etc.
56040	Obstetrics and gynecology-related Obstetrics, Reproductive endocrinology, Gynecologic oncology, Female health care medicine, etc.
56050	Otorhinolaryngology-related Otorhinolaryngology, Head and neck surgery, etc.
56060	Ophthalmology-related Ophthalmology, Ophthalmological optics, etc.
56070	Plastic and reconstructive surgery-related Plastic surgery, Reconstructive surgery, Aesthetic plastic surgery, etc.

Medium-sized Section 57: Oral science and related fields

Basic Section	Examples of related research content
57010	Oral biological science-related Oral anatomy, Oral histology and embryology, Oral physiology, Oral biochemistry, Pharmacology for hard tissues, etc.
57020	Oral pathobiological science-related Oral infectious diseases, Oral pathology, Oral experimental oncology, Immunity and inflammation, Laboratory medicine, etc.
57030	Conservative dentistry-related Operative dentistry, Endodontology, Periodontology, etc.
57040	Regenerative dentistry and dental engineering-related Regenerative dentistry, Biomaterial science, Dental materials science, Oral and maxillofacial prosthetics, Oral implantology, etc.
57050	Prosthodontics-related Prosthodontics, Oral rehabilitation, Gerodontology, etc.
57060	Surgical dentistry-related Oral and maxillofacial surgery, Oral maxillofacial reconstructive surgery, Dental anesthesiology, Psychosomatic medicine dentistry, Dental radiology, etc.
57070	Developmental dentistry-related Orthodontics, Pediatric dentistry, etc.

(Broad Section I)

57080	Social dentistry-related
	Dental hygiene, Preventive dentistry, Oral health administration and management, Dental education, Forensic odontology, etc.

Medium-sized Section 58 : Society medicine, nursing, and related fields

Basic Section	Examples of related research content
58010	Medical management and medical sociology-related
	Medical management, Medical social science, Ethics for medical science, Ethics for medical care, Biomedical education, History of medical science, Health policy and economics, Clinical trials, Health and medical services administration, Disaster medical science, etc.
58020	Hygiene and public health-related: including laboratory approach
	Hygiene, Public health, Epidemiology, Global health, etc.
58030	Hygiene and public health-related: excluding laboratory approach
	Hygiene, Public health, Epidemiology, Global health, etc.
58040	Forensics medicine-related
	Forensic medicine, Forensic pathology, Forensic toxicology, Forensic genetics, Suicide, Abuse, Clinical forensic medicine, Sudden death, etc.
58050	Fundamental of nursing-related
	Fundamental of nursing, Nursing education, Nursing administration, Nursing ethics, Global nursing, etc.
58060	Clinical nursing-related
	Critical care and emergency nursing, Perioperative nursing, Nursing of chronic illness, Oncology nursing, Psychiatric nursing, Palliative care nursing, etc.
58070	Lifelong developmental nursing-related
	Women's health nursing, Maternal nursing, Midwifery, Family health nursing, Child health nursing, School nursing, etc.
58080	Gerontological nursing and community health nursing-related
	Gerontological nursing, Community health nursing, Public health nursing, Disaster nursing, Home care nursing, etc.

Medium-sized Section 59 : Sports sciences, physical education, health sciences, and related fields

Basic Section	Examples of related research content
59010	Rehabilitation science-related
	Rehabilitation medicine, Rehabilitation nursing, Rehabilitation medical care, Physicotherapeutics, Occupational therapy, Assistive technology, Speech and language therapy, etc.
59020	Sports sciences-related
	Sports physiology, Sports biochemistry, Sports medicine, Sports sociology, Sports management, Sports psychology, Sports education, Training science, Sports biomechanics, Adapted sports science, etc.
59030	Physical education, and physical and health education-related
	Growth developmental science, Physical and health education, Physical education in school, Educational physiology, Physical systems science, Higher brain function science, Martial arts theory, Outdoor education, etc.
59040	Nutrition science and health science-related
	Nutritional physiology, Nutritional biochemistry, Nutritional education, Clinical nutrition, Functional food, Lifestyle-related disease, Health promotion, Aging, etc.

(Broad Section I)

Medium-sized Section 90 : Biomedical engineering and related fields

Basic Section	Examples of related research content
90110	Biomedical engineering-related
	Medical imaging, Medical modeling, Biological simulation, Biometrics, Artificial organs, Tissue engineering, Biophysical properties, Biocontrol, Biomechanics, Nanobio systems, etc.
90120	Biomaterials-related
	Biofunctional materials, Tissue engineering materials, Biocompatible materials, Nanobio materials, Drug delivery systems, Stimuli-sensitive materials, Genetic engineering material, etc.
90130	Medical systems-related
	Medical ultrasound system, Diagnostic imaging system, Laboratory diagnosis systems, Minimally invasive treatment systems, Remote diagnosis and treatment systems, Organ preservation systems, Medical information systems, Computer-assisted surgery, Medical robot, etc.
90140	Medical technology assessment-related
	Regulatory science, Safety evaluation, Clinical study, Medical technology ethics, Medical devices, etc.
90150	Medical assistive technology-related
	Healthcare and rehabilitation engineering, Life assist technology, Care support technology, Accessibility design, Universal design, Rehabilitation and nursing robot, Assist device for artificial internal organ, Rehabilitation devices, Nursing science and engineering, etc.

Broad Section J

Medium-sized Section 60 : Information science, computer engineering, and related fields

Basic Section	Examples of related research content
60010	Theory of informatics-related
	Discrete structure, Mathematical logic, Theory of computation, Mathematical theory of programs, Computational complexity theory, Algorithm theory, Information theory, Coding theory, Theory of cryptography, Learning theory, etc.
60020	Mathematical informatics-related
	Optimization theory, Mathematical systems theory, System control theory, System analysis, System methodology, System modeling, System simulation, Combinatorial optimization, Queueing theory, Mathematical finance, etc.
60030	Statistical science-related
	Statistics, Data science, Modeling, Statistical inference, Multivariate analysis, Time series analysis, Statistical quality control, Applied statistics, etc.
60040	Computer system-related
	Computer architecture, Circuit and system, LSI design, LSI testing, Reconfigurable system, Dependable architecture, Low power technology, Hardware/software codesign, Embedded system, etc.
60050	Software-related
	Programming language, Programming methodology, Operating system, Parallel and distributed computing, Software engineering, Virtualization technology, Cloud computing, Software dependability, Software security, etc.
60060	Information network-related
	Network architecture, Network protocol, Internet, Mobile network, Pervasive computing, Sensor network, IoT, Traffic engineering, Network management, Service platform technology, etc.
60070	Information security-related
	Cryptography, Tamper resistance technology, Authentication, Biometrics, Access control, Malware countermeasure, Countermeasures against cyber attacks, Privacy protection, Digital forensics, Security evaluation and authorization, etc.
60080	Database-related
	Data model, Database system, Multimedia database, Information retrieval, Content management, Metadata, Big data, Geographic information system, etc.

(Broad Section J)

60090	High performance computing-related
	Parallel processing, Distributed processing, Cloud computing, Numerical analysis, Visualization, Computer graphics, High performance computing application, etc.
60100	Computational science-related
	Mathematical engineering, Computational mechanics, Numerical simulation, Multi-scale modeling, Large-scale computing, Massively parallel computing, Numerical computing methods, Advanced algorithms, etc.

Medium-sized Section 61 : Human informatics and related fields

Basic Section	Examples of related research content
61010	Perceptual information processing-related
	Pattern recognition, Image processing, Computer vision, Visual media processing, Acoustic media processing, Media editing, Media database, Sensing, Sensor fusion, etc.
61020	Human interface and interaction-related
	Human interface, Multi-modal interface, Human-computer interaction, Computer supported cooperative work, Virtual reality, Augmented reality, Realistic communication, Wearable device, Usability, Ergonomics, etc.
61030	Intelligent informatics-related
	Search, Inference, Machine learning, Knowledge acquisition, Intelligent system, Intelligent information processing, Natural language processing, Data mining, Ontology, Agent system, etc.
61040	Soft computing-related
	Neural network, Evolutionary computation, Fuzzy theory, Chaos, Complex systems, Probabilistic information processing, etc.
61050	Intelligent robotics-related
	Intelligent robot, Behavior and environment recognition, Planning, Sensory behavior system, Autonomous system, Digital human, Real world information processing, Physical agents, Intelligent space, etc.
61060	Kansei informatics-related
	Kansei design, Kansei cognitive science, Kansei psychology, Kansei robotics, Kansei measurement evaluation, Kansei interface, Kansei physiology, Kansei material science, Kansei pedagogy, Kansei brain science, etc.
90010	Design-related
	Information design, Environmental design, Industrial design, Spatial design, Design history, Theory of design, Design standard, Design support, Evaluation of design, Design education, etc.
90030	Cognitive science-related
	Cognitive science in general, Cognitive models, Kansei, Human factors, Cognitive and brain science, Comparative cognition, Cognitive linguistics, Cognitive engineering, etc.

Medium-sized Section 62 : Applied informatics and related fields

Basic Section	Examples of related research content
62010	Life, health and medical informatics-related
	Bioinformatics, Life informatics, Biological information, Neuroinformatics, Neural information processing, Molecular computing, DNA computing, Medical information, Health information, Medical image, etc.
62020	Web informatics and service informatics-related
	Web system, Semantic web, Web mining, Social network analysis, Service engineering, Educational service, Medical service, Welfare service, Social service, Information culture, etc.
62030	Learning support system-related
	Media literacy, Learning media, Social media, Learning content, Learning management, Learning support, Remote learning, e-Learning, etc.
62040	Entertainment and game informatics-related
	Music information processing, 3D content, Animation, Game programming, Network entertainment, Media art, Digital museum, Experience design, etc.

90020	Library and information science, humanistic and social informatics-related
	Library science, Information services, Information organizing, Information retrieval, Bibliometrics, Information resources, Information ethics, Digital humanities, Social Informatics, Digital archives, etc.

Broad Section K

Medium-sized Section 63 : Environmental analyses and evaluation and related fields

Basic Section	Examples of related research content
63010	Environmental dynamic analysis-related
	Global warming, Environmental change, Water and material cycle, Ocean, Land, Polar regions, Environmental measurements, Environmental model, Environmental information, Remote sensing, etc.
63020	Radiation influence-related
	Radiation, Measurement, Control, Repair, Biological effects, Risk, etc.
63030	Chemical substance influence on environment-related
	Toxicology, Toxic substance to human, Trace chemical substance, Endocrine disruptor, Repair, etc.
63040	Environmental impact assessment-related
	Atmosphere, Hydrosphere, Terrestrial impact, Impact assessment on human health, Social and economic impacts, Impact assessment on the future generation, Environmental impact assessment, Assessment methods, Monitoring, Simulation, etc.

Medium-sized Section 64 : Environmental conservation measure and related fields

Basic Section	Examples of related research content
64010	Environmental load and risk assessment-related
	Environmental analysis, Environmental load analysis, Environmental monitoring, Pollution dynamics assessment, Evaluation of radioactive substances dynamics, Environmental modeling, Exposure assessment, Toxicity evaluation, Environmental assessment, Chemical substance management, etc.
64020	Environmental load reduction and remediation-related
	Removal of contamination, Treatment of waste material, Control of contamination source, Disposal of waste material, Environmental load reduction, Remediation measure of contamination, Noise and vibration reduction, Countermeasure of ground settlement, Bioremediation, Radioactive decontamination, etc.
64030	Environmental materials and recycle technology-related
	Recycle materials, Valuable materials recovery, Separation, refining and purification, Environment-conscious design, Recycle chemistry, Green production, Zero emission, Resource circulation, Renewable energy, Biomass utilization, etc.
64040	Social-ecological systems-related
	Biodiversity, Conservation biology, Natural capital, Impact of climate change, Impact analysis on ecosystem, Ecosystem management, Ecosystem restoration, Ecosystem services, Natural tourism resources, Regional environmental planning, etc.
64050	Sound material-cycle social systems-related
	Sound material-cycle systems, Material and energy budget analysis, Low carbon society, Unused energy, Regional revitalization, Water use system, Industrial symbiosis, Life cycle assessment (LCA), Integrated environmental management, 3R (reduction, reuse, recycle) social systems, etc.
64060	Environmental policy and social systems-related
	Environmental philosophy and ethics, Environmental laws, Environmental economics, Environmental information, Environmental education, Environmental activities, Environmental management and governance, Social and public system, Consensus forming, Sustainable development, etc.

(Reference 1)
Procedures on the Handling of Grants-in-Aid for Scientific Research (Omitted)

(Reference 2)
Procedures on the Handling of JSPS Grants-in-Aid for Scientific Research (KAKENHI (Series of Single-year Grants)) (Omitted)

Inquiries

1. Inquiries about the invitation of applications should be directed to the following divisions through the research institution.

(1) For inquiries concerning the invitation of applications: Scientific Research Aid Division, Research Promotion Bureau, MEXT

Division	Team in charge	Internal line and direct phone
General inquiries about the Application Procedures	Administrative Team for Grants-in-Aid	Direct phone:03-6734-4183 Switchboard:03-5253-4111 (Internal line:4183)
Grant-in-Aid for Transformative Research Areas (A)(Publicly Offered Research) ,Grant-in-Aid for Scientific Research on Innovative Areas(Finished Research Area)	Grants-in-Aid for Scientific Research Team	Direct phone:03-6734-4087,03-6734-4094 Switchboard:03-5253-4111 (Internal line:4087,4094)

* Available every day except on Saturdays, Sundays, National Holidays, the New Year Holidays (from December 29 until January 3).

(2) For inquiries concerning the use of the KAKENHI Electronic Application System

- **Call center**

Telephone: 0120-556-739 (toll-free)

* Available from 9:30 to 17:30 every day except Saturdays, Sundays, National Holidays and the New Year Holidays (from December 29 until January 3)

(3) For inquiries concerning the use of the Cross-ministerial Research and Development Management System (e-Rad)

- **e-Rad Help Desk:**

Telephone: 0570-057-060 (Navi Dial)

* Available from 9:00 to 18:00 except on Saturdays, Sundays, National Holidays and the New Year Holidays (from December 29 until January 3)

* The following phone number is also available. 03-6631-0622

< Important points >

1) How to operate e-Rad
Manuals on how to operate e-Rad can be referred or downloaded from the portal site (URL: https://www.e-rad.go.jp). Please agree to the terms of service and apply.

2) Time period when e-Rad is available
Monday to Sunday, 00:00 - 24:00 (in operation 24 hours a day, 365 days a year)
However even during the above-mentioned time period, the operation of e-Rad may be disrupted or suspended, when maintenance and inspection is being carried out. If the operation is scheduled to be disrupted or suspended, this will be announced beforehand on the portal site.

(4) For matters related to the "Self-Assessment Checklist on the Improvement of the System" based on the "Guidelines on the Management and Audit of Public Research Funds at Research Institutions (Implementation Standards)"

Office of Competitive Research Funding Administration, Research Environment Division, Science and Technology Policy Bureau, MEXT
Telephone: 03-5253-4111 (ext. 3866, 3827)
E-mail: kenkyuhi@mext.go.jp

(5) For matters related to the "Checklist Pertaining to the Current Status" based on the "Guidelines for Responding to Misconduct in Research"

Office for Research Integrity Promotion, Research Environment Division, Science and Technology Policy Bureau, MEXT

Telephone: 03-6734-3874
E-mail: jinken@mext.go.jp

(6) For matters related to use of support by Platform formed by "Foundation of Scientific Research Support"

Grants-in-Aid for Scientific Research Team I and II, Scientific Research Aid Division, Research Promotion Bureau, MEXT
Telephone: 03-6734-4087

(7) For matters related to the "National Bioscience Database"

National Bioscience Database Center, Japan Science and Technology Agency (JST)
Telephone: 03-5214-8491

(8) For matters related to the "Inter-University Bio-Backup Project"

Executive Office, IBBP Center, Inter-University Research Institute Corporation National Institutes of Natural Sciences
Telephone: 0564-59-5930, 5931

(9) For matters related to the "National BioResource Project"

National BioResource Project (NBRP) Executive Office
(established in the Research Organization for Information and Systems, National Institute of Genetics)

Telephone: 055-981-6809

(10) For matters related to the "researchmap"

Service Support Center (in charge of the researchmap), Department of Information Infrastructure, National Institute of Advanced Industrial Science and Technology (JST)
Web inquiry form: https://researchmap.jp/public/inquiry/

(11) For matters related to the "Security Export Control Policy"

Security Export Control Administration Division, Trade Control Department, Trade and Economic Cooperation Bureau, Ministry of Economy, Trade and Industry
Telephone: 03-3501-2800
FAX: 03-3501-0996

(12) Upon application to the "Grant-in-Aid for Transformative Research Areas," applicants may make inquiries to the Senior Scientific Research Specialists (See note) of the MEXT about the system. Please contact the Scientific Research Promotion Division, Research Promotion Bureau, MEXT (see (1)).

(Note) Researchers in universities or other research institutions who make investigation, instruction,and advice on academic matters (Article 53 and 62 of " Ministry of Education, Culture, Sports, Science and Technology organization rules").

"List of Senior Scientific Research Specialist (in charge of Grants-in-Aid for Scientific Research)"

URL: https://www.mext.go.jp/a_menu/shinkou/hojyo/1284449.htm

2. Application forms can be downloaded from the following website.

MEXT's website on Grants-in-Aid for Scientific Research
URL: https://www.mext.go.jp/a_menu/shinkou/hojyo/boshu/1351544.htm