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

FY2023

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.

August 1, 2022

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 FY2023” including the “Transformative Research Areas (A/B)” and the “ Grant-in-Aid for Scientific Research on Innovative Areas”.

The contents are:

“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,” “Ⅳ Instructions for Grant Recipients” and “Ⅴ 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 FY2023, 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.

The major changes in the FY2023 Call for Proposals are listed on the following pages.

- Grants-in-Aid for Scientific Research is a competitive 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.

  In preparing Research Proposal Document, plagiarism and/or misappropriation of the research contents of others are strictly impermissible. Applicants must comply with research ethics.

- 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).

< Major Changes in the Call for Proposals for Fiscal Year 2023>

(1) Changes in schedule for the Call for Proposals

○The schedule for the call for proposals for FY 2023 Transformative Research Areas (A/B) has been changed to earlier dates as shown below. For other research categories, there are no planned changes to the FY2022 schedule for call for proposals. (See page 18)

Schedule for FY2023 Call for Proposals and Notice of Review Results for Transformative Research Areas (A/B) (Tentative)

Research Category	Start of Call for Proposals	Deadline for Submission of Applications	Timing of Notice of Review Results
Transformative Research Areas (A)	May 23, 2022 (August 20, 2021)	July 19, 2022 (October 18, 2021)	Late February 2023 (June 16, 2022)
Transformative Research Areas (B)	May 23, 2022 (August 20, 2021)	July 19, 2022 (October 18, 2021)	Late February 2023 (May 20, 2022)
Transformative Research Areas (A) (Publicly Offered Research)	August 1, 2022 (November 24, 2021)	October 5, 2022 (January 28, 2022)	Late February 2023 (June 16, 2022)

* The dates in parenthesis ( ) on the lines below show the FY2022 schedule.

(Reference) Schedule for FY2023 Call for Proposals and Notice of Review Results for Main Research Categories(Tentative)

Research Category	Start of Call for Proposals	Deadline for Submission of Applications	Timing of Notice of Review Results
Specially Promoted Research	July 1,2022 (July 1, 2021)	September 5, 2022 (September 6, 2021)	Late March 2023 (March 18, 2022)
Scientific Research (S)	July 1,2022 (July 1, 2021)	September 5, 2022 (September 6, 2021)	Late March 2023 (April 27, 2022)
Scientific Research (A)	July 1,2022 (July 1, 2021)	September 5, 2022 (September 6, 2021)	Late February 2023 (February 28, 2022)
Scientific Research (B/C), Early-Career Scientists	August 1,2022 (August 1, 2021)	October 5, 2022 (October 6, 2021)	Late February 2023 (February 28, 2022)
Challenging Research (Pioneering/Exploratory)	August 1,2022 (August 1, 2021)	October 5, 2022 (October 6, 2021)	Late June 2023 (June 30, 2022)

* The dates in parenthesis ( ) on the lines below show the FY2022 schedule.

○Applicants should take note that in connection with the forward shifting of the Call for Proposals, the deadlines for the submission of applications have also been brought forward. (See page 18)

○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 "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. (See page 68)

(Reference) MEXT and JSPS plan to further bring forward the schedule for the FY2024 Call for Proposals for Specially Promoted Research and Scientific Research (S) to start in April 2023.

(2) Revisions, etc. to the Review Section Table

○The Review Section Table which will be applicable starting from the Call for Proposals for the Grants-in-Aid for Scientific Research-KAKENHI- for FY2023 has been revised. For details, please refer to the MEXT website. (See page 118)
https://www.mext.go.jp/content/20220318-mxt_gakjokik-000021232.pdf

[Key points of the revision]

- The examples of related research content of the Basic Sections have been changed.
(While maintaining the current classification of Basic, Medium-sized, and Broad review sections, the examples of related research content offered for the Basic Sections have been revised)

- Joint reviews will be conducted for several Basic Sections under Grant-in-Aid for Scientific Research (B).
(For Grant-in-Aid for Scientific Research (B), joint reviews will be conducted by consolidating several Basic Sections for which the number of applications is notably small)

(3) Relaxation of Restrictions on Parallel Grant Application/Receipt applicable to Early-Career Scientists (Second Time) and Challenging Research (Pioneering)

○Starting from the FY2023 Call for Proposals, restrictions on parallel submission of research proposals and receipt of grants between Early-Career Scientists (Second Time) and Challenging Research (Pioneering) will be relaxed in order to further enhance support for

early-career scientists.

(4) Notice of Review Results of Preliminary Screening for Challenging Research

○Starting from the FY2023 Call for Proposals, JSPS will notify the review results of the preliminary screening for Challenging Research (Pioneering/Exploratory) to the Principal Investigators and their research institutions whose research proposals were not adopted. Notification will be made through the electronic application system after the review of preliminary screening is completed.

(5) Changes to the application requirements for Grant-in-Aid for Research Activity Start-up

○The application requirements for FY2023 Grant-in-Aid for Research Activity Start-up will be changed. Applicants must fall under either A) or B) below. (See page 69 and the FY2023 Application Procedures for this research category (Call for Proposals is scheduled to start in early March 2023))

A) An individual who obtains eligibility for KAKENHI application on or after October 1, 2022, 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 FY2022.

(*) FY2023 Grants-in-Aid for Specially Promoted Research, Transformative Research Areas, Scientific Research, Challenging Research, and Early-Career Scientists

(6) Research Integrity

○ln response to the “Policy for Securement of Research Integrity” (April 27, 2021, Decision of Council for Science, Technology and Innovation), JSPS is taking necessary measures to ensure the transparency of research activities. (See page 7, 105)

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 FY2023 Call for Proposals.

Note that MEXT and JSPS are planning to upgrade its systems so that such information registered in e-Rad will be reflected in the KAKENHI Electronic Application System starting from the FY2024 Call for Proposals.

(Key Actions)

- It is explicitly stated that applicants must declare not only acquisition of other domestic competitive research funding but also any foreign research funding in “The Status of Application and Acquisition of Research Grants” column in the Research Proposal Document.
- Applicants must enter the affiliated institution and position in applying for and acquiring research grants for the research project entered in “The Status of Application and Acquisition of Research Grants” column in the Research Proposal Document.
- Research Proposal Documents should be submitted after appropriately sharing with their affiliated research institutions, the information necessary to ensure the transparency of all research activities that the applicant is engaged in. If the applicant plans to handle any technology regulated by the Foreign Exchange and Foreign Trade Act of Japan (Act No. 228 of 1949), he/she must abide by said Act and the rules, etc. of his/her affiliated research institution, and thoroughly check the security export control system and how to handle such technology prior to submitting the Research Proposal Document.

Note that untruthful statement or misrepresentation in the Research Proposal Document may result in cancellation or reduction of the research grant.

(7) Participation in the KAKENHI Peer-review Process

○It is re-emphasized that positive acceptance of invitation to serve as KAKENHI reviewer is the responsibility of researchers. Supporting the peer-review system of KAKENHI by the whole body of researchers by appropriate sharing of the burden of proposal review is crucial in sustaining the scientific research. (See page 93)

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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 FY2023 (Grant-in-Aid for Transformative Research Areas (A)(Publicly Offered Research)) (Forms/Procedures for Preparing and Entering a Research Proposal Document).”

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

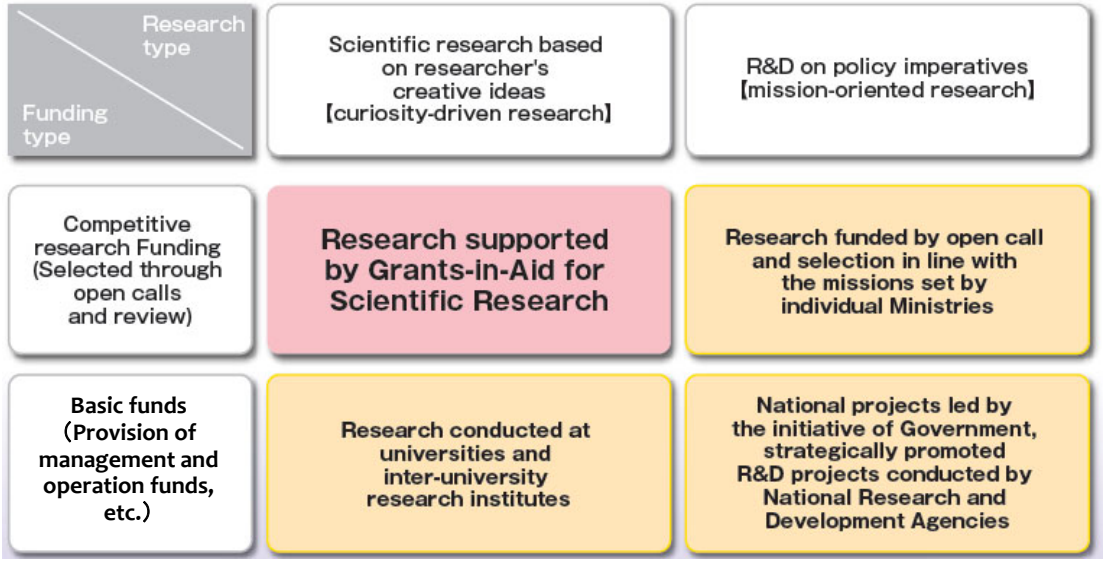
(URL) https://www.mext.go.jp/a_menu/shinkou/hojyo/boshu/1351544.htm

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 August 2022

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 million yen per fiscal year per proposed area. [A call for proposals for "budget for collecting research results of Finished Research	SG

	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.	SG	

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	SG
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)	MF
Fostering Joint International Research	(A) 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 FY2018 call for proposals.] (B) 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.)	
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 MEXT). From FY1999 on, these tasks have been gradually transferred to JSPS. The current role-sharing between MEXT and JSPS is as shown below.

❖ As of August 2022

Research category	**Call for proposals, Review** Preparation of the document(s) for procedures, Reception of proposal submission	**Grant delivery** Notifications of unofficial decision Reception of the application form (after unofficial decision) 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, 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.

[Grants-in-Aid for Scientific Research]

❖ As of August 2022

	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" (*) of competitive research funds, relevant information on funding applications are 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 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 in which more than one competitive research funds are unnecessarily and duplicative allotted to one and the same research project by one and the same researcher. Either of the following cases falls under "Unreasonable Duplication."

- **Cases where simultaneous applications have been made to more than one competitive 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 funding 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 competitive research 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 competitive research funds in violation of the content of the funding decision or the conditions it implies.

・“Fraudulent Grant Acquisition”:
Receiving competitive research 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 FY2023 (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 FY2022. Refer to the website below for the schemes to which this specifically applies at present.
URL: https://www8.cao.go.jp/cstp/compefund/kyoukin_r3-4.pdf

○Period of KAKENHI suspension

[Improper Grant Spending and Fraudulent Grant Acquisition of KAKENHI]

Researcher categories	Extent of the improper grant spending		Period of KAKENHI suspension
I. Researchers who committed improper grant spending of KAKENHI and researchers who conspired in such acts	1. Misappropriation of KAKENHI for personal gain		10 years
II. Researchers who committed improper grant spending of KAKENHI and researchers who conspired in such acts	2. Other than 1.	(i) Cases of major seriousness and maliciousness	5 years
		(ii) Cases other than (i) and (iii)	2 to 4 years
		(iii) Cases of minor seriousness and maliciousness	1 year
III. Researchers who acquired KAKENHI by deception or other fraudulent means and researchers who conspired in such acts	－		5 years
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	－		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. .

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>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></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 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"

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

○ "Guidelines for Responding to Research Misconduct"

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

Note: 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 available to other researchers and to the general public, through posting 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.

To promote dissemination of research achievements, the KAKENHI can be used to cover such outreach-related expenses as preparation of website or printing of pamphlets. The KAKENHI grantees are urged to actively pursue public promotion of their research achievements through the aid of KAKENHI so as to make them widely known to the public at large.

In this connection, the KAKENHI grantees are encouraged to participate in the "HIRAMEKI ☆ TOKIMEKI SCIENCE" program, in which the latest science developments are presented to elementary, junior high and high school students in an easy-to-understand style.

In addition, 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.
【Japan】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.
【Japan】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/data/Open_access.pdf

[Reference 1: 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.

[Reference 2: 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.

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 page 91)

[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 the JSPS]

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

* URL: https://www.jsps.go.jp/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 "V. Instructions for Administrative Staff of Research Institution")
Start of the Call for Proposals **Monday, August 1, 2022**		[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 30**
	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:** **Thursday, December 1** 6) Submission (Sending) of the Application Documents
Deadline for the Submission **4:30 pm** **Wednesday, October 5** **(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, he or she should verify the section "Preparation of the KAKENHI Application Form" (pages 81, 86), 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 office worker 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 schedule below is as of August 1, 2022. There may be changes in the plan including the timing of the provisional grant decision due to COVID-19. When the changes occur it will be announced on the MEXT website and through the research institutions.

Transformative Research Areas (A) (Publicly Offered Research)
November 2022 to January 2023: 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 the Japan Society for the Promotion of Science (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 33 research area (which starts in FY2020 or FY2022) shown in Attached Table 1 (cf. page 25)

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

Budget and number per research area shown in Attached Table 1 (cf. page 25)

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 5 "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, 2023) 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 FY2024-2025 in the first year of the set period of the area and a call for proposals for FY2026-2027 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 FY2024-2027) exceeds 15 % of the budget (the total for five years) for the whole research area

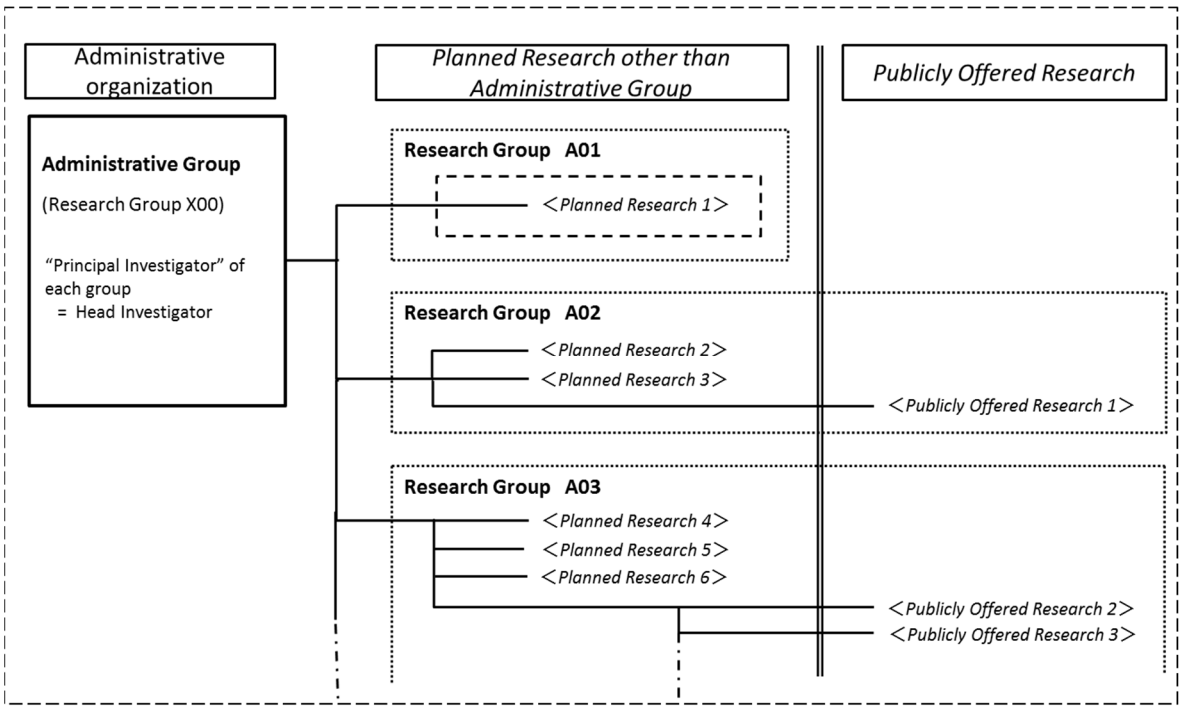
● Constitution of research area and roles

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.	

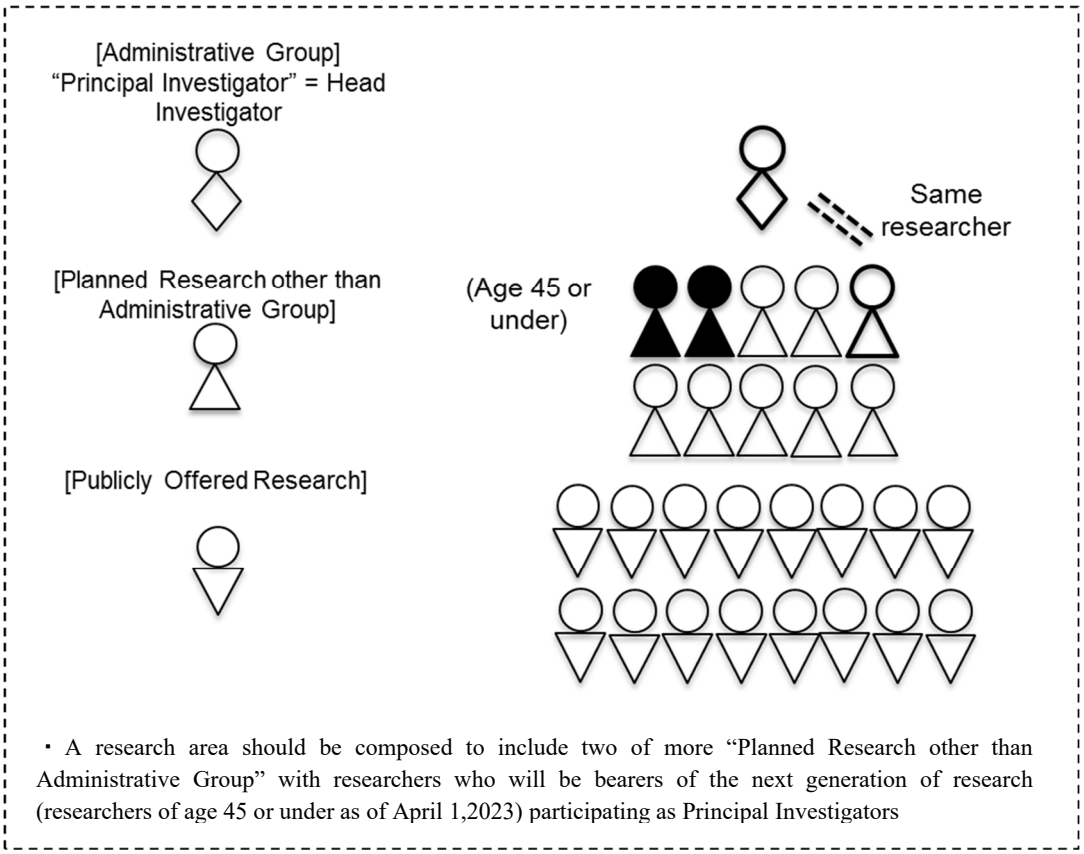
*1: When setting up the budget for Publicly Offered Research, please post annual budget enough to achieve research per project.
*2: The call for proposals and selection of research projects for "Publicly Offered Research" will be conducted in the first year and third year of research period. For a description on review process, see in page 31.
*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 FY2023 (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 1,2023) 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.

  ○ 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	20A101	Lifelong sciences: Reconceptualization of development and aging in the super aging society	FY2020-2024	2 years	10 10	6 3
2	20A102	Excavating earthenware: Technology development-type research for construction of 22nd century archeological study and social implementation	FY2020-2024	2 years	2 6 1	3 2 1
3	20A103	A New Archaeology Initiative to Elucidate the Formation Process of Chinese Civilization	FY2020-2024	2 years	8 4	2 4
4	20A104	Connectivity and Trust Building in Islamic Civilization	FY2020-2024	2 years	14 4	1.5 2
5	22A101	Establishment of Child Poverty Research	FY2022-2026	2 years	15	1
6	20A201	Dynamic Exciton: Emerging Science and Innovation	FY2020-2024	2 years	20	3
7	20A202	Next Generation Astrochemistry: Reconstruction of the Science Based on Fundamental Molecular Processes	FY2020-2024	2 years	10 6	2 5
8	20A203	What is dark matter? – Comprehensive study of the huge discovery space in dark matter	FY2020-2024	2 years	9 8	2.4 2
9	20A204	Condensed Conjugation Molecular Physics and Chemistry: Revisiting "Electronic Conjugation" Leading to Innovative Physical Properties of Molecular Materials	FY2020-2024	2 years	20	3
10	20A205	Biophysical Chemistry for Material Symbiosis	FY2020-2024	2 years	20	3
11	20A206	Progressive condensed matter physics inspired by hyper-ordered structures	FY2020-2024	2 years	10 10	5 3
12	20A207	Comprehensive understanding of scattering and fluctuated fields and science of clairvoyance	FY2020-2024	2 years	16	3.5
13	22A201	Establishing data descriptive science and its cross-disciplinary applications	FY2022-2026	2 years	15 3	2 3
14	22A202	Foundation of "Machine Learning Physics" ---- Revolutionary Transformation of Fundamental Physics by A New Field Integrating Machine Learning and Physics	FY2022-2026	2 years	18 11 5	1 2 5
15	22A203	Systems biosynthetics based on accumulation, prediction, and creation of biological reactions	FY2022-2026	2 years	16 10	4.5 3.6
16	22A204	Chiral materials science pioneered by the helicity of light	FY2022-2026	2 years	18 3	3 2
17	22A205	Supra-ceramics: Molecule-driven frontier of inorganic materials	FY2022-2026	2 years	18 4	2.5 1.5
18	22A206	CO world	FY2022-2026	2 years	10 6	2.5 5
19	20A301	Glia decoding: deciphering information critical for brain-body interactions	FY2020-2024	2 years	8 10	5 3
20	20A302	Multi-layered regulatory system of plant resilience under fluctuating environment	FY2020-2024	2 years	18	3
21	20A303	Inducing lifelong plasticity (iPlasticity) by brain rejuvenation: elucidation and manipulation of critical period mechanisms	FY2020-2024	2 years	9 15	5 3

22	20A304	Multifaceted Proteins: Expanding and Transformative Protein World	FY2020–2024	2 years	15	4
23	20A305	Genome modality: understanding physical properties of the genome	FY2020–2024	2 years	5 11	4 5
24	20A306	Material properties determine body shapes and their constructions	FY2020–2024	2 years	15 5	5 3
25	22A301	Deciphering and Manipulating Brain Dynamics for Emergence of Behaviour Change in Multidimensional Biology	FY2022–2026	2 years	20	3
26	22A302	Mechanical self-transformation of living systems	FY2022–2026	2 years	12 5	5 3
27	22A303	Genomic dynamics underlying the plastic hermaphroditism in plants: the basis of exploratory reproductive adaptations.	FY2022–2026	2 years	5 10	7 4.5
28	22A304	Reevaluation of self recognition by immune system to decipher its physiological advantages and pathological risk	FY2022–2026	2 years	25	3
29	20A401	Analysis and synthesis of deep SHITSUKAN information in the real world	FY2020–2024	2 years	30	3
30	20A402	Creation and Organization of Innovative Algorithmic Foundations for Social Advancement	FY2020–2024	2 years	17	2
31	20A403	Molecular Cybernetics –Development of Minimal Artificial Brain by the Power of Chemistry	FY2020–2024	2 years	25	4
32	22A401	Photonic Computing Highlighting Ultimate Nature of Light	FY2022–2026	2 years	10 5	2.5 6
33	22A402	Macro coastal oceanography: integrated simulation for the material dynamics from the land through the open ocean	FY2022–2026	2 years	6 10	5 2

(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 FY2023 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

Lifelong sciences: Reconceptualization of development and aging in the super aging society

http://www.lifelong-sci.jinkan.kyoto-u.ac.jp/en/

Number of Research Area : 20A101 Term of Project : FY2020-2024
Head Investigator : TSUKIURA Takashi
Research Institution : Kyoto University, Graduate School of Human and Environmental Studies

1. Details of Research Area

Since early 1900s, when Gerontology was founded, life expectancy has been greatly extended in many countries, and the percentage of elderly people has drastically increased. In Japan, the percentage of elderly population is now over 28% in the total population of our country, and many problems caused by the super aging society should be resolved urgently. In the traditional view of development and aging, the human lifetime has been regarded as "growing to declining". However, recent findings in many research fields suggest that the traditional view is not enough to understand the human lifetime. Thus, the new concept of human lifetime has to be proposed for people living in the super aging society.

The purpose of this project is to redefine a human lifetime as a series of complex processes by social interactions, and to propose the novel view of development and aging by replacing the traditional view. To address this issue, we employ the multidisciplinary approach, which includes the fundamental research of psychology, sociology, cultural anthropology, and the practical research of pedagogy. With the integration of these researches, we would like to provide scientific evidence to realize comfortable lives in all generations, and to make a new program of lifelong learning using the results of fundamental research.

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

In this Research Area, we have four main research fields including eight Planned Research Groups. In cognitive (A01) and physiological (A02) psychology, researchers investigate the neural and psychological mechanisms underlying impaired and preserved functions in older adults. In addition, researchers in clinical psychology (A03) evaluate cognitive declines in neurological and psychiatric patients, and investigate the mechanisms related to cognitive and brain reserve. Researchers in sociology survey how social supports are effective enough to realize comfortable lives in Japanese people by statistical analyses of large data sets (B01, B02). In cultural anthropology, research teams investigate cultural diversity in concepts of development and aging by field studies in several areas of Africa and Asia/Oceania, and propose future directions in the reconceptualization of development and aging (C01, C02). In studies of pedagogy, researchers apply findings in fundamental research to make a new program of lifelong learning, and propose the social policy of this program by working with regional government (D01). Details of these Planned Research Groups are shown in our website.

Regarding the Publicly Offered Research, we are widely calling for interesting proposals related to these Planned Research Groups. For psychology research, we welcome proposals about "psychology research related to the mechanisms of brain and mind" (A04). The Publicly Offered Research of sociology is expected to propose "sociology research of individual lifestyles interacting with social environment" (B03). In cultural anthropology, we recruit research proposals of "cultural anthropology research of socio-cultural basis related to the diverse view of development and aging" (C03). In pedagogy, research proposals of "practical research in social education" are accepted for Publicly Offered Research (D02). In addition, we welcome research proposals of interdisciplinary field (E01). Examples of E01 include philosophical research about the view of life and death, jurisprudence research of death with dignity, economics about employment of elderly people or geriatric care, artificial intelligence (AI) study of future prediction in the super aging society, biological study of aging in non-human animals, etc.

To realize our goal, we hope that proposals of Publicly Offered Research would be ingeniously planned from various viewpoints, and would include novel techniques of experiment or data analysis. In addition, proposals to bridge among different research fields are important in the Publicly Offered Research. In "Lifelong Sciences", the diversity is the most important concept. Thus, we are very looking forward to creative ideas from men and women researchers in all generations.

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	Psychology research related to the mechanisms of brain and mind	6	10
B03	Sociology research of individual lifestyles interacting with social environment	3	10
C03	Cultural anthropology research of socio-cultural basis related to the diverse view of development and aging		
D02	Practical research in social education		
E01	Interdisciplinary research		

Research Outline of Research Areas

Excavating earthenware:
Technology development-type research for construction of 22nd century archeological study and social implementation
http:// http://www.fhss.kumamoto-u.ac.jp/archaeology/earthenware/

Number of Research Area	:	20A102	Term of Project : FY2020-2024
Head Investigator	:	OBATA Hiroki	
Research Institution	:	Kumamoto University, Faculty of Humanities and Social Sciences	

1. Details of Research Area

The Japanese Archaeological discipline has studied pottery for measuring space and time for about 100 years. The precision of the chronology is unparalleled in the world. Furthermore, in the 21st century, high-precision dating technology was developed, and by giving more accurate dating to pottery, detailed and accurate spatiotemporal arrangement (chronology) became possible, not only inside the archipelago but also in other countries. Chronological parallel relationships have also been grasped. On the other hand, it was clarified by the impression research of pottery that frequently has taken place since around 2005 that various information other than the shape and decoration pattern is latent in this pottery. Cultivated plants and household pests detected by this method became an important basis for knowing when the cultivation of legumes in the Jomon period started and developed and when cereal grains, such as rice and foxtail millet, were introduced into Japan from the continental region of East Asia. Then, with the progress of research, the existence of unexposed seeds and insects inside the fabric of earthenware and the existence of vessels incorporated with a large number of seeds and insects became apparent, and it became necessary to investigate the cause of impressions from the viewpoint of organic inclusions in the clay paste. Furthermore, it was found that the age of the organisms in the pottery, which was determined by the pottery type, was inaccurate due to the regional difference in the usage time of the same type of pottery. In this project, to solve these problems, we established the new academic discipline "Earthenware comprehensive analysis study" We believe this project will be the innovative and basic method for constructing a 22nd-century archaeological study, which reconstructs the modern shrinking archaeological society.

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

Publicly offered research targets research that supplements or further develops the concept of the research area. Furthermore, in addition to the research linked to planned research, another primary framework in which existing research materials, not limited to earthenware, will be reused is hopeful in the framework of forward-looking "construction of future archaeological materials" (Research Items C). Research item A01 is the basis of the A01 group's AI-based identification and development research. A02 is research that collects information from a comprehensive historical perspective from all over the world and serves as a reference for the materials of the A02 group. A03 is a study to enhance the impression data of the Jomon-Yayoi period in the area where impression research has not been conducted. B01 is research to develop a new biomarker analysis method. B02 is a method to estimate cooked ingredients from cooking residue remaining in earthenware. B03 aims to develop and improve the accuracy of different dating methods to verify AMS carbon-14 dating. B04 is a study that reviews the results of high-precision dating from an archaeological background and builds a systematic model of measured values and their origins.

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	Basic and diverse model construction research for identification of nuts and insect impressions by AI	3	1
A02	Archaeological and ethnographic study on prehistoric ancient food storage and insect repellent	2	1
A03	Study of regional characteristics of plant and insect indentations during the Jomon-Yayoi transition period	2	1
B01	Research for the reconstruction of paleo-food by developing various biomarkers	3	1
B02	Restoration research for the utilization environment of earthenware by DNA analysis	2	1
B03	Development of a new dating method for prehistoric times	2	1
B04	Construction of human activity restoration model by using high-precision dating	2	1
C01	Study for pottery making technology and tempers in agricultural societies by ethnographic and historical research	1	1
C02	Research and development of methods for reusing existing research materials in archeology and new analytical methods	2	1

Research Outline of Research Areas

A New Archaeology Initiative to Elucidate the Formation Process of Chinese Civilization
http:// www.chugokubunmei.jp/

Number of Research Area	:	20A103	Term of Project :	FY2020-2024
Head Investigator	:	NAKAMURA Shin-ichi		
Research Institution	:	Kanazawa University		

1. Details of Research Area

It is an attempt to present a new strategy of archeology for elucidating the origin of Chinese civilization. Archeology, which reconstructs human history with visible objects, and archeological science, which extracts invisible information from those objects, collaborate on an equal footing, and specify the production area and distribution route of the various prestige goods. Our target prestige goods are jade, turquoise, cowry shell, crocodile leather drum, ivory, lacquer ware, special pottery, mercury vermilion, etc. The movement route of humans will also be cleared. We mainly deal with human skeletons that have met an unusual end, such as martyr and sacrifice, and explore their history. In addition, we will examine the impact from the west during the formation of Chinese civilization and the Proto-Silk Road as its propagation route.

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

This research area consists of the following seven research groups. A01: Production and distribution of prestige goods, A02: Material analysis and production area estimation of archaeological remains, A03: Development of archaeological information infrastructure, B01: Dynamism of Eurasian livestock culture explored from zooarchaeology, B02: Exchange and transformation of rice, millet and wheat cultures explored from botanical archaeology, C01: Restoration of the movement of humans and materials through isotope analysis, C02: Development of paleogenomic analysis platform and its application. For details of each research group, refer to the website of the area.

As for the publicly offered research, a total of 10 research groups will be solicited, 6 of which are linked to the above 7 research groups and the rest 4 span multiple research groups. The outline of each is as follows. A01 deals with comparative pottery typology between the Central Plain and its surrounding regions. A02 tries to reconstruct the manufacturing technology and raw materials of prestige goods, and A03 targets geospatial analysis of material culture and language. B02 clarifies morphological and physiological changes that occur with the expansion of cultivation area by exploring the changes in plants. In C01, social stratification is traced from the distribution of food resources that reflect individual differences through paleopathology and diet analysis, and C02 follows the expansion of house rats that have moved with humans using the technique of genomic analysis. D01 is a study of architecture-related remains such as murals, stone carvings, roof tiles, etc.

E01 deals with archaeological and historical studies of ritual remains in the region centered on northwestern China, and F01 covers animal archeology and genomic analysis related to livestock breeding, as well as material culture study. G01 examines the role that dairy products played in the fusion process of different agricultural traditions in Eurasia.

It should be noted that all studies are limited to those related to China-Central Asia in terms of region and late Neolithic to early Bronze Age in terms of time. We look forward to ambitious proposals that bridge archeology and archeological science.

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	Comparative pottery typology between the Central Plain and surrounding areas	2	8
A02	Restoration of manufacturing technology or raw materials for prestige goods		
A03	Approach to population dynamics using GIS		
B02	Geographical and botanical studies on suitable areas for growing dryland crops in eastern Eurasia		
C01	Osteoarchaeological research related to civilization formation		
C02	Genomic study of house rats in China		
D01	Research on special architecture-related remains		
E01	Study of rituals in agricultural/pastoral boundary areas	4	4
F01	Study on the origin and development of livestock farming in eastern Eurasia		
G01	Anthropological, historical, and nutritional studies on the use of dairy products		

Research Outline of Research Areas

Connectivity and Trust Building in Islamic Civilization
https://connectivity.aa-ken.jp/en/

Number of Research Area	:	20A104	Term of Project :	FY2020-2024
Head Investigator	:	KUROKI Hidemitsu		
Research Institution	:	Tokyo University of Foreign Studies, Research Institute for Languages and Cultures of Asia and Africa		

1. Details of Research Area

Horizontal relationship building has long been a strength of Islamic civilization. Our research investigates the trust and connectivities that have historically accumulated in the Islamic world, verbalizing and making visible the tacit knowledge therein and expressing this knowledge as strategies. In so doing, it is our aim to propose new outlooks for resolving the rifts deepening around the world today. With a view to Islam over its history within the global whole, this project studies trust building processes at sites of connectivity. This research project does not only deal with cases peculiar to Islamic civilization but also emphasizes a point how our research can find and examine the knowledge and wisdom of forming relationship and building trust in the whole world and construct strategies from them. Therefore, the project also synthetically discusses common features and correlations of Islamic civilization with other civilizations.

Research Groups A focus on connectivities: A01 which deals with the movement and connectivity of goods and money; A02 which delves into the movement, changes and connectivity of knowledge and information; and A03 which looks at the movement and connectivity of human populations. Research Groups B concentrate primarily on the concept of trust building: B01 which looks at trust building and networks among the elite and the states themselves; B02 which elucidates the strategies of thought in the process of fostering trust in a divided world; and B03 which seeks to propose new outlooks for stability through a study of peacebuilding strategies utilized by populations in conflict zones. Research Group C uses digital humanities tools to analyze and visualize data on connectivities and trust building. C01 looks at historical documents to discover modes of connectivities and trust, seeking to uncover the underlying Islamic nature which they may have in common.

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

We will be recruiting research in three categories. The first category supports Research Groups A01 to B03. Included in this category will be work extending beyond our primary regional and historical scope, such as comparative research across historical eras and the non-Islamic world; research from angles and analytical structures extrinsic to our primary focus; and work bridging two or more topics. In our second category under Research Group C, we seek research applying digital humanities' tools to shed light on trust building and connectivities in topics not covered in our plans for C01. We also seek research that will further innovation in data analysis methodologies. The third category includes fields not covered by the above. Specifically, this includes Research Groups D01- "Islamic Trust Building and Connectivity in Disciplines such as Law, Governance, Development, Media, Education, Literature, and Gender"; D02 - "Islamic Trust Building and Connectivity in Global Politics"; and finally, D03 - "Trust Building and Connectivity through Experimental Approaches in the Humanities and Social Sciences." In all of the above categories, our invitation extends not only to scholars specializing in Islamic studies but also to researchers across a wide range of fields and regions, and aims to develop comparative studies from new perspectives. For more details on each of the research projects, please refer to our website.

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	Mobility and Continuity in the Islamic Economy	1.5	7
A02	Changes in the World of Islamic Thought		
A03	Immigrants, Refugees, and Community Building		
B01	State Systems and Principles of Islamic Community		
B02	Trust Building Through Thought and Strategy		
B03	Trust and Peacebuilding in Zones of Conflict		
C01	Digital Humanities Tools in the Analysis of Connectivities	2	4
D01	Islamic Trust Building and Connectivity in Law, Governance, Development, Media, Education, Literature, and Gender	1.5	7
D02	Islamic Trust Building and Connectivity in Global Politics		
D03	Trust Building and Connectivity through Experimental Approaches in the Humanities and Social Sciences		

Research Outline of Research Areas

Establishment of Child Poverty Research
https://www.poverty-research.jp

Number of Research Area	:	22A101	Term of Project :	FY2022-2026
Head Investigator	:	ABE Aya		
Research Institution	:	Tokyo Metropolitan University, Graduate School of Humanities		

1. Details of Research Area

This research area aims to upgrade poverty research in Japan into an academic discipline and in doing so, develop a research community who will lead an evidence-based policy making in the area of poverty alleviation. Even though the main focus of the research will be on child poverty, it is expected to expand to include poverty of other age category as well as poverty in general. However, since the Research Area's main goal is to build a community of researchers to interact with policy, the research will be focused on the poverty in Japan. The research area will construct a massive database by integrating data from social surveys on child poverty conducted by more than 300 municipalities around Japan. The database is expected to become one of the largest database on children with deprivation indicators which is becoming increasingly popular as a poverty index to supplement income-based poverty index. A group of researchers from multiple disciplines will jointly be involved in the design of the database, development of common poverty index, and its analysis. The analysis will consist of analysis of spatial and regional aspects of child poverty, analysis of small sample groups, analysis of the mechanisms connecting poverty and the child outcomes, and development of poverty alleviation systems and programs.

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

The research area calls for innovative research related to child poverty, especially those pertaining to the below mentioned research areas. The research can be qualitative and quantitative empirical studies, policy research, meta-analysis, and international comparative studies. It is encouraged that research uses the child poverty database constructed by this research area but not limited to only those. Researchers from various academic fields are welcome. All projects should draw concrete policy implications at the end of the project.

【Research Group Area E01 Research on the effects of spatial and regional characteristics on child poverty】 The strength of the relationship between poverty and child outcome is influenced by regional characteristics (geographical, demographical, and social such as social capital, etc.). The quantitative and qualitative research investigating such spatial and regional aspects of poverty are invited.

【Research Group Area E02 Research on the mechanism connecting poverty and child outcomes】 Research to investigate the mechanisms between poverty and various child outcomes such as health, academic achievements, psychological well-being, peer relations, and aspirations are invited.

【Research Group Area E03 Research on the poverty of small groups :】 Research of small groups such as single-father households, gender minorities, children with non-Japanese origin, children with health problems and disability, young cares is often difficult due to their limited sample size. The research proposal to utilize the child poverty database which should have enough sample size to investigate such groups are called for. Qualitative and policy research on poverty of these small groups is also welcome.

【Research Group Area E04 Research on the development of systems and programs to alleviate child poverty】 Research to develop systems and programs such as policies, business models, technologies and policy programs are invited. Research is not limited to actual programs to help the poor but also include research on effective advocacy, political and bureaucratic processes.

All research projects are expected to communicate closely with the Planned Research members and participate in Research Area events as much as possible, and to coordinate their research agenda with the main body of the Research Area.

3. Research Groups, 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	Research on the effects of spatial and regional characteristics on child poverty	1	5
E02	Research on the mechanism connecting poverty and child outcomes		7
E03	Research on the poverty of small groups		
E04	Research on the development of systems and programs to alleviate child poverty		3

Research Outline of Research Areas

Dynamic Exciton: Emerging Science and Innovation
https://dynamic-exciton.jp/en/

Number of Research Area	:	20A201	Term of Project :	FY2020-2024
Head Investigator	:	IMAHORI Hiroshi		
Research Institution	:	Kyoto University, Graduate School of Engineering		

1. Details of Research Area

Photochemistry is expected to play a versatile role in electronics, energy, medicine/heath care, and functional materials in modern society. In molecular donor-acceptor (D-A) systems, charge-transfer (CT) has been regarded as "static exciton" governed by Coulombic interaction. However, in addition to Coulombic interaction, dynamic effects including movement of atomic nucleus and lattice as well as spin-orbit interaction influence behavior of electron and spin with the passage of time ranging from femtoseconds to seconds (defined as "dynamic exciton"). For instance, recently power conversion efficiencies of organic photovoltaics (OPV) have been improved remarkably, but there is a limit to understanding the underlying mechanism solely from a framework of "static exciton", as things stand at the moment, becoming a bottleneck of high-performance OPV. Moreover, to get more deep insight into the dynamic effects occurring at primary stages of photophysical and photochemical events, it is needed to exploit precise spectroscopic measurements and theoretical treatments. In this research area, we aim to solve the above issues by merging rational molecular design based on the dynamic effects with world-leading high-resolution spectroscopies and unique theoretical analyses. In particular, we focus on manipulating CT states for energy conversion such as organic light-emitting diodes (OLED) and OPV in term of electron-vibration and spin-orbit couplings.

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

To achieve our goal, three research groups are organized: Dynamic Exciton Creation (A01), Dynamic Exciton Analysis (A02), and Dynamic Exciton Function (A03). They also focus on synthetic creation of novel D-A molecules and D-A model systems (A01), physicochemical and theoretical evaluation of photoinduced D-A interaction in model and complex systems (A02), and exploration of innovation in complex systems on a basis of photoinduced D-A interaction (A03), respectively. Specific research examples include synthesis of novel D-A molecules and science of D-A model systems (topic 1), science and innovation of OLEDs (topic 2), science and innovation of OPVs (topic 3), and exploration of innovation on synthetic and biological features by molecular photoredox catalysts and optical cell manipulation (topic 4). Publicly offered research should complement these research groups and topics, boosting their research cooperatively and harmoniously. Highly encouraged are research proposals from researchers working on synthetic organic chemistry, structural organic chemistry, coordination chemistry (A01), theoretical chemistry, physical chemistry (A02), materials chemistry, biological chemistry, and organic photochemistry (A03), as well as female and young researchers who can work towards interdisciplinary fusion of various academic fields including physics, chemistry, and biology.

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	Dynamic Exciton Creation	3	8
A02	Dynamic Exciton Analysis	3	6
A03	Dynamic Exciton Function	3	6

Research Outline of Research Areas

Next Generation Astrochemistry: Reconstruction of the Science Based on Fundamental Molecular Processes
https://next-astrochem.com

Number of Research Area	:	20A202	Term of Project :	FY2020-2024
Head Investigator	:	SAKAI Nami		
Research Institution	:	RIKEN, Cluster for Pioneering Research		

1. Details of Research Area

Planet formation is a natural consequence of the star formation process, and there is an incredible variety of planetary systems, which are significantly different from the Solar System. Recent ALMA observations have revealed chemistry in planet-forming regions. Various complex organic molecules are found in protoplanetary-disk forming regions, and their abundances vary significantly among objects. This indicates that the Solar System may not have been common in terms of its initial chemistry, which invokes the discussion on the rarity of our existence. Progress of the Solar System exploration, including the recent successful return of the Hayabusa2 spacecraft, makes it possible to analyze pristine Solar System materials directly. The combination of such analysis with high-sensitivity observations of planet-forming regions will tell us the chemical origin of our Solar System and how common or rare it is in the universe. However, to tackle these questions, we have to revisit fundamental astrochemical processes. In the past decades, the astrochemical studies focused on chemistry under extremely low temperature and density conditions, where only barrierless exothermic reactions proceed efficiently. During the planetary system formation, on the other hand, the physical condition changes dynamically resulting in dynamic interactions of molecules between gas and dust(ice) surface. Investigation of such physical and chemical processes is crucial to understand the formation of complex organic molecules and the chemical variety of planet-forming regions. This transformative Research Area aims at the re-establishment of "astrochemistry" through investigation of the microscopic chemical processes with the close collaboration of astronomy, planetary science, and molecular science, and also aims at understanding the origin of the Solar System from the view of chemistry.

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

In this Research Area, we investigate the chemical variety of planet forming regions obtained from astronomical observations (Planned Research: A01) as well as from analysis of pristine extraterrestrial matters (A02) through laboratory experiments (A01: Spectroscopy, A02: Reproducing the Solar System Organics, A04: Gas-Phase Reactions, A05: Surface Reactions) and chemical evolution modeling during the star and planet formation (A03). The model will be constructed by the combination of hydrodynamic calculations, reaction parameters obtained by the laboratory experiments (A04, A05) and quantum chemical calculations (A03).

The next generation astrochemistry therefore requires collaborations between a variety of research fields and disciplines such as astronomy, physics, chemistry, planetary science. For the "Publicly Offered Research" projects, we welcome proposals on innovative research topics complementary and/or related to this area from various fields and disciplines. Two categories will be prepared: 1) The maximum budget up to 5 million yen per year, which will be good for proposals on laboratory experiments, sample analysis, and technological developments. 2) The budget lower than 2 million yen per year. This will be good for theoretical/observational studies, exploratory experiments, and/or testing new ideas. Depending on the necessity, applications for research that can be conducted for less than 2 million yen per year are also welcome.

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	Exploring Chemical Evolution along Formation of Planetary-System by High Resolution/Sensitivity Observations	2 5	10 6
A02	The Chemical Environment of the Solar System during its Formation		
A03	Theoretical astrochemistry based on microscopic processes in the gas and solid phases		
A04	Experimental study of gas phase chemical reaction by advanced beam technologies		
A05	Molecular-scale elucidation of the reaction elementary processes on the model dust surfaces by single-molecule surface spectroscopy		

Research Outline of Research Areas

What is dark matter? - Comprehensive study of the huge discovery space in dark matter
http://member.ipmu.jp/DarkMatter/

Number of Research Area	:	20A203	Term of Project :	FY2020-2024
Head Investigator	:	MURAYAMA Hitoshi		
Research Institution	:	The University of Tokyo, Kavli Institute for the Physics and Mathematics of the Universe		

1. Details of Research Area

"Dark matter" certainly exists and plays a crucial role in formation of all cosmic structures such as galaxies. However, the nature of dark matter remains a mystery. As guided by particle physics, most efforts of dark matter search have been focused on Weakly Interacting Massive Particles (WIMP) candidates in the mass range of two order magnitudes, but observations and experiments in 2010's did not find any clue of WIMP. There is now growing interest in non-WIMP dark matter candidates. In this research area, to comprehensively cover the vast discovery space of dark matter search spanning 90 orders of magnitudes in the mass scale, we aim at opening up research area using theoretical approaches, observations of the Universe and terrestrial experiments. We will develop the research project by using timely experiments and observations such as laser interferometry (for which the technology has matured rapidly in recent years), data at the Subaru Telescope, accelerators, artificial satellite, gravitational wave, and high-energy neutrino experiments. In particular, we aim to derive high-impact research results by utilizing the existing state-of-the-art facilities invested in by Japan while adding unique ideas from young researchers. We will focus on developing integrated and innovative research in the fields of astronomy, physics, and engineering.

To perform a comprehensive study of dark matter that is a dominant component of matter in the Universe today, we focus on three categories of dark matter candidates, "light dark matter", "heavy dark matter", and "macroscopic dark matter". Theory Research Groups (A01 – A03) will study generation mechanism of dark matter in the early universe and dark matter physics, and explore observation and experiment methods for dark matter search.

Observation and Experiment Research Groups (B01 – B06) will explore the nature of dark matter using new methods based on the unique idea/consideration from this group and/or taking advantage of the cutting-edge observational data of the Universe. More exactly, we will use laser interferometer experiment (B01), spectroscopic data of Subaru telescope (B02), high-cadence, wide-field-of-view imaging data in optical wavelengths (B03), the innovative technical method/data in X-ray energy range (B04), electron-position accelerator experiment (B05), and cosmic microwave background (B06).

Research Group (C01) will take a top-down approach such as quantum gravity to explore ultimate theory explaining the existence and physics of dark matter. Research Group (C02) will use numerical simulations to study how different dark matter models lead to characteristic features in cosmic structure formation. These C01 and C02 help and stimulate synergetic research between different Research Groups for dark matter physics.

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

In this research area, we will approach the nature of dark matter by experimental and observational Research Groups (B01 – B06) based on cutting-edge unique ideas with guidance from multidisciplinary Research Groups (C01 – C02) in a top-down approach and theoretical Research Groups (A01 – A03) in a bottom-up approach.

We expect that Publicly Offered (open-solicited) Research programs can cover theoretical studies of dark matter physics based on fundamental theory such as string theory, studies of dark matter physics using particle physics experiments, astronomical and terrestrial data or the combined datasets, and studies of new dark matter search method. We expect that observational/experimental studies via Publicly Offered Research programs can carry out experiment/observational studies of dark matter physics and R&D research of instruments that are different from or complementary to our Planned Research. Moreover, we expect Publicly Offered Research programs of cosmic string and topological defects and the observational efforts (e.g. constraining the abundance) that are not covered by our Planned Research.

We expect Publicly Offered Research programs that are different from or complementary to our Research Groups, carry out dark matter physics spanning different research programs, and carry out research programs based on new ideas/methods.

Please refer the details of each Research Group to the Research Area's link.

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/experiment studies of dark matter physics	2.4	9
E02	Theoretical studies of dark matter physics	2	8

Research Outline of Research Areas

Condensed Conjugation Molecular Physics and Chemistry:
Revisiting "Electronic Conjugation" Leading to Innovative Physical Properties of Molecular Materials
https://x-con.jp/en

Number of Research Area	:	20A204	Term of Project :	FY2020-2024
Head Investigator	:	SEKI Shu		
Research Institution	:	Kyoto University, Graduate School of Engineering		

1. Details of Research Area

Diamonds are one of the leading candidates exhibiting higher charge carrier mobility than that in crystalline silicon: a defending champion semiconductor material. This unique electronic property of diamonds minds us the potential and intrinsic predominance of "short" σ-bonds among carbon atoms, and hence of further shorter multiple bonds in achieving high electronic density of states. The use of designed electronic conjugation over carbon atoms is rather natural to realize future materials with exceptional electronic properties, where "condensation of electronic states" (condensed conjugation) will play a key role via an ultimate shrinkage of inter-molecular spaces and/or filling the spaces with electrons as well as electronic states. Herein this Research Area, we will establish a novel concept of intermolecular electronic conjugation, referred to as "X"-conjugation, by revisiting thoroughly the longitude and latitude in the development of "conjugation" in chemistry. Starting from the precise design of organic molecules with well-confined intermolecular spaces, thermal fluctuations in the condensed phases of molecular systems will be controlled perfectly by the wide-range/spatial alignment of intermolecular interactions as well as the leading-edge energy dissipation theory. A series of unique assessment techniques of opto- and magneto-electronic properties of molecular materials is presently the central complex of the current research project, pioneering the unprecedented properties of molecular systems with "X"-conjugation. We will address this final target through the following three strategies: (1) shrinking the intermolecular spaces to the limit (0.3 nm) by the precise design of molecules, (2) aligning precisely and programmatically the extremely wide-dynamic-ranging intermolecular interactions that control the thermal fluctuations of molecules, and (3) loading electrons/spins onto molecules and realizing new electronic states that contribute to the overall high Density-of-States (DOS). We believe the transformative research toward "X"-conjugation can be achievable only by mutual translational research between the scientists in organic chemistry and solid state physics.

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

The keys to address the molecular systems with "X"-conjugation and their unpreceded physical, electronic, and spintronic properties are in (1) the establishment of a molecular library for "X"-conjugation by organic/molecular chemists (Research Group A01), (2) the designing extremely wide-dynamic-range intermolecular interactions into the molecular systems (Research Group A02), and (3) the methodologies/techniques to access the extraordinary DOS regardless of equilibrium/non-equilibrium approaches (Research Group A04). We expect scientists in Publicity Offered Researches to contribute to these three key areas. Simultaneously the proposals based on unique/cutting-edge measurement/assessment techniques to puzzle out the nature of "X"-conjugation (Research Group A03) are highly appreciated.

I) "X"-conjugation beyond σ- and/or π-conjugation (A01): Our open question is: Are there other electronic conjugations? Revisiting the first definition of conjugation as energy gain in electron delocalization, we welcome ambitious research proposals aiming to establish a new electronic conjugation in intermolecular spaces via the precise design of molecular skeleton with minimum intermolecular distances, as a bottom-up approach starting from critical issues in synthetic protocols, or as a top-down approach from the topological design of molecules in ultimate close-packed structures.

II) Embodiment of "X"-conjugation in reality by designed intermolecular interactions (A02): Confident proposals are expected to realize molecular systems interplaying wide-range interactions and their minimal fluctuations in close-packed molecular systems. For instance, focusing on the degree of molecular freedom in condensed phases is one of the major targets of this Research Group to fight against thermal fluctuation.

III) Precise analysis of "X"-conjugation in condensed phases (A03): As the central complex of unique assessment techniques of "X"-conjugation, we welcome proposals in the uncovered area by the present Planned Research such as nano-and mesoscopic measurements of spin diffusion/transport, coupling of phonons and electrons(states) of molecular systems with "X"-conjugation, and implementation of the systems into devices in collaboration with Groups of A01 and A02.

IV) Toward unprecedented properties of "X"-conjugation (A04): Points of consolidation in this group are predominantly in the implementation of "X"-conjugation into low dimensional structures as well as interfacial states. The approaches from theoretical aspects are also highly demanded to predict intermolecular interactions quantitatively and lead to sophisticated spatial designs of interactions.

For all the scientists in Publicity Offered Researches, our original science career support system entitled "Condensed Conjugation Research Fellowship" is opened and presumed to be applied by young researchers, which offers the first post-doctoral researcher positions via cross-appoint systems.

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	"X"-conjugation beyond σ- and/or π-conjugation	3	5
A02	Embodiment of "X"-conjugation by designed intermolecular interactions	3	5
A03	Precise analysis of "X"-conjugation in condensed phases	3	5
A04	Toward unprecedented properties of "X"-conjugation	3	5

Research Outline of Research Areas

Biophysical Chemistry for Material Symbiosis
https://material-symbiosis.jp

Number of Research Area	:	20A205	Term of Project :	FY2020-2024
Head Investigator	:	YAMAYOSHI Asako		
Research Institution	:	Nagasaki University, Graduate School of Biomedical Science		

1. Details of Research Area

In our body, we have some amazing symbiotic relationships with other organisms. The relationship between a mother and her unborn baby is a representative example of them. The mother does not reject her fetus, even though the fetus is completely another organism. This symbiosis is achieved *via* "symbiotic communications" between mother and fetus using an intricate and fascinating system, the placenta. Another intriguing example is the relationship between humans and our intestinal bacteria.

In contrast, although many different types of functional molecules, including biological drugs and biocompatible materials, have so far been developed, symbiosis between humans and non-self molecules/materials has not fully been established. We have just started this unique research project to define what exactly is "material symbiosis". The primary goal of our material symbiosis project is to delineate previously-neglected, weak but specific interactions between living cells/biomolecules and materials, and eventually find ways to achieve material symbiosis in our body. In the end, we are hopefully able to compile knowledge obtained through this project, and establish a new field–what we call "biophysical chemistry for material symbiosis."

Our projects conduct to understand and elucidate material symbiosis underlying intermolecular communication between biomolecules/living cells and materials in biophysical chemistry perspectives. Two Research Groups (A01/A02) mainly focus on elucidation of mechanisms underlying intermolecular communication between biomolecules/living cells and materials. The other Research Group (A03) features development of biomaterials that that exhibit desired relationships with biomolecules/living cells. We welcome research proposals with experimental/theoretical ideas that contribute cooperatively to made up material symbiosis. We also welcome research proposals from young researchers who have high motivation for next challenges.

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

Three Research Groups pursue individual goals to elucidate underlying interactions between living cells/biomolecules and materials. We will provide technical support such as symbiotic material synthesis and ultra-high resolution AFM analysis to integrate interdisciplinary collaboration in the project.

The A01 Research Group elucidate "weak interactions" for material symbiosis by means of various measuring methods. It has not been easy to get a closer look at symbiotic intermolecular interactions, which are shown with fast and weak interactions in living organisms; therefore, we will develop novel imaging systems, structural analyses, physicochemical analyses, computational approaches, and other methods to uncover symbiotic interactions. We will select 8 research proposals that will contribute to the achievement of material symbiosis from multiple perspectives.

In the A02 Research Group, we are specifically focusing on interactions between biomolecules and materials. These interactions can be broken down into various elementary interactions, such as electrostatic, hydrogen bonding, hydrophobic, *van der Waals* forces. We translate the relationship between biomolecules and materials into more fundamental biophysics and chemistry terms such as thermodynamic, kinetic parameters, and other possible variables. We welcome proposals that cover a wide range of synthetic materials, as well as natural molecules to elucidate the interaction between materials and biomolecules and will select 5 research proposals.

The goal of the A03 Research Group is designing and creating novel materials that symbiotically interact with biomolecules. The A03 group conduct research with the goal developing functional molecules based on the unique knowledge of symbiotic interactions obtained in the project. We also analyze the biological responses induced by these functional molecules. We will select 7 research proposals that will create novel materials (from inorganic to organic, bio-derived materials, etc.) utilizing symbiotic interactions.

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	Measurement and analysis of symbiotic interactions	3	8
A02	Elucidation of symbiotic parameters		5
A03	Development of novel symbiotic materials		7

Research Outline of Research Areas

Progressive condensed matter physics inspired by hyper-ordered structures
http://www.hyperordered.org

Number of Research Area	:	20A206	Term of Project :	FY2020-2024
Head Investigator	:	HAYASHI Koichi		
Research Institution	:	Nagoya Institute of Technology, Faculty of Engineering		

1. Details of Research Area

"Hyper-ordered structures" are defined as an interface between the crystalline and amorphous phases of a material that induces the material's functionality. For example, it can refer to dopants that are aperiodic structures in crystals. In particular, we focus on defect complexes and nanostructures composed of multi-elements and vacancies. On the other hand, we also defined topological regularity in a glass network as "Hyper-ordered structures", that is highly related to the glass property. Such a nano-scale order structure is a treasure trove of material functionality, and possess an infinite potential of various substances that can be developed by controlling these "hyper-ordered structures". We will work on observing, understanding, and controlling these "hyper-ordered structures". In particular, A: "dopant-induced hyper-ordered structures", B: "hyper-ordered structures with vacancies and voids", and C: "hyper-ordered structures at the crystal/amorphous boundary" are set as priority research targets.

These "hyper-ordered structures" exist in a wide range of materials such as dielectrics, functional glasses, zeolites, superconductors, and biomaterials. These structures will be accurately determined by site-selective quantum beam techniques, in combination with computational techniques. We will elucidate their functionality, and design new "hyper-ordered structures" using large-scale first-principles calculations. In addition, by utilizing mathematical methods such as topology analysis, we will propose descriptors for "hyper-ordered structures". Based on these insights, we will explore materials with "hyper-ordered structures" utilizing data-centric science. We will go beyond the idea of single-site doping and pave a way to creating highly functional materials based on topology control.

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

We consider that "hyper-ordered structure" is a general concept for developing and enhancing material functions, which can provide new perspectives for researchers in various fields. The selection of publicly-offered research will proceed according to the purpose of the Planned Research A01-03 as shown below. In addition, we welcome proposals that exceed our expectations and enhance synergistic effects. We expect that the publicly-offered researches will make significant impacts such as decisive breakthroughs in materials development. The maximum amount of application is set to 5 million yen/year and 3 million yen/year depending on the scale of research.

A01 Sample Group: This research group is mainly focused on the design and development of "hyper-ordered structures" in bulk inorganic compounds and proteins. Furthermore, thin films, organic compounds, biomaterials and so on, are also potential materials. We believe that the role of "hyper-ordered structure" can be understood in a larger framework by including these substances. In addition, for industrial commercialization, we would like to encourage researchers that are close to device development.

A02 Measurement Group: Most of the measurement techniques in the Planned Research are based on the scattering phenomenon of quantum beams, but we believe that the combination with different methods will deepen the understanding of the "hyper-ordered structures". We expect proposals including complementary techniques, such as spectroscopy and bulk physical property measurement that can evaluate the effects of "hyper-ordered structures". The research on dynamics is welcome.

A03 Theory Group: In Planned Research, we will mainly use first-principles calculations, phased data analysis, and machine learning. In order to elucidate the electronic state and functionality in a more comprehensive manner, we are looking forward to various researches using not only the above methods but also such as classical molecular dynamics simulation, applied mathematics, data-centric science, and materials informatics, that can analyze and explore these "hyper-ordered structures".

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	Creation and Application of "Hyper-ordered Structures	5	10
A02	Analysis and Evaluation of "Hyper-ordered Structures"	3	10
A03	Elucidation and Design of "Hyper-ordered Structures"		

Research Outline of Research Areas

Comprehensive understanding of scattering and fluctuated fields and science of clairvoyance
http://www.org.kobe-u.ac.jp/scattering_clairvoyance/

Number of Research Area	:	20A207	Term of Project :	FY2020-2024
Head Investigator	:	MATOBA Osamu		
Research Institution	:	Kobe University, Center for Optical Scattering Image Science		

1. Details of Research Area

Optics and related imaging techniques play indispensable roles in the development of natural sciences. However, there remain problems that are not fully understood and overcome even with modern optical science and technologies. One of such problems is the phenomena, where straight light is disturbed inside scattering and fluctuated fields. Scattering theories, described by wavelengths and particle size, were established. However, a comprehensive theory in four-dimensional (space and time) scattering and fluctuation in the general media such as air, water, and living organisms need to be established.

This research area aims at understanding multiscale scattering and fluctuation phenomena that scales from nanometer to kilometer order in 3D space, and overcoming those effects. To tackle this, we need to comprehensively measure the light scattered and fluctuated by multi-scale targets from living organisms to the atmosphere, and utilize deep learning methods incorporated with the latest theories to understand the scattering and fluctuating fields. This will allow us clairvoyance; imaging of scattering and fluctuation themselves, as well as objects behind them. Clairvoyance brings innovations in natural sciences such as life science and astronomy, and engineering such as information and communication technology. The goal is to create an academic area, named "Science of clairvoyance" that can comprehensively and interdisciplinary understand the scattering and fluctuations.

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

Towards the establishment of "Science of clairvoyance", we need to understand multi-scale scattering and fluctuations, which are common and fundamental research subjects in optics, mathematics, informatics, life science, information and communication engineering, and astronomy. To this end, we divide the research area of "Science of clairvoyance" into three research groups as A01, A02, and A03. Throughout the research groups and the linking between them, we pioneer in a new research area. Research group A01 focuses on visualization and measurement, and modeling of light propagating in the scattering or fluctuating media. Research group A02 focuses on delivering new theory of scattering and see-through imaging, and realizing data-driven imaging by machine learning or deep learning methods. Research group A03 focuses on understanding the scattering properties of the media in real-life and scientific applications, including living plants, animals, and microorganisms, and the fluctuating atmospheric layers. Also, this project aims to provide fruitful results to prove the theories.

We call for proposals as Publicly Offered Research which can share our purpose and goals, complement and reinforce our research plans. Detailed research interests are as below:

1 Theoretical researches on light propagation in scattering and fluctuating media.
2 New measuring/analysis/modeling methods on light propagation in scattering and fluctuating media.
3 Development of new image processing, signal processing, machine learning, and deep learning methods related to scattering and fluctuation imaging.
4 Development of spatial information communication techniques via scattering and fluctuation of light waves
5 Development of sensors, compensation devices, etc. for scattering and fluctuation imaging.
6 Measurement and clairvoyance of scattering and fluctuation in living cells/cultured samples and tissues.
7 New observational astronomy by measuring and overcoming atmospheric fluctuations.

With Addition of Publicly Offered Researches and with their joint research with Planned Researches, we expect broader coverage of theoretical and methodological approaches in the scattering and fluctuation phenomena in optics, mathematics, and information science. In the field of life science, information and communication technology, and astronomy, we expect to find novel natural phenomena by understanding scattering and fluctuating organisms and atmosphere that have never been fully answered before, as well as establish novel natural science methodologies and highly efficient information communication by the clairvoyance of the scattering and fluctuating media. Especially, we expect Publicly Offered Researches of new scattering theory, analysis, modeling, and spatial information communication. Throughout the research plan, we expect to find and train young scientific researchers who have a broad perspective in the area related to scattering and fluctuation problems.

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	Physical basis of science of clairvoyance	3.5	5
A02	Mathematical basis of science of clairvoyance		6
A03	Science of clairvoyance in actual problems		5

Research Outline of Research Areas

Establishing data descriptive science and its cross-disciplinary applications
https://data-descriptive-science.org

Number of Research Area	:	22A201	Term of Project :	FY2022-2026
Head Investigator	:	HIRAOKA Yasuaki		
Research Institution	:	Kyoto University, Kyoto University Institute for Advanced Study		

1. Details of Research Area

The modern world is inundated with data. However, as seen in the black box problem in AI technology, it cannot be said that the true value contained in such data is being fully utilized. In order to make effective use of such big data, it is significant to describe the essential structure of the data in an appropriate mathematical language, and to use that descriptive language in the process of giving meaning and of understanding mechanisms behind the phenomena. In this Research Area, we will solve this problem by developing descriptors (mathematical languages that express the essential structure of data) that focus on the "shape" and "movement" of data, using state-of-the-art mathematical and data science methods. To this end, our Research Area is organized as a trinity of mathematics, data science, and application to create a new fusion area, "data descriptive science". The Planned Research consists of three groups. Research Group A01 will conduct mathematical and data science research for building theoretical foundations of data descriptive science. Research Group A02 will focus on research exploring new areas of data descriptive science. Research Group A03 will conduct research applying our methodologies to materials science and life science.

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

We welcome research proposals for Publicly Offered Research from mathematics, data science, and applications. Proposals that are complementary to the Planned Research and actively promote fusion research are expected.

Research Group A01 calls for theoretical and methodological studies for the construction of data descriptive science. In mathematics research, we expect ambitious proposals for developing new data descriptors using, for example, probability theory, optimal transport, differential equations, variational methods, operator theory, etc. In data science research, the main themes are machine learning, representation learning, mathematical statistics, natural language processing, and time series analysis. We welcome research that bridges mathematics and data science. Research Group A01 mainly focuses on theoretical research, but also welcomes proposals that can conduct fusion research with applied themes in our Research Area.

Research Group A02 calls for a wide range of exploratory research on mathematics and applications that will open up new areas of data descriptive science. In mathematics research, the call is for research on developing new data descriptors using topology, representation theory, algebraic analysis, algebraic geometry, dynamical systems, etc., and research on data analysis using these methods. As for applied research, we expect data analysis research related to high-dimensional visualization, VR (virtual reality), large-scale complex networks, and flow/transport phenomena on complex systems.

Research Group A03 calls for theoretical and experimental research on materials science and life science. In the Planning Research of materials science, we will visualize heterogeneity within materials in structural materials and energy materials using X-ray microscopy (XRM). As Publicly Offered Research, the open call includes applications of XRM to the other new areas (ex. earth science), proposals of new experimental approaches other than XRM for observation of heterogeneity, and proposals of analysis methods of multi-dimensional big data in terms of materials science. As life science themes, we envision proposals that challenge a variety of pattern formation processes at multiple scales, develop basic technologies for manipulating cell functions based on cell mechanics, and elucidate intracellular signaling networks and the mechanisms that determine cell diversity. The research equipment (XRM and confocal microscope) prepared in our Research Area can be used by Publicly Offered Research.

For Publicly Offered Research, it is not necessary to have conducted interdisciplinary research at the beginning of the research. For such proposals, opportunities for discussions shall be provided in consideration of the direction of data descriptive science, the expertise of the proposed subject, and the research subjects to be studied by Planned 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
A01	Basic Research	2	6
A02	Exploration Research	2	6
A03	Application Research	Theoretical research: 2 Experimental research: 3	3 3

Research Outline of Research Areas

Foundation of "Machine Learning Physics"
--- Revolutionary Transformation of Fundamental Physics by A New Field Integrating Machine Learning and Physics
http://mlphys.scphys.kyoto-u.ac.jp

Number of Research Area	:	22A202	Term of Project :	FY2022-2026
Head Investigator	:	HASHIMOTO Koji		
Research Institution	:	Kyoto University, Graduate School of Science		

1. Details of Research Area

In physics, which has traditionally progressed through both experiment and theory, the search for theoretical principles and mathematics and the development of experiments through technological development have revealed new aspects of space and matter. On the other hand, recent technological innovations such as machine learning have brought about social innovations. The objective of this research area, "Machine Learning Physics," is to integrate machine learning and data science methods including network science, etc., with theoretical methods in physics to discover new laws and explore new materials, which are fundamental issues in physics. This new research area integrates particle physics, condensed matter physics, gravity, computational physics, and machine learning from the viewpoints of mathematics, statistics, and topology.

Group A aims to solve fundamental problems in physics by integrating physics and machine learning, and Group B aims to develop methods to solve problems in physics by utilizing the affinity between machine learning and physics. Group B aims to develop methods to solve problems in physics through new fields that utilize the affinity between machine learning and physics. A01: Innovative acceleration of quantum computations in computational physics; A02: Improvement of the detection sensitivity of accelerator experiments and refinement of corresponding theories in particle physics; A03: Elucidation of quantum fluctuation and quantum entanglement in condensed matter physics and construction of condensed matter physics 2.0. A04: Emergence mechanism of space-time concepts in quantum and gravitational physics; B01: Mathematical study of the mechanism of deep learning using physics domain knowledge and classification of methods to deal with the problem; B02: Overcoming the problem of computational difficulty in learning by statistical mechanics/development of a framework that can be used throughout theory and practice. B03: Development of methods based on topological data analysis and physical processes of learning models.

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

Since this research area integrates machine learning and physics, we aim to promote fusion through the participation of various researchers in machine learning, physics, and the surrounding fields of physics, and to create a new research field that transcends the boundaries of existing fields. For this reason, in addition to research proposals on themes deeply related to the research groups A01-A04 and B01-B03, we also expect related research proposals and stimulate fusion. In particular, for the latter, for example, desired are proposals that promote the fusion of diverse viewpoints, various fields of physics, and machine learning methods, proposals that contribute to the creation of a network of the entire area, and proposals that promote collaboration with surrounding academic fields.

The upper limit of the application is set at 1,000,000 yen/year for trial research, 2,000,000 yen/year for medium-scale numerical and theoretical research, and 5,000,000 yen/year for large-scale computational research.

E01: Research proposals related to research groups A01, A02, and A04. Research proposals that are expected to interact with this research area in related research fields (including astronomy, quantum information, quantum computation, etc.).

E02: Research proposals related to research group A03. Research proposals that are expected to interact with this research area in related research fields (including physical chemistry, material informatics, brain science, biophysics, etc.).

E03: Research proposals related to research groups B01, B02, and B03. Research proposals that are expected to interact with this research area in related fields (including mathematical research on machine learning, 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 Annual Budget (Million yen)	Number of research projects scheduled to be selected
E01	Research using machine learning in quantum, particle, space-time, gravity, and related sciences	1 2 5	6 4 2
E02	Research using machine learning in condensed matter physics and related materials science	1 2 5	6 4 2
E03	Research to develop machine learning methods to solve various problems in physics	1 2 5	6 3 1

Research Outline of Research Areas

Systems biosynthetics based on accumulation, prediction, and creation of biological reactions
https://bio-4cast.skr.jp/en/

Number of Research Area	:	22A203	Term of Project :	FY2022-2026
Head Investigator	:	KUZUYAMA Tomohisa		
Research Institution	:	The University of Tokyo, Graduate School of Agricultural Life Sciences		

1. Details of Research Area

Natural products are very important research targets, not only for elucidating their behavior in living organisms but also for drug discovery applications. Although a large amount of genetic information related to the biosynthesis of natural products is now available, the structure, reactivity, and selectivity of biosynthetic enzymes have not been easily analyzed and clarified, and the biosynthetic pathways of many natural products have remained unknown. Therefore, this Research Area, "Forecasting Biosynthesis," will organize an organic and complementary collaborative research setting in close collaboration with the three Research Groups of (A01) accumulation, (A02) forecasting, and (A03) creation of biological reactions related to natural product biosynthesis. The objective of this Research Area is to open an innovative field of biosynthetic research that freely integrates two experimental disciplines, synthetic biology and synthetic organic chemistry, and closely links them with theoretical systems of informatics and computational science while incorporating artificial intelligence (AI) to create molecules at will. The AI to be developed in this Research Area is a system that can theoretically forecast the structure and biosynthetic pathways of new-to-nature compounds. To construct this forecasting system, it is essential to incorporate deductive methods such as theoretical calculations and quantum chemical calculations, which have been lacking thus far in this Research Area, in addition to existing inductive analytical methods. By constructing this forecasting system, we will initiate a fundamental change in the field of natural product chemistry from the conventional concept that has persisted for more than half a century—that natural products are to be "searched for"—to one in which natural products are "created."

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

This Research Area should be composed of openly solicited researchers spanning a wide range of fields, including natural product chemistry, bioorganic chemistry, synthetic organic chemistry, synthetic biology, and structural biology in the experimental system and computational chemistry, theoretical chemistry, computational biophysics, information science, and AI in the theoretical system. To this end, the three Research Groups below will be established. Active applications from young researchers who are motivated to innovate the field of natural product chemistry are also expected.

Research Group A01 (Accumulation of biological reactions) seeks to identify novel biocatalysts (enzymes) for the biosynthesis of the basic building blocks of natural products such as terpenes, polyketides, alkaloids, peptides, and their hybrids, derived from bacteria including actinomycetes, fungi, and plants, by using existing bioinformatics methods from the genome database and AI (initially in progress) to be developed under Research Group A02. This research will directly contribute to the construction of new scientific principles in biomolecular chemistry and related fields by discovering unknown functions and accumulating a large number of biological reactions through precise functional analysis and structural basis elucidation research.

Research Group A02 (Forecasting of biological reactions) calls for research aimed at (1) developing predictors that can predict biological reactions and (2) developing AI that can efficiently improve enzyme activity and extend substrate specificity by integrating structural prediction, machine learning, and quantum chemical calculations. The goal of developing these predictors is to obtain a highly accurate AI that combines inductive methodology, which finds rules based on large amounts of empirical data, and deductive methodology, which derives useful information about biological reactions from the three-dimensional structure of enzymes based on theory. This includes, for example, a methodology that enables retro-biosynthetic analysis of natural products, a methodology that predicts the structure of natural products from genetic information alone, a methodology that compensates for the weak areas of the existing genome mining tool antiSMASH to increase prediction accuracy, and a methodology that uses AI to analyze multi-omics data to efficiently find new biocatalysts.

Research Group A03 (Creation of biological reactions) focuses on the expansion of biological reactions through approaches such as enzyme engineering by synthetic biology and evolutionary engineering; AI-based enzyme engineering using machine learning; molecular dynamics calculations, quantum chemical calculations, etc.; innovative enzyme control using decoy molecules; and chemical-enzyme hybrid synthesis. We call for research that develops new methods of molecule creation by extending biological reactions through approaches such as molecular design strategies that revolutionize biosynthesis to develop environmentally benign material production processes, create a large number of novel bioactive compounds, and extend the space of compounds that can be produced by biocatalysts. This group will play an important part in increasing the number of compounds that are output by this Research Area and improving the diversity of molecular structures.

This Research Area aims to nurture a young generation of researchers who can use both experimental and theoretical approaches at will rather than simply collaborating with each other. Proposals from theoretical researchers who have not previously conducted research on living organisms but who are flexible and willing to collaborate with experimental researchers in this Research Area are welcome. Proposals from experimental researchers who are willing to actively develop joint research with theoretical researchers are also 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	Accumulation of biological reactions	4.5	16 projects together with Group A03
A02	Forecasting of biological reactions	3.6	10 projects
A03	Creation of biological reactions	4.5	16 projects together with Group A01

Research Outline of Research Areas

Chiral materials science pioneered by the helicity of light
http:// light-chiral-materials-science.jp/

Number of Research Area	:	22A204	Term of Project :	FY2022-2026
Head Investigator	:	OMATSU Takashige		
Research Institution	:	Chiba University, Graduate School of Engineering		

1. Details of Research Area

An object is chiral if it cannot be superimposed onto its mirror image. Chiral objects have the same chemical and physical properties as their mirror images but different optical properties (e.g. circular dichroism), and they play universally important roles in materials science. Chiral objects, including physical matter and phenomena, chemical composites and even biomaterials, possess typically helical structures, such as spirals and vortices on a nano/macro-scale.

This research area aims to freely manipulate a myriad of nanomaterials using helical light fields to establish exotic micro- to macro-scale helical structures with multifunctional properties. Further, we pioneer innovative materials sciences and advanced materials technologies, such as chemistry with chiral light fields, engineering with light induced helices, and physics in vortices, by employing this structured matter.

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

This research area consists of 10 planned research projects classified into the following three sub-projects: [A] basics and theory of physical and chemical phenomena via helical light fields and matters ("fundamentals of helical-light induced chiral materials science"), [B] spatio-temporal observation of the interaction between helical light fields and matters ("direct observations of helical-light induced chiral materials"), [C] fabrication of multi-scale functional helical structures and discovery of exotic interactions between helical-light fields and matters ("demonstrations of helical-light induced chiral materials science and technology".

This research project will aim for the following three goals. (1) Chiral crystallization at ultimate chiral bias, ultrahigh sensitive detection and ultrahigh resolution observation of chirality etc.: Chemistry with chiral light fields. (2) Biomimetics, tissue engineering etc. with light-induced helices: Engineering with light induced helices. (3) Creation, annihilation and manipulation of nano/micro-scale vortices, such as quantum vortices, skyrmions etc.: Physics in vortices.

We expect the research proposals, which reinforce and promote the three subprojects [A]-[C] and contribute significantly to achievement of three goals (1)-(3), as publicly offered research projects. We also expect that, going beyond the planned research projects, the publicly offered research projects will enable the improvement of the universal and academic achievements of this project and the establishment of further interdisciplinary research areas based on interaction between helical light fields and materials.

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	Fundamentals of helical-light induced chiral materials science	Experimental research : 3 Theoretical research : 2	18 3
B04	Direct observations of helical-light induced chiral materials science		
C05	Demonstrations of helical-light induced chiral materials science and technology		
D01	Interdisciplinary research projects based on interaction between helical light fields and materials beyond three sub-projects		

Research Outline of Research Areas

Supra-ceramics: Molecule-driven frontier of inorganic materials
http://supraceramics.jp

Number of Research Area	:	22A205	Term of Project :	FY2022-2026
Head Investigator	:	MAEDA Kazuhiko		
Research Institution	:	Tokyo Institute of Technology, School of Science		

1. Details of Research Area

In this research area, we define "supra-ceramics" as a group of materials in which molecular units (molecular ions, complexes, clusters, etc.) are incorporated into inorganic materials, and create new materials with innovative properties and functions through cross-disciplinary research that brings together researchers from different fields. The objective is to revolutionize the academic system of materials science, focusing on inorganic materials. In this research area, the target supra-ceramics are classified into the following two types according to the way in which molecular units are incorporated, and the creation of new materials of both types will be pursued.

Endospheric supra-ceramics: New materials that contain molecular ionic species within the lattice of inorganic crystals. Based on the strong electronic interactions within the narrow space of the crystal, new properties and functions that cannot be created by conventional molecular ion-containing materials (MOFs, etc.) are expected to be created.

Exospheric supra-ceramics: New materials that have outstanding properties and functions by placing functional molecules at specific locations on the surface of inorganic solids. Unlike conventional organic-inorganic hybrids, perturbations from crystal surfaces or interfaces are maximally utilized to create new structures and electronic states that inorganic solids or molecules alone do not possess, leading to modulation of physical properties and functions.

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

In this research area, we will construct a materials design science of supra-ceramics based on close collaboration among "synthesis," "analysis and theory," and "physical properties and functions". Research Teams A01 and A02 are defined as Group A, and Research Team A03, which consists of publicly offered researches, is established in Group A. Similarly, Groups B and C are defined, and Research Teams B03 and C03 are established, respectively. We wish to expand the entire research area by including important research topics that are not included in the current research plan as publicly offered research, thereby providing a driving force for research in the area. We expect applications from various materials-related fields, such as solid-state chemistry, coordination chemistry, crystallography, supramolecular chemistry, catalysis, and condensed matter physics. We consider the possibilities of the following subjects in each research category, for example, but also welcome original one that is not covered by these categories.

Group A: Research on the synthesis of materials using electric fields, high pressure, etc., synthesis of materials under special atmospheres, development of processes to precisely control the chemical composition and arrangement (regular or irregular arrangement) of molecular ions and organic ligands, and establishment of guidelines for controlling dimension and morphology including nano- and macrostructure.

Group B: Structural dynamics of supra-ceramics, development of electronic structure measurement devices and analytical methods for light elements, analytical methods using first-principles calculations, etc., of data from analytical electron microscopes and various spectroscopic methods, chemical bonding of supra-ceramics, understanding and prediction of physical properties Theoretical calculation techniques for understanding and predicting chemical bonding and physical properties of supra-ceramics, prediction of materials and composition using materials informatics, etc.

Group C: Experimental/theoretical studies on the creation of properties and functions of supra-ceramics. Bulk properties of materials, interfacial properties including thin films, electronic devices, catalysts, biomaterials, etc.

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

Research Team Number	Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A03	Development of new synthesis method and dimensional/morphological control of supra-ceramics	Experiment, 2.5	7
B03	Design and advanced structural analysis of supra-ceramics	Experiment, 2.5	4
C03	Development of new properties and functions of supra-ceramics	Experiment, 2.5	7
A03	Development of new synthesis method and dimensional/morphological control of supra-ceramics	Theory, 1.5	4
B03	Design and advanced structural analysis of supra-ceramics		
C03	Development of new properties and functions of supra-ceramics		

Research Outline of Research Areas

CO world
http://co-world.jp

Number of Research Area	:	22A206	Term of Project :	FY2022-2026
Head Investigator	:	UENO Yuichiro		
Research Institution	:	Tokyo Institute of Technology, Graduate School of Science		

1. Details of Research Area

This research area aims to elucidate the planetary environment necessary for emergence of life, through interdisciplinary study of "CO worlds" in which organic molecules are generated from carbon monoxide. Recent astronomical observations and planetary exploration missions have discovered habitable environments beyond the Earth; however, we still do not understand what kind of planetary environment is necessary for the emergence of life. In this research area, we investigate the diversity of possible planetary environments, systematically focusing on major carbon species (CO_2/CO/CH_4) according to the redox state. An environment rich in CO is particularly suitable for synthesizing various organic molecules. It is also interesting that the earliest carbon fixation by Earth's life (the acetyl-CoA pathway) can use CO as a carbon source. Furthermore, recent geochemical and theoretical studies have provided evidence for the presence of CO in the atmospheres of the early Earth and Mars.

Based on these considerations, this research area will promote study of CO worlds by integrating four research fields. By using model calculations of planetary atmosphere and material cycling together with geochemical observations and experiments of atmospheric molecules including stable isotope species (isotopologues), the Theory Group (A01) and Geochemistry Group (A02) will investigate how much CO is present in the atmosphere of the early Earth, Mars and other planets including exo-planets, and characterize which organic molecules are produced in each atmosphere. In parallel, the Biology Group (A03) and Chemistry Group (A04) will clarify what kind of ecosystem, metabolism and chemical reaction system are established under such a planetary environment. The presence of organic molecules is not enough to create life. Rather, a chemical system itself must arise in the environment for providing building blocks of life. By focusing on CO, this research area plans to demonstrate that a chemical system capable of evolving into life (geometabolism) can be established in the actual planetary environment. Through this interdisciplinary research, we aim to revolutionize the astrobiology research field, and provide more concrete methods for discriminating traces of life (biosignatures) in future astronomical observations and planetary explorations.

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

One of our goals is to extend "biogeochemistry" of the Earth into other planetary systems. Further, we aim to facilitate the search for life in the Universe, as well as microbiology and chemistry research fields initiated from the study of CO worlds. Therefore, we are seeking proposals to award as Publicly Offered Research in various fields, not only planetary science and geochemistry, but also microbiology, mathematical science, synthetic chemistry, and the fusion of these areas. The following are examples of research topics related to each Research Group:

- A01 and A02: the CO_2 stability problem of planetary atmospheres, Redox evolution of planetary atmospheres focusing on carbon species, Observation and/or modeling of CO and bio-signatures in extrasolar planets, Biogeochemical CO cycling, Development of stable isotopologue methods and their application to biomarkers, Isotope anomalies by photochemical reactions, Spectroscopic observation of planetary atmospheres, etc.
- A03 and A04: Evolutionary analysis of CO_2 fixation and energy metabolism, Biochemistry of CO metabolism such as acetogens, Microbial ecology in extreme environments, Analysis of early enzymes, Utilization of microbes for synthetic gas. C and N fixation by electric / optical / thermal catalytic chemistry in a CO environment, Interaction between metal, CO and organic molecules, Theory and experiment concerning autocatalytic systems within planetary environments, etc.

We also welcome innovative and challenging proposals that do not fit within these frameworks. The guideline for making these Publicly Offered Research awards is 2.5 million yen or less for 10 projects for theoretical and small-scale experimental research. We intend to select 6 larger projects supported at 5 million yen or less for experimental research in topics of particularly high priority.

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	Theoretical modeling of CO world	2.5 5.0	10 6
A02	Decoding CO world in early Earth and Mars		
A03	Biology of CO world		
A04	Chemistry of CO world		
B01	Interdisciplinary research connecting from A01 to A04		

Research Outline of Research Areas

Glia decoding: deciphering information critical for brain-body interactions
http://gliadecode.com

Number of Research Area	:	20A301	Term of Project :	FY2020-2024
Head Investigator	:	OKABE Shigeo		
Research Institution	:	The University of Tokyo, Graduate School of Medicine		

1. Details of Research Area

The internal state of an animal changes continuously in response to the environment. The internal condition of the animal body also affects brain functions. Traditionally the sensory organs have been taken as the main route of interaction between the nervous system and the environment. However, recent studies proposed that glial cells play a central role in the interaction between the brain and peripheral tissue. Internal conditions of the body are presented to the brain via the glial interface. Reciprocally, glial cells transmit signals of the brain status to the peripheral organs and tissues. The development of new methods for decoding the signals in glial cells (glia decoding) will help a full understanding of brain-body interactions. This research area achieves comprehensive decoding of glial cell functions by recruiting researchers with new analytical methods or interest in peripheral organs. To this end, we set three goals as follows:

(1) Understand the information processing between glia and neural circuits, with particular reference to the dynamics of metabolic, cardiovascular, and immunological responses.

(2) Clarify the various interaction mechanisms between the environment, internal body state, and brain function, especially those operating via the glia-derived signals.

(3) Develop methods of decoding glial cell state, function, and intercellular signaling (glia decoding), which facilitate the understanding of signal integration in the brain-body interactions.

These approaches will clarify the functional correlation between brain and body, leading to a new research field beyond the current brain science.

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

We call the following three Research Groups as Publicly Offered Research. Unique proposals with potentials for collaboration with Planned Research and utilizing the decoding data produced in this Research Area are encouraged. We expect many proposals involving database construction and mathematical analysis. Proposals from young researchers are welcome. We also expect basic approaches to disease etiology, which relates glial functions to the impairment of brain-body interactions. In addition to Research Projects with the upper limit of 3M yen, we call Research Projects with the upper limit of 5M yen, which include technology development, database construction, or mathematical analysis.

In Research Group A01, we call research proposals on the functional network of glia and neurons. We welcome proposals that can be linked to Planned Research, which performs integration of neuron-network imaging and functional analysis of glia, development of imaging probes for glial signal transduction, and decoding signals between glia, neurons, and blood vessels. Mathematical analysis and data-driven research aiming at in vivo glia decoding are also encouraged.

In Research Group A02, we call research proposals that can be linked to Planned Research, which carry out research on brain-body interaction, with emphasis on immune and inflammatory signals. We expect proposals on the recovery process of the peripheral tissue and the participation of specialists on immune responses. Proposals on the development of new experimental systems and model animals, which enable further analyses of brain-body interactions, are also welcome.

In Research Group A03, we call proposals that fit with a comprehensive analysis of brain-body interaction. The proposals are also expected to be linked to the technologies provided by Planned Research, which develop innovative technology of glia manipulation and analysis. Proposals are expected to be mutually beneficial and complementary to the projects of technology development in Planned Research. To achieve a comprehensive acquisition of glial information and its decoding, intensive application of bioinformatics is necessary. Proposals based on information science 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
A01	Brain functions based on the integration of glia and neural network	5	6
A02	Regulation of the brain-body interaction by glia	3	7
A03	Comprehensive analysis and manipulation of glia-mediated brain-body interactions	5 3	2 3

Research Outline of Research Areas

Multi-layered regulatory system of plant resilience under fluctuating environment

https://plant-resilience.jp

Number of Research Area	:	20A302	Term of Project :	FY2020-2024
Head Investigator	:	MATSUSHITA Tomonao		
Research Institution	:	Kyoto University, Graduate School of Science		

1. Details of Research Area

Plants are exposed to constantly fluctuating environments where they sprout. Attributes of their environment, such as soil nutrients and leaf-filtered sunlight, display mosaic-type spatial fluctuations, and are accompanied by irregular fluctuations across time, such as in degree of dryness. Moreover, it is not unusual for attributes of a real natural environment to fluctuate in a compound manner. To survive in such environments, plants are equipped with characteristic resilience mechanisms that enable them to adapt robustly and flexibly to environmental changes across a wide dynamic range. However, research to date has been limited to analysis of single-environment response under uniform conditions, and has not elucidated multi-layered adaptive mechanisms in intrinsically fluctuating, compound environments. In particular, most phenomena and molecular mechanisms whose actions can be observed only under fluctuating environmental conditions remain to be elucidated. By focusing on molecular mechanisms that regulate fluctuating temporal and spatial environmental information, and the proteome diversification mechanisms supporting them, this research project will seek to elucidate the nature of plant environmental resilience, and revolutionize research into biological adaptation to the environment.

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

Researchers engaging in the Publicly Offered Research are expected to work toward the goal of this Research Area, which is to elucidate molecular mechanisms of plant response to fluctuating environmental systems, and to promote the research through active discussion and joint research with the Planned Research Group.

Superior research proposals are desired that fully reflect the target direction of the aforementioned Research Area, and take a bold approach to elucidating the molecular-level mechanisms by which plants demonstrate resilience under fluctuating and irregular environmental levels of a wide range of factors, including light, nutrients, temperature, and dryness. It is encouraged that proposals will embody diverse points of departure that leverage the strengths of each applicant, such as by complementing the goals of the Planned Research, or adopting a perspective that differs from that of the Planned Research. In addition, proposals are encouraged that address environmental adaptation mechanisms seen typically in compound environmental systems where multiple factors fluctuate simultaneously, or that are otherwise innovative with wider vision such as those address relationship between fluctuating environments and morphogenesis. As long as proposals seek ambitiously to elucidate response mechanisms with respect to fluctuating environmental systems, specific previous research achievement with respect to fluctuating and irregular environments is not necessarily required, but proposals are expected to encompass molecular mechanisms that operate under such environments.

With respect to research implementation of the Publicly Offered Research, the Research Support Center established in this Research Area (Transcription Start Point Sequencing Section, Next-generation Sequencing Section, Epigenomic Analysis Section, Mass Spectrometry Section, Comprehensive Protein Interaction Analysis Section, and Imaging Section) may be utilized. Furthermore, proposals for the Publicly Offered Research that involve extensive use of new research technologies complementing those of the Research Support Center, are encouraged. Innovative, interdisciplinary, and ambitious proposals capable of making major contributions to the elucidation of molecular mechanisms operating under fluctuating environmental systems from a broad plant science perspective are encouraged.

With respect to the three core research perspectives of this Research Area (spatial fluctuations in the environment; irregular temporal fluctuations in the environment; and proteome diversification mechanisms that support adaptive capacity in fluctuating temporal and spatial environments), the objective is that each Research Group, while having its respective major research focus, will promote mutually cooperative, organically collaborative research; and to encourage achievement of this objective, Research Groups shall not be strictly divided. As such, all applications for the Publicly Offered Research shall be attached to Research Group A01.

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	Multi-layered regulatory system of plant resilience under fluctuating environment	3	18

Research Outline of Research Areas

Inducing lifelong plasticity (iPlasticity) by brain rejuvenation: elucidation and manipulation of critical period mechanisms
http:// iplasticity.umin.jp/

Number of Research Area	:	20A303	Term of Project :	FY2020-2024
Head Investigator	:	KANO Masanobu		
Research Institution	:	The University of Tokyo, Graduate School of Medicine		

1. Details of Research Area

Brain function is greatly influenced by experience during postnatal development. Early in life, neural wiring is dramatically reorganized to reflect input from the environment in such "critical periods (CPs)" – restricted times during which plasticity of neuronal connectivity is particularly high. Salient CP experiences are etched into neural circuits that persist throughout life. For example, if juvenile animals are deprived of vision through one eye, that eye becomes virtually blind for the remainder of the animal's life if not corrected during their CP. It is then anticipated that CP reopening in adulthood might enable recovery of impaired neural function or the acquisition of additional brain functionality. Indeed, recent studies have demonstrated the possibility to advance or delay CP onset as well as to reopen CPs in adulthood. Furthermore, after brain injury, neural circuit plasticity seems to be transiently enhanced to facilitate functional recovery, analogous to a "CP" seen in normal development. In our Transformative Research Area, we therefore redefine CP as a limited time window of elevated capacity for plasticity and reorganization of neural circuits potentially throughout life. We aim to deepen our understanding of the development of brain and mind by pursuing basic mechanisms of CPs and to induce lifelong plasticity (iPlasticity) by brain rejuvenation.

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

This research area consists of nine teams of "Planned Research" that examine the mechanisms of CPs during development (Research Group A01) and that pursue the means to manipulate and reopen CPs as well as the mechanisms of CPs after brain injury (Research Group A02). Their research backgrounds include experimental neuroscience at molecular/cellular, neural circuit and system levels, as well as developmental psychology and computational neuroscience. For "Publicly Offered Research," we solicit innovative and unique proposals that will complement this "Planned Research" and contribute to both the elucidation of CP mechanisms and their manipulation and reopening.

For Research Group A01, we expect research proposals on neural circuit refinement during development using not only rodents but also unique animal models, such as *Drosophila*, zebra finch, zebrafish, medaka or monkey. We further welcome research proposals on human development and its disorders, such as amblyopia, hearing or language impairment and neuropsychiatric spectrum disorders (e.g., autism and schizophrenia).

For Research Group A02, we expect research proposals about the influence of attention, conscious awareness and social interaction on the development of brain function. We also welcome basic research proposals on the mechanisms of recovery from injury to the brain or peripheral nervous system, such as ischemia or traumatic mechanical injury, as well as related clinical research. Furthermore, we encourage proposals from researchers in computational neuroscience, robotics and artificial intelligence related to CPs.

Researchers who apply for "Publicly Offered Research" are expected to collaborate and interact closely with others in this research area to introduce novel research methods and accelerate CP research. We thus establish two categories of "Publicly Offered Research" with an upper limit of annual budget of 5 million and 3 million yen, respectively. For the research category of 5 million yen-upper limit, we expect proposals from researchers who already have research outcomes on CPs seeking to advance them substantially. For the category of 3 million yen-upper limit, we welcome challenging and exploratory proposals, particularly from young researchers, which may lead to breakthroughs in understanding, manipulation and reopening of CPs.

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	Mechanisms of neural circuit reorganization in CPs during development	5	9
A02	Manipulation and reopening of CPs and mechanisms of CPs after brain injury	3	15

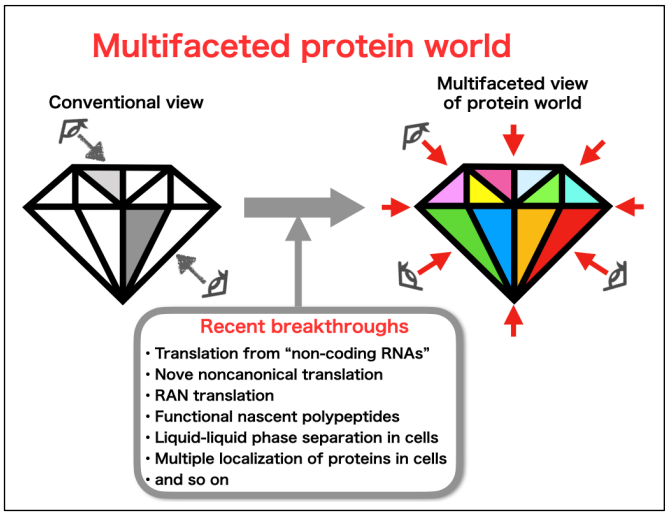
Research Outline of Research Areas

Multifaceted Proteins: Expanding and Transformative Protein World
http://proteins.jp

Number of Research Area	:	20A304	Term of Project :	FY2020-2024
Head Investigator	:	TAGUCHI Hideki		
Research Institution	:	Tokyo Institute of Technology, Institute of Innovative Research		

1. Details of Research Area

Over the past few years, the traditional view of proteins has been updated. Current protein science has been based on the premise that the ribosome synthesizes the polypeptide from the start codon to a stop codon of the open reading frame (ORF) in the mRNA. The completed polypeptide chain folds into a three-dimensional structure and then functions. However, recent breakthroughs based on discoveries and technological innovations have revealed novel aspects of protein science. For example, translation does not always start from the AUG codon of the annotated ORFs and terminate at the stop codon. The noncanonical translation is universal, with translation often starting at a codon other than AUG, stopping in the middle of translation elongation, or prematurely terminating. Noncanonical translation can also be disease-associated, as in the case of translation initiation not dependent on the AUG codon (RAN translation), which occurs in nucleotide repeats implicated in neurodegenerative diseases. Relatedly, accumulating evidence has shown that non-coding RNAs, initially named by a definition as not encoding proteins, are translated, producing physiologically relevant proteins. The repertoire of proteins comprising the proteomes is increasing due to innovations such as mass spectrometry-based proteomic analysis. It has also become clear that proteins do not always fold and function in a specific location or in one particular structural state. For example, some proteins have been found to exert their functions during translation. Some proteins localize to multiple organelles, and it is becoming clear that such multiple localization is directly related to their functions. Thus, many aspects of the "protein world" have not been previously appreciated. The protein world we recognize is expanding and changing. In other words, to truly understand proteins, it is necessary to question the conventional views on the translation, the repertoire, and modes of function, and to redefine the protein world from a new perspective. The aim of this research area is to establish a new paradigm for protein-related life science by clarifying the entity, molecular mechanism, physiological significance, and regulation of proteins while exploring the expanding and transformative protein world from a "multifaceted" perspective.



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

In the publicly offered research, we hope to promote close collaboration by proposing research fields that are not covered in the planned research and new methodologies to explore the multifaceted protein world. In addition, we encourage proposals from young or/and female investigators for the future of in vivo protein science. Examples of the research include the following, but are not limited to, and we look forward to receiving other innovative and challenging proposals. Note that proposals that only deal with the post-translational modifications such as phosphorylation, acetylation, and processing would not be considered.
[Examples] Molecular mechanisms of the noncanonical translation; Identification of previously unannotated ORF-derived translation products; Novel functions of nascent polypeptide chains; Expression mechanisms and physiological functions of proteins translated from non-coding RNAs; Protein folding regulated by synonymous mutations; Molecular mechanisms of repeat-associated non-AUG (RAN) translation, and analysis of RAN translation products; Physiological functions and physical properties of intrinsically disordered proteins including so-called low-complexity domains; Understanding of the multifaceted protein world through structural biology approaches; Physiological functions and molecular mechanisms of multiple protein localization in cells; Study on de novo designed proteins; Bioinformatics to develop the multifaceted protein world.

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	Multifaceted Proteins: Expanding and Transformative Protein World	4	15

Research Outline of Research Areas

Genome modality: understanding physical properties of the genome

https://www.genome-modality.com

Number of Research Area	:	20A305	Term of Project :	FY2020-2024
Head Investigator	:	NISHIYAMA Tomoko		
Research Institution	:	Nagoya University, Graduate School of Science		

1. Details of Research Area

Since the discovery of DNA double helix, genome study has been expanded and our knowledge of the genome was enormously progressed. The past genome researches have forced on its informational aspects, such as replication, repair, recombination, and division of the genomic information and further highlighted epigenetic regulations to explain genetic phenomena. On the other hand, physical properties of the DNA, such as stiffness, torsion, supercoiling and so on, have been much less understood, although it is the most important properties directly affecting the genome structure. In this project, we will focus on physical properties of genome/DNA to understand how the genome builds its structure and how it functions. We define "genome modality" as a multi-dimensional mode to organize the structure and function of the genome. We will uncover bona fide figure of the genome from the perspective of genome modality. To this end, we utilize methods of biochemistry, cell biology, genome science, and polymer physics and create new field to study "genome modality."

Objects of our Research Area are widely ranging from nanoscale DNA/nucleosome structures to organisms. Regulators of genome modality include nucleoplasmic/cytoplasmic environments, physical properties of proteins, and physicochemical reactions such as liquid-liquid phase separation, as well as physical properties of DNA. How do they regulate genome modality in each scale and define chromosome- or chromatin-dynamics, and how does dysfunction of the factors result in disorganization of cellular functions and causes diseases? We will address these questions from different approaches including theoretical physics, measurements of biophysical properties, reconstitutions, and genomics as well.

In the framework, there are 3 major categories as follows. A01: Physics of genome modality, where we uncover nanoscale genome structure and properties, and also build multi-scale theoretical model of the genome. A02: Mesoscale genome modality, where we focus on mesoscale structure including nucleosome, DNA loops, and chromatin fibers/domains, and figure out how these structures are formed. A03: Regulation of genome modality and disorders, where we address the questions how dysfunction of genome modality-regulating factors causes diseases.

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

In Publicly Offered Research, we invite experimental and theoretical studies uncovering genome structure in each scale, as well as studies developing multi-scale theory connecting A01 to A02 and A03. In A01, following studies are applicable; 1) Studies to understand nanoscale DNA physics, genome structure, and physics of the protein that regulates nanoscale DNA. 2) Studies to develop novel technologies to analyze DNA physics. 3) Studies to develop multi-scale theory for genome structure. These studies include, for instance, soft matter physics of DNA or genome, analyses for protein structure and intra-nuclear structure by using Cryo-EM or super resolution microscopy, modeling for chromatin/chromosome dynamics, theoretical or statistical analyses for Hi-C or chromatin dynamics. These studies dealing with nanoscale DNA physics are anticipated to develop into higher-order genome studies or cellular functions. In A02, studies to highlight mechanisms regulating mesoscale genome structure are applicable. These studies include analyses of higher-order chromatin structure, phase separation, physical properties of DNA/chromosomes/nucleus, and reconstitution system including single-molecule imaging of the proteins/DNAs regulating those mesoscale phenomena. In A03, genome structure studies in model/non-model organisms, studies uncovering relationship between genome structure and transcription, replication, or disorders, and studies to understand genome dynamics by using AI/machine learning are applicable.

In any of these Research Groups, we anticipate applications from young or female researchers. In the Research Proposal Document, "Theoretical research" or "Experimental research" should be declared.

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	Physics of genome modality	Theoretical research : 4 Experimental research : 5	5 11
A02	Meso-scale genome modality		
A03	Regulation of genome modality and disorders		

Research Outline of Research Areas

Material properties determine body shapes and their constructions
https:// www.architect-bio.info

Number of Research Area	:	20A306	Term of Project :	FY2020-2024
Head Investigator	:	INOUE Yasuhiro		
Research Institution	:	Kyoto University, Graduate School of Engineering		

1. Details of Research Area

When building a house, it is important to choose the appropriate building materials. This is because the physical properties of the building materials determine how they are manufactured and assembled, which in turn determines the final shape of the house. This factor can be linked to the morphogenesis of living organisms. Since cells alone are not rigid enough to build and maintain the physical body, support materials (calcium, collagen, chitin, etc.) are used. For building "bodies," cells must choose construction methods depending on materials. In this area, we aim to reveal the principle of morphogenesis by demonstrating a new paradigm for processing non-cellular materials. By viewing the essence of morphogenesis as "body = workpiece, cell = worker," we believe that mathematical modeling and large-scale simulation will become easier whereby the relationship between "macroscopic shape" and "cellular behavior" will become clearer at a stroke. In addition, since this paradigm is engineering itself, we can expect the application of industrial design technologies to living organisms, as well as the industrial application of discoveries obtained from living organisms.

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

In Planned Research, we have largely focused on the architecture of the "body" by processing "rod-like" and "planar" materials, but we believe that there would be many other phenomena in which body construction methods are used for morphogenesis. In the Publicly Offered Research, we expect proposals for experimental and theoretical approaches that are not found in Planned Research. Proposals that are complementary to Planned Research will also be considered.

Research group A01 calls for experimental themes that elucidate the principles of morphogenesis from the perspective of processing of non-cellular materials. Examples include the formation of vertebrate bones, arthropod exoskeletons, mollusk shells, echinoderm skeletons, and plant cell wall, as well as the processing of materials and cellular behavior in body construction methods, and cell-material interactions at the molecular and cellular levels. We also look forward to the discovery of unique phenomena that could revolutionize commonly accepted knowledge and the challenge of new research that begins to investigate their mechanism.

Research group A02 calls for theoretical studies that explain the morphogenesis of living organisms. There are several theories that can be applied to the understanding of body construction methods, even in fields that are different from the expertise of the Planned Research members. For example, we expect research proposals from these different fields, such as geometry and continuum mechanics, which deal with space and shape, and physics of self-organization through which structures are spontaneously formed. Also, from engineering, we expect proposals that have a high degree of commonality in terms of the processing of materials. Examples include issues that approach the formation of the skeleton from material mechanics and design engineering, and issues that approach the behavior of cell workers from control engineering and architecture.

Research group B01 calls for research proposals that promote this Research Area through the development of measurement and manipulation techniques for materials and cells, or research proposals that apply the principles of morphogenesis to engineering theory and technology development. The development of technologies that broadly support experimental research is expected to be an essential part of Publicly Offered Research to achieve the goals of this Research Area. For research topics at engineering applications, in addition to mimicking the shapes and functions of living organisms, we also expect new engineering applications by focusing on the principles and processes underlying biological morphogenesis.

The above examples of research topics are intended only as examples, and other research topics that address the processing of non-cellular materials are also eligible.

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 of Body Construction	experiment: 5 w/o experiment: 3	15
A02	Theory of Body Construction		5
B01	Engineering of Body Construction		

Research Outline of Research Areas

Deciphering and Manipulating Brain Dynamics for Emergence of Behaviour Change in Multidimensional Biology

http://braidyn-bc.jp

Number of Research Area	:	22A301	Term of Project :	FY2022-2026
Head Investigator	:	MATSUZAKI Masanori		
Research Institution	:	Graduate School of Medicine, The University of Tokyo		

1. Details of Research Area

In the process of human behavior change, multidimensional behavior changes, i.e., not only changes of the goal-directed behavior, but also changes such as facial movements that may be related to internal states such as motivation, conflict, and joy of success, often appear. This should be common not only to humans but also to many animal species, but it is difficult to measure detailed behavioral changes in small animals such as mice, and has been overlooked in many studies. However, with the rapid progress of AI technology in the past few years, it has become possible to extract with high precision the movements of a mouse's entire body, including its eyes, whiskers, tongue, jaw, and other facial features, from video data alone. In this Research area, we aim to "quantitatively" elucidate the relationship between multidimensional behavioral change and brain dynamics (brain information dynamics, which is neural activity that encodes information at a given moment, the dynamics of synaptic connections and molecular expression that define the neural activity, metacognition, and meta-learning). We will also investigate the principles by which the dynamics of related circuits operate to generate behavioral change, how this relationship differs between individuals and between healthy and diseased individuals, and whether direct manipulation of the dynamics of related circuits or behavioral interventions can promote the desired behavioral change.

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

Publicly Offered Research is invited for studies that fall under Research Groups A01 and A02. Research on the development of techniques and tools to measure and manipulate behavior change and brain dynamics with multidimensional high precision is also welcome. Target animals are not limited to mammals, but proposals on a variety of species are welcome. The administrative group plans to promote the openness of measurement, standardization, and analysis methods for multidimensional data, and we encourage research that actively uses these methods to analyze multidimensional data obtained. The administrative group also plans to acquire behavioral change data and brain dynamics data from mice and make them publicly available within the research area, and research based on the analysis of this data is also welcome. We seek participation from a wide variety of researchers, and in particular, we expect active application from young researchers.

In Research Group A01, "Wide Brain Dynamics of Behavior Change", we welcome proposals that measure or manipulate brain dynamics of behavior change, including social behavior change, metacognition that unconsciously defines behavior change, developmental and aging-related behavior change, and disease models, as well as research on computational models, simulations, and robotics that relate these studies and behavioral interventions. We welcome research that attempts to clarify the relationship between behavioral change and brain dynamics through behavioral interventions. The development of methods to standardize behavior change and brain dynamics among individuals and methods to extract interspecies commonalities are also welcome.

In Research Group A02, "Interactions between Wide and Local Brain Dynamics", we welcome proposals that relate not only local brain activity but also dynamics at the single cell level and single synapse level to multidimensional behavior change based on rigorous cellular construction, and model brain circuits. We welcome proposals that perform dimensional reduction of multidimensional data, and extract behavioral changes common to the task. We are also looking for research that takes a broad view of brain dynamics, including neuronal activity by action potentials, changes at the gene and protein levels, glial cell dynamics, autonomic and peripheral nerve dynamics, and brain dynamics related to immunity and inflammation, brain-gut interaction, etc., and acquires and analyzes such multidimensional data. We welcome highly motivated research that seeks to elucidate the mechanisms of behavioral change through strong collaboration by sharing and standardizing multidimensional data within 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
A01	Wide Brain Dynamics of Behavior Change	3	10
A02	Interactions between Wide and Local Brain Dynamics	3	10

Research Outline of Research Areas

Mechanical self-transformation of living systems
http://multicellular-mechanics.org

Number of Research Area	:	22A302	Term of Project :	FY2022-2026
Head Investigator	:	MOTEGI Fumio		
Research Institution	:	Institute for Genetic Medicine, Hokkaido University		

1. Details of Research Area

Elucidating the design principles of multicellular organisms is a fundamental challenge for researchers in the field of life science. Global order of an organism generally develops from local interactions among molecules and cells. Collectively, these interactions—referred to as *self-organization*—give rise to the emergent properties of fate, form, and function of cells, ultimately leading to morphogenesis of tissues and organs. Mechanical forces that cause changes in size, shape, and position of cells are integral to morphogenesis, and recent studies have highlighted the potential for mechanical forces to modulate cellular fate and function, suggesting the existence of a complex feedback between forces and cellular physiology.

This Research Area aims to develop new paradigms of morphogenesis through quantitative and holistic evaluation of how mechanical forces control emergent properties of self-organizing feedback in developing organisms. We will develop cutting-edge technologies to investigate mechanical processes and determine the magnitude and distribution of forces within cells and extracellular spaces. With this insight, we will understand how these forces elicit self-organizing feedback leading to progressive self-tuning transformation of multicellular systems over longer timescales.

Our Planned Research is composed of three Research Groups: A01 and A02 will elucidate mechanical self-organization in a diverse array of multicellular systems, while B01 will develop novel techniques in the measurement and analysis of mechanics, as well as theoretical methods to model and numerically simulate self-organization. Through close and organic collaborations within this multi-disciplinary group, we expect to reveal novel insights into mechanical self-organization and achieve a paradigm shift in the understanding of biological design principles.

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

We are calling for Publicly Offered Research that will conduct quantitative measurement and analysis of mechanical forces by incorporating and inventing new methods from physics and chemistry. In addition, we expect Publicly Offered Research to investigate the physiological functions of mechanics by manipulating forces within cells and tissues while employing theoretical analyses. We also seek Publicly Offered Research that will investigate a wide range of mechanical self-organization events. The projects will be expected to not only complement and strengthen the Planned Research, but also to take up the challenge of establishing unique systems and innovative techniques to further accelerate the overall research aims.

We expect the A03 Research Group to be aimed at investigating self-organization of unique biological systems including, but not limited to, "*ex vivo* analysis of tissue morphogenesis," "formation of organoids derived from differentiated stem cells," and "reconstituted systems by restructuring cellular interactions." These projects will improve our understanding of extracellular mechanics and reveal how multicellular systems sense and respond to external forces. In addition, we encourage challenging proposals involving, for example, the use of "unconventional model animals and plants" and investigating "nonbiological forces" (e.g., gravity, atmospheric or water pressure, and geomagnetism). A proposal targeting disease and aging would also be considered if it fits the overall objectives.

The B02 Research Group should aim at developing innovative techniques for the quantitative measurement, manipulation, and evaluation of various types of forces in multicellular systems. Particularly, proposals on the development of force biosensors and force-measuring technologies that can be applied to cell surfaces, nuclear membranes, and the lumenal surfaces of embryos or tubular organs are highly welcomed. We encourage the development of new technologies for the manipulation of in vivo forces such as optogenetics, material engineering, and MEMS technology. B02 also welcomes "dry" research proposals focused on theoretical investigation and mathematical modeling of mechanical self-organization.

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
A03	Research on mechanically self-organizing multi-cellular systems	5 (wet) 3 (dry)	12 5
B02	Development of techniques for measurement, manipulation, and theoretical analysis of mechanical self-organization		

Research Outline of Research Areas

Genomic dynamics underlying the plastic hermaphroditism in plants: the basis of exploratory reproductive adaptations.
http:// www.ige.tohoku.ac.jp/prg/flower/

Number of Research Area	:	22A303	Term of Project :	FY2022-2026
Head Investigator	:	AKAGI Takashi		
Research Institution	:	Graduate School of Environmental and Life Science, Okayama University		

1. Details of Research Area

Plants have evolved hermaphrodite flowers, in which male and female functions can coexist. Hermaphrodite flowers have allowed flexible bidirectional transitions between two contrasting reproductive systems, selfing and out-crossing, to explore a wide range of environments. In other words, in plants, multiple lineages have constantly but independently established various out-crossing systems from the ancestral hermaphroditism, while they could have disrupted them to reverse into selfing, as an adaptation. These recurrent "scrap and rebuild" would be a nature of evolution in plant reproductive systems.

The rapid scraping and rebuilding cycles in the plant reproductive systems have left strong traces on the evolution of their drivers. In turn, various evolutionary indexes in genomic information and protein interactions/conformations of these factors would be nice materials to visualize their history of exploration. Thus, plant reproductive biology is a challenging field to integrate conventional biology with various advanced information sciences, including recent AI technologies based on large-scale genomic and evolutionary information. In actuality, with a collaborative application of advanced information technologies and whole-genome sequencing across plant species, this research area preliminarily found that the establishment of hermaphrodite flowers and their plastic transitions into out-crossing systems had a fundamental impact on the history of plant reproduction.

In this research area, we will overlook the various transitions of plant reproductive strategies and find their potential links, with advanced information science platforms, integrating molecular dynamics simulation, genome evolution, structural biology, and chemical biology, etc. Our final aim is to elucidate "genome dynamics triggering exploratory reproductive adaptations, based on the plastic hermaphroditism", which goes beyond the conventional research frameworks.

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

We expect publicly offered research that can complement the topics not covered by the existing research groups, and can develop new technologies by collaborative integration with our technologies in the Research Support Centre for Interdisciplinary Science consisting of seven research units; information technology (AI) unit, genome and mathematical modeling unit, evolutionary biology unit, structural imaging unit, chemical and molecular dynamics unit, single-cell omics unit, and high-throughput genome-editing unit. We target research with various plant species, in plant physiology, biochemistry, molecular genetics, and genetic breeding. We also welcome proposals from emerging fields that integrate structural biology, molecular cell biology, evolutionary ecology, genomics and epigenomics, information science, structural systems science, and molecular dynamics simulation, etc.

This research area will adopt a total of approximately 15 publicly offered research proposals aiming for a synergistic effect through collaboration with the existing research groups. A two-stage research fund allocation will be planned, taking into account the research contents and environments. Approximately five research projects, with high relevance and performance in relation to our research area, and with the potential for drastic development, will be selected to allocate a budget of JPY 7,000,000/year. Approximately 10 projects will be selected for exploratory topics, including by young researchers, to allocate a budget of JPY 4,500,000/year.

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	Genomic dynamics underlying the plastic hermaphroditism in plants: the basis of exploratory reproductive adaptations	7 4.5	5 10

Research Outline of Research Areas

Reevaluation of self recognition by immune system to decipher its physiological advantages and pathological risk
https://self-ref-imm-percept.biken.osaka-u.ac.jp

Number of Research Area	:	22A304	Term of Project :	FY2022-2026
Head Investigator	:	YAMASAKI Sho		
Research Institution	:	Osaka University, Research Institute for Microbial Diseases		

1. Details of Research Area

Immunology has become an extremely familiar field of science to the general public. We all now appreciate that antibody medicine has opened up new avenues for the treatment of various diseases and that vaccines have become common throughout the world in a short period of time. Thus, immunology is a scientific field that is directly related to human diseases and the results of basic research have directly led to contributions to society. However, there remain many immune diseases and phenomena that have not been elucidated. To address this, we need a systematic approach based on new technologies and perspectives that go beyond conventional views.

The immune network was considered to be a system that monitors exclusively "outward", such as pathogens. However, recent studies have revealed that many immune sensors are also looking "inward" to detect perturbations derived from external/internal stresses by sensing alteration of self molecules, such as proteins, nucleic acids, lipids, sugar chains, metabolites, etc. Thus, various physiological processes which utilize these organic substances can be directly or indirectly linked to the immune system. Elucidating the mechanisms of self-recognition by immune sensors will advance our understanding of physiological responses and diseases that are not currently linked to the immune system.

Hence, we propose a new concept "self-referential immune perception" that reevaluates self-recognition by immune system to decipher its physiological advantages and pathological risk. Our goal is to advance scientific understanding of currently unsolved immune-related and broader physiological responses. We aim to (1) identify self-components recognized by immune sensors using cutting-edge technologies, (2) clarify the molecular basis of the self-protective response inherent in the immune system by focusing on its physiological and pathological sides, and (3) develop a methodology that enables the prediction of health status by utilizing the self-interactome database established in this research area.

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

The open call for research proposals will be based on the concept mentioned above that complement or greatly develop our research activities. A total of approximately 25 research proposals of up to 3 million yen per single year are invited under A01 and A02. We welcome research proposals focusing on the beneficial responses caused by self-recognition, and do not limit the field related to immune responses and diseases. We also expect to have challenging projects that aim to elucidate various physiological responses and disease mechanisms in a broad range of fields. The definition of "immune sensor" in our research area is "a receptor or related molecule that is known to or expected to recognize "foreign" substances. There is no restriction for target organisms unless it does not fit our research concept. We are particularly interested in challenging proposals from young researchers, female researchers, and researchers currently studying abroad who are eligible to apply.

A01: Molecular basis of self-recognition and function

We aim for the strategic identification of self-components recognized by various immune sensors. We expect research proposals that go beyond identification of such self-components and aim to elucidate the beneficial biological responses. We also expect basic research aiming at establishing new technologies for molecular interaction, molecular identification, and mathematical/informatics analysis. Proposals for innovative methodologies that integrate the data accumulating in this field are also welcome. Research projects that focus solely on pathogen recognition will not be considered.

A02: Adventagous or pathophysiological responses triggered by self-recognition

We expect research proposals that address the physiological advantages of self-recognition by immune sensors straightforwardly, or through analysis of the detrimental effects caused by its dysregulation. This research may include clinical approaches using human samples. One of our final goals is to create a system to monitor and predict our health status using our interactome database. Thus, research proposals aiming to develop new nonlinear data analysis, machine learning, and multivariate analysis are welcome.

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 basis of self-recognition and function	3	25
A02	Physiological or pathogenic responses triggered by self-recognition		

Research Outline of Research Areas

Analysis and synthesis of deep SHITSUKAN information in the real world
https:// www.shitsukan.jp/deep/

Number of Research Area	:	20A401	Term of Project :	FY2020-2024
Head Investigator	:	NISHIDA Shin'ya		
Research Institution	:	Graduate School of Informatics, Kyoto University		

1. Details of Research Area

The purpose of this Research Area is to develop a comprehensive understanding of SHITSUKAN, a human ability to estimate the physical properties, materials, states and sensory values of things and events. SHITSUKAN is closely related to the perception of reality, and an important research topic for informatics, neuroscience, and industry. We have learned from our past research that we should realize not only the superficial SHITSUKAN processing that links the sensory information to SHITSUKAN attribute variables and/or linguistic labels, but also the underlying hidden processing that we call Deep SHITSUKAN. Specifically, what we consider Deep SHITSUKAN are: (A) The process of calculating the ecological values of things or events from SHITSUKAN, including the subsequent process to induce emotional body responses. (B) The process of constructing action-predictive models of the external world in the brain from SHITSUKAN. (C) Processes in which SHITSUKAN processing is influenced by the characteristics of the individuals, such as age, brain dysfunction, and personal experiences. (D) The process of determining what is real and fake through multimodal sensory information of actual objects. Based on this idea, we aim to deepen our understanding of SHITSUKAN by scientifically studying human Deep SHITSUKAN processing, and developing innovative Deep SHITSUKAN technologies. In the Planned Research, we have three Research Groups. In A01 " SHITSUKAN Machine Recognition," advanced research in computer vision will develop technologies that can recognize Deep SHITSUKAN like humans do, and understand differences in Deep SHITSUKAN between real and fake objects. In B01 "SHITSUKAN Biological Recognition," a wide range of research in cognitive and neuro sciences will elucidate Deep SHITSUKAN processing by humans and animals, and improve the quality of human living environments. In C01 "SHITSUKAN Generation," cutting-edge research in augmented reality and media art will develop technologies to manipulate Deep SHITSUKAN in the real world as one wishes, and produce experiences that are indistinguishable from, or superior to, the real ones.

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

According to the differences in research approaches, we divide Publicly Offered Research into two groups: D01 "Information Science and Technology for Deep SHITSUKAN" and D02 "Cognitive and Neuro Sciences for Deep SHITSUKAN" (Figure 1). In either group, we will welcome such research that reinforces and/or complements the themes of Planned Research as follows: (a) Research to develop the technologies for recognition and generation of Deep SHITSUKAN in vision, touch, hearing, taste, smell, language, and/or emotion; (b) Research to understand the neural mechanisms of sensory, linguistic, and/or emotional SHITSUKAN processing. Basic neuroscience research is welcome given it has a tight connection with SHITSUKAN processing; (c) Research on how the human brain represents the external world to produce Deep SHITSUKAN; (d) Research on the relationship between body and SHITSUKAN, such as behavioral actions induced by SHITSUKAN; (e) Theoretical research on sensory SHITSUKAN information, such as SHITSUKAN features acquired via deep learning; (f) Analysis and creation of artistic expression based on scientific understanding of SHITSUKAN; (g) Research in anthropology, archaeology, art history, etc. that leads to an understanding of the origin of human SHITSUKAN; (h) Research on individual differences in Deep SHITSUKAN caused by ageing, evolution, genetic characteristics, culture, etc.; (i) Research aiming for social implementation of SHITSUKAN science and technologies; and (j) Research on Deep SHITSUKAN based on completely new ideas. We encourage applications from female and young researchers.

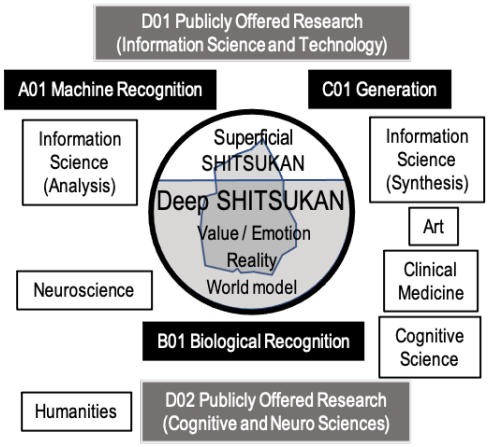


Figure 1: Research formation

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
D01	Information Science and Technology for Deep SHITSUKAN	3	15
D02	Cognitive and Neuro Sciences for Deep SHITSUKAN	3	15

Research Outline of Research Areas

Creation and Organization of Innovative Algorithmic Foundations for Social Advancement
https://www.afsa.jp/en/

Number of Research Area	:	20A402	Term of Project :	FY2020-2024
Head Investigator	:	MINATO Shin-ichi		
Research Institution	:	Graduate School of Informatics, Kyoto University		

1. Details of Research Area

Algorithms, the theories, techniques and logical procedures of information processing, perform a key part of the recent sophisticated information society. Our project aims to develop and organize state-of-the-art techniques for algorithms. The results will be provided as open academic resources for many scientists and engineers in various fields, to be utilized for social advancement. Based on the recent drastic progress of computation power, upcoming innovative computation devices, and new concepts from social sense of values, we will reformulate and organize practical computation models to bridge theory and practice. We will also create and organize computational theories and state-of-the-art techniques for algorithms, such as discrete structure manipulation, constraint satisfaction problem solving, enumeration, discrete optimization, quantum computation theory, etc. Our results will be presented as the innovative Algorithmic Foundations for Social Advancement (AFSA). More detailed information will be shown in our homepage.

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

Our research area AFSA aims to activate the community of young and mid-career researchers who are interested in algorithm techniques and theoretical computer science, in order to output results utilized for social advancement. We will call for proposals of research projects contributing to the following research group activities, based on the applicant's own special theoretical knowledge and/or technical skill.

A01: This group discusses and formulates a set of new problems to be considered in the future society. We welcome researchers who are widely interested in the problems in society, industry, and science, and try to solve some by algorithmic approaches.

A02: This group implements the algorithms proposed in our project and organizes the algorithmic foundations for social advancement. We expect researchers to provide an interface between theoretical researchers and application engineers.

B01: By the collaboration of theoretical researchers and application engineers, this group tackles how to deal with exponentially large-scale discrete structures. We expect proposals of enumeration, graph algorithms, text processing, SAT solving, etc.

B02: This group aims to develop efficient algorithms for solving very large-scale problems required in our society. We call for proposals of basic research topics in the areas of discrete mathematics, combinatorial optimization, machine learning, etc.

B03: Combining the knowledge of classical computation and new quantum models, this group constructs useful algorithmic foundations to implement practically efficient quantum computers connected to conventional systems. We expect proposals on theoretical analysis of quantum computing and practical usage of quantum computers.

B04: This group investigates important problems in theoretical computer science, such as performance assurance, preserving fairness and stability, new computation models and design methodologies for social requirements. We call for proposals not limited to those but more widely related topics in theoretical computer science.

Each project proposal must belong to one of the above research groups. We hope that each project will take part in not only one research group but also collaborating with one or more other research groups.

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	New Problem Formulation on Next Generation Informatics and Researches on their Algorithms	2	17
A02	Socially-Oriented Algorithm Implementation		
B01	Algorithmic Foundations Based on Large-Scale Discrete Structures		
B02	New Computational Models for Algorithms and Discrete Optimization		
B03	Creation of Innovative Foundations to Bridge Theory and Practice of Quantum Algorithms		
B04	Exploration and Development of the Basic Theory of Algorithms		

Research Outline of Research Areas

Molecular Cybernetics - Development of Minimal Artificial Brain by the Power of Chemistry
http://molcyber.org

Number of Research Area	:	20A403	Term of Project :	FY2020-2024
Head Investigator	:	MURATA Satoshi		
Research Institution	:	Graduate School of Engineering, Tohoku University		

1. Details of Research Area

The area of Molecular Cybernetics inherits the basic philosophy of the Innovative Area "Molecular Robotics" (2012-17), which focused on "how to assemble individual molecular materials and molecular devices as a system," and challenges the development of methodologies for constructing larger-scale molecular systems. In particular, we construct systems with complex functions by implementing molecules with different functions, such as sensors (S), processors (P), and actuators (A), into artificial cells (compartments), such as liposomes, and then combining these compartments. The methodology studied here, which can be called" molecular systems engineering", differs from that of conventional robots and computers, in which components are wired together. All functions are assembled bottom-up as reactions between molecules in solution.

This Research Area consists of four planned, and open research projects to realize: integration, information transfer, learning, and deployment. The planned research projects aim to demonstrate the functions of S, P, and A, and then to demonstrate a simple learning function (Pavlovian conditional reflex) by joining these three types of artificial cells in a microfluidic device.

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

The Area invites research proposals from a wide range of perspectives related to the following five topics. Particularly, we welcome active proposals from young researchers and female researchers.

R01 Realization of new functions: nucleic acids, artificial nucleic acids, proteins, enzymes, peptides, lipids, molecular machines, molecular devices for information transfer through lipid membranes, molecular motors (microtubules/kinesin/dynein, actin/myosin, etc.), molecular design and synthesis, cell-free transcription and replication, optical control of reactions, reaction acceleration, hydrogels, and nanostructures (DNA Origami, etc.), lipid membrane properties, membrane deformation, MD simulation of membranes, coarse-grained simulation, biophysics, synthetic biology, systems biology, evolutionary molecular engineering, etc.
R02 Innovative Theory Pioneering: autonomous distributed systems, emergent systems, control theory, artificial intelligence, machine learning, neural nets, DNA computers, soft computing, reservoir computing, chemical reaction networks, complex networks, self-organization, bioinformatics, artificial life, etc.
R03 Molecular system implementation, measurement and control technology: artificial cell engineering, liposome fabrication, microfluidic devices, micro-mechanical measurement, automated experimental systems, remote experimental systems, etc.
R04 Pioneering Applications: cancer diagnosis, DDS, regenerative medicine, soft materials, biomaterials, nanobiology, swarm robots, computational science, etc.
R05 Humanities and Social Science Research: ELSI, RRI, history of Cybernetics, futures research, STEM, science art, etc.

Support for Accepted Researchers: Participants of the Research Area can use custom synthesis services for chemically modified DNA and other nucleic acids, and peptides, as well as various AFMs and super-resolution microscopes at the Single-Molecule Observation Center, and evaluation systems using microfluidic devices at the System Integration Center. In addition, the Area will hold workshops on technologies that should be shared within the Area, such as molecular computing and liposome production methods, and will provide support for researchers of child-rearing age by providing a childcare room during the Area's meetings.

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
R01	Realization of new functions	4	25
R02	Innovative Theory Pioneering		
R03	Molecular system implementation, measurement and control technology		
R04	Pioneering Applications		
R05	Humanities and Social Science Research		

Research Outline of Research Areas

Photonic Computing Highlighting Ultimate Nature of Light
https://sites.google.com/view/photoniccomputing/

Number of Research Area	:	22A401	Term of Project :	FY2022-2026
Head Investigator	:	NARUSE Makoto		
Research Institution	:	The University of Tokyo, Graduate School of Information Science and Technology		

1. Details of Research Area

Optics and photonics are expected to contribute to next-generation computing to accommodate massively growing information processing demands and emerging applications. This Research Area in Grant-in-Aid for Transformative Research Areas (A) highlights the ultimate physical nature of light and photonic technologies—notably by high bandwidth, energy efficiency, multiplexing attributes, interfacing ability to real world environments—for computing.

There are three principal approaches in this Research Area. The first is to create novel computing mechanisms utilizing the ultimate physical limit of light (Research Group B). The second is to develop novel substrates or devices to uncover the potential capability of light for computing (Research Group C). The third is to resolve architectural limits that prevent the successful utilization of light in computing (Research Group A). This Research Area seeks to intertwine various scientific disciplines, including optics, photonics, physics, informatics, computer science, among others, to establish an exciting emerging field of research represented by the title: *Photonic computing highlighting ultimate nature of light*.

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

This Research Area calls for proposals as Publicly Offered Research in all aspects of the initiative ranging from Research Groups A, B, and C that excel in originality and novelty to meet the fundamental concept of this Research Area entitled *Photonic computing highlighting ultimate nature of light*. The interdisciplinary research of photonics and computing has been extensively studied recently, including the transformation to industry on optical hardware accelerators. Photonic computing research is entering a new era, expecting innovative fundamental research for future information processing infrastructure. The aim and role of the Publicly Offered Research of the Research Area are to contribute to building solid foundations of photonic computing as well as extending applications.

The Publicly Offered Research's duration and budget are, however, limited. Therefore, the proposals are highly expected to excel in their originality and novelty while highlighting their unique perspectives, principles, or technologies involving optics and photonics for contributing to innovative computing. In particular, the proposals are expected to focus on one of the following perspectives of Research Groups in this Research Area. Research Group A03, entitled *System architecture to benefit from ultimate nature of light*, sheds light on architectural limitations that prevent the successful utilization of photonics for computing, which are related to the fields of computer sciences, application systems, mathematical sciences, among others. Research Group B04, entitled *Computing mechanism to exploit ultimate nature of light*, focuses on realizing novel computing mechanisms based on the unique physical attributes of photons. The relevant field of research includes information physics, information photonics, quantum sciences, and nonlinear systems. Research Group C03, entitled *Device fundamentals to benefit from ultimate nature of light*, encompasses devices and materials to uncover the potential of light for computing. The related field of research includes optical devices, electronic devices, nanotechnologies, and material sciences. In the meantime, all research proposals are expected to include discussions regarding their future applications, since this Research Area intends to contribute to future information processing and computing paradigms through optics and photonics. Note that this request does *not* mean that application development is mandatory. The Research Area asks all proposals to consider the relevance to applications and other related research.

The interdisciplinarity of this Research Area is particularly characteristic, which includes, but is not limited to, optical science, information science, computer science, electrical engineering, communications engineering, mathematical science, and material science, among others. The applications of photonic computing cover a variety of information and communications technologies, but other scenarios may be considered. Indeed, the extension, expansion, and deepening of the photonic computing research domains is one of the important aims of this Research Area. Cultivating and enriching the network of researchers and developing young researchers is additional value to be accomplished through Publicly Offered 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
A03	System architecture to benefit from ultimate nature of light	2.5	10
B04	Computing mechanism to exploit ultimate nature of light	6	5
C03	Device fundamentals to benefit from ultimate nature of light		

Research Outline of Research Areas

Macro coastal oceanography: integrated simulation for the material dynamics from the land through the open ocean
https://macrocoast.jp/

Number of Research Area	:	22A402	Term of Project :	FY2022-2026
Head Investigator	:	HASUMI Hiroyasu		
Research Institution	:	The University of Tokyo, Atmosphere and Ocean Research Institute		

1. Details of Research Area

The coastal zone environment is changing due to human activities. Global scale changes in the ocean associated with global warming affect the coastal zone, while the supply of various anthropogenic substances is increasing from the land. Rivers, which transport material from the land to the coastal zone, are also affected by global warming. For example, the intensity and frequency of flooding discharge are increasing in Japan. There is an increasing need for prediction and impact assessment for the coastal zone. Still, the current simulations cannot meet such a need because the influences from the land and the open ocean are not sufficiently considered. This Research Area aims to transform the coastal oceanography into a "macro"-scale framework to properly include the influences from the land and the open ocean. Thereby, we intend to realize such a simulation that can properly predict the ongoing changes in the coastal zone and assess the impact of such changes.

This Research Area focuses specifically on the dynamics of nutrients in the coastal zone around Japan. Nutrients are supplied to the coastal zone from the land and the deep open ocean, and both are rapidly changing under human influence. We aim to understand and predict it by properly considering its interaction with the land and the open ocean. One of our goals (the "milestone" of this Research Area) is to comprehensively answer the classical question: Which of the land and the open ocean is dominant in the supply of nutrients that sustains the biological production in the coastal zone?

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

Planned Research is grouped into A (focused on the coastal zone), B (focused on the open ocean), and C (focused on the land). Group A comprises A01 which is focused on physical processes, A02 which is focused on material dynamics, A03 which is focused on ecosystem processes, and A04 which develops an integrated simulation system from the land through the open ocean with an emphasis on the coastal zone. Group B includes B01 which is targeted at the subpolar region, B02 which is targeted at the subtropical region, and B03 which conducts simulations for the entire North Pacific. C01 deals with the terrestrial nutrient dynamics with a focus on its influence on the ocean. We expect Publicly Offered Research to complement and extend Planned Research and to contribute to the above-mentioned integrated simulation system and milestone. We welcome proposals collaborating with multiple groups or targeted at coastal ecosystems. More specific themes are as follows:

A01, A02, A03: Observational research with similar goals to Planned Research but in different regions (A01: Sanriku coast and Tone River estuary; A02: Bays of Tokyo, Ise, and Osaka; A03: to the east of Hokkaido). Observation of principal rivers and spatiotemporal analysis of freshwater and material flux in the target regions of A01. Observational research collaborating with A01 or A02 for the processes of currents and mixing, water mass transformation, and biological production. Observational research collaborating with A03 for quantification of nutrients and iron supply from the land. Research for utilization of nutrients supplied from the land and the open ocean by coastal ecosystems. **A04**: Model development contributing to the integrated modeling system, especially targeted at the processes of suspended particles (aggregation, sedimentation, and resuspension) and mixing in the sea surface layer. **B01, B02**: Research on physical, chemical, and biological processes in the exchange of material between the coastal zone and the open ocean by especially focusing on large-scale currents (such as the Kuroshio, the Oyashio, the Tsushima Current, and the Tsugaru Warm Current). Discrimination and quantification of the origin of nutrients therein. **B03**: Construction of datasets of nutrients in the North Pacific. Development of assimilation methods of such data. **C01**: Model development and validation for riverine transport of material. Construction of databases integrating various water quality data for rivers. Intercomparison of models and datasets for massive discharge of rivers.

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	Flow variability and material dispersion in the coastal zone		
A02	Dynamics of land-origin material in the coastal zone		
A03	Utilization of land-origin nutrients by coastal ecosystem		
A04	Land-coastal zone-open ocean exchange of freshwater and material	5	6
B01	Material exchange between the coastal zone and the subpolar ocean	2	10
B02	Material exchange between the coastal zone and the Kuroshio region		
B03	Inverse modeling for coastal zone-open ocean interaction		
C01	Terrestrial material dynamics and its influence on the ocean		

Attached Table 3

List of Research Areas whose Selected Period will End in FY2022 in Grants-inAid 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 peer review system, reviewers must not disclose the content of the Research Proposal Documents or any other information, in whatever form, that they learn in the course of the review to any other 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)(Publicly Offered Research), 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 FY2023 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 page 92).

(3) Notification of Screening Results

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

1) The council will issue a notification to the research institution on whether the research project has been selected or not, based on the results of the review. (Planned for late February)

2) To Principal Investigator whose proposals have not been adopted and who wish to request for disclosure of the review results at the first stage of the review, MEXT is ready to disclose the approximate ranking per the Basic Section, the score (average score), and the “standard-format opinion” via the electronic application system. (Planned for April)

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 either 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 page 71).

(i) **At the time of the proposal submission, a researcher needs to have been approved by his/her research institution(*) 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.**

< **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 or 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.)

(*): 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)

(Reference) Requirements that the research institution must meet (see page 97):

< 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.**

<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 as 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 age 39 or under or less than 8 years after Ph.D. acquisition as of April 1 of each fiscal year, 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 is no longer age 39 or under or less than 8 years after Ph.D. acquisition. 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)

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)

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

<Important Point 2>

JSPS Research Fellows (DC) and JSPS International Research Fellows are not eligible for KAKENHI application. In general, graduate students are not eligible either (See the notes below for exceptions.). Therefore, an individual with the status of student in a research institution is not eligible even if he/she also holds a position to conduct research in that or other research institution.

(Note 1) 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.

(Note 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.

(i) Publicly Offered Research of Transformative Research Areas (A)(Publicly Offered Research)

(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 (A)) (Excluding CPD)

<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 itis not appropriate to let the individual conduct the said research activity as a part of his/her work within the institution, the 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 document proposal 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 FY2023 Call for Proposals in this category is scheduled for March 2023, and the provisional conditions of the eligibility for application is as follows:

(A) An individual who obtains eligibility for KAKENHI application on or after October 1, 2022, 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 FY2022.

(*) FY2023 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 2023.)

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) 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 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 "Table of Restriction on Parallel Grants Application/Receipt" (see pages 77-80).

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 page 7), 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 FY2023 intends to submit new research proposal as PI the following rules (cases A to D) of restrictions on parallel grant application /receipt apply.

A 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. 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 Publicly Offered Research of “Grant-in Aid for Scientific Research for Transformative Research Areas” and “Grant-in-Aid for Scientific Research on Innovative Areas” are accepted (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 FY2023 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 FY2023 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 FY2023 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.

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" mentioned on page 8.

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 "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.

Example： A researcher cannot apply for Grant-in-Aid for Scientific Research (B) as PI after applying for Grant-in-Aid for Scientific Research (A) as PI (even if he/she withdraws the application for Grant-in-Aid for Scientific Research (A)).

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 "Table of Restrictions on Parallel Grant Application/Receipt," the participation in 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- FY2023 (MEXT)"). The following points should be noted

A The PI of the research projects of the "Transformative Research Areas" and of the "Administrative Group" of the "Scientific Research on Innovative Areas (Research in a Proposed Research Area)" 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-I of the of the research projects of the "Transformative Research Areas" and of the "Administrative Group" of the "Scientific Research on Innovative Areas (Research in a Proposed Research Area)" 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 "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 FY2023" for the research categories for which the call for proposals is announced by the JSPS, applicants should refer to the ""Research categories for which JSPS organizes a call for proposals" in the "Table of Restrictions on Parallel Grant Application/Receipt."

vii)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 next 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.

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.

viii) When a PI of an on-going project of KAKENHI (Multi-year Fund) or KAKENHI (Partial 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.

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.

ix) When an individual who is a JSPS Research Fellow (SPD, PD, RPD, or CPD) has obtained the eligibility for KAKENHI application at the research institution which he/she has registered as his/her host research institution, he/she can submit a research proposal in the following research categories; the "Publicly Offered Research" of the "Transformative Research Areas (A)(Publicly Offered Research)," "Scientific Research (B/C)," "Challenging Research (Exploratory)," "Early-Career Scientists" and "Fund for the Promotion of Joint International Research (Fostering Joint International Research (A)(excluding CPD)."

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 "Table of Restriction on Parallel Grant Application/Receipt,"even if he/she does not receive the "Grant-in-Aid for JSPS Fellows."

x) If an individual is granted his/her application for "Planned Research in Transformative Research Areas (A/B) (including research projects of "Administrative Group")", 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 rule 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 rule of restrictions on parallel grant application/receipt. The applicant should check against such possibility before submitting the research proposal document.

<u>There are no restrictions on parallel grant application/receipt between KAKENHI and other competitive funding schemes.</u> Still, applicants should read the description in the column "Elimination of Unreasonable Duplication and/or Excessive Overconcentration in the Grant Allocation" on page 8.

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 FY2023(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								Pioneering	Exploratory
						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			
				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
Scientific Research on Innovative Areas (Research in a proposed research area)	Administrative group*1	Continued	PI	–	▲					▲	▲				▲		▲	▲					▲	
	Planned research	Continued	PI	–	▲					▲	▲				▲		□						▲	
		Continued	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	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 research 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 or Scientific Research on Innovative Areas (Research in a Proposed Research Area) 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 The "International Activities Supporting Group" (No new proposals have been called since FY2016.) has the same restrictions on duplications as the "Administrative Group."

*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 FY2023 (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
Scientific Research on Innovative Areas (Research in a proposed research area)	Administrative group*1	Continued	PI		▲				▲				▲	▲						
	Planned research	Continued	PI	—	▲				▲				▲							
		Continued	PI	—																
Transformative Research Areas (A)	Administrative group	New Proposal	PI		×	—		—	×				×	×						
		Continued	PI		▲				▲				▲	▲						
	Planned research	New Proposal	PI		×		—	—	×				×							
		Continued	PI		▲			—	▲				▲							
	Publicly offered research	New Proposal						—												
		Continued	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).
Shaded cell: There are not cases that the researcher apply for both research projects mentioned in Column A and Column I

*1 The "International Activities Supporting Group" (No new proposals have been called since FY2016.) has the same restrictions on duplications as the "Administrative Group."
*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."

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 FY2023(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							Pioneering	Exploratory
		New Research Area		Continued				New Research Area		Continued									
		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			General	General	General			
		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
Scientific Research on Innovative Areas (Research in a proposed research area) / Planned research / New Proposal	Co-I					×					×	□							
Scientific Research on Innovative Areas (Research in a proposed research area) / Planned research / Continued	Co-I					▲					▲	□							
Transformative Research Areas (A) / Planned research / New Proposal	Co-I		—	—	—	×					×	□							
Transformative Research Areas (A) / Planned research / Continued	Co-I			—	—	▲					▲	□							
Transformative Research Areas (B) / Planned research / New Proposal	Co-I					×			—	—	×	□							
Transformative Research Areas (B) / Planned research / 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 FY2023(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 / Continued Research Area	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						Pioneering	Exploratory
				New Research Area		Continued		New Research Area		Continued								
		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			General	General	General		
		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**
Scientific Research on Innovative Areas (Research in a proposed research area) / Planned research / New Proposal	Co-I	—	×				×				×							
Scientific Research on Innovative Areas (Research in a proposed research area) / Planned research / Continued	Co-I	—	▲				▲				▲							
Transformative Research Areas (A) / Planned research / New Proposal	Co-I		×		—	—	×				×							
Transformative Research Areas (A) / Planned research / Continued	Co-I		▲			—	▲				▲							
Transformative Research Areas (B) / Planned research / New Proposal	Co-I		×				×		—	—	×							
Transformative Research Areas (B) / Planned research / Continued	Co-I		▲				▲			—	▲							

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 B.
Shaded cell: There are not 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 FY2023 (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)			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)		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 FY2023 (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	Scientific Research on Innovative Areas (Research in a proposed research area)	Transformative Research Areas (A)	Transformative Research Areas (B)
				Planned Research*1	Planned Research*1	Planned Research*1
				New Proposal	New Proposal	New Proposal
				Co-I	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 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 planning a research project, applicants should consider the feasibility based on domestic and international conditions.

In addition, 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.

(1) Revision of the Research Proposal Document

The forms to be uploaded as an attached file in the Research Proposal Document has been amended. Please read the Supplement to the Application Procedures “Forms/Procedures for Preparing and Entering a Research Proposal Document” carefully.

(2) Verification of the Eligibility to Apply

When applying for “Transformative Research Areas (A)(Publicly Offered Research)”, the applicant should carefully verify the following contents.

For submission of a research proposal, the applicant has to complete the relevant Research Proposal Document.
The applicant has to 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.
The details of preparation and application methods of application documents are as follows.

Preparing the Research Proposal Document

When applying, applicants need to access the Electronic Application System using the ID and password for e-Rad and prepare the application documents.

1) Preparation of the Research Proposal Document by Principal Investigator

The Principal Investigator should prepare the Research Proposal Document based on "Procedures for Preparing and Entering Application Information (to be entered on the Website)" and "Procedures for Preparing and Entering a Research Proposal Document" for the specific research

category he or she is applying for.

A Research Proposal Document consists of the following two parts:

Items to be entered in the Website :

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

Forms to be uploaded :

A part containing such entries as “Research Plan, Research Methods” to be prepared by downloading the form from the “Grants-in-Aid for Scientific Research-KAKENHI-” page within the MEXT website (*), 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.**)

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

Research category	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 (Research expenses, 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.

2) Submission of the Research Proposal Document

The research institution to which the Principal Investigator belongs collects and submits the Research Proposal Documents.

Therefore, the Principal Investigators should submit (send) their application documents to the research institution to which they belong by the deadline designated by the research institution in question. Moreover, when submitting (sending) the documents, the applicant should sufficiently verify the contents of the prepared Research Proposal Document (PDF file), and subsequently, perform the "check completed and submission" process. (This means that they should submit the Research Proposal Document (PDF file) to the research institution to which they belong.)

(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 budget less than 100,000 yen.

2. Eligibility of the Project Members

The PI (see page 86) may organize a research team with appropriate combination of Research Collaborators(s) (see page 87), 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.)

To be a Research Collaborators, registration to the e-Rad system is not a requirement.

< Requirements >

1) **The applicant must be an individual belonging to a research institution with a job assignment including 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.)
2) **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.)
3) **The applicant must not be a graduate student or any other categories of student.** (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 ineligible.)

(*): 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" (issued by the MEXT)

(Reference) Requirements that the research institution must meet (see page 95):

< 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 researcher staffs.

(Note 1)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.

(i) Publicly Offered Research of Transformative Research Areas (A)(Publicly Offered Research)
(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 (A)) (Excluding CPD)

(Note 2) JSPS Research Fellows (DC), Foreign JSPS Fellows and graduate students (or students of any other category) cannot be a PI or CO-I of a KAKENHI project.

<Important Point 1>

KAKENHI employee is generally bound by his/her employment contract to concentrate on the research work relevant to the employment-related work specified in it. 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 a KAKENHI employee 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, he/she can submit his/her own KAKENHI proposal, on the condition that the following points are verified by his/her research institution. In this case, he/she can apply for other KAKENHI project(s) as PI.

- 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 the KAKENHI employee's 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 an "early-career scientist" employed with KAKENHI]

A young researcher (*) who is employed with KAKENHI funds (KAKENHI employee) and meets the following conditions, may conduct his/her 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.

(1) The young researcher desires on his/her own will to conduct his/her own research.
(2) The PI or Co-I (the employer of the young researcher) decides 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 decision.
(3) The PI or Co-I judges that the efforts to be spared by the young researcher to the said research is 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 age 39 or under or less than 8 years after Ph.D. acquisition as of April 1 of each fiscal year, and whose job assignment includes research activities. When applying for Grants-in-Aid for Scientific Research (KAKENHI) 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 is no longer age 39 or under or less than 8 years after Ph.D. acquisition. 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 introduction of self-motivated research activities by KAKENHI employee

Attachment to the "Proposals of the Grants-in-Aid for Scientific Research (KAKENHI) in Fiscal Year 2020" (March 19, 2020) (Excerpt)
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" (February 12, 2020, Agreement of the Liaison Meeting of Related Offices and Ministries on Competitive Research Funds)
https://www.mext.go.jp/a_menu/shinkou/torikumi/1385716_00001.htm

<Important Point 2>

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 or research misconduct, 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 him/her conduct the said research activity as a part of his/her work within the institution, it 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 justifiable 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.

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" or "Scientific Research on Innovative Areas" replacements of PI may be accepted by going through appropriate procedures.

(B) <u>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.</u>

(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 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 funds.

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, following people can also participate in the research project as a Research Collaborator: a postdoctoral researcher, a graduate student, a research assistant (RA), a JSPS Research Fellow (DC), JSPS Fellows (SPD, PD, RPD or CPD) 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) can be covered by the direct expense.

* 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, 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, Fostering Joint International Research (B), 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, Scientific Research on Innovative Areas (Research in a Proposed Research Area) (Platforms for Advanced Technologies and Research Resources), Fostering Joint International Research (A) (including the Joint International Research before name change). As for the research category of Fostering Joint International Research (A) (including the Joint International Research 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 among Research Promotion Bureau, Science and Technology Policy Bureau, Research and Development Bureau and Higher Education Bureau)
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

The following kinds of spending 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 research 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. Other Important Points

1) 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 figure when printed in gray scale.

2) The personal information included in the Research Proposal Document will be used for the elimination of "unreasonable duplication and/or excessive concentration in the allocation of competitive funds" and for the appropriate funding of KAKENHI grants. (This includes providing the data to external contractor(s) in charge of electronic processing and management of the KAKENHI data.) The information included in the Research Proposal Document is to 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 that is scheduled to be made public," as laid down in Article 5, paragraph (1), item (i), (a) of the "Act on Access to Information Held by Administrative Organs" (Act No. 42 of 1999) and Article 5, paragraph (1), item (i), (a) of the "Act on Access to Information Held by Independent 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 with full understanding of the information handling (utilization, provision and disclosure) stated above.

3) 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 page 180).

(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

4. Completion of Research Ethics Education Coursework, etc.

Principal Investigators and Co-Investigators taking part in a research funded by the 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 FY2023 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 institute 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 institutes based on "Guidelines for Responding to Misconduct in Research" (Adopted by the 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 the 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 oneself 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 the MEXT on August 26, 2014), 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.

・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 the 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 (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. Participation in the KAKENHI Peer-review Process

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 in 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 (141,000 entries as of FY2021) and has utilized it so as to select the fair and excellent 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 Grant Recipients

Handling of a research project that is to be continued in FY2023(hereafter referred to as "continued research project")

1. Handling of Continued Research Projects Whose PI Fails to Submit the Report on the Research Achievements of his/her Other KAKENHI Project

As is the case for new proposal submissions, no KAKENHI will be delivered to a researcher who fails to submit the Report on the Research Achievements at the end of the research period, without any justifiable reason. In such cases, a cancellation of the official grant decision and an order for refund of the grant may be issued. In addition, the information such as the name of the research institution of the said researcher may be made public.

Furthermore, if a researcher fails to submit the scheduled Report on the Research Achievements without any justifiable reason, then he/she may be ordered to suspend the spending of his/her other KAKENHI grant(s) for the same fiscal year.

2. Completion of Research Ethics Education Coursework, etc.

The PI should check with the administrative section of his/her institution about the rules concerning the research ethics education coursework, etc. For a continued research project upon the formal application for a grant delivery or request for payment in every fiscal year, it shall be confirmed through the electronic application system whether the PI and Co-I(s) have taken the research ethics education coursework, etc.

In case that the PI intends to add a new Co-I to the continued project in FY2023, the PI has to obtain a consent to become a Co-I from the Co-I-to-be via the electronic application system in advance. In this case, the Co-I-to-be has to complete the followings prior to the formal application for grant delivery and report to the PI what he/she has done. (Or, in case the grant has been already delivered, he/she has to do the followings by the time the "application for approval of change of the Co-Investigator" is submitted by the PI to JSPS.)

- Either to read through and learn the teaching materials by oneself 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 to attend a lecture on research ethics conducted by research institutions based on "Guidelines for Responding to Misconduct in Research" (adopted by MEXT on August 26, 2014) .
- To understand thoroughly and to 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.

V. Instructions for Administrative Staff of Research Institution

1. Sharing the Purpose and Aim of the KAKENHI System

The KAKENHI provides a financial support for the creative and pioneering researches based on the original ideas of researchers.

Review of the submitted research proposals is conducted by the peer review process, in which researchers selected from their own community engage themselves in the assessment and reviewing of each research proposals on the basis of its scientific merit. The KAKENHI review process is based on the cooperation of more than 8,000 reviewers.

While the KAKENHI review process has been continually improved by, for instance, the introduction of new review methods from the FY2018 grant, the growing needs of KAKENHI have resulted in the number of new applications exceeding one hundred thousand in recent years. The workload on the researchers who are cooperating as reviewers is getting heavier along with the increase in the applicant number. Pressing concern is that if the burden on the reviewers keeps increasing to be excessive, it may seriously affect the reviewers' own research and educational activities, and may also result in deterioration of the quality of the review process. One of the possible factors for the recent increase in the application number may be attributed to the fact that some of research institutions seem to set the KAKENHI application as one of their organizational activity indicators. Application for the KAKENHI grant per se should be made on the basis of the initiative of the researchers. Therefore, such action on the part of research institutions as to set quota to the constituent researchers is undesirable.

All research institutions are requested to share and disseminate within themselves the primary purpose and aim of the KAKENHI system afresh.

2. Issues to Be Completed Beforehand by the "Research Institution"

(1)Requirements as a "Research Institution" and Procedures for Designation and Change

In order to apply for the KAKENHI, a researcher needs to belong to a "Research Institution." Concerning the "Research Institution" cited here, the following four types of "Research Institution" have been designated as eligible in Article 2 of the Rules for the Handling of Grants-in-Aid for Scientific Research announced by the Ministry of Education, Culture, Sports, Science, and Technology (MEXT).

1) Universities and inter-university research institutions
2) MEXT facilities and other institutions engaged in scientific research
3) Technical colleges
4) Institutions designated by the MEXT (see note as below)

Note:
In order to become a research institution, institutions not falling under 1) to 3) first need to receive the designation by MEXT. Therefore, institutions should consult with the Scientific Research Promotion Division of the Research Promotion Bureau of MEXT.
Moreover, if changes in one of the following items have been scheduled, institutions that have received the designation by MEXT and already have been recognized as a research institution should promptly report the content of these changes to the Scientific Research Promotion Division of the Research Promotion Bureau of MEXT.

A) Abolition or dissolution of the research institution
B) Name and address of the research institution, and name of the representative
C) Matters concerning laws, regulations, endowment acts, and other rules that prescribe the purpose of establishment, the business content, and the internal organization of the research institution

Moreover, researchers who belong to such institutions should consider that, in order to conduct research activities using the KAKENHI, **the research institution should meet the requirements mentioned below**.

< Requirements >

1) **The research institution must authorize the research project for which the KAKENHI is granted, as its proper activity.**
2) **The research institution must take responsibility for management and accounting of the KAKENHI delivered to its researcher(s).**

(2)Ascertainment of the Eligibility to Apply of the Affiliated Researcher

Researchers who intend to apply for KAKENHI should meet the requirements (i) and (ii) below. Therefore, they should sufficiently verify these requirements with the research institution.

Researchers who intend to apply for KAKENHI should meet following application eligibility. **(see page 65)**

(i) **At the time of the proposal submission, a researcher needs to have been approved by his/her research institution 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.**

< **Requirements** >

a) **The applicant must be an individual belonging to a research institution with job assignment including 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 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 or 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., university teaching staff, researcher belonging to a company, etc.) and holds a student status at the same time is eligible.)

(ii) **The individual must not be categorized as ineligible for grant acquisition in the fiscal year subjected to call for proposals, as a penalty for his/her improper grant spending, fraudulent grant acquisition, or research misconduct.**

<Important point 1>

KAKENHI employee whose personnel cost is covered with the KAKENHI fund is generally bound by their employment contract to concentrate on the research work relevant to the employment-related work specified in his/her employment contracts. 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. In this case, he/she can apply as PI, or participate to other KAKENHI project(s) as 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 the KAKENHI employee's 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 an "early-career scientist" employed with KAKENHI]

A young researcher (*) who is employed with KAKENHI funds (KAKENHI employee) and meets

the following conditions, may conduct his/her 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) The young researcher desires on his/her own will to conduct his/her own research.

(2) The PI or Co-I (the employer of the young researcher) decides 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 decision.

(3) The PI or Co-I judges that the efforts to be spared by the young researcher to the said research is 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 age 39 or under or less than 8 years after Ph.D. acquisition as of April 1 of each fiscal year, and whose job assignment includes research activities. When applying for Grants-in-Aid for Scientific Research (KAKENHI) 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 is no longer age 39 or under or less than 8 years after Ph.D. acquisition. 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 introduction of self-motivated research activities by KAKENHI employee

Attachment to the "Proposals of the Grants-in-Aid for Scientific Research (KAKENHI) in Fiscal Year 2020" (March 19, 2020) (Excerpt)
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 December18, 2020, Agreement of the Liaison Meeting of Related Offices and Ministries on Competitive Research Funds)
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.

i) Publicly Offered Research of Transformative Research Areas (A) (Publicly Offered Research)

ii) Scientific Research (B/C)

iii) Challenging Research (Exploratory)

iv) for Early-Career Scientists

v) Fund for the Promotion of Joint International Research (Fostering Joint International Research (A)) (Excluding CPD)

Moreover, research institutions should bear in mind that JSPS Research Fellows (DC), Overseas JSPS Fellows, and students including graduate students cannot apply, even if they hold a position in which they conduct research activities in the research institution to which they belong or in another research institution.

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

In addition to the Principal Investigator who intends to apply, the Co-Investigator who makes up

the Project Members should be limited to whom the researcher information has been registered in e-Rad as "Eligible to Apply for KAKENHI" when research institution submits (sends) the Research Proposal Document to MEXT.

Regarding the registration (update) of the researcher information necessary when applying, the administrative staff in the research institution to which the researcher belongs should perform the procedures using e-Rad. (If there is any item, such as the institution, the position, or others, that needs to be corrected, even though the applicant information has already been included in the researcher list of the research institution, he/she needs to register the correct information on the researcher list.)

For specifics on the method of registration, administrative staff of the research institution should verify the "Manual for Research Institutions to which the Researchers belong (for Research Institution Office Representatives and for Research Institution Office Workers)."

Moreover, concerning the registration of the researcher information in e-Rad, there is no registration period (deadline). Therefore, registration is possible at any time.

However, since Research Proposal Document will not be accepted after the deadline for submission of Research Proposal Document, applicants should complete the registration (update) of the researcher information early, in order to have sufficient time to submit them.

In order not to negatively affect the compilation of the applications within the research institution, when completing the applications, the research institution should perform the various procedures (including the procedures within the research institution), positioning this specific procedure as one of the important procedures to be performed by the research institution.

(Reference) On "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 appointed to a research position, and those who are returning from their leave of absence for childcare, etc. after the regular submission deadline.

The FY2023 Call for Proposals in this category is scheduled for March 2023, and the provisional conditions of the eligibility for application are as follows:

(A) An individual who obtains eligibility for KAKENHI application on or after October 1, 2022, 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 FY2022.

(*) FY2023 Grants-in-Aid for Specially Promoted Research, Transformative Research Areas, Scientific Research, Challenging Research, and Early-Career Scientists

(For details, the Application Procedures for the "Grant-in-Aid for Research Activity Start-up" category to be announced in March 2023 should be referred to.)

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 his/her prospective research institution.

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

(4)Obtainment of an ID and a Password for the Researcher Belonging to the Research Institution

In order to apply for KAKENHI, researchers should perform the procedures, by accessing the "Electronic Application System," he/she should retain the ID and the Password for e-Rad.

For this reason, the research institution should verify whether researchers who intend to apply have an ID and a Password, or not.

In the case where there is a researcher who intends to apply and who has neither ID nor Password, the research institution should provide him/her with an ID and a password in accordance with the following procedure.

1) In order to provide the researcher with an ID and a Password, the research institution needs to have an ID and a Password for use of the research institution. If the research institution has not yet obtained them, it should first of all download a registration form from the e-Rad Portal site, conduct a registration application.

It may takes up to approximately two weeks for the "ID and Password for use of the research institution" to arrive after registration application the "Application for Use of the Electronic Application System".

Notes:

*1: Please refer to "How to Apply for the Registration on Research Institutions." (URL: https://www.e-rad.go.jp/organ/entry.html) on the e-Rad website for information on downloading an application form for the ID and password for e-Rad.

*2: Research institutions that already obtained an ID and a password for e-Rad issued do not need to obtain it again.

*3: It is not necessary to obtain an ID and a password for e-Rad for each research category of the KAKENHI.

2) After obtaining an ID and a Password for use of the research institution, the administrative staff in the research institution should provide an ID and a password to the researcher who is planning to apply as a PI or Co-I. The ID and password for each researcher is issued through registration of the researcher information in e-Rad. Please refer to the "Manual for Research Institutions" (for Research Institution Office Representatives and for Research Institution Office Workers: the section of "Procedures for Researchers") for information on the concrete way how to provide them.

Notes:

*1: When providing the login ID and password, research institutions must make it known to researchers that they must strictly protect the login ID and password in order to prevent them from being disclosed to others.

*2: Once the ID and the password for the researcher have been provided they can be used, even if the

research institution changes.

*3: Please be sure to obtain and use the latest version of the Operation Manual.

(5)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 (Implementation Standards)"

When implementing the adopted research projects with KAKENHI grant the research institutions must comply with the content of the "Guidelines on the Management and Audit of Public Research Funds at Research Institutions (Implementation Standards)" (Adopted by the Minister of MEXT. Revised on February 1, 2021.) (hereinafter referred to as "Guidelines on Public Research Funds"), they must set up a system of the management and audit for implementing the public research funds and report the state of implementation and other matters by submitting 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)" (hereinafter referred to as "Self-Assessment Checklist on the Improvement of the System").

Therefore, "those research institutions which Principal Investigators and Co-Investigators applying for KAKENHI in FY2023 belong to" and "those research institutions which Principal Investigators and Co-Investigators continuing research projects using KAKENHI are scheduled to belong to in FY2023" **must submit in accordance with the procedure and forms posted on the MEXT the "Self-Assessment Checklist on the Improvement of the System" to the Office of Competitive Research Funding Administration, Research Environment Division, Science and Technology Policy Bureau of the MEXT by December 1st (Thursday), 2022 via e-Rad. For details, refer to the website (URL: https://www.mext.go.jp/a_menu/kansa/houkoku/1324571.htm).** If the "Self-Assessment Checklist on the Improvement of the System" has already been submitted in April 2022 or later, it is not necessary to submit it again.

Researchers affiliated to a research institution which has not turned in the said checklist cannot receive the official grant decision.

Note: When using e-Rad, an ID and a Password for the research institution are necessary.

< Inquiries >

(Concerning forms and submission of the Guidelines on Public Research Funds)

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

URL: https://www.mext.go.jp/a_menu/kansa/houkoku/1324571.htm

(Concerning the research institute e-Rad registration)

Helpdesk of the Cross-ministerial Research and Development Management System of MEXT

Telephone: 0570-057-060 (Navi Dial)

Office hours: 9:00-18:00, except on Saturdays, Sundays, National Holidays and the New Year Holidays (from December 29 until January 3)

URL: https://www.e-rad.go.jp/organ/entry.html

(Time period when e-Rad is available for use)
Monday to Sunday 0:00 - 24:00 (in operation 24 hours a day, 365 days a year)
However, even during the above-mentioned time period, it may happen that the operation of e-Rad is 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.

(6) Submission of the "Checklist Pertaining to the Current Status" Based on the "Guidelines for Responding to Research Misconduct"

When implementing the research projects with KAKENHI grant the research institutions must comply with the content of the "Guidelines for Responding to Research Misconduct" (Adopted by the Minister of MEXT on 26 August 2014) (hereinafter referred to as "Guidelines on Research Misconduct") and submit a "Checklist Pertaining to the Current Status based on the Guidelines for Responding to Research Misconduct" (hereinafter referred to as "Checklist on the Research Misconduct").

Therefore "those research institutions which the Principal Investigators and Co-investigators applying for KAKENHI in FY2023 belong to" and "those research institutions which Principal Investigators and Co-Investigators continuing research projects using KAKENHI are scheduled to belong to in FY2023" **must submit in accordance with the procedure and forms posted on the MEXT the "Checklist on the Research Misconduct" to the Office for Research Integrity Promotion, Research Environment Division, Science and Technology Policy Bureau of the MEXT by September 30th (Friday), 2022 via e-Rad. For details, refer to the website (URL: https://www.mext.go.jp/a_menu/jinzai/fusei/1420301_00001.htm).** If the "Checklist on the Research Misconduct" has already been submitted in April 2022 or later, it is not necessary to submit it again.

Researchers affiliated to a research institution which has not turned in the said checklist cannot receive the official grant decision.

Note: Please note that while the "Checklist on the Research Misconduct" is the same in using e-Rad for submission with the "Self-Assessment Checklist on the Improvement of the System," the submission destination is different. Both checklists must be submitted.

Note: When using e-Rad, an ID and a Password for the research institution are necessary.

< Inquiries >

(Concerning the format and submission of Guidelines for Responding to Research Misconduct)

* Differs from the contact information for the Guidelines on Public Research Funds.

Office for Research Integrity Promotion, Research Environment Division, Science and Technology Policy Bureau, MEXT
Telephone: 03-6734-3874
E-mail: jinken@mext.go.jp
URL: https://www.mext.go.jp/a_menu/jinzai/fusei/index.htm

(Concerning the research institute e-Rad registration)

Helpdesk of the Cross-ministerial Research and Development Management System (e-Rad) of

MEXT

Telephone: 0570-057-060 (Navi Dial)
Office hours: 9:00-18:00, except on Saturdays, Sundays, National Holidays and the New Year Holidays (from December 29 until January 3)
URL: https://www.e-rad.go.jp/organ/entry.html

(Time period when e-Rad is available for use)
Monday to Sunday 0:00 - 24:00 (in operation 24 hours a day, 365 days a year)
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.

(7)Implementation of a Research Ethics Education Coursework Based on the "Guidelines on Research Misconduct," etc.

Principal Investigators and Co-Investigators taking part in a new research project have to complete followings before the formal application for grant delivery.

- Either to read through and learn the teaching materials by oneself concerning the research ethics coursework such as "For the Sound Development of Science -The Attitude of a Conscientious Scientist-" (JSPS Editing Committee of "For the Sound Development of Science"), the "e-Learning Course on Research Ethics (eL CoRE)," the "APRIN e-learning program (eAPRIN)," etc., or to attend a lecture on research ethics conducted by research institutes based on the "Guidelines on Research Misconduct."
- To understand thoroughly and to 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 the JSPS.

To that end, each research institution is requested to disseminate broadly what the researchers should consider, in conducting of their researches as well as carrying out an ethics education in research training session based on the "Guidelines on Research Misconduct."

(8)On the Submission of the Report on the Research Achievements

The research institution to which researchers belong has to collect and submit the report on the research achievements. If the research institution has failed, without justifiable reason, to submit the report on the research achievements at the end of the research period, it may happen that it is treated as indicated below. 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.

- No KAKENHI will be delivered to researchers who do not submit the report on the research achievements at the end of the research period, without justifiable reason. Moreover, it may happen that the official grant decision to the researcher is cancelled, that an order to return the grant is issued, or that the information such as the name of the research institute the said researcher belongs to is disclosed in 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.

(9)Obtaining Sufficient Knowledge about the Contents of the Application Procedures

The research institution should beforehand disseminate the contents of the Application Procedures to all the researchers belonging to it. MEXT would especially like to request the dispersion of information on the items listed in the Application Procedures and the submission deadlines of Research Proposal Document, in order to avoid potential misunderstandings.

(10)Ensuring Research Integrity Among Research Institutions

In order to promote the creation of science, technology, and innovation in Japan, we must continue to strengthen overseas joint research with various partners based on the principle of open science. At the same time, in light of newly emerging risks as a consequence of the globalization and openness of research activities in the recent years, there is a growing concern that the values of openness and transparency which constitute the basis of the research environment will be lost and the danger of researchers unknowingly being trapped in conflict of interest or conflict of responsibilities. In such climate, it is vital for our country to build a globally reliable research environment to protect the values that constitute the basis of research environment while encouraging necessary global collaboration and international exchanges.

Therefore, it is vital for universitates and research institutions, etc. to observe the “Policy on Measures to Ensure Research Integrity Against New Risks as a Consequence of the Globalization and Openness of Research Activities (April 27, 2021, Decision of Council for Science, Technology and Innovation)” and formulate relevant rules and systems to manage conflict of interests and conflict of responsibilities, etc., and to autonomously secure the soundness and fairness of research (research integrity) among researchers and at universities and research institutions, etc.

From such perspective, MEXT and JSPS checks whether reasonable efforts can be secured while eliminating unreasonable duplication and excessive concentration of competitive research funds and ensuring transparency of research activities. In addition, MEXT and JSPS may make inquiries to affiliated institutions, as necessary, on the status of formulation of rules and status of identification and management of information as affiliated institution.

○ “Policy on Measures to Ensure Research Integrity Against New Risks as a Consequence of the Globalization and Openness of Research Activities (April 27, 2021, Decision of Council for Science, Technology and Innovation)”

URL: https://www8.cao.go.jp/cstp/tougosenryaku/integrity_housin.pdf

3. Issues that Need to Be Verified When Compiling the Application Forms (Preparing the Research Proposal Document)

The contents of the Research Proposal Document should be verified in each research institution, and all the Research Proposal Document should be submitted to MEXT together. When doing so, special attention should be paid to the following points.

(1) Ascertainment of the Eligibility for KAKENHI Application

It should be verified whether the Principal Investigator listed in the Research Proposal Document are researchers who meet the requirements that are stipulated in the Application Procedures (see page 65), and also whether the researcher information is registered in e-Rad as "Eligible to Apply for KAKENHI."

Moreover, it should be verified certainly that they must not be categorized as ineligible for grant acquisition in FY20221 in KAKENHI and other competitive research funds, as a penalty for their improper grant spending, fraudulent grant acquisition, or research misconduct.

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

Regarding the registration (update) of the researcher information necessary when applying, the administrative staff in the research institution to which the researcher belongs should perform the procedures using e-Rad.

Moreover, even though applicant has already been included in the researcher list of the research institution, if there is any item such as the department placed, the position, or others that needs to be corrected, the applicant's information on the researcher list should be corrected.

(3) Verification with the Principal Investigator

The research institution should verify whether the Principal Investigator who have been listed in the Research Proposal Document have completed the Research Proposal Document, after confirming the description in the column "II. Call for Proposals" in this Application Procedures for Grants-in-Aid for Scientific Research.

(4) 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 numbers of pages instructed for each column is met.

Moreover, the format and other matters of the application forms for each research category are as follows.

Research category	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 (Research expenses, status of application and acquisition of research grants, etc.)

4. Submission and Other Matters of the Research Proposal Document (Preparing the Research Proposal Document)

(i) Transformative Research Areas (A) (Publicly Offered Research)

1） The research institution should access the Electronic Application System using the e-Rad ID and the password to obtain the "Research Proposal Document (PDF files)" prepared by the Principal Investigators, and verify the contents and other matters.

2） If there are no mistakes in the contents of the "Research Proposal Document (PDF files)," the research institution should perform the "approval" process. (Completed to submit (send) the Research Proposal Document (PDF files) to JSPS.) Moreover, it is not possible to make corrections or other modifications to the Research Proposal Document (PDF files) for which the research institution has already performed the "approval" process.

The deadline for the submission of the Research Proposal Document is:

October 5th (Wednesday), 2022, 4:30 pm (This deadline should be strictly observed.)

Note 1: Research Proposal Document that are submitted (sent) after this deadline will not be accepted for any reason. Therefore, the documents should be submitted (sent) well in advance.

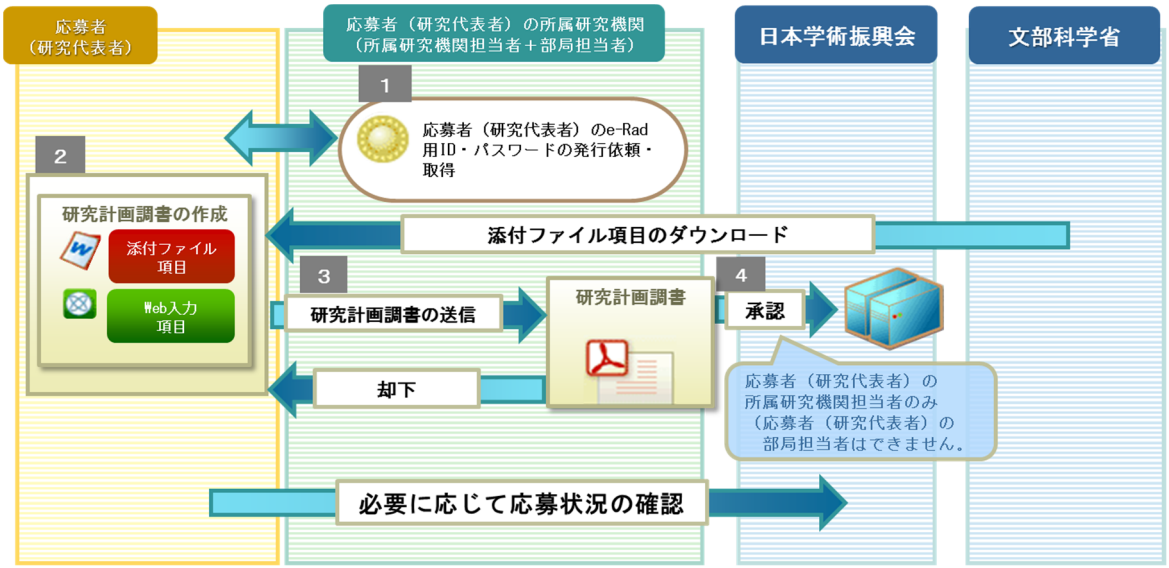
Note 2: After the submission (sending) of the application documents, it is not possible to make corrections or to re-submit them.

Outline of the Electronic Application Procedures

The ID and the password which are used in the e-Rad are designed to verify the individual. Therefore, the handling and administration of them should be done carefully when carrying out the application procedures.

Moreover, an outline of the procedures for electronic application can be found below. However, for details on the operating environment, procedure, etc. of the "Electronic Application System," please refer to the "Operation Manual" of the website below.

URL: https://www-shinsei.jsps.go.jp/kaken/topkakenhi/shinsei_ka.html



[The administrative staff in the research institution to which the applicant (Principal Investigator) belongs]
1 The administrative staff in the research institution to which the applicant belongs issues the ID and the password to the applicant.

[The applicant (Principal Investigator)]
2 The applicant accesses the "Electronic Application System," using the ID and the password he/she received, and prepares 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.

[The applicant (Principal Investigator)]
3 If there are no mistakes in the Research Proposal Document (PDF file) and Letter of Intent the applicant prepared, he/she submits the Research Proposal Document (PDF file) to the research institution to which he/she belongs, by performing the "completed and submission" process.

The administrative staff in the research institution to which the applicant (Principal Investigator) belongs]
4 By approving the Research Proposal Document (PDF file), etc. the administrative staff in the research institution to which the applicant belongs submits (sends) it to JSPS. Moreover, if the Research Proposal Document (PDF file), etc. that the applicant submitted is not approved due to mistakes or other reasons, it will be rejected and the applicant will be requested to make corrections.

(ii) Scientific Research on Innovative Areas (Finished Research Area)

Omitted

VI. 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 (A) - 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_r30305.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/

< Inquiries >
National Bioscience Database Center, Japan Science and Technology Agency
Telephone: 03-5214-8491

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.

< Inquiries >
Executive Office, IBBP Center, Inter-University Research Institute Corporation National Institutes of Natural Sciences Telephone: 0564-59-5930, 5931

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/

< Inquiries >

National BioResource Project (NBRP) Executive Office

(established in the Research Organization for Information and Systems, National Institute of Genetics)

Telephone: 055-981-6809

7. Security Export Control Policy (Coping with Technology Leakage Overseas)

In Japan, export controls (*) 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.

(*) 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).

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.

For this reason, 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.

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)
https://www.meti.go.jp/policy/anpo/

○Ministry of Economy, Trade and Industry: "Handbook on Security Trade Control"
https://www.meti.go.jp/policy/anpo/seminer/shiryo/handbook.pdf

○Center for Information on Security Trade Controls
https://www.cistec.or.jp/index.html

○"Guidance for the Control of Sensitive Technologies for Security Export for Academic and Research Institutions 3rd Edition"
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)

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 Gender Equality in JSPS Programs

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! (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.

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 JSPS Grants-in-Aid for Scientific Research (KAKENHI (Series of Single-year Grants)) (Omitted)

(Reference 2)

Procedures on the Handling of JSPS Grants-in-Aid for Scientific Research (KAKENHI (Multi-year Fund)) (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:03-6734-4183Switchboard:03-5253-4111 (Internal line:4183)
Grant-in-Aid for Transformative Research Areas (A/B), Special Purposes	Grants-in-Aid for Scientific Research Team I and II	Direct phone:03-6734-4094 Switchboard:03-5253-4111 (Internal line: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-R ad 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 numbers are 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 (Internal line: 3866, 3827)

(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

(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
Phone: 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

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