科研費
KAKENHI

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

FY2020

Grant-in-Aid for Scientific Research on Innovative Areas

and

Grant-in-Aid for Special Purposes

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.

September 1, 2019

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 FY2020" including the "Scientific Research on Innovative, Special Purposes".

The contents are：

"Ⅲ 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, "Ⅳ Instructions for Prospective Applicants", "Ⅴ Instructions for Grant Recipients" and "Ⅵ 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 FY2020, 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 call for proposals for FY2020 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 researcher(s)' own initiative and responsibility. Therefore, the implementation of a KAKENHI research project and publication of the research results are solely attributed to the researcher(s)' 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 2020 >

(1) A new research category "Grant-in-Aid for Transformative Research Areas (A/B)" is to be established as a form of constructive renovation of the former category "Grant-in-Aid for Scientific Research on Innovative Areas (Research in a Proposed Research Area)". The official announcement of call for proposals for the new research category is scheduled in January 2020 (after the decision of the FY2020 budget bill). The restrictions on parallel grant application/receipt between the said research category and other research categories are explained in this document as preannouncement. Researchers who are planning to submit proposal(s) to the said research category should be well acquainted with the rules.

The "Scientific Research on Innovative Areas (Research in a Proposed Research Area)" category has discontinued call for proposals of new areas in FY2020. (see page 16)

(2) Starting from the FY2019 call for proposals, the "Research Achievements" column in the Research Proposal Document format has been renamed to "Applicant's Ability to Conduct the Research and the Research Environment". In view of the prevailing misunderstandings of the purpose of the format revision, it is re-emphasized that research achievements (publications, etc.) which the applicant thinks relevant to the proposed research plan can be included in the description of this column as appropriate. (see page 17)

(3) It is re-emphasized that researchers who are/were KAKENHI recipients are requested to be cooperative when asked to participate in the peer review process, as the KAKENHI system relies on the peer review scheme. (see page 103)

(4) There is a change in the submission deadline of the "Self-Assessment Checklist on the Improvement of the System" and the "Checklist on the Research Misconduct" to be filed by the research institution. (Formerly submission of those documents were required at the time of grant application.) Researchers affiliated to a research institution which has not turned in the said checklists cannot receive the official grant decision. Therefore, research institutions should make sure to submit these checklists. (see page 109)

Table of Contents

7. Security Export Control Policy

References

The application forms (Research Proposal Document) and other application materials are contained in separate files. Please refer to "Supplementary Volume 'Application Procedures for Grants-in-Aid for Scientific Research - KAKENHI - for FY2019 (Grant-in-Aid for Scientific Research on Innovative Areas and Grant-in-Aid for Special Purposes) (Application Forms and Data Entry)".

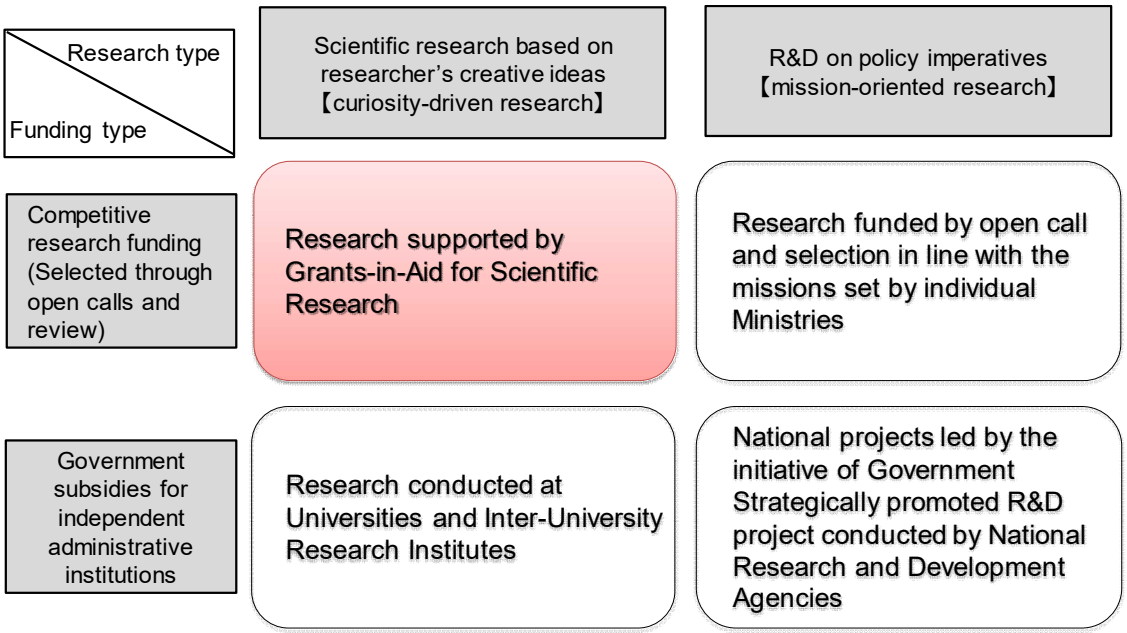
* The application forms (Research Proposal Document) and other application materials can be downloaded from the MEXT website (cf. URL below).
(URL) http://www.mext.go.jp/a_menu/shinkou/hojyo/boshu/1351544.htm

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 are competitive 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 September, 2019

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 open 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 (only in a truly necessary case, budget exceeding 500 million yen is asked for.).	SG

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

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.)	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	Pioneering	SG
		Exploratory	MF
Grant-in-Aid for Young Scientists	[No new proposals have been called since FY2017.] (A), (B): Research conducted individually by a researcher of age 39 or younger. (A) 2 to 4 years 5 million to 30 million yen (B) 2 to 4 years 5 million yen or less	(A)	SG
		(B)	MF
Grant-in-Aid for Early-Career Scientists	[A call for proposals started from FY2018.] Research conducted by an individual researcher (*2) who is less than 8 years after Ph.D. acquisition. As a transitional measures, a non-Ph.D. researcher who is 39 years old or younger can also apply. 2 to 4 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		SG	
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.		
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.		
Scientific Literature	Subsidy for academic publication of research results (books) authored by an individual or a group of researchers.		
Databases	Subsidy for creation and operation of a database open to public use by an individual or a group of researchers.		

*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.

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		MF
Fostering Joint International Research	(A) Support of joint international research project conducted by a KAKENHI grantee in collaboration with researcher(s) at foreign university or 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 proposal, "International Activities Supporting Group" have been incorporated into "Grant-in-Aid for Scientific Research on Innovative Areas "Administrative Group".	
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.)	
Generative Research Field	[No new proposals have been called since FY2020.] This category set for "Scientific Research (B/C)" is open to research proposals for which review within the conventional framework of research fields may be difficult and/or to applicants who prefer their proposals to be screened from a broader perspective relevant to the Generative Research Field. (The research period that can be applied for differs depending on the year of application.)	MF

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 September, 2019

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, Grant-in-Aid for Special Purposes Fund for the Promotion of Joint International Research (International Group)	MEXT	JSPS
Specially Promoted Research, Scientific Research, Challenging Exploratory Research, Challenging Research, Young Scientists, 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 (Fostering Joint International Research, Home-Returning Researcher Development Research), Generative Research Fields	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" (Announcement 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.

1) Application Rules: rules concerning the submission of research proposals
2) Assessment Rules: rules concerning the pre-assessment (review) of applications, and rules concerning the interim, and other progress assessment of granted projects.
3) Utilization Rules: rules concerning the use of KAKENHI

These three sets of rules apply as follows.

【Grants-in-Aid for Scientific Research】

❖ As of September, 2019

	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 Review Outline for Grants-in-Aid for Scientific Research, category "Scientific Research on Innovative Areas" Assessment Outline for Grants-in-Aid for Scientific Research, category "Scientific Research on Innovative Areas"	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 ***The review and assessment rules for FY2020 are scheduled to be made public in middle October.**	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 utilization 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. 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 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 money cannot be completed within the fiscal year, owing to reason(s) unforeseeable at the time of grant delivery, the grant money can be carried over to the next fiscal year by going through the due procedures. 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 money 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"

1) 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 "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.

2) 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 justified 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 Funding"

The "Guidelines on the Proper Implementation of Competitive Funding" (agreement of the liaison meeting of related offices and ministries on competitive funding, dated September 9, 2005; amended June 22, 2017) 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 funding 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

1) Towards elimination of "Unreasonable Duplication and/or Excessive Overconcentration" (*) of competitive 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 grants, are urged to prepare their application documents with due care to clearly state the differences between the project to be submitted and his/her 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.

2) Untruthful statement or misrepresentation of the status of applications and acquisitions of other KAKENHI grants and other competitive funds in the application form, may result in cancellation of grant or reduction of the research budget.

(*) Elimination of Unreasonable Duplication and Excessive Overconcentration in Grant Allocation

"Guidelines on the Proper Implementation of Competitive Funding" -Extract-

(Agreement of the Liaison Meeting of Related Offices and Ministries on Competitive Funding, Dated September 9, 2005 (Revision: June 22, 2017))

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

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

① In the "Guidelines", "Unreasonable Duplication" refers to a situation in which more than one competitive 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 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 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.**

② 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 called "researcher, etc.") in the fiscal year in question exceeds the limit within which they can be used effectively and efficiently, and in which the research funds cannot be used within the research period. Either of the following cases falls under "Excessive Concentration".

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

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

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

・"Improper Grant Spending":
Use of funds for other purposes, intentionally or by gross negligence, for example, by conducting fictitious business transactions ("*azukekin*") with a trader through fictitious order placements, or by charging costs higher than actually needed for personnel, travel expenses, etc., or use of funds in violation of the content of the funding decision or the conditions it implies

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

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

1) **No KAKENHI will be offered, for a fixed period of time, when a researcher or related party has committed a 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, he/she 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 research achievements 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 a fraud, waste, abuse, or fraudulent grant acquisition of competitive funding other than the KAKENHI (including funds under the control of other ministries) etc., and/or has committed research misconduct by means of these competitive funds, and therefore are excluded from receiving these funds in question, for a fixed period of time, will not receive the KAKENHI for the fixed period of time.

Note: This applies to those schemes newly starting a call for proposals in FY2020 (and onward) for "competitive funding other than KAKENHI" as well. It also applies to those schemes that ended before FY2019. Refer to the website below for the schemes to which this specifically applies at present.
Cf. URL: https://www8.cao.go.jp/cstp/compefund/kyoukin31_seido_ichiran.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.	(1) Cases of major seriousness and maliciousness	5 years
		(2) Cases other than (1) and (3)	2 to 4 years
		(3) 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.	－		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 rowspan="2">Responsible author(s) of the paper(s) in question (corresponding author, lead author or other authors bearing equivalent responsibilities)</td><td>Cases where it is judged that the impact on the progress of the science in the field in question and the social impact are major, or the level of maliciousness involved in the acts is high</td><td>5 to 7 years</td></tr>
<tr><td>Cases where it is judged that the impact on the progress of the science in the field in question and the social impact are minor, or the level of maliciousness involved in the acts is low</td><td>3 to 5 years</td></tr>
<tr><td>Author(s) of the paper(s) in question other than the responsible author(s) described above</td><td></td><td>2 to 3 years</td></tr>
<tr><td colspan="2">(c) Individual(s) involved who are not the authors of the research paper(s) for which research misconduct(s) are identified.</td><td></td><td>2 to 3 years</td></tr>
<tr><td colspan="3" rowspan="2">Responsible author(s) of paper(s), (corresponding author, lead author or other authors bearing equivalent responsibilities) for which research misconduct(s) are identified, but not involved in the alleged research misconduct</td><td>Cases where it is judged that the impact on the progress of the science in the field in question and the social impact are major, or the level of maliciousness involved in the acts is high</td><td>2 to 3 years</td></tr>
<tr><td>Cases where it is judged that the impact on the progress of the science in the field in question and the social impact are low, or the degree of severity of the acts is low</td><td>1 to 2 years</td></tr>
</table>

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

2) The relevant information of each research misconduct case may be provided to the relevant offices and the office of research funding under the jurisdiction of Ministry of Education, Culture, Sports, Science and Technology (including independent administrative legal entities and other grant-allocating institutions) in charge of funding within such Offices and Ministries. Thereby the penalized researcher may be also subject to restriction in application of and/or participation to research projects in other competitive funds than the KAKENHI.

Note: "Applying and participating" means proposing new 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 projects).

3) If it is established that research misconduct has taken place in a research paper, report, or other research output funded by the KAKENHI, the researcher will be treated in the same way as stated in the above-mentioned 1) and 2). The severity of the research misconduct and other matters will be taken into consideration.

Moreover, a person who is determined to have a certain responsibility, because, for example, he or she neglected his/her duty of care as a person in charge of the paper, report, etc. in question, will be treated in the same way, even if it has not been established that he or she was directly

involved in the research misconduct.

4) 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 2014), Ordered by the Minister of Education, Culture, Sports, Science and Technology" and "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 independent administrative legal entities 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"

Cf. URL http://www.mext.go.jp/a_menu/kansa/houkoku/1343904.htm

○ "Guidelines for Responding to Research Misconduct"

Cf. URL http://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 research achievement supported by the 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 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 (KAKEN) database 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 a KAKENHI project, researchers should be sure to express that the project has been supported by a KAKENHI grant, by stating in the "Acknowledgment" 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 JP18K45678.
【Japan】本研究は JSPS 科研費 JP18K45678 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)' organization, JSPS or 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

The Japan Society for the Promotion of Science (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.

The open access implementation policy of JSPS is given on the following webpage:
URL: https://www.jsps.go.jp/data/Open_access.pdf

[Reference 1: What is “Open Access”]

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

[Reference 2: Different Routes to Open Access]

There are 3 main ways of open access implementation ((1) to (3) below)

(1) A way to make open the access to the article which is published in the conventional subscription fee type academic journal after a certain period (Embargo) (* 1) (for example 6 months later) 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).

(2) A way to make the article open access by posting the article on the Web established by the research community or public institution

(3) 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 the Japan Society for the Promotion of Science (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 101)

[Extraction from the Statement "Code of Conduct for Scientists – Revised Version –" by the Science Council of Japan dated on 25 January 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 Japan Society for the Promotion of Science (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. System Improvements in the Call for Proposals for Fiscal Year 2020

The following improvements are made to the schemes for the FY2020 call for proposals.

1. Establishment of Grant-in-Aid for Transformative Research Areas

The "Scientific Research on Innovative Areas (Research in a Proposed Research Area)" category has discontinued call for proposals of new areas in FY2020. Instead, a new research category "Transformative Research Areas" is to be established with the aim to lead the way to radical transformation of and change in the existing framework and/or direction of research from various perspectives. Such transformative researches are to be achieved by organic coordination of diverse research groups and with the participation of researchers who shall be bearers of the next generation of research. Although the call for proposals by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) is scheduled in January 2020 and beyond, after the decision of the FY2020 budget bill, the restrictions on parallel grant application/receipt between the said research category and the other research categories are described in advance in this call for proposal document. Researchers who intend to submit research proposal(s) should be well acquainted with the rules given below. (For details of the restrictions on parallel grant application/receipt, see page 88.)

(Background of Establishment)

The research category "Scientific Research on Innovative Areas (Research in a Proposed Research Area)" was established in FY2008 for the purpose of supporting research projects to be conducted by multiple research groups involving a wide range of researchers in related research areas so as to develop new research areas that will lead to upgrade and level-up of scientific research in Japan. Approximately 250 research areas have been adopted in the past 12 years.

This scheme of group research in this category has proved instrumental in achieving, for example, creation of new ideas through discussions among interdisciplinary researchers gathered in the research area, establishment of a framework to address the new issues/themes systematically transcending the disciplines, invigoration of the research fields by enabling young researchers to participate in the research area, and human resources development. With a basic recognition that this research category has been successful, the "Transformative Research Areas" is to be newly established in order to achieve greater success, with the following perspectives:

- In addition to supporting researchers engaged in the formation of large scale research areas from the beginning of the research, it is necessary to support researchers who conduct challenging and exploratory research on a small scale, in small groups, and in short term, then based on the results consequently engage in large scale research areas.
- In order to create research areas that will lead to the radical transformation of and change in the existing framework and/or direction of research, it is necessary to further encourage the participation of a wide range of relevant researchers.
- For the upgrade of research capacity in Japan with a midterm perspective, it is necessary to further promote participation of researchers who will be the bearers of the next generation of research, with expectation that they will lead emerging and interdisciplinary research areas 10 years from now.

(Outline of the Research Category)

The name of the new research category shall be "Transformative Research Areas". The purpose of this research category is to promote the creation of research areas that will radically transform and change the existing framework and/or direction of research with proactive involvement of researchers who will be bearers of the next generation of research (researchers of age 45 or under[1]). According to such factors as the grant scale, research period, and others, two sections are to be installed; "Grant-in-Aid for Transformative Research Areas (A)" and "Transformative Research

[1] Age as of April 1 of the fiscal year when grant will be delivered. Namely, in case of the FY2020 call for proposals the researchers of age 45 or under as of April 1, 2020.

Areas (B)".

"Transformative Research Areas (A)" is a section replacing the former "Scientific Research on Innovative Areas (Research in a Proposed Research Area)". This section is open to research proposals 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 proposals that aim for a truly drastic advancement of the leading-edge portions of a particular academic discipline. For this section, in view of the future development of the research areas, "Publicly Invited Research" will be installed so as to encourage participation of diverse researchers, while taking appropriate measures for nurturing of young researchers.

"Transformative Research Areas (B)" is a section to be established with a new concept. It is a section for more challenging and exploratory research conducted by a compact group of researchers in a short term and with a smaller budget scale. It is expected that it will lead to "Transformative Research Areas (A)" in the future. It is open to research proposals that aim to generate new changes and transformations in academic areas, consequently to create emerging and interdisciplinary areas beyond existing academic disciplines. In view of a midterm development of the research areas, in order to nurture the ability to lead and manage the group research, the Head Investigator shall be a researcher who will be a bearer of the next generation of research.

2. Description of Research Achievements in the Research Proposal Document

○ Clarification that research achievements (publications, etc.) can be entered in the "Applicant's Ability to Conduct the Research and the Research Environment" column

The research achievements in the Research Proposal Document format is intended as a column to verify the applicant's ability to carry through the proposed research plan. To make this point clear, based on the deliberations at the Council for Science and Technology and elsewhere, the former "Research Achievements" column in the Research Proposal Document has been renamed to "Applicant's Ability to Conduct the Research and the Research Environment" starting from the FY2019 call for proposals.

Upon this revision, it was intended that the applicant explains his/her ability to conduct the proposed research plan by appropriately citing selected research achievements (publications, etc.) in the revised "Applicant's Ability to Conduct the Research and the Research Environment" column. This intention based on the problem recognition and basic measures deliberated at the Council for Science and Technology and elsewhere has been stated in the Application Procedures and other documents. However, it appears that the intent of the format revision is not necessarily properly disseminated generating misunderstandings as if the research achievements are no longer allowed or no longer required in this column.

To clear the confusion, the intent of the format revision is more clearly stated in this "Application Procedures" document (see Reference 1). In addition, to further clarify that the applicant can include appropriately selected items of his/her research achievements in the "Applicant's Ability to Conduct the Research and the Research Environment" column, examples of format for citing selected publications appropriate in explaining the applicant's ability to conduct research in the Research Proposal Document are provided (see Reference 2).

Reference1: The summary on the discussion including in the Subdivision on Research Grant Screening Section of the Academic Deliberation in the Subdivision on Science, Council for Science and Technology

(Problem recognition, etc.)

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

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

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

Reference 2: Excerpt from Research Proposal Document "3 Applicant's Ability to Conduct the Research and the Research Environment" for Scientific Research (C)

Note:

1. The description in this column is to explain the feasibility of the research plan. On citing research achievements (research papers, books, patents, invited talks, etc.) they should be given not as an exhaustive list but as supporting evidence to prove the applicant's ability to conduct the proposed research.

2. Sufficient information should be given so that the reviewers can identify the research achievements.

In the case of a research paper, for example, the relevant bibliographic information, including the title of the paper, the author(s), the title and the volume of the journal, the publication year, and the pages of the article should be given.

3. The research papers that can be cited are only those already published or accepted for publication.

4. These notes written in italics should be deleted when filling this column.

(For details, please see the relevant pages for each research category in the Application Procedures for Grants-in-Aid for Scientific Research-KAKENHI- (Supplement))

3. Relaxation of Restrictions on Parallel Grant Application/Receipt

In the KAKENHI system, different "Research Categories" are established on the basis of budget scale, contents, 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 high-level 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. (For details of restrictions on parallel grant application/receipt, see page 79.)

For the FY2020 call for proposals, some of the restrictions on parallel grant application/receipt have been relaxed in light of deliberation at the Subdivision on Grants-in-Aid for Research in the Subdivision on Science, Council for Science and Technology and elsewhere. The aim of the relaxation is to expand the opportunities for young researchers to take on challenges in research categories with larger budgets, and to promote challenging and high-level researches by a wider range of researchers.

For the contents of deliberation at the Council for Science and Technology and elsewhere, refer to the following documents:

○ Documents distributed at the 3rd meeting of Subdivision on Grants-in-Aid for Research in the Subdivision on Science, the 10th Council for Science and Technology
-Document 2-1 "Immediate Initiatives for KAKENHI Reform (Basic idea, etc. toward budgetary requests for FY2020) (draft)"
-Document 2-2 "Immediate Initiatives for KAKENHI Reform (Basic idea, etc. toward budgetary requests for FY2020) (draft) [Pertinent Material]"
http://www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu4/045/shiryo/1418448.htm

○ Summary of Discussions by the KAKENHI Reform Promotion Taskforce (Revised Edition), Japan Society for the Promotion of Science (March 15, 2019)
http://www.mext.go.jp/b_menu/shingi/gijyutu/gijyutu4/045/shiryo/__icsFiles/afieldfile/201__9/04/15/1415283_010.pdf

Expansion of Challenge Opportunities for Young Researchers

○ Relaxation of Restrictions on Parallel Grant Application for "Grant-in-Aid for Early-Career Scientists (Second Time)" and for "Grant-in-Aid for Scientific Research (S/A/B)"

The FY2019 budget for the Grants-in-Aid for Scientific Research was significantly increased. The funding to high-level young researchers was substantially strengthened by radical budget allocation for grant categories targeting mainly young researchers, "Early-Career Scientists[2]" and "Research Activity Start-up[3]" in particular. (The number of "Early-Career Scientists" grants newly adopted in FY2018: 6,256 (adoption rate: 30.7%) → that in FY2019: 7,831 (adoption rate: 40.0%).)

On the other hand, follow-up inspection of the influence of the discontinuation of call for proposals in the "Young Scientists (A)" since FY2017 has revealed the following trends: While a certain fraction of the researcher population that formally applied to the "Young Scientists (A)" category shifted to the "Scientific Research (B)" category comparable in budget scale, a greater fraction of the researcher population actually shifted to the "Scientific Research (C)" category with smaller budget scale. Furthermore, the number of young researchers applying to the "Scientific Research (S/A)" category with larger budget scale was extremely small, as ever. One of the conceivable reasons for such trends could be the difficulties young researchers are facing in their attempt to take risk of aiming higher for the development of their own research, under the current environment for young researchers in Japan with such problems as insecurity of research posts.

In order to advance the research capability of Japan amidst greater sophistication of research and intensification of international competition, it is essential to take a measure to encourage high-level young researchers to take risk of aiming higher for larger scale research. In the FY2020 call for proposals, the system improvement with the relaxation of restrictions on parallel grant application as described in the followings has been implemented, to reduce the risks in aiming higher for larger scale research as the next step, for those young researchers who have gained a certain level of experience through conducting research with an "Early-Career Scientists" grant, and thereby expanding the challenge opportunities for young researchers.

Relaxation of Restrictions on Parallel Grant Application for "Early-Career Scientists (Second Time) (*)" and for "Scientific Research (S/A/B)"

(*) In the FY2020 call for proposals, "Early-Career Scientists (Second Time)" shall mean "Early-Career Scientists" applied for by a researcher who is currently in the final fiscal year of an on-going research project receiving an "Early-Career Scientists (First Time)" grant, or a researcher who has finished receiving the first time "Early-Career Scientists" grant in the past (in FY2018 or earlier) and is eligible to apply for the second time "Early-Career Scientists" grant. Note that the "Early-Career Scientists" category hereby encompasses the "Young Scientists (S/A/B)" categories in the former scheme.

(Note) Researchers cannot simultaneously receive an "Early-Career Scientists (Second Time)" grant and a "Scientific Research (S/A/B)" grant. (In case the both proposals are adopted, that in the "Scientific Research (S/A/B)" category shall be given priority.)

[2] Research conducted by an individual researcher who is less than 8 years after Ph.D. acquisition.

[3] Research to be 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 kind of leave

(Reference) Adoption of proposals of young researchers in FY2019 KAKENHI

The adoption rate of proposals of young researchers (researchers of age 39 or under) are relatively high compared to the overall adoption rate.

Research category		Number of applications	Number of adoptions	Adoption rate
Scientific Research (A)	Age 39 or under	84	29	34.5%
	Overall	2,412	605	25.1%
Scientific Research (B)	Age 39 or under	1,368	473	34.6%
	Overall	11,396	3,327	29.2%
Scientific Research (C)	Age 39 or under	4,751	1,945	40.9%
	Overall	45,758	12,918	28.2%

○ Relaxation of Restrictions on Simultaneous Receipt of a Grant in the "Grant-in-Aid for Research Activity Start-up" Category and Grants in Other Research Categories

The "Research Activity Start-up" is a research category targeted at young researchers and others who were not able to apply at the time of the regular application period for the "Scientific Research" and other research categories (call for proposals in September of the fiscal year prior to the grant delivery), to support the start-up phase of their research activities so as to smoothen the step-up to their subsequent research stage. The recipient of a "Research Activity Start-up" grant can submit new KAKENHI proposal(s) to the "Scientific Research" and other research categories in subsequent fiscal years. However, formerly he/she was not allowed to receive the both grants simultaneously if the latter application(s) were adopted. (In that case, the second fiscal year grant for the "Research Activity Start-up" would not be delivered.).
It is observed that the recipients of the "Research Activity Start-up" grants are overwhelmingly young researchers (researchers of age 39 or under). (The fraction of young researchers in the grantees of the "Research Activity Start-up" category in FY2018 was 85%.) It is also considered that letting the "Research Activity Start-up" grant recipient complete his/her research plan would contribute to more effective execution of research. For these reasons, starting from the FY2020 call for proposals, the above-mentioned restriction on simultaneous receipt of grants is eliminated, and thereby encouraging young researchers and others endowed with fresh and flexible ideas in their newly appointed research positions toward more ambitious challenges.

Relaxation of Restrictions on Simultaneous Receipt of a Grant in the "Research Activity Start-up" Category and Grants in Other Research Categories

-The recipient of a "Research Activity Start-up" grant which is on-going in FY2020 can newly receive grant(s) in the "Scientific Research" and other research categories in FY2020 if the latter are adopted, without giving up the former.

Promotion of Challenging Research

○ Relaxation of Restrictions on Parallel Grant Application/Receipt for "Grant-in-Aid for Challenging Research (Pioneering)" and for "Grant-in-Aid for Scientific Research (B)"

"Challenging Research" is a research category started from the FY2017 call for proposals established by a constructive reorganization of the former "Challenging Exploratory Research"

category so as to enable support of longer-term/larger scale research plans. The aim of this research category is to promote bold challenges that may transform the existing framework of science.

As for the "Challenging Research (Pioneering)" category, it has been recognized that the applicants/grantee population tends to lean toward relatively senior generation of researchers. The reason for this trend may be partly because parallel grant application was only permitted with the "Scientific Research (S/A)" category and partly because highly selective screening was exercised for this category as compared to the "Scientific Research" and other research categories as indicated by the adoption rate of about 10%.

In the FY2020 call for proposals, the system improvement with the relaxation of restrictions on parallel grant application/receipt as described in the followings has been implemented, with the perspective of further strengthening pioneering explorations of emerging interdisciplinary research areas, by promoting challenging high-level researches by a wider range of researchers.

Relaxation of Restrictions on Parallel Grant Application/Receipt for "Challenging Research (Pioneering)" and for "Scientific Research (B)"

-Formerly, grant application in parallel with an application to the "Scientific Research (B)" category was only permitted with the "Challenging Research (Exploratory)" category. Starting from the FY2020 call for proposals, grant application/receipt in parallel with the "Scientific Research (B)" category is also permitted with the "Challenging Research (Pioneering)" category.
-The "Challenging Research (Pioneering)" is scheduled to be transferred to the Multi-year Fund from FY2020 onward.

III. Call for Proposals

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

The following shows the research categories for which Ministry of Education, Culture, Sports, Science and Technology (hereinafter “MEXT”) is organizing a call for proposals:

Grant-in-Aid for Scientific Research on Innovative Areas

Grant-in-Aid for Special Purposes

Note: Schedule, application procedures, and other matters for "Grant-in-Aid for Special Purposes" are different from those for Grants-in-Aid for Scientific Research on Innovative Areas (cf. page 74).

2. Schedule from Application to Grant Delivery (Grant-in-Aid for Scientific Research on Innovative Areas)

(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 "IV. Instructions for Prospective Applicants" and "V. Instructions for Grant Recipients")	Procedures to be Performed by the Research Institution (See "VI. Instructions for Administrative Staff of Research Institution")
From September 1 (Sunday, 2019 Start of the Call for Proposals		[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 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.	
	[Procedures to be completed, if the need arises] 2) Participation process of the Co-Investigator-to-be joining as a project member	[Procedures to be completed, if the need arises] 4) The researchers who belong to the Institutions give a consent to become the Co-Investigator.
	3) 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: September 30 (Monday)** 6) ・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: December 2 (Monday)**
		7) Submission (Sending) of the Application Documents
November 7 (Thursday) 4:30 pm Deadline for the Submission (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" 3)), 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" 7)).
   Next, he or she should verify the section "Preparing the Application and Submitting the Application" (pages 90-103), 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" 5 and 6)). If it has not been submitted, no official grant decision will be made for the researchers belonging to the research institution in question. (see page 109)

4. If the project members are organized with some Co-Investigators, the Principal Investigator should conduct the consent process to register the Co-Investigators through the electronic application system (mentioned in "Procedures to be Performed by the Principal Investigator" 2)). And the Co-Investigators-to-be need to obtain a necessary consent to become a Co-Investigator from their research institutions, and so on (mentioned in "Procedures to be Performed by the Research Institution" 4)).
   The Principal Investigator cannot submit (send) the Research Proposal Document to his/her research institutions until the research institutions to which the Co-Investigators-to-be belong give the consent to become a Co-Investigator in the research project, and so on. For this purpose, the Principal Investigator is asked to organize the project members immediately (see page 96).

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

Continuous Research Area (Publicly Offered Research)
December 2019 to March 2020: Screening *1 Early April 2020: Informal decision to grant the funding Middle of April: Application for funding Around August: Disclosure of review results Late April: Decision concerning the granting of the funding Middle of July: Remittance (part of the first term) *2 Around October: Remittance (part of the second term) *2

Notes:

*1 Screening and assessment are conducted by MEXT and the delivery of grants after informal decision to grant the funding 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 Each Research Category

1) Grant-in-Aid for Scientific Research on Innovative Areas (Research in a proposed research area)

(1) Continuous Research Area (Publicly Offered Research)

A) Intended for:

Research projects of Publicly Offered Research related to 38 research area (which starts in FY2017 or FY2019) shown in Attached Table 1 (cf. page 32) and Attached Table 2 (cf. page 34)

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 32) and Attached Table 2 (cf. page 34)

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).
- The each reviewer will carry out document-based screening and the same reviewer will carry out a collegial screening based on the document-based screening results in a committee dedicated to each research area (which will include researchers who are not the member of the research area in question).

(2) Finished Research Area

A) Intended for:

20 research areas in the Attached Table 3 (cf. page 73) whose selected periods end in FY2019

B) Qualified person:

Head Investigator of Finished Research Area

C) Eligible costs:

Budget for collecting research result of Finished Research Area

D) Budget provided:

3 million yen or less than

(3) Restrictions on parallel grant application/receipt etc.

A) Restrictions on parallel grant application/receipt related to "Grants-in-Aid for Scientific Research on Innovative Areas":

The restrictions on parallel grant application/receipt related to Principal Investigators and Co-Investigators of "Grants-in-Aid for Scientific Research on Innovative Areas" are as the Attached Table 4 (cf. page 85). The applicant should be sure to verify it before preparing application documents.

- Continuous Research Area (Publicly Offered Research)
  It is possible to receive grants for up to 2 research projects in Publicly Offered Research. However, it is not possible to apply for and receive grants for 2 research projects in the same research area.

- Finished Research Area
  If a Head Investigator (the Principal Investigator of Administrative Group) of "research area whose selected period will end in FY2019" applies in order to collect research results of the research area, rules on restrictions on duplication between the same research category and another research category are not imposed on Principal Investigators and Co-Investigators.

B) Application documents, methods, or others:

The applicant should pay attention to application documents and methods because they are different between application for "Continuous Research Area (Publicly Offered Research)" and application for "Finished Research Area". Moreover, see "3. Preparing the Application (Research Proposal Document) and Submitting the Application (Research Proposal Document)" of "IV. Instructions & Procedures for those Intending to Apply" for the details.

(4) New Research Area [references]

A) Purpose:

New research areas proposed by a group of diverse researchers which, through efforts for collective research, scholarly training, shared use of equipment, etc., will develop and lead to the upgrading and enhancement of scientific research in Japan.

B) Intended for:

Research areas expected to develop innovative and creative scientific research, which either "a) aim for creation of a new and merged area beyond existing academic areas" or "b) aim for significant and dramatic development of the area in question" 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 and develop a new research area across multiple areas;
2) "(i) Area having (or expected to have) international superiority", "(ii) Japanese unique area or unprecedented area having (or expected to have) creativity and novelty", or "(iii) Area which is important from the perspective of academic international trend, etc. and requires significant consideration for the development because Japan lags behind";
3) Area expected to bring sufficient results, academic or social meanings, and ripple effects, etc. 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" or other grants-in-aids 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 dramatic development based on the results.

C) Total budget provided:

In principle, the budget provided per research area is set at around 10 million yen to 300 million yen per fiscal year.

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

Five years

E) Constitution of research area:

- A research area should consist of "Planned Research *1" and "Publicly Offered Research *2"
- The "Planned Research" consists of an administrative organization composed of "Administrative Group *3" and individual "Planned Research".

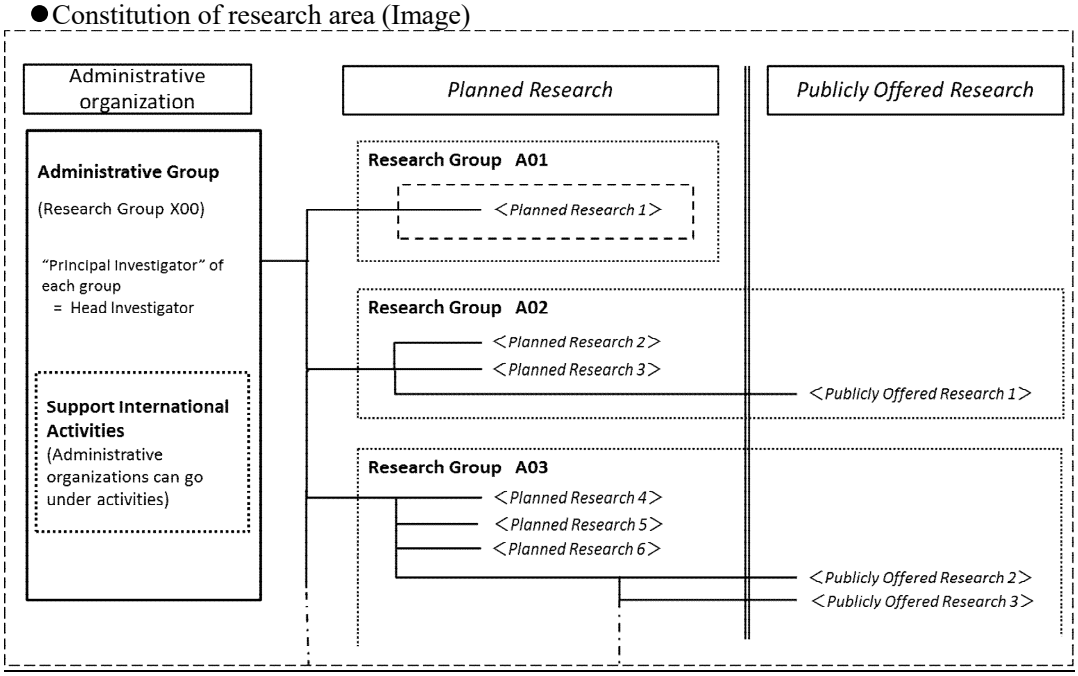
Distinction		Description
Planned Research *1		Research projects in which a Head Investigator (Principal Investigator of "Administrative Group") organizes researchers in the research area in question in advance and systematically make progress in order to develop the research area (including research projects of Administrative Group)
	Administrative Group *3, *4	Organization which formulates research policy for the whole research area, adjusts projects, supports research (purchase, development, and operation of equipment and devices shared in the research area, and provisions of experimental samples and materials, etc.), organization which formulates the optimum policy for international development (strengthening of the research area by finding current international researches, development of new international network, etc.), analyses international trend, and performs 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.)), or conduct other activities (which does not actually conduct research) *A Head Investigator of the research area in question shall be the Principal Investigator, and Principal Investigators of all "Planned Research" consisting of the research area must be organization members (Co-Investigators and Research Collaborators). In addition, a Co-Investigator of "Planned Research" can be an organization member (Co-Investigator and Research Collaborators) when necessary. Moreover, persons other than Principal Investigators and Co-Investigators of "Planned Research" cannot be Co-Investigators of Administrative Group. * Support International Activities can go under activities.
Publicly Offered Research *2		Research projects which one researcher performs in cooperation with "Planned Research" in order to further promote research in the research area in question and a call for proposals is organized after setting the research area in question. *Research period of Publicly Offered Research is set at two years (a second and third year or fourth and fifth year of the set period of the area), and calls for proposals are organized at the time corresponding to the first year and the third year of the set period of the area.

*1: 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.

*2: The replacement of the Principal Investigator is not permitted in principle except for research projects of "Administrative Group". If a Principal Investigator of Planned Research lacks, however, it may be permitted via screening by the Academic Deliberation Council for Science and Technology.

*3: It is not permitted to allot direct costs for research projects of "Administrative Group" to costs directly required for achieving other research projects in the research area in question.

● Constitution of research area (Image)



● Participation of Members of Research Area in "Administrative Group"
A researcher composing the research area participates in "Administrative Group" under the following position.

Member of research area	→	Participation in "administrative group"
Head Investigator	→	Principal Investigator (mandatory)
Principal Investigator of Planned Research	→	Co-Investigator or Research Collaborator (mandatory)
Co-Investigator of Planned Research	→	Co-Investigator or Research Collaborator (if necessary)
Research Collaborator of Planned Research	→	Research Collaborator (if necessary)

1) A Head Investigator must be the Principal Investigator of "Administrative group".
2) Principal Investigators of "Planned Research" must participate as Co-Investigators or Research Collaborators of "Administrative group".
3) Co-Investigators of "Planned Research" can participate in "Administrative group" when necessary.
4) Persons other than Principal Investigators and Co-Investigators of "Planned Research" can participate as Research Collaborators of "Administrative group" and when necessary. However, they cannot become Co-Investigators of "Administrative Group".

F) Interim assessment, ex-post assessment:

- Interim assessment is conducted in the third fiscal year after setting up the research area and ex-post assessment is conducted in the fiscal year following completion of the research 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.

G) Others:

- 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.

Attached Table 1 List of Research Areas in which "Publicly Offered Research" is Solicited in Grants-in-Aid for Scientific Research on Innovative Areas

No	Research Area Number	Title	Term of Project	Research Period	Number of projects scheduled to be selected	Upper Limit of Annual Budget (in million yen)
1	1901	Construction of the Face-Body studies in transcultural conditions	FY2017-2021	2 years	3 8 13	2 1.5 1
2	1902	Creation of the study of reconciliation	FY2017-2021	2 years	4	1.2
3	5101	Integrative Human Historical Science of "Out of Eurasia": Exploring the Mechanisms of the Development of Civilization	FY2019-2023	2 years	2 2 14	5 4 2
4	2901	Aqua planetology	FY2017-2021	2 years	6 6	5 2
5	2902	Discrete Geometric Analysis for Materials Design	FY2017-2021	2 years	5 15	9 3
6	2903	Soft Crystals: Science and Photofunctions of Flexible Response Systems with High Order	FY2017-2021	2 years	24	2.5
7	2904	Chemistry for Multimolecular Crowding Biosystems	FY2017-2021	2 years	5 18	5 2.5
8	2905	Gravitational wave physics and astronomy: Genesis	FY2017-2021	2 years	3 6 12	4 2 1
9	2906	Frontier research on chemical communications	FY2017-2021	2 years	24	2.5
10	2907	Hybrid Catalysis for Enabling Molecular Synthesis on Demand	FY2017-2021	2 years	20 10	3 2
11	6101	Physical Properties of Quantum Liquid Crystals	FY2019-2023	2 years	2 6 4	5 3 1.5
12	6102	Mid-latitude ocean-atmosphere interaction hotspots under the changing climate	FY2019-2023	2 years	2 6	9.7 3
13	6103	New Materials Science on Nanoscale Structures and Functions of Crystal Defect Cores	FY2019-2023	2 years	12	3
14	6104	Aquatic Functional Materials: Creation of New Materials Science for Environment-Friendly and Active Functions	FY2019-2023	2 years	27	2.5
15	6105	Unraveling the History of the Universe and Matter Evolution with Underground Physics	FY2019-2023	2 years	6 5	2.5 1
16	6106	Hypermaterials: Inovation of materials scinece in hyper space	FY2019-2023	2 years	8 7	4 2
17	6107	Science on Interfacial Ion Dynamics for Solid State Ionics Devices	FY2019-2023	2 years	16	3 2

No	Research Area Number	Title	Term of Project	Research Period	Number of projects scheduled to be selected	Upper Limit of Annual Budget (in million yen)
18	3901	Transomic Analysis of Metabolic Adaptation	FY2017-2021	2 years	8 7	5 2
19	3902	Evolutionary theory for constrained and directional diversities	FY2017-2021	2 years	13	5
20	3903	Principles of pluripotent stem cells underlying plant vitality	FY2017-2021	2 years	13	4.5
21	3904	Toward an integrative understanding of functional zones in organelles	FY2017-2021	2 years	12	3.8
22	3905	Spectrum of the Sex: a continuity of phenotypes between female and male	FY2017-2021	2 years	12	5
23	7101	Multimode autophagy: Diverse pathways and selectivity	FY2019-2023	2 years	10 18	4 2.5
24	7102	Program of totipotency: From decoding to designing	FY2019-2023	2 years	13	4
25	7103	Mechanisms underlying replication of non-genomic codes that mediate plasticity and robustness for cellular inheritance	FY2019-2023	2 years	15	4
26	7104	Intrinsic periodicity of cellular systems and its modulation as the driving force behind plant development	FY2019-2023	2 years	18	4
27	4901	Preventive medicine through inflammation cellular sociology	FY2017-2021	2 years	2 8	9 4
28	4902	Giant reservoirs of heat/water/material : Global environmental changes driven by the Southern Ocean and the Antarctic Ice Sheet	FY2017-2021	2 years	4 12	7.5 2.5
29	4903	Studies of Language Evolution for Co-creative Human Communication	FY2017-2021	2 years	8 14	4 2
30	4904	Integrated analysis and regulation of cellular diversity	FY2017-2021	2 years	3 9	6 3
31	4905	Brain information dynamics underlying multi-area interconnectivity and parallel processing	FY2017-2021	2 years	20	3
32	4906	Creation of novel light energy conversion system through elucidation of the molecular mechanism of photosynthesis and its artificial design in terms of time and space	FY2017-2021	2 years	14 14	3 2
33	8101	Non-equilibrium-state molecular movies and their applications	FY2019-2023	2 years	7 7	5 3
34	8102	Hyper-adaptability for overcoming body-brain dysfunction: Integrated empirical and system theoretical approaches	FY2019-2023	2 years	20	3
35	8103	Integrated Biometal Science: Research to Explore Dynamics of Metals in Cellular System	FY2019-2023	2 years	20	3
36	8104	Information physics of living matters	FY2019-2023	2 years	6 12	3.5 1.5
37	8105	Studies on intelligent systems for dialogue toward the human-machine symbiotic society	FY2019-2023	2 years	5 10	10 5
38	8106	Post-Koch Ecology: The next-era microbial ecology that elucidates the super-terrestrial organism system	FY2019-2023	2 years	10 3	4 3

(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 FY2020 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.

1 Construction of the Face-Body studies in transcultural conditions

http://kao-shintai.jp/

Number of Research Area	:	1901	Term of Project :	FY2017-2021
Head Investigator	:	YAMAGUCHI K., Masami		
Research Institution	:	Chuo University, Department of psychology		

We will clarify the sub-conscious processing of facial and corporeal expressions in order to better understand the fusion among different people and different cultures. For example, by analyzing a person's gaze, of which one is normally unaware, it is possible to understand the communication and expression strategies enclosed within a single culture from the perspective of cultural diversity. Understanding facial and corporeal expressions in transcultural situations in turn leads to the acceptance of others, different cultures, and heterogeneity.

This project consists of three research groups: "Examination of the cross-cultural aspects of facial and corporeal expressions (research group: A01)," "Elucidating the mechanisms that create the facial and corporeal expressions of different cultures (research group: B01)," and "Comparative phenomenology of facial and corporeal expressions (research group: C01)." Empirical data and evidence will be collected by field research (mainly in A01) and experimental research (mainly in B01), with each aimed at cultural difference comparison and understanding of foreign cultures. Experimental studies in B01 elucidate the basic mechanism that creates cultural impact and diversity revealed in A01. Theoretical studies in C01 are utilized for establishing theoretical basis for phenomena and data obtained in A01 and B01. The three project areas are linked organically. We encourage proposals from researchers of various backgrounds, particularly young researchers, to promote interdisciplinary collaboration and exchange. We support this research collaboration and exchange by actively employing research content with novel ideas and by providing budgetary and organizational support. We also welcome proposals of engineering research aiming to offer novel technology to our project. The budgetary range for publicly offered research is presumed to be between 1 million yen (e.g., theoretical research in C01) to a maximum of 2 million yen (e.g., research using functional brain imaging in B01) per annum.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01: Examination of the cross-cultural aspects of facial and corporeal expressions; Research on facial and corporeal expressions and representations, mainly comprising cultural anthropology fieldwork. This also includes collaborative research with neighboring fields.	1	4
	1.5	3
	2	1
B01: Elucidate the mechanisms that create the facial and corporeal expressions of different culture; Experimental studies in the fields of experimental and cognitive psychology, neuroscience and clinical studies. This area also includes studies tied with expressive techniques.	1	5
	1.5	5
	2	2
C01: Comparative phenomenology of facial and corporeal expressions; Research based on philosophical examinations, including cosmetology, linguistics, literary studies, sociology, ethics, aesthetics and art theory, and comparative phenomenology.	1	4

2 Creation of the study of reconciliation

http://www.prj-wakai.com/

Number of Research Area	:	1902	Term of Project :	FY2017-2021
Head Investigator	:	ASANO, Toyomi		
Research Institution	:	Waseda University, Faculty of Political Science and Economics		

This research project attempts to establish the academic basis for "Reconciliation Studies" by reexamining "conflict resolution studies," first developed in the field of "International Relations" in Western academia, focusing specifically on the historical context of East Asia. In East Asia, the "bitter legacies" of war and colonialism came to be the core of national emotions and historical memories and continue to interrupt the construction of stable regional relations, producing mistrust among nations. In view of the current situation in which these historical issues are increasing conflict between Japan and Korea in 2019, nationalism theory backed by East Asian historical contexts should be combined with conflict resolution studies.

The creation of "Reconciliation Studies" has been established in order to gather scholars from around the world and to reconcile disputes over historical issues in East Asia since 2017. We observed that many attempts to realize reconciliation were always subjugated to the theory of realism and economic liberalism favoring national interest and power. This project, in contrast, aims eventually to have an age in which it is possible for people to imagine reconciliation between nations, similar to how people imagine an anonymous community as a nation. This project will explore the social conditions in which the concept of imaginable reconciliation can be possible by forming an intellectual framework as a first step. We are also planning to establish a new academic association of 'International Reconciliation Studies' and develop it from East Asia.

We publicly call for innovative research plans from any researcher whose research interest is closely associated with our project in the following categories. Under the category of A02-A06, we invite research plans focusing on theoretical and empirical studies upon each actor which is related with national emotions. Under the category of B01-B06, we call for research plans focusing on concrete cases and specific issue which impinge upon some actors mentioned above.

Applicants should be able to collaborate in order to establish the theoretical and empirical bases of a new academic field of "Reconciliation Studies." We welcome ambitious research plans not only from history and political science, but also from other disciplines such as sociology, anthropology, psychology, legal philosophy, and so on.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A02 Research on Political & Diplomatic history (Comparative analysis of reparations and claims, Normalization of diplomatic relations after decolonization of Empires , etc.)	1.2	4
A03 Research on Thought & Theory (Transitional Justice theory, Reciprocal reconfiguration between domestic and international politics over history issues, etc.)		
A04 Research on Network of Historians (Historiography of joint history projects in East Asia, Emotional History, etc.)		
A05 Research on Citizen Activism (Studies upon citizens, civil associations and NPO which were in charge of history issues)		
A06 Research on Cultural Reconciliation & Memory (How memories have been formed through media, television and film)		
B01 Research on residual orphans, returnees, support and settlement of Japanese repatriates, the settlement process, etc.		
B02 Research on comfort women, nurses and gender activists		
B03 Research on military qualifications, compensation for detainees, trials, etc.		
B04 Research on war and recruitment of civilians, militaryvotes, private company responsibilities, etc.		
B05 Research on memory, memorial service, museums, etc.		
B06 Research on history education (common textbooks, comparison with European history education, etc.)		

3 Integrative Human Historical Science of "Out of Eurasia": Exploring the Mechanisms of the Development of Civilization

http://out-of-eurasia.jp

Number of Research Area	:	5101	Term of Project :	FY2019-2023
Head Investigator	:	MATSUMOTO, Naoko		
Research Institution	:	Okayama University, Graduate School of Humanities and Social Sciences		

The project aims to clarify the mechanism of the creation of civilization, by analyzing the material data from the period of its development based on the model of the mutual permeation of matter and mind as mediated by the body. The Americas, the Japanese archipelago, and Oceania, the regions of final destination for *Homo sapiens* who left Eurasia and dispersed by overcoming bottlenecks and extreme conditions, are selected as the object to investigate the processes which unfolded independently under different natural environmental and historical circumstances. Our goal is to establish the truly integrated research field that enable to propose a new view of human and culture, overcoming the dualistic mind–body and mind–matter frameworks that have formed the basis of modern science.

We invite research projects that complement our active transdisciplinary project consisting of many disciplines. In a close collaboration with the Research Groups in our project, invited research projects are expected to investigate various periods and areas in the extra-Eurasian region, either empirically or theoretically, to contribute to the establishment of methodological framework of Integrated Human Historical Science. Our ultimate purpose is to understand the nature of civilization which has brought about the modern world and provide a scientific foundation for the actions for the future. Thus innovative research projects by younger researchers are the most welcome.

We invite: 1) research projects that are related to one of our Research Groups A01-03, B01-03, and C01 with a complimentary research field or view point, 2) empirical and highly innovative research projects related to more than one Research Groups, 3) theoretical and/or methodological research concerning the construction of the Integrated Human Historical Science, and 4) researches to develop analytical method for Big Data, 3d images, or GIS.

Annual research grant is basically up to 2 million yen, but 4 million yen for transdisciplinary research that requires fieldwork or research instruments, and 5 million yen for experimental research projects.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Creation of Artificial Landscape and Development of Spatiotemporal Cognition	5	2
A02 How art and technology connect mind, body, and society	4	2
A03 Growing complexity of social groups and warfare	2	14
B01 Sociocultural mechanisms underlying niche construction based on ethnographic research		
B02 Neurobiological mechanisms of cognitive niche construction		
B03 Genetic diversity and physical changes associated with human dispersal and the development of complex societies		
C01 Integrative studies of anthropological, archaeological, and cognitive evidence through 3D database construction and mathematical analyses and modeling		

4 Aqua planetology

http://www.aquaplanetology.jp/

Number of Research Area	:	2901	Term of Project :	FY2017-2021
Head Investigator	:	SEKINE, Yasuhito		
Research Institution	:	Tokyo Institute of Technology, Earth-Life Science Institute		

Recent advances in spacecraft explorations have revealed the present/past existence of liquid water on planetary bodies beyond Earth in the Solar system. Our research project proposes a new field of research – aqua planetology – that aims at comprehensive understanding on the roles of liquid water in the origin and evolution of planets and on habitability there. This requires research interactions between geology, geochemistry, biosphere science, astronomy, and planetary science. We try to achieve this goal both by constructing a theory of chemical reactions and hydrological cycles on planetary bodies and by collecting observational evidence through spacecraft missions, such as Hayabusa2, and geochemical analyses of extraterrestrial samples. The expected achievements of our research project include 1) understanding of hydrological cycles within planetesimals and the factors that control water volume of Earth, and 2) revealing the evolution of aqueous environments and prediction of biosphere on Mars and icy satellites.

In our research project, the subgroup A01 performs laboratory experiments on water-rock reactions and predicts planetary biospheres, the subgroup A02 performs experiments of water-ice interactions on planetary surfaces, A03 constructs numerical models of planetary geochemical cycles through including experimental data obtained by the subgroups A01 and A02, B01 constructs a X-ray microscope for molecular geochemical analyses and develops proxies to reconstruct aqueous environments from extraterrestrial samples, and B02 performs analyses of data obtained by Solar system explorations, including Hayabusa2, Mars missions, and icy satellite missions.

As publicly invited researches of Type I, we expect innovative researches in surrounding areas of aqua planetology, including hydrology, extremophile microbiology, field geology, Solar system exploration science, and Solar system astronomy. As Type I, researches that have long-term scopes in related research fields are also expected. As Type II, we expect interdisciplinary researches that utilize the research resources developed by our research project, such as Hayabusa2 data and X-ray microscope. Researches that aim to reveal co-evolution of planetary environments and life and that develop science instruments for future space explorations are also expected as Type II.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Water-rock reactions	2 (Type I) 5 (Type II)	6 6
A02 Water-ice interactions		
A03 Modeling of cycles		
B01 Molecular geochemistry		
B02 Solar system exploration		

5 Discrete Geometric Analysis for Materials Design

https://www.math-materials.jp/

Number of Research Area	:	2902	Term of Project :	FY2017-2021
Head Investigator	:	KOTANI, Motoko		
Research Institution	:	Tohoku University, Graduate School of Science		

A new research area is proposed in collaboration between mathematics and materials science in order to understand the structure-function-process correlation principle and develop mathematics for new phase materials. We invite proposals of various mathematical methods and concepts, and also challenges in materials science to cooperate with mathematical ideas. Successful applications are not necessarily by interdisciplinary teams but are expected to be active and show exceptional potential for leadership in interdisciplinary collaborations in promoting this project.

A01 targets topological materials. Mathematical/theoretical proposals to discover a universal framework to explain robust topological phases, or experimental proposals to produce/analyze topological materials by employing mathematical models are expected.

A02 targets understanding of structures of polymer materials which prohibit multi-functions as hierarchical networks. Mathematical/ computational analysis of the structures or synthesis of soft matters including liquid crystals, gels, colloidal materials along the line are most welcome.

A03 targets nano-porous materials. Proposals of mathematical/computational approaches to understand dynamical formations of multi-continuous structures or synthesis/ control of various porous materials expected.

B01 targets developments of new methods and theories in information science and data science for material design

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 (inorganic): topological materials	9 3	5 15
A02 (organic): polymer materials using network analysis		
A03 (composite): dynamical formation of nano-porous materials		
B01 Information science for material design		

6 Soft Crystals: Science and Photofunctions of Flexible Response Systems with High Order

http://www.softcrystal.org

Number of Research Area	:	2903	1	Term of Project :	FY2017-2021
Head Investigator	:	KATO, Masako			
Research Institution	:	Hokkaido University, Faculty of Science			

This project aims to establish a new science concerning "Soft Crystals", which respond to macroscopic gentle stimuli (e.g. vapor exposure, rubbing, and rotation) that exhibit visually remarkable changes such as luminescence and optical properties. This project also aims to develop novel functional materials on the basis of the scientific achievements. "Soft Crystals" are regulated solids with stable and highly ordered structures. However, they are characteristic of facile structural transformations and phase transitions in response to weak but particular stimuli. One of scientifically most important challenges is to clarify the phenomena of the formation and phase-transition of "Soft Crystals". Through the scientific research, we aim to create a new area, which can provide new materials beyond the conventional hard crystals and/or soft matters.

In this research area, the following three research groups, A01–A03, will promote research cooperatively to establish a new fusion area with the concept of Soft Crystals. For all the three groups, experimental and theoretical researchers will collaborate closely with each other for effective studies. Proposals for unique research projects which are expected to promote this area greatly are very welcome. In particular, the studies based on theoretical and physical approaches could take important parts.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Development of Soft Crystals through molecular design & synthesis	2.5	8
A02 Development of Soft Crystals with novel structures and morphology	2.5	8
A03 Development of Soft Crystals with superior physical properties & functions	2.5	8

7 Chemistry for Multimolecular Crowding Biosystems

http://www.bunshi-kyouzatsu.jp

Number of Research Area	:	2904	Term of Project :	FY2017-2021
Head Investigator	:	HAMACHI, Itaru		
Research Institution	:	Kyoto University, Graduate School of Engineering		

Live cells and tissues are multimolecular crowding biosystems consisting of many kinds of biological molecules densely condensed in the closed small spaces. However, conventional biochemical researches ignored such complicated environments where biological molecules reside, and most experiments have been conducted in a purified and dilute solution. The purpose of our research project is to establish new chemical approaches available for functional analysis and artificial regulation of biological molecules in the multimolecular crowding biosystems. Accumulating cutting-edge findings from a broad range of research fields (chemical biology, synthetic biology, biophysical chemistry, nano-bioengineering, etc.), we aim to quantitatively describe the multimolecular crowding biosystems and to devise new molecules and methods, which contribute to innovate on bioimaging, drug discovery and disease diagnosis. We envision that our researches could create a new trend for biofunctional life chemistry.

This research project consists of three teams (A01 – A03) to promote individual researches on their specific topics. Meanwhile, the project highly encourages collaborative researches between the project members. A01 team focuses on development of chemical strategies, establishment of molecular design and synthesis of artificial probes and modulators for analyzing and regulating biomolecules available in cells and tissues. A02 team focuses on quantitative analysis and description of multimolecular crowding biosystems on the basis of biophysical and computational chemistry. A03 team focuses on creation of new nanobio-devices for analyzing and diagnosing specific biological molecules (biomarkers) in cells, tissues and in vivo. This project also plans to establish Center for Integrated Biomolecular Chemistry (CIBIC) as a hub that underpins and promotes collaborative research between the project members. A variety of the instruments, chemical tools, methods and know-how for accelerating integrated research can be shared by all of the members through operating CIBIC.

We expect many applications from publicly offered research, which propose attractive projects and can complement the planned researches conducted by main project members, in order to accomplish the ultimate goal of this project. We call for the two types of research application with the different budget limit; one is pioneering and challenging research (2.5 million yen per year), and another one is comprehensive and high impact research (5 million yen per year), both of which will be expected to bring excellent results.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Synthetic chemistry for multimolecular crowding biosystems	2.5 5	18 5
A02 Physical and computation chemistry for multimolecular crowding biosystems		
A03 Analytical and applied chemistry for multimolecular crowding biosystems		

8 Gravitational wave physics and astronomy: Genesis

http://gw-genesis.scphys.kyoto-u.ac.jp

Number of Research Area	:	2905	Term of Project :	FY2017-2021
Head Investigator	:	TANAKA, Takahiro		
Research Institution	:	Kyoto University, Graduate School of Science		

In 2016, the LIGO reported the first direct detection of gravitational waves (GWs). Since then, the Virgo joined the observation network, which has dramatically increased the GW detection events, including the epoch-making binary neutron star merger event GW170817. KAGRA, the Japanese GW detector, is about to enter the actual observational stage by the end of this year. Japan has strong points in data analysis of GWs, multi-wavelength observations of astronomical objects corresponding to the GW sources and theoretical studies. The purpose of this area is, by integrating these existing specialties, to push forward the trend of the genesis of GW physics and astronomy, and to establish a new research field from the two aspects "comprehensive analysis of GW data" and "new physics and astronomy that expand from GW detection".

In order to achieve this objective, this innovative area includes various research subjects such as testing gravity theories, cosmology, star formation, neutron star structure, origin of gamma ray burst, galaxy chemical evolution, and supernova physics. Following the detection of GWs, the relevant research areas to be included in our collaboration are rapidly expanding, and it is expected to develop even to unpredictable directions along with future new findings. In our planned research projects, we focused on the selected contents in order to clarify our scientific goals. For that reason, there are many issues being not included as research in the peripheral field. Even as for the research contents already categorized in the planned research projects, new research fields are still expanding when considering and reexamining relevant subjects more widely or deeply. Subscription research is open to such research proposals widely.

In pursuit of the explosive progress of GW research, the objective is to initiate new researches leading the world from this innovative area, and from that point of view, we would like to adopt projects that are creative and internationally competitive. Finally, we encourage such researches that suit with the keyword “establishing new physics and astronomy that expand from GW detection".

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Testing gravity theories using gravitational waves		
A02 New developments of gravity theory research in gravitational wave physics and astronomy		
A03 Theoretical study on binary black hole formation		
B01 Physics and astrophysics with gravitational waves from binary neutron star coalescences, black hole neutron star coalescences, pulsars and magnetars	4 2 1	3 6 12
B02 Gravitational wave sources probed with high energy observations		
B03 Study of nucleosynthesis in neutron star merger with optical-infrared follow-up observations of gravitational wave sources		
C01 Deciphering physics of core-collapse supernovae via gravitational-wave astronomy		
C02 Studying supernova explosions via their neutrino emissions		

9 Frontier research on chemical communications

http://www.pharm.kyoto-u.ac.jp/fr_chemcomm

Number of Research Area	:	2906	Term of Project :	FY2017-2021
Head Investigator	:	KAKEYA, Hideaki		
Research Institution	:	Kyoto University, Graduate School of Pharmaceutical Sciences		

Many natural products have served as pharmaceuticals, agrochemicals, and their leads because of the structural and biological diversity. However, essential roles of natural products as chemical communication molecules among microbes, animals, plants, et cetera have not been fully elucidated. Integrated understanding of various kinds of chemical communications could therefore accelerate functional regulation by utilizing chemical communication molecules.

This research project aims at not only developing innovative high-order analysis platforms, but also at clarifying essential roles of natural products as chemical communication molecules in the natural environment, leading to development of useful chemical tools as well as pharmaceuticals/agrochemicals leads. In addition, this research project would contribute to the advancement in medical, agricultural, and food sciences, as well as open up a new discipline, "Molecular Sociology", which would focus on the frontiers in chemical communications in a variety of biological species.

In this research area, the following three research groups interact closely with each other.

Group A01 (Chemical Communications in Biological Species): Screening and development of bioactive natural products as chemical communication molecules by a target-based phenotypic screening approach.

Group A02 (Ligand-induced Chemical Communications): Development of bioactive synthetic ligands as chemical communication molecules by theoretical design and synthesis and physicochemical approach.

Group A03 (Integrated Methods for Chemical Communication Analysis): Development and application of integrated platforms for identifying chemical communication molecules and analyzing their modes of action.

Now, attractive applications in various research fields such as chemical ecology, environmental science, pharmacology, structural biology, synthetic chemistry, artificial intelligence, and bioinformatics, as well as natural product chemistry, with synergistic, transversal, and applied perspectives, are openly recruited for these research groups. The applications by young researchers are also encouraged.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Chemical Communications in Biological Species	2.5	8
A02 Ligand-induced Chemical Communications	2.5	8
A03 Integrated Methods for Chemical Communication Analysis	2.5	8

10 Hybrid Catalysis for Enabling Molecular Synthesis on Demand

http://hybridcatalysis.jp

Number of Research Area	:	2907	Term of Project :	FY2017-2021
Head Investigator	:	KANAI, Motomu		
Research Institution	:	The University of Tokyo, Graduate School of Pharmaceutical Sciences		

Organic synthesis has been consistently developed and refined up to the present, but several important issues remain unresolved. One such issue is the practical synthesis of high-value-added complex molecules through streamlined multicatalytic reactions starting from readily-available, abundant molecules. Nature utilizes multicatalytic (i.e., multienzymatic) systems for the biosynthesis of natural products. The most effective artificial multicatalyst system in a flask so far, however, promotes only two or three reactions at most. With this in mind, the purpose of our research project is to develop hybrid catalysis, a multicatalytic system involving catalysts with distinct individual functions. Integrating the functions of multiple catalysts, hybrid catalysis will enable molecular synthesis of high efficiency, flexibility, and adaptability on demand, starting from abundant organic molecules.

Group A01 focuses on the development of new activation methods of stable molecules using hybrid catalysis, including hydrocarbons and other carbon feedstocks. Group A02 focuses on the development of the methods to precisely control multiple reaction parameters, including regio-, functional-group, and stereoselectivity, with high flexibility and adaptability. Group A03 focuses on the development of domino catalysis rapidly increasing structural complexity, starting from simple molecules to multifunctional molecules.

Original and ground-breaking proposals for the development of hybrid catalysis, achievable especially through collaboration in the research project framework, will be considered as candidates. Innovative proposals from young researchers leading to game-changing catalyst systems, are most welcome. As examples, we would accept proposals for homogenous/heterogenous hybrid catalyst systems and proposals for analytical methods related to the elucidation of reaction mechanisms. We encourage the applicants to describe in the proposal possible collaboration research plans with the Planned Research(es) of the Hybrid Catalysis research area.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Activation methods of stable molecules	3	20
A02 Precise controls of selectivity	2	10
A03 Super-efficient molecular synthesis		

11 Physical Properties of Quantum Liquid Crystals

http://qlc.jp

Number of Research Area	:	6101	Term of Project :	FY2019-2023
Head Investigator	:	SHIBAUCHI, Takasada		
Research Institution	:	The University of Tokyo, Graduate School of Frontier Sciences		

Recently, novel electronic states similar to conventional liquid crystals such as spin liquid crystals, electronic nematic orders, and pair density wave have been observed in several solid materials, and studied independently in each research field. In this research project, we focus on these self-organized electronic states with new scales arising from many-body quantum effects, and introduce a new concept "quantum liquid crystals" (QLCs) to unify these novel states of matter. Here we explore broad QLC materials like quantum fluid systems with broken symmetries and conventional liquid crystals exhibiting some quantum effects, in addition to the above-mentioned examples, and study both the universality and diversity of QLCs.

We call for research proposals with original ideas and new viewpoints, complementary to the planned research. A total of 12 grants will be funded. Applications will be considered in any area of research relating to quantum liquid crystals. This research may be fundamental in nature, or orientated to method development and future quantum technology, and need not be based on previous research on electronic states. Within this broad area, four major themes have been identified. Research group A01 aims to develop and synthesize materials that exhibit QLC states, and distributes them to other experimental research groups. We welcome proposals treating broad materials including organic and molecular-based materials, as well as complexes and metal-organic frameworks. In research group B01, we invite research proposals to clarify the ground states and elementary excitations of QLCs, and especially those focusing on hierarchy structures of length and time scales. Research group C01 calls for theoretical research proposals on QLC states and related emerging phenomena, with emphasis on cooperation with experimental research groups. In research group D01, we welcome research proposals aiming to control QLCs by using a variety of methods and searching for novel functionality based on a macroscopic change in physical properties.

We also call for collaborative research proposals promoting relationship between researchers in different fields, or interdisciplinary research proposals from outside of the research field of physical properties in inorganic systems. Especially, proposals from research fields of soft-matter including liquid crystals, organic materials, quantum information, applied mathematics, etc. are welcomed. For experimental proposals, we will accept 2 large-scale research proposals with annual budget up to 5 million yen.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Development of QLC materials	Experimental: 5	2
B01 Advanced measurements of QLCs	Experimental: 3	6
C01 Theory of QLCs	Theoretical: 1.5	4
D01 Control and functionality of QLCs		

12 Mid-latitude ocean-atmosphere interaction hotspots under the changing climate

http://www.jamstec.go.jp/apl/hotspot2/

Number of Research Area	:	6102	Term of Project :	FY2019-2023
Head Investigator	:	NONAKA, Masami		
Research Institution	:	Japan Agency for Marine-Earth Science and Technology, Application Laboratory		

Replacing the conventional assumption that the mid-latitude ocean is passive to atmospheric variability, we have established a new paradigm that strong warm currents (e.g., the Kuroshio and the Gulf Stream) and associated strong ocean frontal zones play active roles in the climate system as "climate hotspots." In this project, we plan to further develop the new paradigm by bringing together latest observational and numerical modeling studies, and to apply these results to studies on the predictability of ocean/atmosphere variability and global warming, showing scientific and societal importance and validity of the paradigm. More specifically, we will investigate multiple spatio-temporal scale interactions in *climate hotspots*; how they can affect the predictability of extreme weather (such as typhoons and bomb cyclones) and ocean currents; and how *climate hotspots* play a role in the warming climate.

There are three planned-research groups based on time scales of variability: (A01) extreme weather on several-day scale, (A02) ocean/atmosphere variability on 10-day to several-year scales, and (A03) roles of mid-latitude ocean-atmosphere interactions in natural variability on a longer time-scale and/or in the changing climate. Publicly Offered Research for the present project are expected to collaborate tightly with these groups and expand/deepen the whole project by complementing them and providing new insights. Applications with the following topics are highly welcomed:

i) *In situ* observational studies to understand the processes for mid-latitude ocean-atmosphere interactions. Observational studies collaborating with our planned-research observations with additional variables and/or viewpoints are expected. Challenging observational studies using the latest automated tools are also welcomed.

ii) State-of-the-art numerical high-resolution modeling studies and/or unique experiments complementing the numerical modeling and data analyses by the planned-research groups. Studies analyzing the numerical experiments by the planned-research groups from completely new viewpoints are also welcomed.

iii) Data analyses investigating mid-latitude ocean-atmosphere interaction processes including their changes under global warming. Use of data products such as CMIP5/6 outputs archived by the planned-research group, state-of-the-art satellite observations, high-resolution atmospheric objective analysis/reanalysis, and ocean data assimilation are expected.

Upper limits of the annual budget for observational and other studies are 9.7 and 3 million yen, respectively.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Extreme events and mid-latitude ocean on weather forecast scale	9.7	2
A02 Ocean and atmosphere variability on seasonal prediction scale	3	6
A03 Ocean and atmosphere variability relating to future mid-latitude climate projection		

13 New Materials Science on Nanoscale Structures and Functions of Crystal Defect Cores

http://www.core.mp.pse.nagoya-u.ac.jp

Number of Research Area	:	6103	Term of Project :	FY2019-2023
Head Investigator	:	MATSUNAGA, Katsuyuki		
Research Institution	:	Nagoya University, Graduate School of Engineering		

In recent advanced materials, crystal defects such as point defects, grain boundaries, interfaces and dislocations serve as physical origins of development of distinct materials properties. For future materials design, therefore, it is important to reveal structure-property relationships of crystal defects at the nanometer scale. Recent progresses on nanoscale characterization and computational science are remarkable, and make it possible to acquire nanoscale information on crystals defects in materials quantitatively. In most cases, however, previous information on crystal defects is limited to data on their static atomic structures. In order to realize materials design and development from the nanometer scale, it is essential to obtain systematic understanding of not only static atomic structures of crystal defects but also their localized quantum structures in response to external electromagnetic and temperature fields. In this project, the localized electronic and atomic structures of crystal defects are referred to as "crystal defect cores" that can bring about distinct or peculiar materials properties, and researchers specializing in theoretical calculations, nanoscale characterization and advanced materials processing conduct collaborative studies on crystal defects in advanced materials. We aim at establishing novel scientific principles in materials science based on the concept of "crystal defect cores", and at further developing novel materials functions and exploratory materials by designing and controlling crystal defects.

The research group A01 focuses on theoretical researches by first-principles based calculations and information-science based techniques, and the research group A02 covers experimental nanoscale characterization of electronic and atomic structures at grain boundaries, interfaces and dislocations. Major topics in the research group A03 involve development of novel materials functions and exploratory materials by using diverse advanced materials processing techniques.

In particular, we expect proposals that plan to develop computational analysis methods, experimental characterization techniques and advanced materials that are not covered in the main research groups of the project. Proposals that conduct intimate collaborative studies with other researchers in the project and can stimulate research activity of the whole project are desirable. Researchers whose proposals are accepted are allowed to use common specimens and facilities available within the project. Challenging proposals from younger researchers are highly welcome.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Modeling and design of crystal defect cores	3	3
A02 Nanoscale characterization of crystal defect cores	3	3
A03 Materials development based on crystal defect cores	3	6

14 Aquatic Functional Materials: Creation of New Materials Science for Environment-Friendly and Active Functions

http:// www.aquatic-functional-materials.org/

Number of Research Area	:	6104	Term of Project :	FY2019-2023
Head Investigator	:	KATO, Takashi		
Research Institution	:	The University of Tokyo, Graduate School of Engineering		

In this research project, we focus on "Aquatic Functional Materials" which is defined as materials that exhibit functions while they harmonize and interact with environment in the existence of "water" through fusion of "materials science" and "basic science of water". We create and establish materials science on "Aquatic Functional Materials" based on fundamental science of structure-function relationship between water and materials from a wide range of standpoint of views including organic chemistry, polymer chemistry, physics, measurements and computational science, and engineering. Interactions between "water" and "materials" in the level of molecules and molecular nano-assemblies are understood for the creative development of aquatic functional materials with electronic/ionic, bio/environmental, and mechano-functions. These approaches lead to create scientific research on innovative areas in the field of advanced materials science.

Research Group A01: Studies on design of molecular assemblies, materials, and functional molecules to develop aquatic functional materials. Research Group A02: Studies on structures and dynamics of materials and water using advanced measurements and simulation. Research Group A03: Studies on exploration of electronic/ionic, bio/environmental, and mechano-functions of aquatic functional materials.

The publicly offered research will mainly focus on research proposals that fit the concept and purpose of this project to establish science of aquatic functional materials for development and contribution of Japanese materials science.

For the publicly offered research, we strongly encourage to propose creative, interdisciplinary, and challenging research plans by sharing the scope of this research project. We welcome research proposals related to creation of science of "Aquatic Functional Materials" using synthesis, analysis, characterization, and theory for molecular and structure design, and exploration of functions. Scientific backgrounds are chemistry, physics, biology, engineering, syntheses of molecules and materials, device fabrication, fundamental and applied materials science of theory, calculation, and experiments and basic science of water. Active applications of research proposals from young and/or female scientists are welcomed.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Development of Molecules and Materials	2.5	27
A02 Advanced Measurements and Simulation		
A03 Exploration of Functions		

15 Unraveling the History of the Universe and Matter Evolution with Underground Physics

http://www.lowbg.org/ugap/

Number of Research Area	:	6105	Term of Project :	FY2019-2023
Head Investigator	:	INOUE, Kunio		
Research Institution	:	Tohoku University, Research Center for Neutrino Science		

This project pursues search for Neutrinoless double beta decay, direct search for dark matter, observation of supernova relic neutrinos and observation of geo-neutrinos with the world leading sensitivities in underground laboratories and develops "underground astroparticle physics" unraveling fundamental problems such as "How is matter created?", "How are stars/galaxies formed?", "How are elements produced?" and "How are they brought to the earth?". We advance ultra-low radioactivity techniques as a common technical base and involve novel low-temperature sensor technologies. We also aim at seamless integration of particle cosmology and cosmic chemical evolution as a theoretical framework spanning the history of the universe. Technical and scientific application/spread to the adjacent fields is also considered. For those purposes, we intensively propel the planned researches listed below, and invite two years research proposals those strength or supplement them.

We consider the following 5 types of proposals; 1. Research and development that uses or advances ultra-low radioactivity environment and its technology, 2. Emergent research developing diverse ultra-low radioactivity techniques and low-temperature sensor technologies, 3. Experimental and theoretical research that improves precision of relevant physical parameters or model calculations, 4. Research and development aiming at connection and application to diverse fields, 5. Research for theoretical development or of boundaries between fields.

Number of projects scheduled to be selected is 6 for experimental research or theoretical research requiring huge computation capped at 2.5 million yen per year, and 5 for theoretical research or small-scale experimental research capped at one million yen per year.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01: Experimental research on Majorana nature of neutrinos in the inverted hierarchy region	Experimental research or theoretical research requiring huge computation 2.5	6
A02: Experimental research on Majorana nature of neutrinos and development of next generation high sensitivity s techniques using 48Ca		
B01: Direct search for dark matter with the highly sensitive large detector		
B02: Direct search for dark matter with directional sensitivity		
C01: History of star formation in the universe with high sensitivity observation of supernova relic neutrinos		
D01: Application of ultra-low radioactivity techniques to the cutting-edge astroparticle researches	Theoretical research or small-scale experimental research 1	5
D02: Increasing sensitivities of astroparticle researches with ultra-low temperature technologies		
E01: Theoretical research on new particle physics models and the evolution of the early universe unravelling the origin of matter		
E02: Theoretical research on supernova neutrinos in connection with nuclear physics and cosmic chemical evolution		

16 Hypermaterials: Innovation of materials science in hyper space

http://www.rs.tus.ac.jp/hypermaterials/html

Number of Research Area	:	6106	Term of Project :	FY2019-2023
Head Investigator	:	TAMURA, Ryuji		
Research Institution	:	Tokyo University of Science, Department of Materials Science and Technology		

"Hypermaterials" refer to a group of substances such as quasicrystals and approximant crystals, which are uniformly described in a high-dimensional space including the "complementary space". For example, a three-dimensional quasicrystal is a three-dimensional cross-sectional structure of a six-dimensional periodic crystal, and another three-dimensional space called "complementary space" is required to describe the structure. In this research project, we will establish and utilize data science in the complementary space and collaborate to synthesize new hypermaterials such as semiconducting, ceramic, polymer quasicrystals, and magnetic, quantum critical, and superconducting quasicrystals. In addition, we will pursue various physical properties closely related to high dimensions and symmetry that is impossible with conventional crystals, such as abnormal high temperature specific heat and abnormal heat conduction. Furthermore, by describing the atomic behavior, magnetic, electronic, phonon states, etc., of hypermaterials in the complementary space, which are complex in real space, we will search for hidden orders behind the complexity in a high-dimensional space, and aim to create new materials science.

We expect complementary researches that are not covered by the planned research groups. Applicants do not need to have quasicrystal research experience in the past, and once selected, they will conduct research in collaboration with the planned research groups. Samples can also be provided. Research group A01 will challenge to synthesize not only metal-based but also semiconductor-based, oxide-based, and polymer-based quasicrystals. In particular, proposals from ceramics and polymer specialists are highly welcomed. Research group A02 invites proposals on structural studies related to high-dimensional crystallography and evaluative analysis of high-dimensional crystals. Research group A03 welcomes new ideas on crystallography, first-principles calculations, structure / property prediction by data science, and high-dimensional band calculation methods. Research group A04 invites research proposals closely related to high dimensions and symmetry : investigations of new physical properties, developments and proposals of new experimental methods, and related theoretical researches, including mathematics. In addition, applied and practical researches that take advantage of the properties of hypermaterials are also invited. All research groups welcome challenging proposals especially from female and young researchers.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Synthesis of Hypermaterials	Experimental research: 4	8
A02 Structure of Hypermaterials		
A03 Hypermaterials Informatics and the Search for Hidden Orders	Experimental research or Theoretical research: 2	7
A04 Physics of Hypermaterials and the Search for Hidden Orders		

17 Science on Interfacial Ion Dynamics for Solid State Ionics Devices

https://www.interface-ionics.jp/

Number of Research Area	:	6107	Term of Project :	FY2019-2023
Head Investigator	:	IRIYAMA, Yasutoshi		
Research Institution	:	Nagoya University, Graduate School of Engineering		

This research project aims to establish fundamental concept and principle to control ion transport and/or ion accumulation around the Interface of Solid State Ionics materials (ISSI), that is, "Interface IONICS". We aim to apply "Interface IONICS" to develop advanced solid state ionics devices such as all-solid-state batteries, all-solid-state capacitors, electronic/ion devices, etc.

This project consists of four programed research groups, that is, "A01: Model interface fabrications and researches on basic properties of the ISSI", "A02: Advanced measurements of the ISSI", "A03: Theory and data science of the ISSI", and "A04: Novel function developments of the ISSI. In the Gp-A01, advanced technologies on single crystal and thin film fabrications are applied to prepare well-designed and simple model interface and their fundamental ion transport and/or accumulation properties are investigated using electrochemical methods. In the Gp-A02, modulation and distribution of potential, ion concentration, chemical potential, electronic state, structure, phase, etc. around the ISSI are evaluated using advanced measurement techniques. In the Gp-A03, both the distribution and dynamics mechanism of ions and electrons around the ISSI are investigated using theoretical approach that combines multi-scale calculation and informatics analysis (machine learning and image / spectral analysis). In the Gp-A04, novel functional materials that enable fast ion transport and/or dense ion accumulation around the ISSI are investigated especially focusing on crystalline / amorphous interface.

The open research projects cover basic and applied researches on novel solid state ionics devices using the ISSI, novel measurements and calculation methods for the ISSI, precise structural regulation methods of the ISSI, and material researches focusing on the ISSI using nanoparticles. Proposals that can collaborate with planned researches and creative and challenging proposals by young researchers are welcome. For details of the planned researches, please see the project web site.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Model Interface Developments	Experimental : 3 Theory & Data Science : 2	16
A02 Advanced Analysis		
A03 Theory and Data Science		
A04 Novel Function		

18 Transomic Analysis of Metabolic Adaptation

http://transomics.umin.jp/

Number of Research Area	:	3901	Term of Project :	FY2017-2021
Head Investigator	:	KURODA, Shinya		
Research Institution	:	The University of Tokyo, Graduate School of Science		

Living organisms dynamically adapt their metabolism in response to change in surrounding environment and maintain biological homeostasis. The metabolic adaptation is controlled by interplay between metabolome layer and other omic layers including genome, epigenome, transcriptome, and proteome. Interaction between multi-omic layers is here denoted as " trans-omic" network. In this research area, we aim to elucidate the mechanism of metabolic adaptation using advanced technologies for multi-omics measurements and trans-omic approaches with integration of multi-omic layers using mathematical modeling. In this area, we set up two research groups: elucidation of the mechanism of metabolic adaptation (A01), and development of trans-omic analyses (A02).

(A01) Elucidation of the mechanism of metabolic adaptation. This involves biology-orientated study. We seek studies on metabolic adaptation for various species including animals, plants, and microorganisms. We prioritize studies to elucidate biological phenomena which adapt to environmental changes by controlling metabolism from the viewpoint of trans-omics.
(A02) Technology development of trans-omic analyses. This involves technology-orientated study. Trans-omics is an integrative discipline which requires conceptual ideas, knowledge, technologies and experiences derived from a wide field of experiments and theories. In A02, we seek studies for development of omics measurement technologies for high speed, high sensitivity, quantification and multiplexing. We also consider studies for development of analytical technologies such as connecting multi-omic layers based on databases and interpreting multi-omic networks based on statistical / information science and mathematical modeling.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Elucidation of the mechanism of metabolic adaptation	Experimental field : 5 Theoretical field : 2	8
A02 Technology development of trans-omic analyses		7

19 Evolutionary theory for constrained and directional diversities

http://constrained-evo.org/

Number of Research Area	:	3902	Term of Project :	FY2017-2021
Head Investigator	:	KURATANI, Shigeru		
Research Institution	:	RIKEN		

By detecting the correlation between the fluctuations observed through short time range and those observed through longer evolutionary time scale, this area tries to identify mechanical backgrounds and factors responsible for the bias and directionality found in phenotypic changes. It is also within the scope of this area to test the validity of Fluctuation-Response Theory, already put forth to explain the unevenness found in phenotypic evolution. Eventually, it tries to construct the framework of Biased Evolution Theory, which is expected to explain more extensively the phenotypic evolution, not only of unicellular organisms, but also of multicellular animals and plants.

Along the above noted outline, 13 research projects will be selected. Those proposals that deal with phenotypic variations, genomic changes, experimental evolutionary studies, theoretical studies, population genetics, developmental biology in evolutionary contexts will be considered. Epigenetic studies will also be within the scope.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A07 Constraints and Directionalities in Evolution	5	13

20 Principles of pluripotent stem cells underlying plant vitality

http://www.plant-stem-cells.jp/en/

Number of Research Area	:	3903	Term of Project :	FY2017-2021
Head Investigator	:	UMEDA, Masaaki		
Research Institution	:	Nara Institute of Science and Technology, Graduate School of Science and Technology		

Pluripotency of animal stem cells decreases shortly after fertilization, but some plant stem cells do not lose their pluripotency. These stem cells proliferate in the plant body and aid in continuous and dynamic organ growth. Plants also have the ability to induce somatic cells to become pluripotent stem cells through cell reprogramming. This unparalleled ability to increase and maintain stem cells facilitates plants to thrive in changing environments. However, there have been limited studies on stem cell characteristics of plants. Hence, this project focuses on clarifying the mechanisms underlying plant stem cell proliferation and maintenance *in vivo,* and determining the unique characteristics of plants that can freely control the pluripotency of their stem cells. Advances in collaborative research in this project will lead to an understanding of the basic principles of plant systems that facilitate the maintenance of long-lasting pluripotent stem cells.

We focused on two research themes. Research theme A01 is stem cell "quantity", which includes stem cell proliferation and the formation of new stem cells. Research theme A02, stem cell "quality", includes the maintenance of stem cells *in vivo*. Research proposals related to the behavior of pluripotent stem cells and genome homeostasis in other organisms that are related to an understanding of plant stem cells are also included. We are seeking public research proposals that will increase our understanding of stem cell regulation from different perspectives. Proposals of particular interest are those that seek to elucidate the control of stem cell division/differentiation in tissues, investigate the mechanisms underlying the induction/loss of pluripotency, conduct comparative analyses of long-lasting stem cells and transient stem cells, or explore regulatory mechanisms of stem cell niches through hormones and bioactive substances. Additionally, we welcome proposals that involve a chromatin and genome-level point of view, especially those aiming to elucidate the correlation between pluripotency and chromatin dynamics, or understand genome maintenance in stem cells. Creative research proposals by young scientists in which new research technologies are implemented for further collaborative research in this project are also welcome.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Stem cell proliferation	4.5	13
A02 Stem cell maintenance		

21 Toward an integrative understanding of functional zones in organelles

http://www.organellezone.org

Number of Research Area	:	3904	Term of Project :	FY2017-2021
Head Investigator	:	SHIMIZU, Shigeomi		
Research Institution	:	Tokyo Medical and Dental University, Medical Research Institute		

Organelles are specialized structures in cells, which play specific roles to regulate various cellular events. The recent rapid development of imaging techniques have clarified the details of organelle dynamics, demonstrating that (1) various functional regions are dynamically formed within organelles, (2) organelle functions are made possible by the comprehensible actions of these functional regions. We named these local functional organelle regions as "zones".

We will study three organelle zones, namely, the "response zone", "communication zone", and "sorting zone". The "response zone" is a specific functional region that appears in organelles in response to various stressors. The "communication zone" is a contact region that enables the exchange of various molecules between different organelles. The "sorting zone" is a region within the endoplasmic reticulum (ER) and Golgi apparatus, in which macromolecules are specifically modified and sorted to their appropiate destinations. By analyzing these organelle zones, we aim to create a paradigm shift from organelle biology to organelle zone biology.

In order to achieve our aims, we invite researchers to submit proposals that elucidate the molecular mechanisms of zone formation and investigate their biological roles. The A01 unit targets the "response zone" and "communication zone". The "communication zone" includes a organellar contact region, such as the mitochondria-associated ER membranes (MAM). We welcome research proposals on organelle zones related to nucleus. The A02 unit targets "sorting zone". We call for research proposals elucidating the function of the ER and Golgi apparatus by clarifying the nature of "sorting zone", such as the "sugar chain-modifying sorting zone". We are also inviting original applications that target organelle zone from a variety of angles; e.g. mathematical and theoretical biology, disease-oriented organelle zone, and innovative analyzing techniques.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Elucidation of response zone and communication zone	3.8	7
A02 Elucidation of sorting zone	3.8	5

22 Spectrum of the Sex: a continuity of phenotypes between female and male

http://park.itc.u-tokyo.ac.jp/sexspectrum/

Number of Research Area	:	3905	Term of Project :	FY2017-2021
Head Investigator	:	TACHIBANA, Makoto		
Research Institution	:	Osaka University, Graduate School of Frontier Biosciences		

We frequently found the sex phenotypes that locate between typical male and female in gene modified animals, human patients of disordered sex development, and various wild animals. We thus propose a novel concept of sex; continuous distribution between typical male and female (sex spectrum). In this regard, individual sex should be represented as a particular position in the spectrum and this position can be shifted to either direction. We aimed to reveal molecular mechanisms controlling these "positioning" and "shifting" through quantitative analyses using several parameters (e.g. expression levels of the sex chromosome genes, epigenome structure, amounts of the secreted sex steroids, activities of the sex steroid receptors, and metabolic activities). It is conceivable that the "positioning/shifting" is controlled by genetic and endocrine factors, and is influenced by environmental factors. We appreciate research projects that can address molecular mechanisms within two years. There is no limitation of species. We also appreciate research proposals as follows:

1. Studies for various sex-related phenomena other than sex development and sex reversal
2. Studies of the sex spectrum of cells/organs other than gonads
3. Studies using a unique approach (e.g. using cell lines or stem cells)
4. Study having a synergistic effect in cooperation with the planning research

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Sex spectrum and genetic factors	5	12
A02 Sex spectrum and endocrine factors		
A03 Sex spectrum and environmental factors		

23 Multimode autophagy: Diverse pathways and selectivity

http://proteolysis.jp/multimode_autophagy/

Number of Research Area	:	7101	Term of Project :	FY2019-2023
Head Investigator	:	KOMATSU, Masaaki		
Research Institution	:	Juntendo University, Graduate School of Medicine		

To date, autophagy research has focused on “macroautophagy” accompanied by autophagosome formation. However, there are actually a number of autophagy pathways including “microautophagy” that surrounds cytoplasmic components by invaginating or extending vacuolar or lysosomal membranes, “lysosomal membrane transport autophagy” in which the substrates directly pass through the lysosomal membrane and “endocytosis-mediated cellular membrane degradation”. Furthermore, although autophagy has been generally considered to be a non-selective degradation pathway, all autophagy pathways have selectivity. It has become clear that soluble proteins, liquid-liquid phase separated granules, aggregates, nucleic acids, and organelles such as mitochondria and the endoplasmic reticulum are selectively recognized, sequestered and degraded. In this research project, various pathways of autophagy and selective degradation via these pathways are integrated and defined as "multimode autophagy", and we will clarify their molecular mechanisms and physiological functions. Further, we aim for an understanding of the comprehensive self-degradation by elucidation of the linkage of, time series of, contribution of and functional evolution of each autophagy pathway. In addition, we will establish a system that can efficiently promote autophagy research by interdisciplinary fusion, training of young researchers, and international activities.

In the public offering researches, we share the research objective of an overall understanding of multimode autophagy and expect researches that will lead to an expansion of the field through joint research within the field, not limited to individual researches; specifically, researches on novel types of autophagy, challenges related to the degradation of new substrates, not limited to proteins and organelles, special techniques and research methods (including experimental methods as well as computational methods such as mathematical biology), the elucidation of membrane dynamics, research on autophagy in various biological species and development of quantitative systems for each mode of autophagy. In particular, autophagy researches other than macroautophagy, researches pursuing relationships between various autophagy pathways, and challenging proposals from the young generations are welcomed.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Multimode autophagy	4 2.5	10 18

24 Program of totipotency: From decoding to designing

https://totipotency.biken.osaka-u.ac.jp

Number of Research Area	:	7102	Term of Project :	FY2019-2023
Head Investigator	:	OGURA, Atsuo		
Research Institution	:	RIKEN, BioResource Research Center		

Totipotency is the most undifferentiated genomic status typically found in the genome of fertilized oocytes. Totipotency is also defined as the ability of a single cell to contribute to all the cell types and tissues that emerge during development. These include the placenta in mammals. Our research area aims to identify totipotency-related factors at the multiscale levels and to regulate and reconstruct totipotency. Our ultimate goal is to establish an international research core of totipotency by combining cutting-edge analytical technologies and unique developmental engineering techniques.

To this end, our research area consists of two research groups. The first research group A01 will undertake basic researches related to totipotency; i.e., identification of the genomic sequences, epigenome, maternal factors, nuclear structure, gene expression, embryonic factors, and their interactions at the multiscale levels that ensure totipotency of fertilized/nuclear transferred oocytes. Their developmental stage-dependent changes will also be analyzed. The second research group A02 will seek for the techniques for regulation and construction of totipotency. These may include regulation of genomic reprogramming and derivation of totipotent cells.

The publicly offered researches should belong to either of the research groups, A01 or A02. While all the publicly offered researches will pursue the common goal towards understanding the mechanisms of totipotency and regulation of totipotency, their research subjects can be diverse, not being limited to fertilized oocytes. Therefore, we welcome researches on totipotency-related epigenome of germ cells, loss of totipotency in early embryos, early placentation in mammals, and transgenerational effects. As most planned researches focus on research using mammals, the publicly offered researches will be expected to cover many kinds of organisms other than mammals. Researches that synergistically promote specific planned researches to outstanding development will also be considered. In addition, proposals of technology development for the analysis of totipotency and interdisciplinary research such as biophysics will be welcomed.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Decoding of the totipotency program	4	13
A02 Regulation and construction of totipotency		

25 Mechanisms underlying replication of non-genomic codes that mediate plasticity and robustness for cellular inheritance

http://www.non-genome.com/

Number of Research Area	:	7103	Term of Project :	FY2019-2023
Head Investigator	:	NAKANISHI, Makoto		
Research Institution	:	University of Tokyo, Institute of Medical Science		

Multicellular organisms consist of cells with diverse phenotypes even though the genomic information is essentially the same. The diversity of these cells is defined by non-genomic codes. Non-genomic information is coded by multi-layered mechanisms, containing DNA and histone modifications, non-coding RNA, higher-order structures of chromatin, and transcription factor networks as well as the interconnections of these layers. In this research project, we focus on the elucidation of the mechanisms underlying replication of non-genomic codes, including DNA methylation and histone modifications during mitotic and meiotic cell cycle. We are also interested in the interconnections of multi-layered non-genomic mechanisms and biological processes regulated by these mechanisms such as cellular differentiation.

Group A01 aims to understand the replication mechanisms of non-genomic codes, such as DNA methylation, histone modifications, non-coding RNA, high ordered chromatin structures, and transcriptional networks. Proposals to develop imaging technology, single cell and single-molecule analyses for the detection of non-genomic codes, and those to analyze the structural basis of the replication machinery are also welcomed. In Group A02, we aim to uncover the molecular basis of how replication mechanisms of non-genomic codes regulate the plasticity and robustness of differentiated cells in multicellular organisms regardless of animals and plants. These mechanisms should include stem cell renewal, maintenance of stemness, and cellular differentiation during symmetric and asymmetric divisions. By the use of mathematical and simulation analyses, the development of the methods to be able to consolidate big data from multiple layers into a single data storage is also involved in this subject. We welcome original and challenging proposals from young and/or female researchers.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Basic molecular mechanisms underlying replication of non-genomic codes	4	7
A02 Regulatory mechanisms of cellular function by replication of non-genomic codes	4	8

26 Intrinsic periodicity of cellular systems and its modulation as the driving force behind plant development

http://plant-periodicity.org

Number of Research Area	:	7104	Term of Project :	FY2019-2023
Head Investigator	:	NAKAJIMA, Keiji		
Research Institution	:	Nara Institute of Science and Technology, Graduate School of Science and Technology		

In this area, we aim to elucidate mechanisms and significance of producing periodic morphologies in plants that show both robustness and plasticity, through intimate collaboration among plant biologists, information scientists, and theoretical biologists.

Plants exhibit periodic morphologies in multiple scales from organelles to organs. Modulation of such periodicity enables differentiation of species-specific morphologies and environmental adaptation. Thus, in order to understand plant growth and development, it is essential to solve the question of how plants produce periodic morphologies. Along this line, special interests are directed to generators of intrinsic oscillations, mechanisms of modulating periodicity and controlling plant growth and morphogenesis at multiple levels from organelles to individuals. The area is divided into three groups; those elucidating the mechanisms of organ morphogenesis (A01), the mechanisms of cell fate and cell structure determination (A02), both by using imaging and molecular genetic techniques, and those developing new methods and technologies based on theoretical biology and information science (A03).

As for Publicly Offered Research Groups, not only proposals from plant developmental biologists and theoretical biologists, but also those from information scientists aiming to assist biological discoveries are welcome. As for proposals from biologists, those complementing subjects of the Planned Research Groups are expected. Examples include those working on non-model species, and those working with modulation of periodic morphologies in response to environmental factors. Proposals working on generic periodicity alone, such as circadian clocks and cell cycles, and those working on extremely long periodicity such as fluctuation in an evolutionary time scale, are to be excluded. Expected proposals from information scientists include, those developing new methodologies to bring about innovations to biological researches using computer vision, machine learning, augmented reality, and human augmentation.

How the proposal is expected to contribute to approaching to the goal of the area; constructing the principles in plant development based on periodicity and its modulation, or how the proposal is expected to revolutionize the methods in biological sciences, should be explicitly described in each application.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Principles in organ morphogenesis	4	18
A02 Principles in cell fate and cell structure determination		
A03 New methods in theoretical biology and information science		

27 Preventive medicine through inflammation cellular sociology

http://inflammationcellularsociology.org

Number of Research Area	:	4901	Term of Project :	FY2017-2021
Head Investigator	:	MATSUSHIMA, Kouji		
Research Institution	:	Tokyo University of Science, Research Institute of Biomedical Sciences		

A paradigm shift from reactive to preventive health care is urgently required. In this project, by characterizing the individual cells and tissue microenvironment of inflamed tissues that together make up a "cellular society of inflammation", we will investigate the origin, pre-disease condition, progression and irreversible changes of inflammatory disease. For this purpose, we will establish the following three research groups to facilitate preventive medicine through the cellular sociology of inflammation. Group A01 will establish the cellular society of inflammation for chronic inflammatory disease with different pathogeneses and affecting different organs through basic and clinical research. Group A02 will investigate the regulation of internal and external environmental responses (i.e., stress responses, metabolism and cellular and tissue senescence) that promote initiation, progression and irreversible changes of inflammatory disease, and will establish molecular targets for preventive therapies. Group A03 will integrate this information to establish models and databases for the cellular society of inflammation. For this recruitment, we expect research proposals to have synergy with planned research by sharing experimental systems and computational analysis. We also expect proposals dealing with the modeling and simulation of the cellular society of inflammation and proposals from young researchers.

Proposals recruited under Group A01 will help to establish or generalize the concept of cellular society of inflammation through clinical and basic research related to various chronic inflammatory diseases. These proposals are also expected to include original approaches relating to single-cell transcriptome technology and data analysis. Proposals recruited under Group A02 will include basic research on stress responses, will use genetically modified animals and pharmacological inhibitors to identify and validate key signaling factors, or will use model validation and drug screening to reconstruct the cellular society of inflammation in vitro. Proposals recruited under Group A03 will develop methods that integrate spatial data from tissue imaging and quantitative gene expression data, or will generate innovative and creative simulation models.

Coordinators in planned research will support multi-omics analysis and data analysis in this research area.

Research Group		Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01	Establishment of a cellular society of inflammation for chronic inflammatory disease	9	2
A02	Regulation of the cellular society of inflammation by environmental factors and establishment of molecular targets for preventive therapies	4	8
A03	Establishment of socio-cellular informatics		

28 Giant reservoirs of heat/water/material : Global environmental changes driven by the Southern Ocean and the Antarctic Ice Sheet

http://grantarctic.jp

Number of Research Area	:	4902	Term of Project :	FY2017-2021
Head Investigator	:	KAWAMURA, Kenji		
Research Institution	:	National Institute of Polar Research, Division for Research and Education		

This project considers the Southern Ocean and Antarctic ice sheet as a unified system, and aims to establish "Antarctic Environmental System Science" by deep understandings of individual processes, various interactions, and global changes driven by the Antarctic. Towards these goals, field observations, analyses of various samples, numerical modeling, and collaborations of data and modeling are conducted to investigate the state and interaction between different environmental components such as ocean, ice sheet, crust, ecosystem, greenhouse gases, and their changes in the past and future. We invite research proposals in four pre-planned themes (A01 to A04) and four cross-cutting themes (B01 to B04).

A01: studies on the Southern Ocean
A02: studies on the Antarctic ice sheet and solid earth
A03: developments of unmanned probes and analyses of their data
A04: numerical modeling on various spatial and temporal scales.
See our website for details of A01 – A04.
B01: atmospheric physics and modeling (e.g., cloud physics, radiation process, boundary layer, relationship between global-scale and Antarctic circulations, regional climate model, analysis of new-generation high-resolution global model)
B02: various satellite observations (e.g., remote sensing of ice sheet, sea ice, ocean and ecosystem)
B03: research using new observational and analytical methods (e.g., development of unmanned underwater vehicles and airplanes, observations with unmanned probes, bio-logging, observations with new technology, development and improvement of paleoenvironmental proxies)
B04: data analyses and modeling from different viewpoints than the pre-planned research (e.g., analyses of new data and model results generated in our research with advanced statistical or informatics methods, social and economic impacts of sea level rise induced by melting Antarctic ice sheet)

In order to accommodate applications that require relatively high costs for observational or analytical equipment, sample analyses, employment (postdoc, technician), etc., two types of upper limits are offered.

Researchers from wide range of scientific disciplines and career stages are welcome, including those who have not been engaged in Antarctic research, and young researchers.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Reservoir of heat and materials: Southern Ocean and its variations	7.5 2.5	4 12
A02 Reservoir of water and heat: Antarctic ice sheet and its variations		
A03 Challenges for unexplored frontiers		
A04 Integrative modeling of the Antarctic ice sheet, ocean, and climate		
B01 Atmospheric physics and modeling (cross-cutting theme)		
B02 Various satellite observations (cross-cutting theme)		
B03 Research using new observation and analytical methods (cross-cutting theme)		
B04 Analyses and modeling of acquired data (cross-cutting theme)		

29 Studies of Language Evolution for Co-creative Human Communication

http://evolinguistics.net

Number of Research Area	:	4903	Term of Project :	FY2017-2021
Head Investigator	:	OKANOYA, Kazuo		
Research Institution	:	The University of Tokyo, Graduate School of Arts and Sciences		

The purpose of this research project is twofold: Firstly, we aim to construct a scenario of language evolution which is consistent with linguistics, biology, and human evolutionary and developmental studies, the adequacy of which is to be validated by constructive methods including mathematical models. Secondly, on the basis of the scenario we make proposals for our future communication and continued existence of the human species. Through these endeavors, our ultimate goal is to form a new interdisciplinary area of human science – *Evolinguistics*. Language is an epoch-making technology which allowed humans to integrate individual knowledge into civilizations. Currently humans are in the process of creating new forms of communication based on language and information technology. By understanding the origins and evolution of language, we believe that we can design better methods of communication for the future and contribute to the sustainable development of the human species.

We invite public researches which will further develop, complement or bridge our planned researches described below (see our website for details). Empirical studies include experiments, surveys and fieldwork. Research group A01 investigates the origins and evolution of human language by integrating the advantages of generative grammar and cognitive linguistics, to be strengthened by other frameworks including phonology and historical linguistics. B01 studies the evolution of subfunctions for language by conducting comparative studies on a variety of species at the levels of genomes, neural circuits, behaviors, and ecology. B02 uses the methods of anthropology, archaeology, primate ecology, comparative cognitive science, and evolutionary modeling to infer the timing and the selective mechanisms of the emergence of those subfunctions underlying language. B03 studies the emergence of hierarchical structure and intention sharing in child language development to infer the phylogeny of language in light of its ontogeny. C01 explores the biological and cultural evolution of co-creative communication by using constructive methods such as mathematical models, simulations, language evolution experiments, dialogue experiments, and interactive robot experiments. As a whole, we especially welcome proposals which will contribute to the diversification of this project.

Research Group	Upper Limit of Annual Budget (Million yen)		Number of research projects scheduled to be selected
A01 Theoretical Frameworks for Studying the Origins and Evolution of Language	Theoretical and empirical studies	2	6
B01 Biological Realization of Prelinguistic Functions	Large-scale empirical studies Theoretical and empirical studies	4 2	2 2
B02 Anthropological Study on the Emergence of Language	Large-scale empirical studies Theoretical and empirical studies	4 2	2 2
B03 Cognitive Scientific Study on the Development of Language	Large-scale empirical studies Theoretical and empirical studies	4 2	2 2
C01 Constructive Understanding of the Origins and Evolution of Language	Large-scale empirical studies Theoretical and empirical studies	4 2	2 2

30 Integrated analysis and regulation of cellular diversity

http://cDiversity.umin.jp/

Number of Research Area	:	4904	Term of Project :	FY2017-2021
Head Investigator	:	FUJITA, Naoya		
Research Institution	:	Japanese Foundation for Cancer Research, The Cancer Chemotherapy Center		

A human body is estimated to be composed of 3.7 x 10^{13} cells. The cell population is not homogenous and is composed of diversity-rich heterogeneous cells differentiated from tissue stem cells. Such cellular diversity is important for the construction and maintenance of robust organs and tissues enduring environmental changes. So, it is speculated the collapse of the cellular diversity causes the onset and development of various diseases including cancer.

In this research project, we will clarify the basic principles of cellular diversity that are essential for the construction and maintenance of robust organs and tissues and their dysfunction in human disease through interdisciplinary collaborations among researchers who specialize in biology, mathematics, engineering, informatics and genomics. We will also develop novel mathematical models of cellular diversity and identify therapeutic targets for disease treatment.

Our research project consists of three research categories: A01 "Analysis of basic principles of cellular diversity", A02 "Mathematical analysis and modeling of cellular diversity" and A03 "Confirmation of mathematical model of cellular diversity". Through interdisciplinary collaborations of the members in this research project, we are expecting to put forward the cycle of biological studies, mathematical modeling and confirmation of cellular diversity using animal or organoid models, to elucidate the novel key molecules and pathways responsible for the onset and the progression of disease.

Based on the project design, we favor research proposals that can reinforce or synergistically promote the existing members' projects. For instance, we are seeking applicants who are investigating organogenesis and applicants who are developing real-time imaging systems that can visible in single-cell levels. We also welcome applicants who are trying to develop novel mathematical model. Those who will apply to the experimental research categories, i.e., A01 and A03, would be better to indicate whether their own researches fit either a highly-realizable fundamental experimental research or a challenging experimental research on the application form.

Research Category	Upper Limit of Annual Budget (Million yen per year)	Number of research projects scheduled to be selected
A01 Analysis of basic principles of cellular diversity	Fundamental experimental research: 6	3
A02 Mathematical analysis and modeling of cellular diversity	Challenging experimental research: 3	4
A03 Confirmation of mathematical model of cellular diversity	Theoretical research: 3	5

31 Brain information dynamics underlying multi-area interconnectivity and parallel processing

http://brainfodynamics.umin.jp/

Number of Research Area	:	4905	Term of Project :	FY2017-2021
Head Investigator	:	BITO, Haruhiko		
Research Institution	:	The University of Tokyo, Graduate School of Medicine		

The brain acquires information of the external world as multimodal sensory inputs and performs an enormous amount of information processing within and across areas, while compressing and storing it by appropriately transferring it between layers through parallel mechanisms. A central issue of today's neurobiology is to elucidate and reproduce the substance of this "brain information dynamics" using state-of-the-art techniques of measurement and manipulation and to decipher behavioral principles that rely on circuit-based mechanisms of memory, prediction, and decision-making. The aim of this Consortium Research Project is to establish a novel multidisciplinary research field, “brain information dynamics”, which encompasses a wide range of challenges from high-definition cytoarchitecture reconstruction to mapping of circuit models that define information transfer and storage in the brain, high-resolution measurement and manipulation of multi-areal network dynamics, and verification of computational models and theories leading to closed-loop control of recursive networks.

Research Group A01 Brain information decoding: We welcome proposals that will decipher basic circuit features related to higher brain function: basic cell type, connection motif, I/O conversion, and synaptic plasticity. Proposals that aim to apply novel computational approaches to decoding the brain information from massive experimental data are also welcome.

Research Group A02 Brain information recording: By performing functional cellular and circuit recordings through imaging and electrophysiology across a large number of cells, we will identify how information is expressed, transferred and converted in a variety of cell ensembles that communicate between multiple areas. We further welcome proposals that will develop innovative methods for the brain information recording taking advantage of state-of-the-art cell labeling, cell manipulation, and genome-editing technologies.

Research Group A03 Brain information network construction: By analyzing the fMRI signal from the human brain, we aim to tease apart how the brain higher-order functions emerge from communication between different cortical areas. We will consider proposals at the intersection of information science and bioengineering that will develop brain-inspired computing algorithms to be implemented in neural-circuit type hardware.

We welcome proposals that facilitate inter-group cooperation to achieve breakthroughs, and in particular, we encourage ambitious proposals from young and female researchers. For details of the research project, please refer to our website.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Brain information decoding	3	7
A02 Brain information recording	3	7
A03 Brain information network construction	3	6

32 Creation of novel light energy conversion systems through elucidation of the molecular mechanism of photosynthesis and its artificial design in terms of time and space

http:// photoenergy-conv.net

Number of Research Area	:	4906	Term of Project :	FY2017-2021
Head Investigator	:	SHEN, Jian-Ren		
Research Institution	:	Okayama University, Research Institute for Interdisciplinary		

The energy and oxygen required for sustaining almost all life forms on the earth depend on photosynthesis performed by green plants and various algae. This project aims to elucidate the principles of natural photosynthesis at an atomic level, and to use the knowledge obtained from these principles for the development of artificial photosynthetic systems with a high efficiency of light energy conversion that may lead to the production of useful materials. In order to achieve this goal, we have organized a truly interdisciplinary team involving researchers from the fields of biology, biophysics, molecular biology, chemistry (inorganic, organic, synthetic, theoretical, and coordination chemistry), advanced photo-physics, and engineering, and will combine experimental studies with theoretical researches to elucidate the mechanism of photosynthetic water-splitting driven by visible light, the structures and functions of various protein complexes involved in light energy capture and transfer in natural photosynthesis. These studies will be combined with the studies aiming to develop artificial, highly efficient light energy capture, water-splitting, hydrogen production and carbon dioxide reduction systems. In order to promote the interdisciplinary researches between the fields of natural and artificial photosynthesis, advanced photo-physical instrumentations and theoretical approaches will be introduced to connect the researches in the two fields. The output of this project will significantly contribute to the acquisition of clean, renewable energy, thus help to solve the problems of energy shortage and global warming, two critical issues that our society is facing, or will face in the near future. Proposals covering the above areas but not included in the pre-defined research projects, especially those involving interdisciplinary researches, are welcome.

Research Group		Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A04	Elucidation of principles governing natural photosynthesis	3	14
B03	Elucidation of common principles of natural and artificial photosynthesis by means of advanced measurements and theoretical approaches	2	14
C03	Development of artificial photosynthetic systems		

33 Non-equilibrium-state molecular movies and their applications

http:// www.molmovies.med.kyoto-u.ac.jp

Number of Research Area	:	8101	Term of Project :	FY2019-2023
Head Investigator	:	IWATA, So		
Research Institution	:	Kyoto University, Graduate School of Medicine		

In order to understand the functions of biological macromolecules essential for life, it is most effective to capture their chemical reactions and structural changes in real time. X-ray free electron laser (XFEL) is a unique tool to observe these reactions and changes with outstanding time and spatial resolutions. Promote and develop this method as a versatile technology applicable to a wide range of biological macromolecules, we will integrate various methodologies including organic chemistry, computational science and biophysics to understand basic questions such as switching and signaling mechanisms of proteins and reaction mechanisms of enzymes. Based on these results, we will also develop controlling methods of biological macromolecules using light and other stimulations.

We call for proposals from researchers who develop basic technologies for making molecular movies (beamline science, chemical biology, protein engineering, etc.), and facilitate the use of molecular movie technology (biophysics, analytical chemistry, physical chemistry, etc.). We welcome the participation of researchers who will integrate diffent methodrogies. In particular, we encourage applications from computational scientists who will analyse the experimental results quantatively.

We also welcome applications from the researchers in fields such as biochemistry, molecular biology, structural biology, and synthetic chemistry, who are studying biological macrololecules or small molecule coumpounds where the molecular movie technique could address the detailed mechanisms of these systems. Since the research using XFEL is a very new interdisciplinary field of physics, chemistry and biology, we encourage applications from those who are totally new in this area. We also welcome proposals for developing new molecular tools in imaging, optogenetics, and optopharmacology.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Structural Biology ad Chemical Biology	5	7
B01 Molecular Movie Platform Design	3	7
C01 Computational Chemistry and Spectroscopy		

34 Hyper-adaptability for overcoming body-brain dysfunction: Integrated empirical and system theoretical approaches

http:// http://www.hyper-adapt.org

Number of Research Area	:	8102	Term of Project :	FY2019-2023
Head Investigator	:	OTA, Jun		
Research Institution	:	The University of Tokyo, School of Engineering, RACE		

The goal of our research project is to elucidate the neural and computational principles of "hyper-adaptability." The hyper-adaptability is defines as the capability of central nervous system (brain and spinal cord) to manage impairment of sensory, motor and cognitive functions including ageing-related ones, by reactivating and recruiting pre-existing, latent but available networks. This capability is implemented by new computational principles and practical functions. We will approach this goal by linking neuroscience with systems engineering so that we could comprehensively understand fundamental mechanisms of acute / chronic impairments and disorders, and the principle of frailty.

We call for two-year research proposals of new groups shown below:

Research group A05 (corresponding to A01, A02, A03 and A04): neuroscience research in relation to hyper-adaptability, such as intervention studies on body cognition, sensori-motor, body structure, posture, emotion, memory, and those aiming at elucidating the mechanisms of hyper-adaptability in accordance with neurological disorders, development, or aging.

Research group B05 (corresponding to B01, B02, B03 and B04): systems engineering research in relation to hyper-adaptability, such as mathematical modeling studies on phenomena of hyper-adaptability by using data mining, machine learning, system identification, and model verification studies using brain activity analysis and motion analysis.

We encourage proposals on interdisciplinary study of neuroscience and systems engineering, and especially those of young researchers.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A05 neuroscience research on elucidation of phenomena and function of hyper-adaptability	3	10
B05 systems engineering research on elucidation of phenomena and function of hyper-adaptability	3	10

35 Integrated Biometal Science: Research to Explore Dynamics of Metals in Cellular System

http://bio-metal.org

Number of Research Area	:	8103	Term of Project :	FY2019-2023
Head Investigator	:	TSUMOTO, Kouhei		
Research Institution	:	The University of Tokyo, School of Engineering		

Several trace metal elements including iron, zinc, and copper play important roles in physiological functions such as energy conversion, material conversion and signal transduction. We call such metal and metalloid elements required to sustain life of all living organisms as "Biometal". Dynamics of Biometals *in vivo* such as their uptake, transport, sensing and utilization are strictly regulated, and its failure causes diseases. Some other metal elements are toxic, and their toxicity is emerged by perturbation of the dynamics of Biometal *in vivo*. In this project, our goal is to unravel the dynamics of Biometal *in vivo* comprehensively through all levels of biological organization and to establish a novel research field of "Integrated Biometal Science", in which the present research fields related to Biometal could be integrated. We will elucidate the strategy of living organisms, which was acquired during their evolution, to utilize effectively metal and metalloid elements for life and growth. Thus, "Biological Metal Element Strategy" will be established in this project.

In the research item A01, the functional roles of Biometal to maintain cellar homeostasis will be elucidated by studying the structure, interaction and function of proteins responsible for dynamics of Biometal *in vivo*. In the research item A02, the mechanisms of *in vivo* Biometal dynamics will be elucidated to develop its control method. In the research item A03, the mechanisms of development of toxicity of toxic metals will be elucidated in connection with *in vivo* Biometal dynamics. In the research item B01, measurement and analysis methods for Biometal research will be highly upgraded through collaboration with the project members in A01 ~ A03. We welcome challenging research proposals to contribute for the establishment and development of "Biometal Science" from researchers in various research areas including medical science, drug design, public health, computational science, and materials science in addition to the usual research fields relevant to Biometal.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 "Maintenance" of Bio-metal Dynamics	3	20
A02 "Failure" of Bio-metal Dynamics		
A03 "Disturbance" of Bio-metal Dynamics		
B01 "Measurement" of Bio-metal Dynamics		

36 Information physics of living matters

http://infophys-bio.jp/

Number of Research Area	:	8104	Term of Project :	FY2019-2023
Head Investigator	:	OKADA, Yasushi		
Research Institution	:	The University of Tokyo, Graduate School of Science		

Information or signaling has been one of the core concepts to understand the biological systems. Recent progress in technologies has enabled quantitative measurements of biological phenomena even at a single molecule level. However, theoretical framework(s) are still missing that can handle information in biological systems in a quantitative and unified manner. In this project, we aim at establishing a new interdisciplinary research field by applying this new information physics to biological systems. The theoretical frameworks of information physics will deepen our understanding of the biological systems. For example, we will be able to discuss the design principles of the existing biological systems through the quantitative analyses of their efficiencies, which will be enabled by the theoretical tradeoff relations among various (thermo) physical quantities and information. At the same time, many good model systems or interesting questions will be found in the real biological systems, which will stimulate the further development of the theory of information physics. We would build a research group to explore this new research field through active feedbacks between biologists and physicists.

We would welcome research proposals to widen research targets and approaches that are covered in this project.

D1: For the theoretical studies, we expect proposals not necessarily related directly to information thermodynamics, but other related topics such as information theory, control theory, learning theory, network theory, non-equilibrium physics, soft matter, stochastic process, dynamical system. Namely, we would welcome applications from various fields including information sciences, (bio)physics or mathematical sciences.

D2: The current biological targets in this project is very focused and limited. Therefore, we would welcome wide variety of proposals not necessarily limited to those related to information in a narrow sense or classical biophysical targets.

D3: We would also strongly welcome cross-disciplinary proposals that cover both theoretical approaches and experimental approaches. We also expect computational approaches or simulation studies in this category.

Since this project aims to explore a new research field at the interface of physics and biology, we strongly welcome ambitious, challenging proposals from young researchers, especially to cross the border between the two research disciplines.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
D01 Theoretical studies on information physics of living matters	3.5	6
D02 Experimental studies on information physics of living matters	1.5	12
D03 Cross-disciplinary studies on information physics of living matters		

37 Studies on intelligent systems for dialogue toward the human-machine symbiotic society

http://www.commu-ai.org/

Number of Research Area	:	8105	Term of Project :	FY2019-2023
Head Investigator	:	ISHIGURO, Hiroshi		
Research Institution	:	Osaka University, Department of Systems Innovation		

In the near future, home appliances and robots are expected to act autonomously. Humans and robots and appliances will communicate with each other through the use of language in order to understand each other's intentions and desires. As a result, symbiotic relationships between humans and robots and appliances will form. In order to realize a society in which there is such a symbiosis, this research will create a new academic area based on the following four planned areas of research: research that realizes the ability of robots to communicate and continue dialogue even when the content of the dialogue is not fully understood (A01), research that enables human-robot communication based on dialogue understanding and generation for specific purposes (A02), research that enables robots to build their own action decision models and estimate the interlocutor's action decision model (A03), research on the social impact of robots with intentions and desires, both through research on social norms in a symbiotic society and through demonstration experiments with people (A04).

In addition to the planned research groups, about 100 million yen per year is available for publicly offered research. This includes research on the implementation of intelligent systems and robots that interact with humans, and research on the humans involved with these interactive systems.

We will recruit 5 groups at a cost of 10 million yen each to employ postdoctoral researchers and research assistants to conduct publicly offered research, and 10 groups at a cost of 5 million yen each to conduct publicly offered research.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01 Dialogue engagement and rapport research	10	5
A02 Communication understanding and generation research		
A03 Behavioral decision model estimation research	5	10
A04 Human-machine social norms research		

38 Post-Koch Ecology: The next-era microbial ecology that elucidates the super-terrestrial organism system

http://postkoch.jp/

Number of Research Area	:	8106	Term of Project :	FY2019-2023
Head Investigator	:	TAKAYA, Naoki		
Research Institution	:	University of Tsukuba, Faculty of Life and Environmental Sciences		

Earth's terrestrial ecosystems are sustained by the complex interactions of diverse organisms with each other and with their physical environment. In order to further elucidate the functionality of ecosystems, a new model of ecosystem dynamics that focuses on microbes should be developed to better reflect the abundance of microbes in the terrestrial environment and their interactions with a wide continuum of biological species. The overall goals of this research project are two-fold: to develop "post-Koch" techniques that enable the isolation and functional identification of new microbial species (Subproject A01), and to create a post-Koch ecology model based on functional informatics (Subproject A02). These goals will be achieved by the interdisciplinary application of engineering science, microbiology, ecology, and information science. Post-Koch ecology will help elucidate the principles of terrestrial ecosystem regulation and maintenance, which will in turn lead to innovative methods for sustaining and proactively improving the global environment.

Specifically, Subproject A01 aims to develop innovative post-Koch microbial techniques and use them to isolate unknown species that have not been detected by conventional methods. Interested scientists are invited to submit proposals on the following topics: (i) innovative techniques for microbial isolation, culturing, analysis, manipulation, etc., leveraging cutting-edge technologies such as fine processing, micro-electronic mechanical systems (MEMS), spectroscopy, and microscopic imaging; and (ii) discovery and functional analysis of new microbes and enhancement of their functional diversity. Subproject A02 intends to create a post-Koch ecosystem model by developing new bioinformatics techniques and by applying existing technologies from a new perspective. This subproject calls for creative proposals on the following topics: (i) mechanisms for the development of functionality in ecosystems involving microbe-microbe and microbe-plant interactions, (ii) integrated analysis of complex environmental and microbial data, and (iii) technologies for constructing large-scale microbial bioresources.

Both subprojects will give preference to ideas that include plans for experiments in the defined experimental farm available to this project, use the environmental and microbial data generated by the farm, and activate the entire project through interdisciplinary collaboration.

Research Group	Upper Limit of Annual Budget (Million yen)	Number of research projects scheduled to be selected
A01: Innovative post-Koch microbial techniques and their use to isolate unknown microbial species	4	6
A02: Post-Koch ecology model based on functional informatics	Experimental Research: 4 Informatics/Ecological Research: 3	4 3

Attached Table 3 List of Research Areas whose Selected Period will End in FY2019 in Grants-in-Aid for Scientific Research on Innovative Areas

No	Research Area Number	Title	Term of Project	Head Investigator (Research Institution)
1	1701	Rice Farming and Chinese Civilization : Renovation of Integrated Studies of Rice-based Civilizations.	FY2015-2019	NAKAMURA, Shinichi (Kanazawa University)
2	2701	Frontiers of materials science spun from topology	FY2015-2019	KAWAKAMI, Norio (Kyoto University)
3	2702	Precise Formation of a Catalyst Having a Specified Field for Use in Extremely Difficult Substrate Conversion Reactions	FY2015-2019	MASHIMA, Kazushi (Osaka University)
4	2703	Science of hybrid quantum systems	FY2015-2019	HIRAYAMA, Yoshiro (Tohoku University)
5	2704	J-Physics: Physics of conductive multipole systems	FY2015-2019	HARIMA, Hisatomo (Kobe University)
6	2705	Why does the Universe accelerate? - Exhaustive study and challenge for the future -	FY2015-2019	MURAYAMA, Hitoshi (The University of Tokyo)
7	2706	Interaction and Coevolution of the Core and Mantle: Toward Integrated Deep Earth Science	FY2015-2019	TSUCHIYA, Taku (Ehime University)
8	2707	Middle molecular strategy: Creation of higher bio-functional molecules by integrated synthesis.	FY2015-2019	FUKASE, Koichi (Osaka University)
9	2708	Solar-Terrestrial Environment Prediction as Science and Social Infrastructure	FY2015-2019	KUSANO, Kanya (Nagoya University)
10	3701	Quality of lipids in biological systems	FY2015-2019	ARITA, Makoto (RIKEN)
11	3702	Integrative understanding of biological phenomena with temperature as a key theme	FY2015-2019	TOMINAGA, Makoto (National Institutes of Natural Sciences, Okazaki Institute for Integrative Bioscience)
12	3703	Chromosome Orchestration System	FY2015-2019	SHIRAHIGE, Katsuhiko (The University of Tokyo)
13	3704	Resonance Biology for Innovative Bioimaging	FY2015-2019	MIYAWAKI, Atsushi (RIKEN)
14	3705	Discovery of the logic that establishes the 3D structure of organisms	FY2015-2019	KONDO, Shigeru (Osaka University)
15	3706	Integrative system of autonomous environmental signal recognition and memorization for plant plasticity	FY2015-2019	KINOSHITA, Toshinori (Nagoya University)
16	4701	Conquering cancer through neo-dimensional systems understanding	FY2015-2019	MIYANO, Satoru (The University of Tokyo)
17	4702	Ocean Mixing Processes: Impact on Biogeochemistry, Climate and Ecosystem	FY2015-2019	YASUDA, Ichiro (The University of Tokyo)
18	4703	Non-linear Neuro-oscillology: Towards Integrative Understanding of Human Nature	FY2015-2019	NAMBU, Atsushi (National Institute for Physiological Sciences)
19	4704	"LIVING IN SPACE" - Integral Understanding of life-regulation mechanism from "SPACE"	FY2015-2019	FURUKAWA, Satoshi (Japan Aerospace Exploration Agency)
20	4705	Understanding human recognition of material properties for innovation in SHITSUKAN science and technology	FY2015-2019	NISHIDA, Shin'ya (NTT Communication Science Laboratories)

2) Grant-in-Aid for Special Purposes

- Emergency Research on Outbreak of Disasters

In case of research project which cannot be expected when submitting application documents for other research categories (researches on an outbreak of disasters), is an emergency research project that must be conducted in FY2020 (researches in which the target will be lost unless the research is started promptly), and is extremely important, please contact and consult with Grants-in-Aid for Scientific Research Team I and II, the Scientific Research Aid Division of the Research Promotion Bureau of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) (phone: 03-6734-4094) through research institution.

Moreover, the rules on restrictions on duplication between the same research category and another research category are not imposed on Principal Investigators and Co-Investigators who try to apply for "Grant-in-Aid for Special Purposes" for the above emergency research projects.

<Reference> Points in screening for Grant-in-Aid for Special Purposes (Emergency research on an outbreak of disasters)

- Is the research target natural disaster which suddenly occurred? (Wasn't it possible to predict it in advance?)
- Must it be conducted in this fiscal year (is the research target deteriorated or lost?)
- Are there sufficient social demands or academic values for it?
- Isn't it possible to treat it with other research funding?

IV. 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 Grant-in-Aid for Scientific Research (KAKINHI) as Principal Investigator (PI) must meet the requirements ① and ② 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 79).

JSPS Research Fellows (DC) and Foreign JSPS Fellows are not eligible for KAKENHI application. In general, graduate students are not eligible either. (See the notes below for exceptions.) Therefore, individuals with the status of student in a research institution are not eligible even if they also hold a position to conduct research in that or other research institution.

(Note1) 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.

(Note2) If JSPS Research Fellows (SPD, PD, RPD, or CPD) meet the following application requirements at their research institutions which they register as their host research institutions, **they can also apply only from the host research institutions for below research categories other than the "Grant-in-Aid for JSPS Fellows (JSPS Research Fellow)"**.

1) Publicly Offered Research within Grant-in-Aid for Scientific Research on Innovative Areas (Research in a Proposed Research Area)
2) Grant-in-Aid for Scientific Research (B/C)
3) Grant-in-Aid for Challenging Research (Exploratory)
4) Grant-in-Aid for Early-Career Scientists
5) Fund for the Promotion of Joint International Research (Fostering Joint International Research (A))

① **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 1) , 2) and 3) stated below, and have his/her Researcher Information properly registered in the e-Rad system as eligible for KAKENHI application.**

< **Requirements** >

1) **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.)
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 105):
< 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.

② **The individual must not be categorized as ineligible for grant acquisition in FY2020, as a penalty for his/her improper grant spending, fraudulent grant acquisition, or research misconduct.**

A researcher who is employed by a KAKENHI grant (hereafter called "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 (hereafter called "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.

・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.

The PIs and the Co-Is constitute the "members of funded projects", as stipulated in the Law on the Improvement of the Administration of the Budget for Grants-in-Aid (1955, Law no. 179). In an event that they have committed improper grant spending, fraudulent grant acquisition, research misconduct, etc. the eligibility for KAKENHI application will be suspended for a period of time specified by the rule.
In the following cases, an individual registered in the e-Rad system as "eligible for KAKENHI application" may be subject to different treatment.

・In case the research institution to which the individual belongs has made a judgement that it is not appropriate to let the individual conduct the said research activity as a part of his/her work within the 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 FY 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 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 the researcher. 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) 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 obtaining research position, and those who are returning from their leave of absence for childcare etc. after the regular submission deadline.

The FY2020 call for Proposals in this category is scheduled for March 2020, and the provisional conditions of the eligibility for application is as follows:

① An individual who could not submit a KAKENHI proposal, because he/she obtained the eligibility for KAKENHI application only after the application deadline (November 7, 2019) to the research categories (*) of which the Call for Proposals is announced in September 2019 by the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and by the Japan Society for the Promotion of Science (JSPS).

② An individual who could not submit a KAKENHI proposal to the research categories (*) for which the Call for Proposals is announced in September 2019 by MEXT and JSPS., because he/she was on a leave of absence for childcare etc. in FY2019.

(For the details, the Application Procedures for the "Grant-in-Aid for Research Activity Start-up" to be announced in March 2020 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 ① above, should act accordingly by contacting the administrative section of his/her prospective research institution.

(*) Here, the relevant research categories are "Scientific Research on Innovative Areas", "Specially Promoted Research", "Scientific Research", "Challenging Research" and "Early-Career Scientists" among the Grants-in-Aid for Scientific Research for FY2020.

(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.

Restrictions on parallel grant application/receipt do apply to the current round of call for proposals.

○ 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(s). 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 categories, in accordance of the basic concepts outlined above and by taking into consideration the purpose, characteristics and other factors of each KAKENHI category

Accordingly**, the applicant should be well acquainted with the description the rules given below, and the "Table of Restrictions on Parallel Grants Application/Receipt" (see page 85-89).**

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 Funding" (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

① In case of application for the same research area when trying to apply for 2 research projects in the same research category (Grants-in-Aid for Scientific Research on Innovative Areas)

In "Grants-in-Aid for Scientific Research on Innovative Areas", **the application for the same research area by one researcher is only one research project regardless of Principal**

Investigators or Research Collaborator (If the researcher has a continuous research project, the application of a new research project for the same research area is not permitted).
However, Principal Investigators of "Planned Research" must participate as Co-Investigator or Research Collaborator of "Administrative Group". In addition, Co-Investigator of "Planned Research" can participate in "Administrative Group" when necessary.

(cases marked with "－" in the Table)

② 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, the following rules (cases A to D) of restrictions on parallel grant application /receipt apply.
Cases in which a researcher extended the research period for a KAKENHI grant (Multi-year Fund) or a KAKENHI grant (Partial Multi-year Fund) in the final fiscal year (except the extension of research period due to maternity/childcare leave, research stay abroad, etc.), constitute exception to the rules given below.

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

(cases marked with "×" in the Table)

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

(cases marked with "▲" in the Table)

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

For cases marked with "■", the research category in the column A is given priority. For "□" , the research categories in the section B are given priority

D Cases of accepting up to 2 research projects which are applied for Publicly Offered Research of Grants-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)

③ 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 a PI of the prospected on-going project in FY2020 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 a part of the 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 CI 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 B.

〔For cases marked with "□", the research category in the column B is given priority.〕

④ 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 in FY2018 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 FY2020 intends to submit another research proposal as a PI, there are no restrictions in general, so that the researcher can participate in both projects.
However, for a part of the 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 CI 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 B.

〔For cases marked with "□", the research category in the column B is given priority.〕

⑤ 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 FY2020 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 a part of the research categories, the following rules (cases A to B) of restrictions on parallel grant application/receipt as stated below do apply.

A Cases in which the researcher cannot be a CI 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. The relative priority of the research categories is indicated by the marks "■" and "□" in the Table.

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

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

(4) Important Notes

1)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 Concentration in the Grant Allocation" mentioned on page 7.

2) 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.

3) 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.

4) In regard to the "Table of Restrictions on Parallel Grant Application/Receipt", the participation to the "Summarizing Group" in the "Scientific Research on Innovative Areas (Research in a Proposed Research Area)" is deemed exceptional (see "Application Procedures for Grants-in-Aid for Scientific Research-KAKENHI- FY2019 (MEXT)"). The following points should be noted.

   A The PI of the "Administrative Group" and the PI of "Supporting Group for International Activities" of a project in the "Scientific Research on Innovative Areas (Research in a Proposed Research Area)" category should check the restriction on parallel submission of proposal as PI or Co-I of other research proposals he/she intends to submit in parallel by referring to the relevant entries of the "Table of Restrictions on Parallel Grant Application/Receipt.

   B The Co-I of "Administrative Group" of a project in the "Scientific Research on Innovative Areas (Research in a Proposed Research Area)" should check the **relation with participation as PI or Co-I to the "Planned Research (Planned research other than the "Administrative Group" and the "Supporting Group for International Activities") of the project, in addition to the restrictions stated in the item A above.**"

5) In regard to the Restrictions on Parallel Grant Application/Receipt relevant to "the researcher submitting a research proposal as a PI/Co-I" or "the PI/Co-I of the prospected on-going project in FY2020" for the research categories for which the call for proposals is announced by the JSPS, applicants should refer to the Attached Table 4.

6) When a PI of an on-going project of KAKENHI (Multi-year Fund) or KAKENHI (Partial Multi-year Fund) opts to use the extension of the research period in the final FY (except in the case of 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) or other on-going project(s) by the same PI.

7) 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 institution, he/she can submit a research proposal in the following research categories; the "Publicly Offered Research within Scientific Research on Innovative Areas (Research in a Proposed Research Area)", "Scientific Research (B/C) ", "Challenging Research (Exploratory)"

and “Early-Career Scientists” and “Fund for the Promotion of Joint International Research (Fostering Joint International Research (A)”.

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

   During the period of his/her term, a JSPS Research Fellow (SPD, PD, RPD, or CPD) 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 restriction on parallel grant application/receipt. The applicant should check against such possibility before submitting the research proposal document.

9) There are no restrictions on parallel grant application/receipt between KAKENHI and other competitive funding schemes. Still, applicants should read the description in the column “Elimination of Unreasonable Duplication and/or Excessive Overconcentration in the Grant Allocation” on page 7.

Attached Table 4　Table of Restrictions on Parallel Grant Application/Receipt for "Grants-in-Aid for Scientific Research on Innovative Areas"

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 FY2020(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)		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 / Continued Research Area	Research area different from the one in Column A								
					Publicly offered research	Publicly offered research							Pioneering	Exploratory
					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
Scientific Research on Innovative Areas (Research in a proposed research area)	Publicly offered research	Administrative group*	Continued	PI	—	▲	▲	▲					▲	
		Planned research	Continued	PI	—	▲	□						▲	
			New Proposal	PI	—	◆	□						×	
			Continued	PI		◆	□						▲	

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

2) Type "Principal 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 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 FY2020 (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)		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							
					Planned research*2	Planned research*2						Pioneering	Exploratory
					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**
Scientific Research on Innovative Areas (Research in a proposed research area)	Publicly offered research	Administrative group*1	Continued	PI		▲	▲						
		Planned research	Continued	PI	—	▲							
			New Proposal	PI	—								
			Continued	PI									

*1 The "International 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."

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 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 B.
◆:The researcher can only apply for one reserch project mentioned in Column B in addition to the research project mentioned in Column A.
(Two applications for the same area is not permitted.)
Shaded cell: There are not cases that the researcher apply for both research projects mentioned in Column A and Column B.

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 FY2020(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)		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 / Continued Research Area	Research area different from the one in Column A							Pioneering	Exploratory
				Publicly offered research	Publicly offered research								
				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
Scientific Research on Innovative Areas (Research in a proposed research area)	Planned research	New Proposal	Co-I	—		□							
		Continued	Co-I	—		□							

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

This table shows the restrictions on parallel grant application/receipt in case of "a person who tries to participate as Co-Investigator in a research project mentioned in Column A (research categories for which MEXT organizes a call for proposals), or a person who has already become Co-Investigator of a research project that is scheduled to be continued in FY2020(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)		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						Pioneering	Exploratory
				Planned research*	Planned research*							
				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
Scientific Research on Innovative Areas (Research in a proposed research area)	Planned research	New Proposal	Co-I	—	×							
		Continued	Co-I	—	▲							

* 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."

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" and "International 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 B.
Shaded cell: There are not cases that the researcher apply for both research projects mentioned in Column A and Column B.

Attached Table 5　Table of Restrictions on Parallel Grant Application/Receipt on Research Categories for which JSPS Organizes a Call for Proposals

1) 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 FY2020 (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: Scientific Research on Innovative Areas (Research in a proposed research area)
			Publicly offered research
			New Proposal
			PI
Specially Promoted Research	New Proposal	PI	■
	Continued	PI	▲
Challenging Research (Pioneering)	New Proposal	PI	×
	Continued	PI	▲

2) 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 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 FY2020 (continued research project) mentioned in Column A" participates in a research project mentioned in Column B as Co-Investigato.
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)
			Planned research*
			New Proposal
			Co-I
Specially Promoted Research	New Proposal	PI	■
	Continued	PI	▲
	New Proposal	Co-I	
	Continued	Co-I	

＊ In regards to the person in charge for new areas, the Administrative Group has the same restrictions on duplication as for planned research.

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 A.

Attached Table 6　Table of Restriction on Parallel Grant Application/Receipt for "Grant-in-Aid for Transformative Research Areas"

The table below shows the restriction on parallel grant application/receipt between the prospective research category "Grant-in-Aid for Transformative Research Areas" for which the call for proposals will be opened in January 2020, the current round of call for proposals and research categories for which JSPS organizes the call for proposals. Accordingly, researchers planning to apply for the "Grant-in-Aid for Transformative Research Areas" should be well acquainted with the restrictions shown in the table.

○The restriction on parallel grant application/receipt for the "Grant-in-Aid for Transformative Research Areas (A)" is the same as that applied to the "Grant-in-Aid for Scientific Research on Innovative Areas (Research in a Proposed Research Area)".
○The restriction on parallel grant application/receipt for the "Grant-in-Aid for Transformative Research Areas (B)" is the same as above except that the restriction is alleviated for the following cases:

【Additional cases for which parallel grant application/receipt is permitted】
・Head Investigator of "Transformative Research Areas (B)" and Principal Investigator of "Scientific Research (S)"
・Head Investigator and/or Principal Investigator of planned research of "Transformative Research Areas (B)" and Principal Investigator of "Challenging Research (Pioneering)"
・Head Investigator of "Transformative Research Areas (B)" and Co-Investigator of "Specially Promoted Research"

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

This table shows the restriction on parallel grant application/receipt in cases of "a person who tries to apply as Principal Investigator for a research project mentioned in column A (Transformative Research Areas)" applies as Principal Investigator for mentioned in column B.

Column A				Column B: Scientific Research on Innovative Areas (Research in a proposed research area)	Speially Proposed Research	Scientific Research (S)	Scientific Research (A)	Scientific Research (B)	Scientific Research (C)	Early-Career Scientist	Challenging Research	
				Publicly offered research			General	General	General		Pioneering	Exploratory
				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
Transformative Research Areas (A)	Administrative Group	New Proposal	PI	■	×	■					×	
	Planned Research	New Proposal	PI	■	□						×	
Transformative Research Areas (B)	Administrative Group	New Proposal	PI	■	×							
	Planned Research	New Proposal	PI	■	□							

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

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

This table shows the restriction 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 (Transformative Research Areas) 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)	Specially Proposed Research	Scientific Research (S)	Scientific Research (A)	Scientific Research (B)	Scientific Research (C)	Challenging Research	
				Planned research*			General	General	General	Pioneering	Exploratory
				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
Transformative Research Areas (A)	Administrative Group	New Proposal	PI	×	×						
	Planned Research	New Proposal	PI	×							
Transformative Research Areas (B)	Administrative Group	New Proposal	PI	×							
	Planned Research	New Proposal	PI	×							

* In regards to the "Scientific Research on Innovative Areas (Research in a proposed research area) in Column B," the Administrative Group has the same restrictions on duplication as for "Planned research."

3) Type "Co-Investigator (New Proposal) (Column A) → Principal Investigator (Column B)"

This table shows the restriction 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 (Transformative Research Areas) applies as Principal Investigator for mentioned in column B.

Column A				Column B: Scientific Research on Innovative Areas (Research in a proposed research area)	Specially Proposed Research	Scientific Research (S)	Scientific Research (A)	Scientific Research (B)	Scientific Research (C)	Early-Career Scientist	Challenging Research	
				Publicly offered research			General	General	General		Pioneering	Exploratory
				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
Transformative Research Areas (A)	Planned Research	New Proposal	Co-I		□							
Transformative Research Areas (B)	Planned Research	New Proposal	Co-I		□							

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

This table shows the restriction 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 (Transformative Research Areas) 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)	Specially Proposed Research	Scientific Research (S)	Scientific Research (A)	Scientific Research (B)	Scientific Research (C)	Challenging Research	
				Planned research*			General	General	General	Pioneering	Exploratory
				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
Transformative Research Areas (A)	Planned Research	New Proposal	Co-I	×							
Transformative Research Areas (B)	Planned Research	New Proposal	Co-I	×							

Blank cell: The researcher can apply for both research projects.

×: The researcher can only apply for one research project (in case he/she applied for a research project mentioned in column A, he/she cannot apply for a research project mentioned in column B).

□: The researcher can apply for both research projects. However, in case both are adopted, he/she only implements the research of the research project in B.

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

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.

(1) Revision of the Research Proposal Document

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

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

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

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

(Problem recognition, etc.)

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

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

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

(2) Verification of the Eligibility to Apply

When applying, the applicant should carefully verify the following contents.

(i) Case of Application for "Continuous Research Areas" and "Finished Areas" in "Grants-in-Aid for Scientific Research on Innovative Areas"

The necessary document for application is the Proposal for Grand-in-Aid (Continuous Research Area) or (Finished Area).

The Principal Investigator should prepare the Research Proposal Document (PDF file) by entering application information (Items to be filled in on the form on the website) and uploading separately prepared Project Description File (Items to be entered in the attached file) to the electronic application system. Then he or she should submit (send) the Research Proposal Document to the research institution he or she belongs to, by the deadline designated by the research institution.

The details on preparation of the Research Proposal Document and the way how to apply 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 PI (applicant) on the website of the KAKENHI Electronic Application System

Forms to be uploaded :

A part containing such entries as the purpose of the research, the research plan and 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

<table>
<tr><td rowspan="2">Research category</td><td colspan="3">Research Proposal Document</td></tr>
<tr><td>Items to be entered in the Website
(First part)</td><td>Forms to be uploaded
(File ID)</td><td>Items to be entered in the Website
(Second part)</td></tr>
<tr><td>Grant-in-Aid for Scientific Research on Innovative Areas (Research in a proposed research area)
"Continuous Research Areas"</td><td rowspan="2">To be entered in the electronic application system
(Title of research project, Fundamental data on the research project such as total budget, Data on the project members, etc.)</td><td>S-8</td><td rowspan="2">To be entered in the electronic application system
(Title of research project, Fundamental data on the research project such as total budget, Data on the project members, etc.)</td></tr>
<tr><td>Grant-in-Aid for Scientific Research on Innovative Areas (Research in a proposed research area)
"Finished Research Areas"</td><td>S-9</td></tr>
</table>

∗ 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 96 1) may organize a research team with appropriate combination of Co-Investigator(s) (Co-I) (see page 96 2), and Research Collaborators(s) (see page 98 3), 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.)

As is the case for PI, **Co-Investigator(s) is also subject to verification of their KAKENHI eligibility by their respective research institute by the time of proposal submission (See Notes below).**

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

(Note 1) A JSPS Research Fellow (SPD, PD, RPD or CPD) who meets the following application requirements at his/her host research institution can participate in a KAKENHI research project as Co-I. There are no restrictions on the research categories in which he/she can participate as Co-I unlike in the case of participating as PI.

(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.

< 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 105):

< 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.

KAKENHI employee 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 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.

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 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 FY 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 summarization of 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 "Scientific Research on Innovative Areas (Research in a Proposed Research Area)" replacements of the PI may be accepted by going through appropriate procedures.

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

(C) The PI must be registered in the e-Rad system as "Eligible for KAKENHI Application". It is also required that he/she is *not* designated as "ineligible for grant receipt" in FY2020 (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 funding.

2) Co-Investigator (Co-I)

(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 FY2020 (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 funding.

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

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

[Actions to be taken by the Principal Investigator]

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

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

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

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

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

* Please refer to the Kakenhi (Grants-in-Aid for Scientific Research) Electronic Application System Operation Manual (URL: http://www-shinsei.jsps.go.jp/kaken/topkakenhi/shinsei_ka.html) for the detailed information such as operating environments, operating methods, and so on.
* After the researcher has given a consent to become a Co-Investigator, the information on the Co-Investigator-to-be will be shown to the research institution to which he/she belongs via the electronic application system, and then it will be necessary to obtain a consent, etc. from the research institution as well.

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

3) Research Collaborator

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

(B) Registration as “Eligible for KAKENHI application” in the e-Rad system is *not* a requirement for becoming a Research Collaborator.
For example, following person 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 (*), 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.

(*) JSPS Fellows (SPD, PD, RPD or CPD) who are *not* registered as eligible for KAKENHI application in their host her research institution, and JSPS fellows (DC)

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 summarization of 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 FY 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.

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) A copy of the Research Proposal Document **in black-and-white (gray scale) print** is sent to the screening committee. Therefore, when preparing the Research Proposal Document, the applicant should pay attention not to make a version of which the content becomes unclear when copied.

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 planned to be made public”, as laid down in Article 5, paragraph 1, item 1 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 database of Grants-in-Aid for Scientific Research (KAKEN) of the National Institute of Informatics, and other means.

The researchers and their affiliated research institutions are requested to carry out the application procedures (including 4) above) with full understanding of the information handling (utilization, provision and disclosure) stated above.

3) Applicants may ask Senior Scientific Research Specialists (See note) of the MEXT about application of "Grants-in-Aid for Scientific Research on Innovative Areas" and thus, if necessary, should consult with the Scientific Research Aid Division of the Research Promotion Bureau of MEXT (cf. page 189 "Inquiries").

(Note) Researchers in universities or other research institutions who make investigation, instruction, and advice on academic matters (Article 53, 62 in MEXT organization rules). They operate a review board for screening and assessment of Grants-in-Aid for Scientific Research and treat inquiries from applicants.

- **"List of Senior Scientific Research Specialist (in charge of Grants-in-Aid for Scientific Research)"**

  URL: http://www.mext.go.jp/a_menu/shinkou/hojyo/1284449.htm

4) If the Continuous Research Area of "Grants-in-Aid for Scientific Research on Innovative Areas" was canceled based on the results of interim assessment or other matters, the application may not be subject to screening even when application documents were submitted.

4. Completion of Research Ethics Education Course and others

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 FY2020 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 oneself concerning the research ethics education coursework such as “For the Sound Development of Science - The Attitude of a Conscientious Scientist” published by the Editorial Committee of the JSPS named “For the Sound Development of Science, the “e-Learning Course on Research Ethics [eL CoRE] or “APRIN e-learning program (eAPRIN)”, 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 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, by the time of the formal application for grant delivery.
- From each Co-Investigator-to-be, the PI must
  ① 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;
  ② 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]

- The Co-I must provide the PI with both a consent of the participation in the research project as a Co-Investigator 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 Editorial Committee of the JSPS named "For the Sound Development of Science, the "e-Learning Course on Research Ethics [eL CoRE] or "APRIN e-learning program (eAPRIN)", 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, other many university faculty databases and so on, and also the Japanese Government as a whole is going to further utilize the Researchmap.

Furthermore, since the posted information in the Researchmap and/or the database of the Grants-in-Aid for Scientific Research (KAKEN) is to be handled as a reference according to the necessity in the review of the KAKENHI, 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 at the review.

< Inquiries >

National Institute of Advanced Industrial Science and Technology

Knowledge base information department service support center (in charge of Researchmap)

Web inquiry form: https://researchmap.jp/public/inquiry/

Telephone: 03-5214-8490

(Open hours: 9:30 - 12:00, 13:00 - 17:00)

6. Cooperation to Review

The Grants-in-Aid for Scientific Research-KAKENHI- adopts a peer review process in which the researchers selected from their own community engaged themselves in the assessment and reviewing of each research proposals on the basis of its scientific merit. The KAKENHI review is conducted every year thanks to the cooperation of more than 7,000 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.

Therefore JSPS has registered the Principal Investigators' information including their names and affiliated research institutions in the Reviewer Candidate Database (103,000 entries as of FY2018) and has utilized it so as to select the fair and excellent reviewers.

The Principal Investigators are expected to further develop their own research through conducting the adopted research projects and to be a peer reviewer which is the credit and responsibility for the promotion of science. Furthermore the experience as a reviewer leads to further expand their academic perspective. When they are requested to be the reviewer by MEXT or JSPS, their positive cooperation is appreciated.

JSPS requests updating the Principal Investigators' data registered in the Reviewer Candidate Database through their affiliated research institutes every year (usually in April) in order to keep them latest. Cooperation to the data update is also appreciated.