National Natural Science Fund Guide to Programs 2023

National Natural Science

Foundation of China

Brief Introduction

The National Natural Science Foundation of China publishes the *National Natural Science Fund Guide to Programs 2023 (the Guide)*, in accordance with the *National Natural Science Foundation Regulations* and relevant documents on program management, to provide applicants with useful guidance on seeking support from the National Natural Science Fund. The *Guide* details NSFC's latest reform measures, application requirements, funding policies and funding priorities, and introduces different program types and their respective requirements. It is an important basis for the allocation of the National Natural Science Fund, and also a must-read reference for applicants.

This book can be used as a reference for researchers in universities and colleges of higher education and research institutions, and for people working in areas of S&T management and policy research.

Editorial Committee

Foreword

The 20th CPC National Congress clearly proposed to advance the great rejuvenation of the Chinese nation on all fronts through a Chinese path to modernization, stressed the need to thoroughly implement the strategiesof invigorating China through science and education,developing a quality workforce, and innovation-driven development, and emphasizedon strengthening basic research, highlighting original innovation, and encouraging exploration. As the source of scientific and technological innovation, basic research is the cornerstone of high-level scientific and technological self-reliance, and essential to the capacity building of original innovation. Itimpacts China's growth into a scientific and technological power, and plays a fundamental role in the realization of the second Centenary Goal. As the main channel of the state to support basic research, the National Natural Science Foundation of China (hereinafter referred to as NSFC) must fully implement the spirit of the 20th CPC National Congress, adhere to the "four aspects", highlight originality, encourage free exploration, strengthen the cultivation of basic research talents, enhanceoriginal innovation capabilities, deepen reform, take the initiative to stride into the future, and continuously improve the efficiency of funding management, so as to provide strong driving force for the high-quality development of basic research in China.

NSFC will intensify efforts to advance reform and continuously improve the sciencefunding system. NSFC will continue to highlight the funding categories based on the four attributes of scientific questions, and help improve the quality of scientific research topic selection. On the basis of peer review, NSFC will improve the evaluation mechanism that features "responsibility, credibility, and contribution", by requiring reviewers to be more responsible, building an interactive review environment, and improving the quality of review. NSFC will also continue to optimize the layout of disciplines by further improving the dynamic adjustment mechanism of application codes, and ensuring the application codes to be scientific, inclusive and guiding.

NSFC will encourage free exploration and highlight original innovation. Through the implementation of Original Exploratory Program, NSFC will encourage researchers to think freely, make bold assumptions, seriously seek evidence, and conduct high-risk research, and support more cutting-edge exploratory research withdisruptive and non-consensual characteristics, cultivate major scientific breakthroughs, and facilitate the output of major original and leading-edgeachievements. By targeting the solution of major and complex basic scientific

questions, NSFC will continue to optimize the program design mechanism, plan strategic researchprospectively, and promote the interdisciplinary integration and convergence. Moreover, NSFC will streamline administration by "delegating power, improving regulation and upgrading service", raise service consciousness, optimize fund management, and create a research environment conducive to original innovation.

NSFC will strengthen the fostering of basic research talents to facilitate the construction of a major world center of professional talent. In accordance with the spirit of the central conference on talent-related work, NSFC will establish an evaluation mechanism that conforms to the characteristics of talent programs. Based on the regularities of innovation development and talent growth, NSFC will ensure stable support for young talents, leading talents and creative groups in basic research fields, promote the balanced regional distribution and coordinated development of talents, establish a dynamic adjustment mechanism for the funding areas of Fund for Less Developed Regions, and continue to adopt preferential policies in areas with limited basic research capacity and for female researchers. NSFC will be increasingly open to the world, with an upgraded funding system to attract outstanding international scholars at different career stages to work in China.

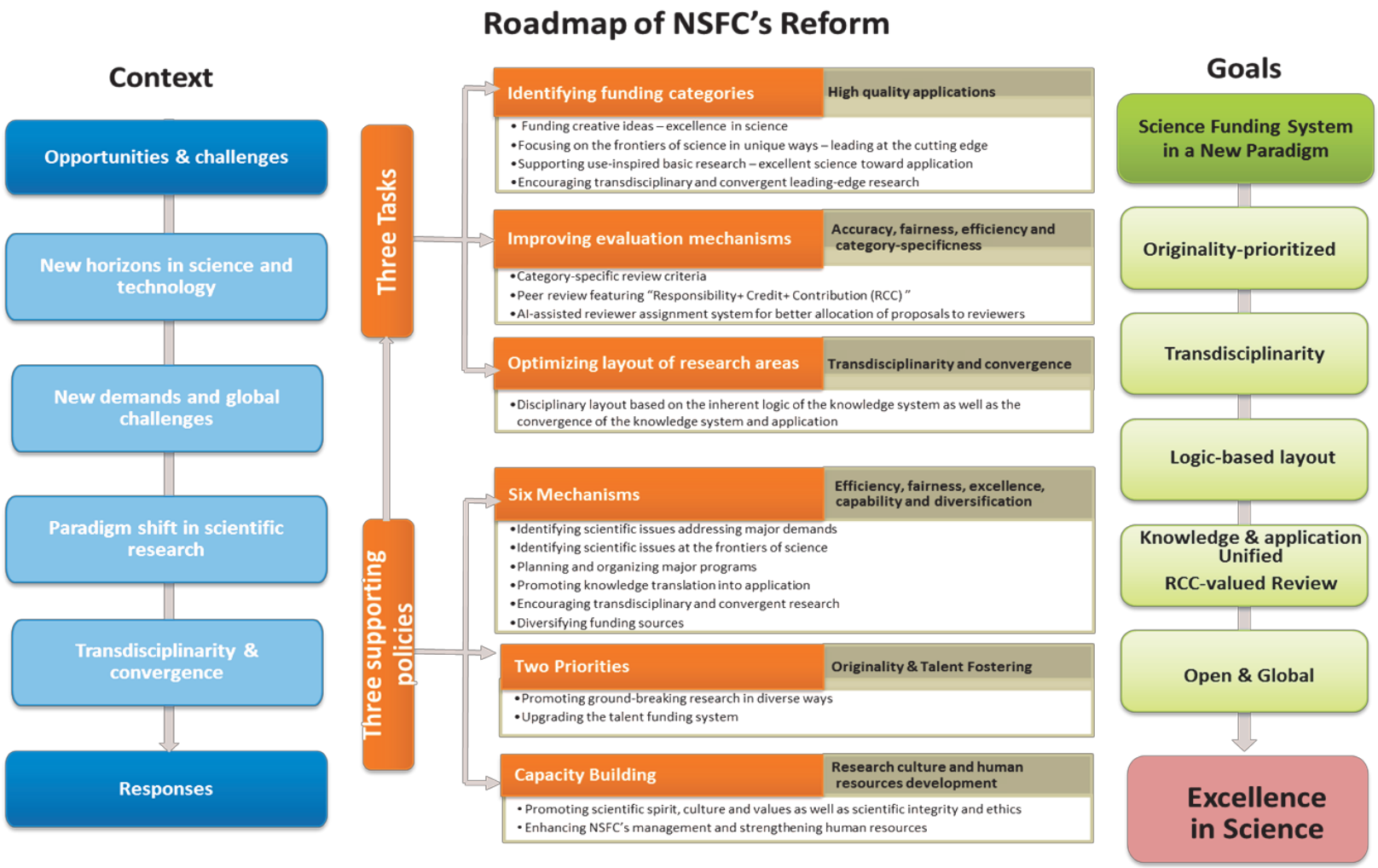
NSFC will seize the opportunity of the paradigm shift in scientific research. With the new S&T revolution and industrial transformation advancing by leaps and bounds, a new trend of basic research is emerging, and facing major challenges such as building a dual circulation development pattern, achieving carbon peaking and carbon neutrality goals and the United Nations Sustainable Development Goals. Only by shifting the paradigm in scientific research, overcoming inertial thinking, and getting rid of the scientific research concept of following and imitating, can we effectively solve the difficult problems. The paradigm shift in scientific research requires not only interdisciplinary integration and convergence, but also identification and analysis from the perspective of the integrity of the knowledge system and the response to major challenges. The S&T community should find ways and means to tackle major challenges by actively changing the scientific research paradigm, and at the same time promote the paradigm shift in the process of coping with those challenges.

NSFC will continuously improve the capability of refining scientific questions. The selection of research topics is the first problem that researchers need to solve. Scientific questions should identify the gap that needs to be filled in the current knowledge system, or the common key theories, regularities or methods that lead the transformation of technology development. The level and quality of scientific questions determine the future of basic research. And refining insightful scientific questions is crucial not only for solving the current problems but also for pointing out future direction. Researchers should identify the practical problems and scientific propositions behind hot topics, and continue to improve the capability of refining scientific questions throughout the whole process of scientific research.

2023 is the opening year to comprehensively implement the spirit of the 20th

CPC National Congress. Under the guidance of Xi Jinping's Socialism Thoughts with Chinese Characteristics for the New Era, NSFC will thoroughly implement General Secretary Xi Jinping's important instructions on scientific and technological innovation, especially on basic research, seriously carry out the instructions of the Central Committee and the State Council on basic research, accurately grasp the strategic positioning that "basic research is the bedrock of the entire scientific system and the key to all technological issues", expedite the construction of a science funding system for the new era that embodies advanced concept, institutional norms, and fairness and efficiency, and establish a system that benefits original innovation and talent fostering, so as to provide solid support for opening up new fields and new tracks and building new driving force and new advantages for development.

Editorial Committee
January 5,2023


Roadmap of NSFC's Reform
Context
Opportunities & challenges
New horizons in science and technology
New demands and global challenges
Paradigm shift in scientific research
Transdisciplinarity & convergence
Responses
Three Tasks
Three supporting policies
Identifying funding categories
High quality applications
• Funding creative ideas – excellence in science
•Focusing on the frontiers of science in unique ways – leading at the cutting edge
•Supporting use-inspired basic research – excellent science toward application
•Encouraging transdisciplinary and convergent leading-edge research
Improving evaluation mechanisms
Accuracy, fairness, efficiency and category-specificness
•Category-specific review criteria
•Peer review featuring "Responsibility+ Credit+ Contribution (RCC) "
•AI-assisted reviewer assignment system for better allocation of proposals to reviewers
Optimizing layout of research areas
Transdisciplinarity and convergence
•Disciplinary layout based on the inherent logic of the knowledge system as well as the convergence of the knowledge system and application
Six Mechanisms
Efficiency, fairness, excellence, capability and diversification
•Identifying scientific issues addressing major demands
•Identifying scientific issues at the frontiers of science
•Planning and organizing major programs
•Promoting knowledge translation into application
•Encouraging transdisciplinary and convergent research
•Diversifying funding sources
Two Priorities
Originality & Talent Fostering
•Promoting ground-breaking research in diverse ways
•Upgrading the talent funding system
Capacity Building
Research culture and human resources development
• Promoting scientific spirit, culture and values as well as scientific integrity and ethics
• Enhancing NSFC's management and strengthening human resources
Goals
Science Funding System in a New Paradigm
Originality-prioritized
Transdisciplinarity
Logic-based layout
Knowledge & application Unified
RCC-valued Review
Open & Global
Excellence in Science

Contents

2023 NSFC Reform Measures

In accordance with the overall plan of the systematic reform of National Natural Science Fund, NSFC will take the following reform measures with the goal of constructing a science fund system for the new era that embodies advanced concept, institutional norms, and fairness and efficiency.

I. Continue implementing the category-specific review

NSFC will continue the pilot category-specific review based on the four attributes of scientific questions, i.e. "exploration and highlight originality; cutting-edge area with the development of new methodology; demand-driven bottleneck; and universal orientation and transdisciplinary convergence", for Young Scientists Fund Program, General and Key Programs, and maintain the proportion of proposals that receive the pilot review. At the same time, NSFC will help the applicants and reviewers better understand the four attributes of scientific questions, and guide researchers to gradually improve the capabilities of refining scientific questions and selecting research topics by means of case database and lecture videos of the attributes of scientific questions.

II. Further upgrade the talent program portfolio

NSFC will steadily expand the funding scale of the Young Scientists Fund to ensure reserve of basic research talents, improve funding efficiency by adopting an overarching approach in planning Excellent Young Scientists Fund and National Science Fund for Distinguished Young Scholars, and linking them up with national S&T talents programs of the same tiers. NSFC will also optimize the application and evaluation mechanism of Science Fund for Creative Research Groups awards, and continue implementing performance evaluation and funding renewal for Basic Science Center Program awards, in order to identify and cultivate more versatile talents who have the potential of growing into strategic scientists.

Excellent Young Scientists Fund (Hong Kong and Macau) and Young Scientists Fund will continue to be open to the young researchers at host institutions in the Hong Kong Special Administrative Region and the Macao Special Administrative Region, so as to cultivate excellent young talents. NSFC will continue to be dedicated

to the organization and implementation of the Excellent Young Scientists Fund (overseas), to attract more excellent overseas young talents to China. NSFC will also make great efforts to implement the Research Fund for International Scientists to support international researchers at different career stages to conduct collaborative research in China.

III. Advance the Original Exploratory Program

Aiming to improve the capability of original innovation, NSFC will advance the Original Exploratory Program by selecting non-consensual, high-risk original proposals of disruptive innovation, and guiding and motivating researchers to engage in original basic research. For details, please refer to the "*Guide to NSFC Original Exploratory Program 2023*" later to be released. In the meantime, NSFC will continue to improve the review and management mechanism by conducting post-award management and conclusion evaluations, encouraging exploration and tolerating failure, and adopting funding renewal mechanism to support promising researches that are likely to bear disruptive and innovative outcomes.

IV. Promote transdisciplinary integration and convergence

NSFC will continue to bolster the development of trandisciplinary convergence and the Department of Interdisciplinary Sciences, and improve the funding portfolio for interdisciplinary researches and develop an interdisciplinary evaluation mechanism by strengthening top-level design and emphasizing the identification and refinement of common scientific questions in interdisciplinary sciences. Facing the frontiers of science and major national needs, NSFC focuses on the comprehensive and complex major issues which human society development faces, and organizes multidisciplinary collaborative research. NSFC will create an academic environment conducive to the development of transdisciplinarity and interdisciplinary sciences, by breaking down disciplinary barriers, opening up disciplinary frontiers, generating disciplinary growth points, exploring new research paradigms, and cultivating interdisciplinary scientific innovation talents and teams.

V. Continue to pilot the evaluation mechanism that features "Responsibility+Credibility+Contribution"(RCC)

Adhering to the principle of positive guidance and incentives, NSFC will continue to pilot the RCC evaluation mechanism. Meanwhile, NSFC will accurately interpret the RCC review mechanism policy, widely publicize the reviewers' code of conduct, and create a good atmosphere for consciously practicing responsible review. NSFC will learn from the pilot experience, and institutionalize it so as to improve the

quality of review.

VI. Encourage diversified investment and collaborative innovation

As of November 2022, 26 provinces (autonomous regions and municipalities) have joined the Joint Fund for Regional Innovation and Development, 12 enterprises have joined the Joint Fund for Corporate Innovation and Development, and 8 industry sectors have established the Joint Fund for Industries of the New Era, which has initially formed a joint funding system for the new era. It has become an important carrier for the science fund management mechanism in strengthening diversified investment and promoting collaborative innovation in the process of NSFC reform. In 2023, NSFC will continue to expand the scope of collaboration of Joint Funds, and explore effective channels and methods for social and individual donations to the science fund.

VII. Enhance International S&T Exchange and Cooperation

NSFC will implement the 20th National Congress of CPC's requirements of "expanding international S&T exchange and cooperation" and continue with the reform, and undertake the tasks outlined in the international cooperation section of NSFC's 14th Five-Year Plan to advance the process of internationalization. NSFC will further explore channels and opportunities for bilateral and multilateral collaborations, conduct joint funding activities with international partners in important research areas under the theme of building a community of a share future for humankind; create an environment conducive to science funding, and put more emphasis on attracting and supporting overseas talents; strengthen cooperation and exchanges between partners across the Taiwan Strait and Hong Kong and Macao. Moreover, NSFC will continue improving the science fund system by holding policy dialogues and discussions with overseas partners.

VIII. Implement the overarching requirements of national S&T program funding

In accordance with *the Notice of the General Office of the Ministry of Science and Technology, the General Office of the Ministry of Finance and the Office of the National Natural Science Foundation of China on Further Strengthening the Project Approval Management of National Science and Technology Plan*, a joint limit is imposed on some researchers leading or participating in NSFC Major Program, Basic Science Center Program, National R&D Program for Major Research Instruments (department's recommendation) and National Key R&D Program, and S&T Innovation 2030—Major Program. Applicants shall confirm the eligibility of the

abovementioned researchers before proposal submission. For details, please refer to "Information on Application" and chapters on relevant program types of this Guide.

IX. Continue to promote the reform of fund management

NSFC will continue to implement the "Measures for Fund Management of NSFC-Funded Projects" (hereinafter referred to as the "Measures for Fund Management").

NSFC will adhere to scientific laws, and give scientific researchers greater autonomy in the use of funds. In addition to National Science Fund for Distinguished Young Scholars, Excellent Young Scientists Fund, and Young Scientists Fund, NSFC will steadily expand the implementation scope of the lump sum payment system; simplify the budget statement to three accounts, i.e. equipment cost, labor cost, and operating expenses; delegate the authority of budget adjustment—the equipment cost to the host institutions, and other direct costs except for the equipment cost to the PIs.

NSFC will insist on putting scientists first, and increase incentives for scientific researchers. The first is to further increase the proportion of indirect costs for grants that use budgeting system and need to have indirect costs verified. The indirect cost is determined according to a certain ratio after deducting the equipment cost from the direct cost, 30% for the part of 5 million yuan and below, 25% for the part exceeding 5 million to 100 million yuan, and 20% for the part exceeding 100 million yuan. For grants in areas of mathematical sciences (referring to those whose application codes 1 are A01-A06 and received by the Department of Mathematical and Physical Sciences), the ratio is further increased to 60%/50%/40%. The second is to expand the scope of labor expenses. The social insurance subsidies and housing provident funds paid by the project employees from the host institutions can be included in the labor cost. The third is to improve the management of surplus funds. After the project is concluded, the unexpended funds will be retained for use by host institutions and will not be recovered.

At the same time, NSFC will track and evaluate the practice of the "Measures for Fund Management", continuously improve fund management, consolidate the main responsibilities of host institutions for fund management and use, to ensure thorough implementation of the new policy, and establish a science fund management mechanism that conforms to the development law of basic research.

X. Further streamline administration by "delegating power, improving regulation and upgrading service"

For postdoctoral researchers who have finished their training and intend to apply for General Program, Young Scientists Fund Program, Fund for Less Developed Regions, Key Program, Excellent Young Scientists Program, Science Fund for

Creative Research Groups, Basic Science Center Program, Special Fund for Research on National Major Research Instruments, and Major Program as the applicant, the funding period will be automatically calculated based on the program type and not modifiable, which makes it more convenient for the researchers. Students are no longer included when filling in the main participants. Information of the main participants in the proposal is collected online. When filling in research outcomes such as papers, all the authors should be listed the same as those at the time of publication, and the first author or corresponding author will not be marked, so as to reduce the paperwork for researchers.

XI. Strengthen the management of host institutions

NSFC will maintain the dynamic management of host institutions by improving the entry and exit mechanism and enabling strict admission control; establish and improve the host institution management system, and explore a classification and categorized management approach. NSFC will also strengthen the supervision on program management of host institutions, develop a mechanism to evaluate credibility and punish misconduct, and reinforce the management and supervision responsibilities of host institutions, to effectively improve the quality of proposals and ensure the implementation of NSFC reform tasks.

XII. Strengthen scientific integrity

NSFC continues to establish a scientific research integrity system that integrates "education, motivation, regulation, supervision, and discipline". NSFC will take education as the foundation, take positive incentives as the guidance, regulation as the criterion, supervision as the starting point, and punishment as the last resort, consider both the long term and the short term, and treat both symptoms and root causes for promoting scientific research integrity, S&T ethics and scientific spirit, culture and values during the "14th Five-Year Plan" period.

Information on Application

When applying for NSFC funds in2023, applicants and their host institutions shall first read carefully the following documents: *the National Natural Science Foundation Regulations* (hereinafter referred to as the *Regulations*), this *Guide*, relevant guidelines for program management, *Regulations on National Natural Science Fund Management*, and notifications and announcements pertaining to application. Should there be any conflicts between guidelines for program management and *Regulations* and this *Guide*, *Regulations* and this *Guide* shall prevail. Information on Application includes eligibility of applicants and requirements for applications, application limits, requirements for budgeting, requirements for scientific integrity and science and technology ethics, responsibilities and accountability of host institutions, and etc.

I. Eligibility of applicants and requirements for applications

i. Eligibility of applicants

1. As the principal investigator (PI), the applicant should comply with Article 10 Clause 1 of the *Regulations*, i.e., the applicant shall have (1) the experience of undertaking basic research program(s) or other basic research activities; (2) a senior academic rank (title) or a doctoral degree, or recommendation from two researchers who are in the same research field and have a senior academic rank (title). Besides, those who apply for certain types of programs shall meet other specific requirements. (For more information, please refer to the text of this *Guide*.)

When an applicant not employed as a full-time staff member at his or her host institution submitsan application, he or she shall truthfully state his or her position, term of employment and annual working duration at the host institution in the application.

2. When a researcher conducting basic research satisfies the requirements as prescribed in the preceding paragraph but has no employer or whose employer is not a registered host institution, on the condition that he or she has obtained the consent from a registered host institution, he or she is eligible to apply for the General Programs and Young Scientists Fund, but is not eligible to apply for other programs.

Under this circumstance, the applicant shall fill in truthfully personal information in the basic information page of the proposal and research experiences in

CV, and sign the agreementin written form with the host institution(for more information please refer to the *Guideline on Management of National Natural Science Fund Host Institutions*). **The hard copy of the agreement shall be archived at the host institution for future reference instead of submitting to NSFC.**

Researchers with overseas identity who are not employed in any host institution shall not apply for NSFC programs as researchers with no employer or whose employer is not a registered host institution.

3. NSFC continues to implement Excellent Young Scientists Fund (Hong Kong and Macao) and Young Scientists Fund open to applicant whose host institution is one of the following eight universities, i.e. Hong Kong University, Chinese University of Hong Kong, Hong Kong University of Science and Technology, Hong Kong Polytechnic University, City University of Hong Kong, Hong Kong Baptist University, University of Macao, and Macao University of Science and Technology. [Please refer to *Excellent Young Scientists Fund (Hong Kong and Macao)* and *Young Scientists Fund* sections in this *Guide* for details.]

4. Students pursuing the postgraduate degree (not obtained by the deadline for NSFC submission) cannot apply for any fund as the PI. However, with the supervisor's consent, in-service personnel can apply for certain categories of programs through the host institution. The applicant should submit a scanned copy of a signed certification of the supervisor's consent, which explains the connection between the dissertation and the proposal and guarantees the working hours and conditions after the project starts, as an attachment to the application. In-service postgraduate students whose employer is not a registered host institution is not eligible to apply for any type of programs.

5. Postdoctoral fellows can apply for the following programs only: General Programs, Young Scientists Fund,Fund for Less Developed Regions, and others to be determined by the corresponding solicitations. However, postdoctoral fellows are not allowed to apply for Young Scientists Fund from any host institution in Hong Kong or Macao.

6. The applicants for the Fund for Less Developed Regions should be full-time employees in the specified host institutions (for more information, please refer to the chapter on Fund for Less Developed Regions in this *Guide*), or the technical personnel following national policy and sent by the Organization Department on the 3 -year or longer aiding mission in Xinjiang and Tibet, who should provide the supporting materials of the aiding mission issued by organization or personnel department of the aided institutions. If the unit that a researcher is working at for the aiding mission in Xinjiang or Tibet is not a registered host institution, they are allowed to apply for Fund for Less Developed Regions through the eligible host institutions in the aided autonomous regions. Part-time employees in the specified host institutions, technical personnel from the specified host institutions affiliated to Chinese central government or the People's Liberation Army or host institutions

outside the regions are not qualified to apply for the Fund for Less Developed Regions.

7. Any overseas researcher employed by a registered host institution shall not apply for projects as both domestic applicant and overseas collaborator (referring to overseas collaborators in international (regional) joint research projects).

The PI of the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao project, and the overseas collaborator of the International (Regional) Joint Research project (including Key International (Regional) Joint Research Program and International (Regional) Joint Research Program under Agreements/MoUs) shall not apply for other types of program (except for the Research Fund for International Scientists) as PI before the end date of their projects.

Domestic PI who has an ongoing project shall not participate in the application for International (Regional) Joint Research Program (including Key International (Regional) Joint Research Program and International (Regional) Joint Research Program under Agreements/MoUs) as an overseas collaborator before the end date of the ongoing project.

8. To avoid duplication of funding, NSFC's Department of Management Sciences and National Social Science Fund jointly limit applications. Please refer to the Funding Areas and Precautions under Department of Management Sciences section of this *Guide* for specific requirements.

Ii. Requirements for applications

1. The proposal shall be prepared by the applicant in person and in accordance with the outline. The applicant and the main participants should fill in their CVs accordingly. **Please note that any unlawful, confidential or sensitive information shall not appear in the proposal.** The applicant shall be responsible for the authenticity and legitimacy of the proposal submitted.

2. In accordance with program types, the applicant shall make accurate selection of the "funding category","subclass introduction" and "annotation". For some programs, annotation should be selected strictly in accordance with this *Guide*. When there is no relevant requirement, the annotation should be left blank.

3. **Pilot category-specific application and review based on the four scientific natures of research will continue being adopted for all the General and Key Programs, and Young Scientists Fund.** Applicants shall choose one out of the four scientific attributes according to the critical scientific problem they aim to solve and the research they hope to conduct, and justify their choice in the proposal. When the proposed research fits multiple scientific attributes, applicants shall choose one that best describes the characteristics of their proposed research.

4. Applicants shall select the application code accurately based on the research

directions or research areas of their proposals, in accordance with the "NSFC Application Code" in this *Guide*. Particular attention shall be paid to the following aspects:

(1) When selecting the application code, please make sure to include the secondary application code(four digits).

(2) Key Programs, Major Research Programs and Joint Funds Programs, etc., may have special requirements for the application codes. For details, please refer to the relevant sections in this *Guide*.

(3) Applicants shall accurately select "Application Code1" and the corresponding "research direction" and "key word" when filling out the proposal form.

(4) For any questions regarding the application code, please contact relevant scientific departments.

5. **The applicant does not need to list students as main participants, but only need to include them in the total number of participants. Main participants will complete their CV online the same way as the applicant. The applicant shall invite main participants to complete their CV via the ISIS system and upload the PDF version of their CV generated by the system. Applications that fail to include complete CV of main participants cannot be submitted.**

For each representative paper listed in the CV, an e-copy of the fulltext of the published paper in PDF format should be uploaded. For each representative monograph, a scanned copy of the cover, abstract, table of contents, copyright page, and etc. in PDF format should be uploaded.

When main participants do not work at the same host institution as the applicant (including graduate students), the employer of the main participants shall be regarded as a collaborative research institution; however, overseas institutions are not regarded as such. Applicants shall select online or accurately fill in the employer information of the main participants. **The information on collaborative research institution in the basic information section of the application form is automatically generated by the online application system.** The number of collaborative research institution for each application shall not exceed two (unless otherwise specified).

6. **If the proposed research involves issues related to science and technology ethics and security (such as biosecurity, information security), the applicant and main participants shall carefully study the knowledge of science and technology ethics, and strictly follow relevant national laws, regulations and codes of ethics,** and provide corresponding materials as attachment in accordance with the requirements of relevant scientific departments (a scanned copy shall be attached to the electronic application).

7. Applicants and the main participants with a senior academic rank (title) shall indicate in the proposal if:

(1) They have more than one host institution when applying or participating in

NSFC projects in one year;

(2) They have different host institutions for on-going NSFC projects.

8. If a research has been funded through other sources, the applicant shall specify the funding details and their difference and connection with the current proposal. Applying for funding from different funding agencies for the same research content should be avoided.

If an applicant applies for different types of NSFC programs during the same year, he or she should specify in the application the other NSFC program applications, their titles and information, and the connection and difference with the current application.

9. The start date for research in proposal shall be January 1, 2024, and the end date December 31, 20xx, depending on the funding periods (unless otherwise specified in this *Guide*).

10. The applicant and the main participants shall use the same and only document of identity for application.

When filling in names of oneself and main participants, the applicant shall make sure the names are in standard characters and exactly the same as the ones on documents of identity. Those who have received funds as applicants or main participants using other identifications shall declare and provide details in the proposal. Host institutions are accountable for verification.

11. Host institutions should download the "2023 NSFC Host Institution Letter of Commitment for Project Application" from the NSFC Grants system in advance, and then upload the scanned electronic copy after it is signed by the legal representative and stamped with the official seal of the host institution to the system (only once a year). The host institution can submit the proposals only after completing the above-mentioned commitment procedures.

12. All the applications for NSFC programs are paperless. **The applicant shall seek consent of main participants and collaborative research institutions regarding all the content of the proposal before submission. The host institution shall confirm the online applications and attachments in the Grants system before the deadline, and submit the list of applications within 24 hours after the deadline. Host institutions do not need to mail hard copies of applications.**

After a grant is awarded, the applicant and the main participants shall sign on the signature and seal page of the application form**themselves**. The overseas participants who cannot sign the page shall send a signed paper document by letter, fax, and etc., stating their consent to participate and perform the related responsibilities in the application and the research work, which will be submitted together with the signature and seal page.The collaborative research institution shall stamp the official seal on the signature and seal page, and ensure the name on the official seal is consistent with the name of the institution in the application. A collaborative research institution that has been registered as a host institution with NSFC shall stamp the

official seal of the host institution; a collaborative research institution that is not registered shall stamp the official seal of the legal entity. **The host institution should stamp the official seal on the signature and seal page of the application form and submit it together with the Project Plan.** The signature and seal information shall be consistent with that of the electronic application. NSFC will handle the cases where the signed and sealed documents are not provided according to the requirements above based on relevant rules and regulations.

Iii. About application reception conditions

According to the *Regulations*, the application for NSFC funds shall not be accepted under any of the following circumstances:

1. The applicant does not meet requirements stated in the *Regulations* ,this *Guide* and relevant management methods.

2. The application materials do not comply with conditions in this *Guide*.

3. The number of proposals does not comply with the Application Limit's conditions.

II. Application limit

i. General requirements

1. Applicants shall only apply for one type of program once in a year, excluding Integrated Program and Strategic Research Program in the Major Research Plan, Scientific Activity Program in Special Program and International (Regional) Exchange Program; for Joint Funds, the same type refers to the same program name.

2. Applicants cannot apply for the same type of program if they received funding for General Program, Key Program, Major Program, Major Research Plan Program (excluding Integrated Program and Strategic Research Program), Program of Joint Funds(referring to the Joint Fund with the same name), and Fund for Less Developed Regions as the PI in the previous year.

Ii. Restriction on the total number of projects applied for and undertaken

Unless specified otherwise, projects whose funding period terminates in the year of application are not included in the total number for applying and undertaking. Proposals that fail to pass the compliance check will not be subject to the restriction on the total number for applying and undertaking.

1. Limit on the total number of projects applied and undertaken

For researchers with a senior academic rank (title), the total number of the following programs he or she applies for (including as applicant and main participant)

and undertakes (including as applicant and main participant) shall not exceed **two**: General Program, Key Program, Major Program, Major Research Plan (excluding the Fostering Program and Strategic Research Program), Program of Joint Funds, Young Scientists Fund, Fund for Less Developed Regions, Excellent Young Scientists Fund, National Science Fund for Distinguished Young Scholars, Key International (Regional) Joint Research Program, International (Regional) Joint Research Program under Agreements/MoUs with direct cost of more than 2 million yuan per project (only the PI are counted, main participants are not counted), National R&D Program for Major Research Instruments (including Special Fund for Major Research Instruments and Special Program of National Major Research Instruments), Basic Science Center Program, Original Exploratory Program, and Emergency Program and Special Program with funding period of over one year (unless otherwise specified, and except for the scientific activities projects under Special Program).**For researchers without senior academic rank (title),** the total number of the above programs that he or she applies forand undertakes as PI shall not exceed **one, and the number shall not exceed two when he or she applies for and undertakes the projects as a main participant.**

The grants that were awarded in 2019 or before and are undertaken by **researchers with a senior academic rank (title)** as main participants are not counted in the total number. However, the projects that researchers apply for as applicants and main participants and those awarded to researchers as PI and main participants in 2020 and beyond are counted in the total number.

The grants that were awarded in 2022 or before and are undertaken by **researchers without a senior academic rank (title)** as main participants are not counted in the total number. However, the projects that researchers apply for as applicants and main participants and those awarded to researchers as PI and main participants in 2023 and beyond are counted in the total number.In case a researcher receives the senior academic rank (title), the projects he or she undertakes as the PI shall be counted into the total number whereas those a researcher undertakes as the major participant shall not.

2. Programs not subject to the total number limit

There is no number limit for Science Fund for Creative Research Groups, Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao,Tianyuan Fund for Mathematics, International (Regional) Joint Research Program under Agreements/MoUs with direct cost of no more than 2 million yuan per project, International (Regional) Exchange Program, Fostering Program and Strategic Research Program of the Major Research Plan, Research Fund for International Scientists, scientific activity projects under Special Program, other types of program with funding period of no more than 1 year, and other programs specified in this *Guide*.

Iii. Special requirements for some types of programs

1. General Program

Applicants with unsuccessful application for the General Program both in 2021 and 2022 (including those rejected at the stage of compliance check) cannot apply for General Program as the PI in 2023.

2. International (Regional) Cooperation and Exchange Program

The PI of an International (Regional) Joint Research Project shall not apply as an applicant for the same type of program.

For International (Regional) Exchange Program, each researcher shall apply for as applicant and undertake as PI only one project under the same Agreement/MoU.

3. Special Fund for Research on National Major Research Instruments

Researchers with senior academic rank (title) shall apply (as applicant and main participant) for Special Fund for Research on National Major Research Instruments only once in the same year.

The PI and main participants of a project of Special Fund for Research on National Major Research Instruments are not allowed to apply for or participate in the application for the same program before the ongoing one concludes.

The PI of a project of Special Fund for Research on National Major Research Instruments (department's recommendation) is not allowed to apply for any type of NSFC program except for National Science Fund for Distinguished Young Scholars.

4. Excellent Young Scientists Fund Program and National Science Fund for Distinguished Young Scholars

At the stage of application, Excellent Young Scientists Fund and National Science Fund for Distinguished Young Scholars are not counted, but are counted between submission and receiving NSFC’s formal funding decision and after approval.

5. Basic Science Center Program and Funds for Creative Research Group

At the stage of application, proposals for Basic Science Center Program are not counted, but are counted between submission and receiving NSFC’s formal funding decision and after approval. Proposals for Basic Science Center Program that do not enter the site inspection procedure will not be counted.

Applicants and main participants shall only apply for and participate in one project for Funds for Creative Research Group or Basic Science Center Program in the same year.

The PI and main participants with senior academic rank (title) who is funded by Science Fund for Creative Research Groups shall not apply for Basic Science Center Program; however, application is allowed in the year of conclusion.

The PI and main participants (key members) shall not apply for any NSFC grants before the awarded project concludes except for National Science Fund for Distinguished Young Scholars and Excellent Young Scientists Fund, Strategic

Research Program of Major Research Plan, and Scientific Activities Projects under Special Program.

Participants who withdraw from Fund for Creative Research Group or Basic Science Center Program shall not apply for or participate in the applications for those two types of programs within 2 years.

6. Basic Science Center Program and Special Fund for Research on National Major Research Instruments (department's recommendation)

The applications for Basic Science Center Program and Special Fund for Research on National Major Research Instruments (department's recommendation) are mutually exclusive in the same year.

7. **Original Exploratory Program**

The Original Exploratory Program is not included in the scope of the total number of applications and grants at the time of application, but will be included in the scope of the total number of applications and grants after the grant is awarded (except for projects with funding period of no longer than 1 year).

Researchers can only apply for one project under Original Exploratory Program (including pre-application) in the same year.

Iv. The limit on the PI for accumulated number of funding

1. For Young Scientists Fund, Excellent Young Scientists Fund, National Science Fund for Distinguished Young Scholars, and Science Fund for Creative Research Groups, the applicant can receive the funding only once.

2. An applicant can only be awarded once for each of the three tiers of the Research Fund for International Scientists, i.e. Research Fund for International Young Scientists, Research Fund for International Excellent Young Scientists and Research Fund for International Senior Scientists.

3. Beginning from 2016, for Fund for Less Developed Regions, the applicant’s accumulated number of funding cannot exceed three. Projects approved in and before 2015 are not counted.

V. Joint Limit with National Science and Technology Program

In accordance with *the Notice of the General Office of the Ministry of Science and Technology, the General Office of the Ministry of Finance and the Office of the National Natural Science Foundation of China on Further Strengthening the Project Approval Management of National Science and Technology Plan*, a joint limit is imposed on NSFC Major Program (only PI and co-PIs of grants only), Basic Science Center Program (only academic leaders and key members), National R&D Program for Major Research Instruments (only PIs and main participants with senior academic rank (title) of the department recommended projects) and National Key R&D Program (only PIs and co-PIs, and excluding Young Scientist Program, Small and

Medium-sized S&T-based Enterprise Program, and International Cooperation Program), and S&T Innovation 2030—Major Program (only PIs and co-PIs, and excluding Young Scientist Program). The number of projects (subjects) that a researcher applies for and undertakes in the same period shall not exceed two in principle. Applications in the year when the above projects (subjects) are concluded are not counted in the number limit.

For researchers with senior academic rank (title), the total number of Special Fund for Research on National Major Research Instruments (including Special Program on National Major Research Instruments) and the National Major Instrument R&D Program and the Key Special Program for Basic Scientific Research Infrastructure and Major Research Instrument R&D (Scientific Equipment direction) by Ministry of Science and Technology one may apply for (including as applicant and main participant) and undertake (including as PI and main participants) shall not exceed one.

Vi. Special notice

1. During the evaluation period (prior to NSFC's final decision), the application shall be counted in the total number, except for those under Original Exploratory Program. Applications that are not subject to the restriction on the total number of projects include: applications for Basic Science Center Program that do not enter the site inspection procedure, applications for Special Fund for Research on National Major Research Instruments (Bottom-up application) that do not enter the budget review procedure, applications for Special Fund for Research on National Major Research Instruments (department's recommendation) that do not enter the budget review or site inspection procedure.

2. In the case that applicants engaged in multiple host institutions apply for or undertake through different host institutions, the Limit is still applicable.

3. In case of an inconsistency between other management regulations and this Limit in terms of total project numbers, the latter shall prevail.

III. Budget Preparation

i. General requirements

The applicants shall make and submit the project budget in accordance with the guidelines of relevant official documents of the Central Government and the State Council and *the Measures for Fund Management of NSFC-Awarded Projects* and *the Specification of Budget Table Preparation for NSFC-Awarded Projects*, following the principle of "policy compliance, target relevance and economic rationality". The proposed budget shall reflect the actual needs of the proposed research. The host institution shall carry out a careful review and approval of the proposed budget in line

with relevant regulations.

Ii. Contents

There are two categories of financial management system for NSFC-funded projects, i.e., the contract-based system and the budget-based system.

1. **Projects under the contract-based system (Hereinafter referred to as contract-based projects)** Applicants of contract-based projects shall apply for the funding amount in a scientific and reasonable way to ensure well-organized and effective use of funding, while without the need to make a project budget. The funding management of contract-based projects shall be carried out in accordance with *Measures for Fund Management of NSFC-Awarded Projects* as well as the internal regulations formulated by respective host institutions on the financial management system of contract-based projects. The Principal Investigator (PI) of contract-based projects, independently in charge of the use of award funding, shall manage the expenditures within the respective amount of direct costs and indirect costs. Transfers of funds between all other budget subjects are permitted without seeking prior consent from the NSFC.

2. **Projects under the budget-based system (Hereinafter referred to as budget-based projects)** Applicants of budget-based projects shall fill in each subject on the budget table in accordance with the actual needs of the proposed research. Only direct costs of each subject are required to be filled in, while the indirect costs would be uniformly calculated by NSFC. Both a *Budget Table of the NSFC-funded Projects* (hereinafter referred to as Budget Table) and a *Budget Justification* should be filled in and submitted by the applicants. The direct cost on the Budget table are as follows：

Equipment expenses refer to the costs of purchase or trial– production of special instruments and equipment, the upgrading and modification of existing instruments and equipment, and the rent of instruments and equipment from other institutes during the implementation period of the project. Computing instruments and software tools can be included in the equipment expense. The purchase of new equipment should be strictly controlled to avoid duplicate purchases by encouraging open sharing, independent research and development, renting special instruments and equipment, and upgrading existing instruments and equipment.

Experimental and Operating expenses refer to the purchase, transportation, handling and arranging of low-value consumables such as materials and auxiliary materials consumed during the implementation period of the project, as well as test and processing costs, fuel and power costs, publication /documentation/ dissemination/IPR services costs, conference /travel/international cooperation and exchange costs, and other related expenses.

Labor costs refer to the labor fees paid to graduate students, postdoctoral

students, visiting scholars, and researchers and research assistants employed for the project, as well as the consulting fees paid to the experts hired on a temporary basis during the implementation period of the project.

The expenditure standard of labor costs for the hired personnel should be level with the average salary of the employees of local research community and technical service industry, depending on the assignments they undertake in the project. The social insurance subsidies and housing provident funds paid by the host institution are included in the labor costs subject.

The consulting fees paid to the temporarily hired experts shall not be paid to the relevant personnel involved in the research and management of this project, and shall be managed in accordance with the relevant national regulations.

Self-raised funds: for this subject, please fill in the funds obtained from the host institution and other sources.

Expenses of each subject on the Budget Table should be direct costs. There is no restriction on the proportion of direct costs for each subject. Applicants shall truthfully list the expenses according to the definition, scope and standard of relevant subjects on the basis of the actual needs of the proposed research. In the Budget Justification, applicants shall describe in details the expenses of each subject on the Budget Table, and specify the qualifications, funding allocation and self-raised funds of the cooperative research institutes. **Detailed explanations should be made for a single purchase of equipment totaling 500,000 yuan or above; and classified explanations should be made for the purchase of equipment totaling less than 500,000 yuan.**

When filling out the Research Plan, the total amount of direct costs on the Budget Table should not exceed the approved total budget of direct costs, and the amount of each subject should not exceed the amount of each subject proposed in the application in principle. Projects that have undergone budget review should be adjusted according to the review comments. During the implementation process, adjustments of labor and experimental and operating expenses should be subject to the project PI according to the actual research needs, while the adjustments of equipment costs need to be submitted to the host institution for approval.

Iii. Funding transfer for cooperative research institutions

1. If the applicant and the main participant of a project are not from the same host institutions, the main participant's host institution (based in China's mainland) is regarded as a cooperative research institution.

2. Both parties of the project shall sign a cooperative research agreement (or contract) before the submission of the Research Plan, with specification of the funding transferred to the cooperative research institution in the Budget Justification.

The cooperative research agreement (or contract) needs not to be submitted to NSFC, but rather kept by the host institutions for future reference.

3. The applicant and the main participant of the project shall prepare their respective budgets (hereinafter referred to as sub-budgets) according to their respective research tasks. Once the sub-budgets are reviewed and signed by the respective host institutions, the applicant shall complete a total budget of the project and submit it to NSFC. The sub-budgets in the application submission stage needs to be signed by the main participants (in the blank of the Budget Table), and the sub-budgets at the Research Plan submission stage needs to be signed by the main participants with the seal of the cooperative research institutions (in the blank of the Budget Table). The sub-budgets need not to be submitted to NSFC, but rather kept in the respective host institutions for future reference.

4. During the implementation of the project, the host institution shall make funding transfers to respective cooperative research institutions according to the project Research Plan and the cooperative research agreement, and strengthen the supervision and management of the transferred funds.

5. If the applicant and main participants have agreed not to make any funding transfers to the cooperative institutions, there will be no need to sign a cooperative research agreement, nor need to make sub-budgets, given that relevant specification be made in the Budget Justification.

Iv. Responsibilities of Host Institutions and PIs

The host institution, bearing the responsibility of the project funding management, shall establish and improve the funding management mechanism following the principle of “unified leadership, multi-level management, and individualized responsibility”. With internal regulation, performance management and supervision and restraint mechanisms put in place, the host institution shall review and approval the project budget, expenditure, final account as well as the budget adjustment carefully, so as to achieve "consistency between real expenditure and final account", and ensure that all expenditures are "truthful, legitimate and effective". The PI in charge of the project is directly responsible for the use of the grant, and bears legal responsibility to ensure the compliance, rationality, authenticity and relevance of the use of the grant.

V. Management of unexpended funds

The NSFC-funded grants are earmarked for supporting scientific researchers to carry out basic research and explorations at frontiers of science, as well as strengthening personnel capability and team-building. The host institution shall enhance the management of the unexpended funds, maintain a dynamic supervision of the fund expenditure and provide real-time early reminder, revitalize the use of

unexpended funds, speed up the progress of fund use, and improve the efficiency of fund expenditure. The PI in charge of the project shall arrange the expenditures reasonably according to the needs of scientific research activities, not only to avoid crash expenditure, but also to prevent from excessive leftovers. When a project is concluded and approved by the NSFC, the host institution will be fully in charge of coordinating the use of the remaining funds, prioritizing the research needs of the team undertaking the project. The host institution shall formulate regulations on the use of unexpended funds. If a project conclusion is not approved by the NSFC, the host institution shall return the remaining funds to NSFCwithin30daysupon receiving the written notice from NSFC.

Vi. Miscellaneous

1. In accordance with the guidelines of the Opinions of The General Office of the State Council on Reforming and Improving the Management of Scientific Research Funds Financed by the Central Government and The Regulation on the Funding Management of NSFC-funded Projects, the host institution shall fulfill its responsibility for the funding management, improve timely its internal administrative systems, enhance the relevant services for researchers, fully implement the financial assistant system for scientific research, improve the management of financial reimbursement, and thus establishing an information-based reimbursement mechanism addressing actual needs of scientific research.

2. Projects funded by NSFC under the Young Scientists Fund, Excellent Young Scientists Fund, and National Science Fund for Distinguished Young Scholars are subject to the contract-based financial management system, and thus without the need to make project budgets.

3. The figures on the budget table shall be measured in “ten thousand yuan” rounding up to 2 decimal places. The costs or prices of each item are measured in “yuan", accurate to single digit. Foreign currency must be converted into RMB at the spot exchange rate published by the People's Bank of China.

IV. Requirements for scientific integrity and S&T ethics

To enhance scientific research integrity and S&T ethics,prevent scientific misconduct in science fund application, NSFC proposes instructions and requirements for scientific integrity and S&T ethics to be followed.

i. About personal information

1. The NSFC project shall be applied for by the applicant himself or herself. It is strictly prohibited to applyunder another person’s name, or fabricate false applicants and main participants.

2. Applicants and main participants shall truthfully fill in the personal information and be responsible for its authenticity; at the same time, the applicant shall also be responsible for the authenticity of the personal information of all the main participants. It is strictly prohibited to forge or provide false information.

3. The academic degree information of applicants and main participants shall be consistent with that on the diploma. The time of degree acquisition shall be the same as on the diploma.

4. Applicants and main participants shall faithfully and accurately fill in the title information of their formal employment at host institutions. Forgery or providing false title information is strictly prohibited.

5. Applicants who are unemployed or whose employer is not a registered host institution shall truthfully fill in the work unit and the employment information. Giving false information is strictly prohibited.

6. Applicants and main participants shall faithfully and accurately complete their curricula vitae, including a detailed list of academic titles and their corresponding periods. It is strictly prohibited to omit the middle academic title and only write the highest one, for example, "1986 to present, Professor". It is strictly prohibited to forge or alter relevant information.

7. Applicants shall accurately provide the information of their postgraduate and postdoctoral tutors, and shall not provide false information or omit any information in that regard.

Ii. About research content

1. The applicant shall fill out the body part of the proposal in accordance with the *Guide*, instructions indicated in the online application system and requirements of the outline, and faithfully fill in relevant research work and research contents. Plagiarism or fraud is strictly prohibited. Violation of law and regulations, codes of ethics and regulations regarding S&T security is also strictly prohibited.

2. When filling in the research achievements such as papers, the applicant and main participants shall truthfully list the names of all authors(inventors or participants) of the research results as they appeared when published, and shall not alter the order of authors(inventors or participants).

3. Applicants and main participants shall strictly abide by the academic norms and codes of conduct recognized by the scientific community and shall not include "research results" that are generated from scientific misconducts such as forgery, tampering, plagiarism, entrusting "third party" to compose or submit the proposal, and peer-review fraud as the basis of applying for science funds.

4. Proposals with same or similar research contents shall not be submitted by different applicants through different host institutions to apply for different types of programs simultaneously. Projects that have already been funded are not allowed to

be proposed.

5. The research content of the proposal should not be the same as that of the proposal that has been submitted through another channel and is being reviewed. If the research content has been funded through other channels or programs, applicants shall state the funding situation and the difference and connection with the proposed projectin the application. Applicants shall not submit the same research content once again to NSFC for funding.

Iii. Other relevant requirements

1. Host institutions and collaborative institutions shall implement the specific requirements of the "*Several Opinions on Further Strengthening Scientific Integrity" and "Opinions on Further Promoting Scientific Spirit, Culture and Values"*"Opinions on Strengthening the Governance of S&T Ethics"issued by the General Office of the CPC Central Committee and the General Office of the State Council, follow the instruction of the "*Notice of NSFC and MoST on Further Consolidating the Primary Responsibility of Institutions Undertaking National Science and Technology Programs(Special Projects, Funds, etc.) in Upholding Academic Culture and Scientific Integrity*", establish and improve the education, management and supervision system for upholding scientific research integrity and S&T ethics, examine and verify application materials more strictly, and eliminate exaggeration, falseness and fraud.

2. Applicants shall inform main participants of the relevant contents of the application and the scientific integrity and S&T ethics requirements, and ensure that main participants fully understand the relevant contents and requirements. Both the applicant and the main participants shall be responsible for the authenticity, completeness and compliance of the contents involved. Applicants shall strengthen education and training of team members, especially students.

3. Responsible entities that have been disqualified from applying for or participating in the application by NSFC or have been jointly punished throughout the scientific community, shall not apply for, undertake or participate in any new NSFC-funded projects during the penalty period.

4. Prior to submitting the proposals, applicants together with host institutions shall strictly comply with their commitments in the process of application and review.

5. It is strictly prohibited to engage in any activities that may affect the fairness of NSFC review.

V. Responsibilities of host institutions

1. Host institutions shallorganize application work by strictly abiding by the *Regulations, Guide to Programs, Regulations on Fund Management of National*

Natural Science Fund Host Institutions, other relevant notices and management methods and Funding Management Method, Budget Preparation Notes and Notes on National Natural Science Foundation of China Program Budget Form.

2. Host institutions shall implement "*Several Opinions of NSFC on Further Strengthening the Science Fund Management of Host Institution*", seriously fulfill the responsibilities of management, and strengthen and standardize science fund management.

3. Host institutions shall establish a scientific research ethics review mechanism to prevent ethical and security risks. In accordance with relevant laws, regulations and codes of ethics, host institutions shall establish and improve scientific research ethics management systems; strengthen ethical review mechanism and process supervision; improve the sense of responsibility and legal awareness of scientific research personnel with regard to scientific research ethics through publicity, education and training.

4. Host institutions shall establish a scientific and technological security review mechanism to ensure no confidential or sensitive information appears in the proposals.In accordance with relevant laws and regulations, host institutions shall establish and improve scientific and technological security management systems; strengthen liability system for biosecurity, information security and other scientific and technological security; improve the sense of responsibility and legal awareness of scientific research personnel with regard to scientific and technological security and etc. through publicity, education and training.

5. Host institutions are held accountable for the eligibility of applicants, and shall examine and verify the authenticity and completeness of proposals. Host institutions that allowapplicants without employer or whose employer is not a registered host institution as listed in Article 10 Clause 2 of *Regulations* to apply for funds via their institutions, shall bear the responsibilities listed in Article 13of the *Regulations*, and sign the written contract. The written contract shall be archived at the host institution for further reference instead of submitting to NSFC.

6. Host institutions should ensure that they themselves, collaborative institutions, applicants and main participants are not in the penalty period during which the application, undertaking and participation of S&T activities funded by governmental finance are restricted.

7. Host institutions should focus on the quality of the proposals, rather than the number of proposals attained by mass mobilization, setting rigid goal, and adopting reward and punishment measures linked to proposal submissions, so as to gradually improve the overall level of basic research of the institution.

8. **Host institutions should upload the electronic scanned copy of the*2023NSFC Host Institution Letter of Commitment for Project Application* that is signed by the legal representative and stamped with the official seal in a timely manner, to ensure applicants can finish and submit their proposals online on**

time; and confirm and submit each and every proposal and its attachments, and the list of proposals of the host institution within the set time frame, to ensure all the proposals will be accepted properly.

VI. Accountability

1. Host institutions that neglect management and fail to perform the duties of examining the authenticity, completeness and compliance of the application materials, or host institutions and cooperative institutions violating commitments, shall be punished depending on the severity of the situation by NSFC in accordance with the *Regulations*,"*Notice of NSFC and MoST on Further Consolidating the Primary Responsibility of Institutions Undertaking National Science and Technology Programs(Special Projects, Funds, etc.) in Upholding Academic Culture and Scientific Integrity", "Rules for the investigation and handling of scientific integrity cases (for trial implementation)","NSFC Measures for Investigation and Handling of Research Misconduct", "Memorandum of Cooperation on Imposing Joint Disciplinary Measures on Discredited Entities in the Area of Scientific Research",* requirements stated in this*Guide* and the signed letter of commitment.

2. Applicants and main participants violating the requirements and commitments stated in this *Guide* or other scientific and technological activities, once discovered, shall be punished(such as termination of review) depending on the severity of the situation by NSFC in accordance with the provisions of the *Regulations* and the *Guide.* Suspected violations of scientific research integrity requirements will be investigated, and verified cases will be handled with seriousness.

3. Clues and whistle-blowing reports related to the violation of disciplines and laws will be transferred to relevant discipline inspection and supervision departmentsin accordance with management authority.

Funding Areas and Precautions for Scientific Departments

Basic Science Section

The basic science section is integrated by the mathematical physics science department, the chemical science department and the earth science department. The basic science section focuses on facing the world's scientific and technological frontier, strengthening the development of basic science, contributing to the human knowledge system, and cultivating the first mover advantage for cutting-edge technological innovation in various fields.

Department of Mathematical and Physical Sciences

Mathematical and physical sciences (including mathematics, mechanics, astronomy, physics I and physics II) are important foundations of natural science, and the precursor and basis for the development of contemporary science. In their own development, mathematical and physical sciences also provide theories, methods and means for other disciplines. Research findings in mathematics and physics play a key role in promoting the progress of both basic and applied scientific disciplines. Disciplines in mathematical and physical sciences are peculiar in characteristics, such as big differences between or among disciplines, and pure theoretical research (such as mathematics, theoretical physics, etc.) and experimental studies. Many disciplines feature “mega-science”, such as high energy physics, nuclear physics, astronomical physics, high temperature plasma physics, etc.

Mathematical and physical sciences have extensive interactions with other sciences, for example, mathematics with information science, life science and management science, physics with materials science, life science, information science and chemistry, astronomy with earth science, and mechanics with engineering science, material science and earth science. Their interactions produce a series of interdisciplinary and cross-boundary disciplines and new research areas have emerged, and at the same time research objects and areas are also expanding.

The Department will continue to increase its support on basic research that takes as its primary goals advancing the disciplinary development, promoting original innovation and training talented researchers and meeting the needs of national long-

term development, as well as interdisciplinary research within the Department and with other departments.

Funding of programs in Department of Mathematical and Physical Sciencesin 2022

Unit: 10,000 yuan

Divisions		General program			Young scientist program			Less developed region program		
		Projects	Direct cost	Success rate (%)	Projects	Direct cost	Success rate (%)	Projects	Direct cost	Success rate (%)
Mathematics	Mathematics I	270	12 328	22.82	315	9 420	26.60	54	1 529	19.35
	Mathematics II	269	12 281	22.18	343	10 290	24.77	55	1 559	18.84
Mechanics	Dynamics and control	73	4 029	22.67	77	2 290	26.01	8	257	22.86
	Solid mechanics	161	8 879	22.64	195	5 780	25.56	16	515	20.51
	Fluid mechanics	84	4 626	22.52	117	3 480	25.94	5	161	13.89
	Bio-mechanics	33	1 818	22.30	38	1 110	25.68	1	33	33.33

Continued

Divisions		General program			Young scientist program			Fund for Less developed region		
		Projects	Direct cost	Success rate (%)	Projects	Direct cost	Success rate (%)	Projects	Direct cost	Success rate (%)
Mechanics	Physical mechanics	4	221	19.05	7	210	46.67	0	0	0
	Explosive and impact dynamics	41	2 255	22.53	59	1 750	25.76	0	0	0
	Environmental mechanics	19	1 048	22.09	18	540	26.09	6	194	20.69
Astronomy	Astrophysics	70	3 858	24.65	71	2 090	28.40	6	194	15.38
	Astrometry and celestial mechanics	53	2 922	20.23	37	1 090	22.42	3	96	33.33
Physics I	Condensed matter physics	232	12 804	22.39	258	7 650	25.42	34	1 094	18.78
	Atomic and molecular physics	42	2 310	22.70	45	1 340	27.11	7	228	19.44
	Optics	140	7 710	22.51	169	4 960	26.08	16	515	18.39
	Acoustics	39	2 144	22.81	43	1 290	26.71	3	96	21.43
	Quantum regulations	25	1 381	22.73	39	1 140	26.90	1	33	20.00
Physics II	Fundamental physics and particle physics	112	6 147	23.28	110	3 240	26.63	15	486	27.27
	Nuclear physics, nuclear technology and its applications	143	7 913	22.34	156	4 650	26.40	6	195	14.29
	Accelerator, reactor and detectors	60	3 286	21.74	64	1 910	24.71	2	61	50.00
	Plasma physics	57	3 160	22.18	63	1 870	24.32	2	64	6.90
Total or average		1 778	103 090	22.68	2 123	63120	26.42	209	7 310	19.16
Direct cost per project		52.48			—			30.46		

In 2022, the Department received 8,566 applications for General Programs, which is 727 more than 2021, increasing 9.27%. 1,927 projects were funded, the funding rate was 22.50%, and the funding per project was 524,800 yuan in average. The funding per project was 456,600 yuan for mathematics, and 551,200 yuan for other disciplines.

In 2022, the Department received 8,623 applications for Young Scientists Fund, and 2,224 projects were funded. The success rate was 25.79%. The development of

young scientists is particularly important for the development of mathematical and physical sciences. The Department has always been paying attention to fostering and supporting young scientists, and the funding rate of the Young Scientists Fund has always been higher than that of General Program projects.

In 2022, the Department received 1,262 applications for Fund for Less Developed Region programs, and 240 projects were funded. The success rate was 19.02%. The funding per project was 304,600 yuan in average.

Division of Mathematics

Mathematics (A01-A06)

The Division encourages creative research on important issues in the mainstream and frontier of mathematics, explorations of new ideas, new theories and methods in mathematics and interdisciplinary applications, inter-crossing of different branch disciplines with mathematics, and applied mathematical research on practical issues. Applicants are required to have sound research background and capability. Proposal should be prepared based on deep understanding of the current status of the research involved, main issues and relevant research methods and available approaches. The Division encourages researchers to consolidate research team, foster talents and promote academic exchanges through the funded research projects. Research direction adjustment is allowable when needed.

For basic mathematics, the funding aims at maintaining stable development of research directions where China is traditionally strong and has comparatively large-scale research capability, promoting fast development of research areas that are within the mainstream of international mathematical research but relatively weak in China, and promoting interdisciplinary research among branches of mathematics. Focus is given to algorithm, grid theory and its algorithm, geometrical method in representation theory, comparative geometry and geometric analysis in non-smooth space, application in of modern harmonic analysis in number theory, associate geometry and geometric measure, random analysis method and application, and mathematical problems in quantum field theory.

The funding for applied mathematics and computational mathematics aims at improving applications in solving practical problems, and gives more emphasis on basic theory and new methods with strong practical background and sound potentials for application. NSFC encourages mathematical modeling of practical problems, analysis and computation, and statistical methods and theory for big data, supports research on mathematical physical logic, algorithm complexity, discrete probability modeling, optimal algorithm, and combinational algorithm. Focus is given to applied researches such as mathematical modeling and theory of new materials, uncertainty theory in data processing, coding theory and information security, mathematical

modeling and analysis in environmental and energy sciences, bio information and life system, pathogenesis and control of infectious disease, mathematical methods for complex bio process and development of diseases, statistical methods in industry and medical science, statistical and optimization method in deep learning and artificial intelligence, modeling and analysis in economic prediction and financial risk management, and mathematical theory and new method for industrial, medical imaging and image processing.

Please choose the code in maths division for Code I, and the code in relevant divisions for Code II when applying for interdisciplinary projects.

Division of Mechanics

Mechanics (A07-A13)

The Division mainly supports research on dynamics and control, solid mechanics, fluid mechanics, biomechanics, physical mechanics, explosion and impact dynamics, and environmental mechanics. The Division supports projects with creative ideas in the frontiers of mechanical research on the one hand and projects closely related to the sustainable development of economy, society and national security, and the development of engineering and technology on the other hand. The Division supports interdisciplinary research and encourages experimental research using the available experimental facilities and key labs in China and advocates development of engineering analysis software in computational mechanics.

Applications for research in areas of dynamics and control should pay attention to the theory, methods and experimental studies on nonlinear dynamics and control of vibration and noise in frontiers of the discipline and major national needs, strengthen research on complex systems such as non-smooth system, uncertain system, random system, new structure and flexible system, the coupling of solid, flexible bodies, and multi fields interactions. The Division encourages studies on flight mechanics and space environmental dynamics, and analytical mechanics and multi body dynamics, and key issues of dynamics and control problems in major engineering projects, and encourages experimental studies on dynamics and control.

Applications in the area of solid mechanics should strengthen on proposing and studying topics in major engineering applications, and encourage inter-crossing with physics, materials science, chemistry, information and biological sciences, expand basic theory of continuum mechanics, multi-scale mechanics and multi-field coupled mechanics, strengthen the constitutive theory of materials at macro, meso and micro scales, the theory of strength, crack, fatigue and failure mechanism; the mechanical behavior of new materials and structures; experimental measurement techniques and representation methods, new theory and method in computation mechanics and high performance computational software; structural response, optimization, and

completeness evaluations. Applications in physical mechanics should pay attention to inter-crossing with chemistry, biology and information sciences, promote studies on theory, method and applications in complex media and smart systems.

Applications in fluid mechanics should pay attention to studies on the laws and mechanisms governing complex flows. The Division encourages researches on micro-nano scale flow, rarefied gas flow, hypersonic aerodynamics, aerodynamic noise, measurement techniques in experimental fluid mechanics, flow control technique, new methods in CFD and high performance computational software, strengthen studies on high temperature, high pressure and compressible turbulent flow, high speed hydrodynamics, multi-phase complex flow, non-Newtonian flow, and key fluid dynamic problems in aerospace, energy and ocean, and transportation areas.

Applications in biomechanics should pay attention to bio mechanical and mechanical biology problems related to human health and disease, life process, biomechanics and biology in sports, mechanism and transformation medicine related to diseases such as cardiovascular, bone joint and cancer, rehabilitation, tissue engineering, bio-material and bionics, medical materials and equipment, and public health related areas, and experimental studies and software development on biomechanics are encouraged.

Applications for explosive and impact dynamics should pay attention to frontier areas and major national needs, focusing on studies of the dynamic mechanical behaviors of materials, structural response to explosive impacts and detonation mechanisms, dynamic loading and diagnosis, strengthen mechanism of explosive energy release and encourage studies on dynamic response of material and structure in multi field coupling under extreme dynamic loading environment, and protection of human bodies.

Applications for environmental mechanics should pay attention to basic theory of rock mechanics, environmental fluid mechanics, mechanics in extreme conditions and disaster damage, experimental method and numerical methods. Studies on wind-sand and water-sand disasters water pollution, urban smog, carbon dioxide reduction and rock deformation, damage and mechanism of disaster formation are encouraged.

The Division continues to support studies on instruments, new experimental methods and techniques with innovative ideas. The Division will keep supporting projects in computational software development, giving stress on the integration and standardization research on the development of the computational mechanics software which may produce independent or shared IPR.

Division of Astronomy

Astronomy (A14-A19)

The Division mainly supports researches on astrophysics, basic astronomy,

astronomical instruments and technology. In accordance with the trend of astronomical development in the world and the present situation in China, the Division supports research proposals with emphasis on the development of technology and instrumentation. Studies based on existing observation apparatus or facilities to be built soon in China will be encouraged. The Division promotes the combination of innovative ideas, observation and theories, and studies on new technologies and methodologies for astronomy, especially those closely related to mega-science projects under construction in China. Interdisciplinary research is strongly encouraged so as to gradually build up research teams with special features and influence in international scientific communities. International cooperation and exchange will be given much attention.

In the General Program projects funded in recent years, a good balance has been achieved between astrophysics (including galaxies and cosmology, stellar and galaxy matters, solar and planetary system), basic astronomy (including astrometry, celestial mechanics and history of astronomy) and astronomical technology and methods. Young researchers have become the main force in astronomical research and more than half of the awardees are under the age of 40.

In 2023, in addition to strengthening continuous support for projects integrating theory and observation and projects conducted by young scientists, the Division will emphasize on interdisciplinary research with physics, space science, earth science and information science, etc., maintain support on research on advantageous directions, promote research related to using large observatory facilities in China, and foster research topics that have the potential of making breakthroughs. The Division encourages research on basic physical process on celestial bodies, celestial chemical evolution, and celestial bodies in the solar system, extra solar system planetary system, infrared astronomy, space astronomical measurement, and astronomical research that addresses the national needs. The priority will be given continuously to researches in basic astronomy, astronomical technology and methods, and to relative small scaled astronomical research institutions.

In the next few years, the Division plans to give special support to pre-research around the research based on equipment that has already been built or being built, and conceptual studies on new technologies that are urgently needed for large-scale telescope and space exploration.**For applicant in these research areas, please mark "Major S&T Basic Facilities Project" or "New Astronomical Technology" in the application forms.**

Division I of Physics

Physics I (A20-A24)

The funding scope of the Division covers research on condensed matter physics,

atomic and molecular physics, optics, acoustics and new research areas formed between these four disciplines and other disciplines.

According to the current status and requirements of disciplinary development, the Division pays attention to study on experimental methods and techniques motivated by creative ideas, encourages researches in new computational methods and simulation software closely related to experimental physics and exploratory types, key basic physical issues serving national needs, andnew physical concepts and methods in interdisciplinary areas. It is especially encouragedfor in-depth and sustained studies on important physical problems and potential applications that have not become hot topics, and researches in basic physical problems on devices, and emphasize on new areas and directions.

The condensed matter physics studies the structure, interaction, dynamic process of condensed matters and the relations between its macro properties. The Division pays attention to modeling and computation in electron related systems, macro quantum phenomenon, quantum phenomena and quantum effects in various low dimensional and small-scale systems, quantum information and solid state quantumcomputation, superconducting physical properties, self-spinning and magnetism, poly ferric properties and magnetic electro coupling, topological state and topological order, condensed matter physics in extreme conditions, device physics and advanced technologies and methods of characterization, surface and interface physics, semiconductor physics, and physical problems in energy transformation, transport, and storage, non-linear response analysis, temporary physical phenomena in non-equilibrium conditions, Non-Hermitian physics, physics and application of advanced functional materials. Encouraged areas include physical issues and experimental methods related to soft matters, biophysics, and AI. Special attention is paid to creative studies on material, device and physics having important application prospects.

The atomic and molecular physics studies structure, property, interaction and laws of motion of atoms and molecules, and their interactions with surrounding environment. The Division encourages researchers to pay attention to atomic, molecularstructures, spectrum and regulations, complex interactions of atomic and molecular systems, cluster structure, physical property and assembly, atomic and molecular impact physics, atomic and molecular interactions with laser, atomic and molecular properties and regulation in external field, strong field atomic molecular dynamics, atomic and molecular physics in extreme conditions, cold atomic molecular physics, and their applications in quantum computation and quantum simulation, and precision measurement physics based on atoms and molecules. Studies on frontier problems in atomic and molecular physics and interdisciplinary areas are encouraged.

Optics studies generation, propagation of light and its interaction with matter. The Division supports research on generation and regulation of new optical field,

super fast and strong light physics and interference regulation, physical problems of light in complex media and micro nano structures, new optical materials and device physics, precision spectrum and high resolution imaging, physic l problems in new wave band optics and new light sources, photo quantum physics and quantum optics, topological and Non-Hermitian physics in optics and optical systems. The Division emphasizes on precision regulation on optical field phase and structure, ultra high spatial and temporal resolution, super strong and extreme weak optical field, novel optical materials, physics and applications, especially photoelectric integration and photon chip physics and application. The Division encourages optical problems in life sciences, health and energy and environment, and pays attention to applications in information, chemistry, and material sciences.

Acoustics studies the generation, propagation, reception of sound and its effects, including physical acoustic, hydro acoustics, ultrasonic, noise and vibration control, language acoustics, biological acoustics, atmospheric acoustics and earthquake sound, novel acoustic materials and devices, processing of acoustic information, etc. The Division pays attention to basic and applied basic studies having important application potentials. The Division also pays attention to propagation and control of sound in complex structures, acoustic field and information process in sea, and acoustic sensing and devices in the coupling of multi physical field. Interdisciplinary research in medicine, material science, and information science is encouraged.

Quantum regulation is a new area funded in the Division, so as to promote research in related material and physics, new quantum structure, quantum effect and applications. The Division encourages exploratory studies on precision measurement physics, quantum computation and communication, and quantum simulation, and research on quantum device physics and new quantum techniques. Focus will be given to condensed matter physics, atomic molecular physics and optics, and interdisciplinary research on information science and material science.

Division II of Physics

Physics II (A25-A30)

The Division mainly supports research on fundamental physics, particle physics, nuclear physics, accelerator, reactor and detector, plasma physics, and nuclear techniques and applications.

For fundamental physics, funding will be focused on original studies and interdisciplinary research with other disciplines. Stress will be given to important theoretical physical issue arising from scientific experiments and applications.

For particle physics and nuclear physics, the Division will support creative theoretical and experimental research, in particular, the combination of theoretical

and experimental studies related to selected large-scale experimental facilities that are in operation, upgrading or to be completed soon both in China and abroad. Funding will be used to guide research towards the understanding of important physical rules related to the latest experimental results, such as the theory and experiments of phenomenology in particle physics and interdisciplinary research of nuclear physics under extreme conditions with nuclear astrophysics and other disciplines.

For support to nuclear technology, accelerator, reactor and detector, low-temperature plasma and synchronized radiation method and technology, it is hoped that fundamental issues should be drawn from the disciplinary development, national demands and intercrossing with other disciplines, which may facilitate a deeper understanding of physical laws underlying the development of the disciplines and important applications at the same time. Emphasis will be laid on key technologies and innovative ideas in methodology and intercrossing with other disciplines. In addition, the exploration of mechanisms and rules governing the interaction of matter with instantaneous, high energy, high power and strong field radiation (such as charged particles, X/γ, neutron and electromagnetic fields) are key areas for funding. Attention will be given to new acceleration principles, nano-metre micro-beam, high power ion beam, strong current accelerators, plasma radiation source in accelerator and detector and plasma research, and physics and key technologies of all other advanced radiation sources. The Division gives strong support to new types of nuclear detection technology and method such as large area, high counting rate, high temporal resolution, low cost and weak signals, etc., and relevant studies on nuclear electronics.

For nuclear fusion and plasma physics, more attention will be given to the exploration of new diagnostic means related to large facilities which are in operation at present or will be built soon. In particular, basic research on advanced magnetic confinement fusion and new approaches to inertial confinement fusion and related fundamental physical problems, and computer simulation and experimental studies of various kinds of plasma will be stressed.

In order to make more efficient use of limited funds, the Division encourages researchers all over China to make full use of big science facilities, small and medium equipment to conduct research, so as to achieve sustainable development in the research. The Division encourages experimental studies with innovative methods of high resolution diagnosis and detection, and, as well as the development of experimental facilities, detection and diagnosis devices which are important for the development of accelerators, detectors and gravitational wave detection. Applicants may increase the funding request in applications in these areas according to the actual needs. Projects with more young scientists involved in the research team under the same condition will be preferred.

Department of Chemical Sciences

Chemistry is the science that deals with the composition, structures, properties, reactions and transformations of matters, which plays a central role in multidisciplinary integration. Chemical engineering, involved as the unique industrial characteristic of the chemistry subject, aims to realize large-scale production by applying the principles of transfer and conversion of matters and energy, and ultimately to construct substantial foundation for essentials and sustainable development of human society.

The Department of Chemical Sciences is dedicated to raise the overall quality and international status of China's fundamental research, and the creative talents and groups with international impact in the fields of chemical sciences and engineering. Specifically,the Department stimulates and funds research on the reaction, process and function at the multi-scales and multi-levels of atoms, molecules, molecular aggregation and condensed state.Studies on complex chemical systemsare also encouraged to secure the precise control and logic cognitionof chemical synthesis, process and function. Moreover, the Department focuses on expanding knowledge of chemistry and chemical engineering in multiple research fields, such as biology, materials, energy, information, resources, environmental science and human health, targeted at the critical scientific issues confronting economy, society, national security and sustainable development. Accordingly, the projects funded by the Department basically focus on the frontier research in chemistry and chemical engineering by applying various strategies, including the combination of microscopy and macroscopy, statics and dynamics, theoretical chemistry, empirical approach and precise analytical technologies, and fundamental experiments and process engineering. In addition, innovative and interdisciplinary research addressingnew theories, technologies and achievements from other disciplines are highly encouraged to promote the frontier of chemistry and chemical engineering disciplines for sustainable development.

The Departmentwill consistentlypromoteinnovative and high-quality research in the cutting-edge fields, with a focus on in-depth and systematic research, and a priority support to proposals on the basis of multidisciplinary integration. The Department supports creative projects by placing emphasis on the research diversity of ideas, methods and contents, whereas research similarity is highly discouraged. Besides, the Department will be committed to supporting original research, so as to overcome innovation bottleneck that limited the rapid development of chemistry and chemical engineering in China, and ultimately to enabling a breakthrough from high-quantity to high-quality research. In the review process, scientific excellencies are the core criteria for selection, and discipline development with balance, coordination and sustainability will be comprehensively considered. Ultimately, the Department aims

to promote the fundamental research of chemistry and chemical engineering in China to the frontier.

Funding for General Program, Young Scientists Fund and Fund for Less Developed Regions Projects in Department of Chemical Sciences in 2022

Unit: 10000 yuan

Disciplines	General Program			Young Scientists Fund			Fund for Less Developed Regions		
	No. of Projects	Direct cost	Funding rate (%)	No. of Projects	Direct cost	Funding rate (%)	No. of Projects	Direct cost	Funding rate (%)
Synthetic Chemistry	323	17432	21.63	312	9260	18.81	57	1880	16.91
Catalysis and Surface/ Interface Chemistry	207	11175	21.63	238	7060	19.01	34	1122	17.09
Chemical Theory and Mechanism	123	6638	21.65	105	3130	18.82	11	363	16.92
Chemical Measurement	169	9126	21.58	177	5220	19.20	25	825	16.89
Materials Chemistry	215	11610	21.54	265	7770	19.27	33	1088	16.92
Environmental Chemistry	224	12096	21.54	212	6300	19.06	39	1287	17.18
Chemical Biology	155	8370	21.65	136	4000	18.89	26	858	16.88
Chemical Engineering and Industrial Chemistry	453	24462	21.52	383	11400	19.02	48	1582	17.20
Energy Chemistry	166	8961	21.61	214	6350	18.99	25	825	17.24
Total or Average	2035	109870	21.58	2042	60490	19.01	298	9830	17.04
Direct cost funding per project	53.99			—			32.99		

For the General Program projects, the Department received 9,428 proposals in 2022, which was 616 proposals more than in 2021, a rise of 6.99%. After review, 2,035proposals were funded with a success rate of 21.58% and the average direct cost of 539,900 yuan per project. In 2022, the average budgetper project decreased slightly and the success rate increased compared with that of 2021.

For the Young Scientists Fund projects, the Department received 10,739 proposals in 2022, which was 819 proposals more thanin 2021, with a rise of 8.26% . After review, 2,042 proposals were funded with a success rate of 19.01%. In 2022, the success rate increased by 0.44% compared with that of 2021. The Department consistently places a priority of fostering and supporting young researchers to make outstanding achievements in the golden age of creativity. With the principle of people oriented and fostering innovative talents, the Department plays the maintaining and fostering role of the Young Scientists Fund to ensure the funding for excellent young researchers. Youth researchers are encouraged to conduct innovative and independent researches differentiated from theiradvisors' topics. The review criteria will put less emphasis on previous publications, so as to facilitate the growth of young scientists.

For the Fund for Less Developed Regions projects, the Department received 1,749 proposals in 2022, an increase of 146 proposals by 9.11% compared with 2021. After review, 298 proposals were funded with a success rate of 17.04% with an average direct budget of 329,900 yuan per project. In 2022, both the average budget per project and the success rate decreased slightly compared with 2021. On the basis of stabilizing the funding scale of the Fund for Less Developed Regions, the Department will make efforts to further promote the research quality and efficiency of

the Fund, stabilize a batch of talents for fundamental research, and continuously bridge the gap with the developed regions. Applicants are encouraged to carry out research by taking advantage of the local resources, in order to promote the economic development of the regions in a coordinated way.

Notices:

Applicants should review research funding priorities specifically addressed by the divisions of the Department of Chemical Sciences.

The proposals that have similar research contents cannot be applied by different applicants.

Requirements on research ethics and scientific securities (including biology and information security):

For proposals involved in research ethics, applicants shall submit the approval certificate (upload a scanned copy in attachment) granted by ethics committee of the institution or higher authorities. Proposals without the proper ethics certificate will not be accepted or funded.

For proposals involved in scientific securities, applicants shall strictly comply with the relevant national laws and regulations; host institutions shall make a security commitment and submit a scanned copy in attachment. Proposals without the proper security commitment will not be accepted or funded.

For funded proposals involved in research ethics and scientific securities, if the research plan is changed during the implementation period, the applicant is required to resubmit the ethics certificate and scientific security commitment to the National Natural Science Foundation of China in accordance with the above requirements.

To ensure the outcome of funded projects, the applicants supported by high-level funding programs (including Key Program, International (Regional) Joint Research Program, Major Program, Major Research Plan, Key Program and Integrated Program of Joint Funds, and Special Fund for Research on National Major Research Instruments) during the recent two years, would in principle not be supported while applying for low-level funding programs this year. The application is also limited by the situation that the research proposal has similar contents or used repeatedly in other applications for national science and technology projects.

Division I of Chemistry

The Division I supports research in the field of synthetic chemistry.

Synthetic Chemistry (B01)

Synthetic chemistry is a scientific discipline dealing with the synthesis and

transformation of matter, which involves the synthesis of inorganic, organic, polymeric substances, etc. It aims to realize the precise synthesis and application of new substances with specific properties and/or functions, through controlling the selectivity of matter transformation and aggregation process.

Synthetic chemistry is to fulfill the demand for new compounds, new materials, new devices, and new processes in fields such as chemical science, life science, materials science, information science, energy and environmental science. It mainly explores the mechanisms and principles of matter synthesis and transformation, develops novel synthetic strategies, and establishes related theoretical systems and technical methodologies. Research in synthetic chemistry is mainly conducted to fabricate matters with specific structures or functionalities, focusing on their rational design, structural control, transformation and compounding processes, synthesis and assembly with high efficiency and selectivity. The objective is to achieve the precise synthesis of substances in a green, safe, economic and convenient manner, with a particular emphasis on human health, environmental benignity, effective utilization of natural resources and sustainable development.

To this end, the following research directions are encouraged: synthesis with new reagents, new reactions, new structures, new concepts, new strategies and new theories; synthesis under extreme or non-equilibrium conditions, or driven by multiple external fields; controlled synthesis and high-performance functionalization of macromolecules; synthesis based on covalent and/or non-covalent binding, and that occurs at a surface or interface; bio– and biomimetic synthesis rationalized by chemical principles; function-oriented rational design and precise synthesis; in-situ and diverse structural characterization techniques and structure-property relationships of substances; smart data and artificial intelligence assisted synthesis; mechanisms, rules and theories of substance synthesis; synthetic methodologies with high atom economy, sustainability and precise regulation.

Synthetic chemistry is the foundation and core of chemistry. It advocates for interdisciplinary integration, encourages original innovations and breakthroughs centered around material creation and transformation, promotes the resolutions of major scientific problems in relevant fields, and finally boosts the development of the national economy and society.

Division II of Chemistry

The Division Ⅱ supports the research in the field of catalysis and surface/interface chemistry and chemical theory and mechanism.

Catalysis and Surface/Interface Chemistry (B02)

Catalysis and surface/interface chemistry aims to investigate catalytic processes

and the structure and properties of the surface/interface and reveal the physical and chemical basic rules of catalysis and the surface/interface.

The areas funded by catalysis and surface/interface chemistry include catalytic chemistry, surface chemistry, colloid and interface chemistry, electrochemistry, and the related basic theory and research methodology. These areas involve surfaces, gas-solid interfaces, gas-liquid interfaces, liquid-liquid interfaces, liquid-solid interfaces and solid-solid interfaces and gas-liquid-solid multi-phase interfaces.

Catalysis and surface/interface chemistry emphasizes on the basic theory and characterization methods, the development of spatiotemporal– and energy-resolved *insitu* characterization techniques in combination with theoretical calculation, artificial intelligence technology and large scientific devices, etc., and the clarification of the physicalchemistry processes and structural evolution rules of the surface/interface chemistry.

Catalytic chemistry supports research in developing new catalytic concepts, theories and methods, discovering new catalytic reactions, and creating new catalytic materials. It emphasizes cross-integration research between heterogeneous, homogeneous and biocatalysis; strengthens the understanding, rational design and regulation research of catalytic active sites; underlines the research on structure-performance and reaction mechanism, and enhances the coupling and integration of various catalytic reaction processes.

Surface chemistry mainly supports the research at atomic and molecular levels on chemical and physical processes related to surface interfaces. Encouraged research fields include: surface/interface structure, electronic states, performance and regulation; dynamics and energy transfer theories in the assembly and reactions at surface/interface; new methods for physical and chemical propertiesat surface/interface.

Colloid and interface chemistry mainly supports the research on developing new methods and techniques; design and synthesis of new surfactants and construction of aggregates; developing new dispersion systems;understanding interfacial adsorption and infiltration behaviors;developing functionalized molecular assembly system;constructing colloidal materialswith self-repairing and outfield response, and strengthening the fundamental research on the application of colloid and interface chemistry in the fields of materials, life, energy, environment and information.

Electrochemistry mainly supports the research including the construction, characterization, and the theory and simulation methods of the electrochemical interface system; recognition and control of charge transfer, mass transport and transformation process at electrochemical interfaces; in-depth understanding of the active center structure and performance of electrocatalysts; design and synthesis for electrocatalysts and electrolytes; clarification of surface/interface scientific problems in the fields of electrochemical energy conversion and storage, electrochemical synthesis, bioelectrochemistry, photoelectrocatalysis and electrochemical engineering

and manufacturing, etc., emphasis onelectrochemical process in the high-end electronics manufacturing.

Chemical Theory and Mechanism (B03)

Chemical theory and mechanism aim to establish and develop new chemical theories and experimental methods to reveal the mechanism and basic rules of chemical reaction and its related processes.

The areas supported by chemical theory and mechanism include theoretical chemistry, computational chemistry, chemical thermodynamics, chemical kinetics and reaction dynamics, structural chemistry, photochemistry and spectroscopy, chemical reaction mechanisms, moletronics and molecular magnetism, polymer physics and polymer physical chemistry, chemical informatics and artificial intelligence.

Theoretical and computational chemistry focuses on the new methods of electronic structure theories, dynamics and statistical mechanics, and emphasizes on the development of computational chemistry. The rational design and computational simulation is aimed at complex systems such as materials and biology, as well as the fields of catalysis, energy, chemical engineering, environmentand information. For chemical thermodynamics, there is a need to develop theoretical and experimental methods suitable for complex systems, revealing the internal logic between microstructures and system thermodynamic properties, and to focus on the interdisciplinary applications. Researches in chemical kinetics and reaction dynamics focus on the development and utilization of new experimental and theoretical methods to explore the essence and reaction processes of chemical reactions in gas, surface and condensed phases, as well as chemical kinetics under extreme conditions. Applicants are encouraged to conduct research employing large research infrastructures such as advanced coherent light source and focus on the work of ultrafast dynamics, microstructure and mechanisms of condensed phase. Structural chemistry focuses on the structural characterization and techniques of complex functional systems, controllable synthesis and assembly, dynamic bonding and transformation, encouraging the rational design, construction and application of new multi-porous structures. Research of photochemistry and spectroscopy should focus on the development of spatial resolved, time-resolved and energy-resolved new technologies and their new assembly methods to the study of photochemical, photophysical and photobiological mechanisms of luminescent and light conversion systems. The research of chemical reaction mechanisms will be focused on exploring microscopic mechanisms and basic rules of chemical reactions by means of theoretical chemistry, computational chemistry, artificial intelligence and experimental strategies, exploring the microscopic mechanism and basic rules of chemical reactions and catalytic processes. Molecular electronics and molecular magnetism shall focus on new theory and experimental methods for clarification of molecular polarization, electronic coupling, and mechanism of spin conversion.

Polymer physics and polymer physical chemistry mainly focus on the chain behavior and interaction of macromolecules, the evolution mechanism and control over different scales of the structure, the essence of the connection between microstructure and macroscopic properties. For chemical informatics and artificial intelligence, it is encouraged to develop algorithms for storage, retrieval, transformation and data mining of molecular structure information based on general system principles, and to focus on the applications of big data and artificial intelligence in chemistry, chemical engineering, materials, energy, life and medicine. For chemical programs and software, program development and software creation with independent intellectual property rights.

Division III of Chemistry

The Division Ⅲ supports research in the field of materials chemistry and energy chemistry.

Materials Chemistry (B05)

Materials chemistry studies the design, preparation, structure, property and application of materials. It connects chemistry with other disciplines including materials science, life science, medical science and information science. Materials chemistry as a branch of application driven chemistry, is the molecular basis for new material systems. By employing chemical theory and methods, it designs new materials at the atomic and molecular levels, develops preparation methods and techniques, and reveals the structure-property relationships of materials. It aims to modulate materials' macroscopic properties by means of structural function transfer, integration and collaboration at multi-scale and multi-level; to develop new high-performance and multi-functional materials for targeted applications in the fields of energy, environment, health and information.

Materials chemistry focuses on precise preparation of new materials with specific structure and function via tailoring the materials' structure and properties. It places a strong emphasis on enabling research at the intersection between multidisciplines to facilitate interdisciplinary integration and unravel the structure-property relationships. A shared feature of the research is to investigate the fundamental principles governing the materials function using a combination of multiple characterization techniques. By doing so, it strives to address the major national needs and achieve full utilization of characteristic resources in China.

Materials chemistry intends to promote the discovery of functional materials, encouraging not only fundamental research on materials with electrical, optical, magnetic and other properties, but also interdisciplinary research related to biology, medicine and pharmacy. Exemplary key frontier directions include, but not limit to,

structural design and preparation of advanced materials assisted by artificial intelligence, development of chemical methods and principles in advanced processing technologies. Energetic materials chemistry shall address basic sciences underlying the high-density storage, on-demand release and efficient utilization of chemical energy.

Energy Chemistry (B09)

Energy chemistry focuses on the conversion, storage, transmission and utilization of energy at the atomic and molecular level. On the basis of chemical theory and methods, its basic task is to achieve efficient and clean utilization of energy by establishing mechanisms of energy conversion and storage, and developing new materials, methods, and devices.

Energy chemistry is committed to the efficient and clean utilization of fossil resources and renewable energy, particularly the carbon-based energy, solar energy, hydrogen and biomass energy. Specifically, the related research area includes liquefaction and gasification of carbon-based energy, new photovoltaic/thermal materials and devices, electrochemical energy storage materials and devices, chemical energy storage materials. Besides, attention shall also be drawn to thermoelectric/optoelectronic/photothermal/electrochemical energy and chemical processes.

Division IV of Chemistry

The Division Ⅳ supports research in the field of chemical measurement science, environmental chemistry and chemical biology**.**

Chemical Measurement Science (B04)

Chemical measurement science aims to develop chemistry and interdiscipline-related measurement theories, principles, techniques and methods; to develop related instruments, devices, analytical reagents and software; to obtain the composition, structure, morphology, properties, functions of the matters, and ultimately to reveal the molecular basis and space-time variation rules of the interactions.

Chemical measurement science, orients to the science frontiers, major national needs, the main field of national economy and human health, emphasizes interdisciplinarity, methodological innovation, instruments creation based on new principles, and the development of key technologies. It covers multiple areas: detection and analysis from macroscopic to microscopic systems with high sensitivity, high specificity, high resolution and high throughput; establishing new theories, principles, methods and technologies. Accordingly, the research directions include but not limited to:chemical measurement theory; analytical instruments and reagents; sample treatment and separation; big data analysis and artificial

intelligence; spectroscopic methodologies; chemical imaging; micro/nano analysis; chemical and biological sensing; in vivo analysis; analysis of single particle, single cell and single molecule.

The priority funding areas for chemical measurement science include the following:processing, separation and identification methods for complex sample; space-time resolved spectroscopy; new principle and technology of chemical imaging; precise measurement of single molecule, single cell and single particle; micro/nano analysis and devices; structural and functional analysis of biological macromolecules; in vivoand real-time detection of living organisms; omics analysis; biomolecular recognition and probes; *in situ*and on-line characterization techniques; analysis technology under deep space, deep earth and deep sea; energy and materials analysis; analysis technology for diagnosis of major diseases; early warning, screening and traceability of environment and public safety; chemical measurements and device creation based on large research infrastructures.

Environmental Chemistry (B06)

Environmental chemistry is a science that studies the existence, characteristics, behaviors, and effects of chemical substances in environment and the principles and methods for pollution control. It is an important branch of chemical science and the core discipline of environmental science.

Environmental chemistry faces the frontier of the discipline and the national strategic demands, adheres to the problem orientation, and highlights foresight, innovation, crossover and application. Major funding areas of environmental chemistry cover the following branches: environmental pollution and analysis, pollution process and mechanism, pollution control and remediation, environmental toxicology and health effects, environmental theory and computation, radiochemistry and radiation chemistry, biosafety and chemical protection.

Facing the major issues of ecological environment protection in our country and refining the key scientific issues, environmental chemistry encourages to develop new detection and monitoring technologies and methods, and study the environmental chemical behaviors, ecological and health effects and its prevention and control principles and methods through the combination of laboratory research, field experiment, theoretical simulation and environmental big data. The priority funding areas include: characterization and analysis of pollutants in complex environmental media; tracing and behaviors of typical contaminants on multi-media interface; new principles and technologies in environmental catalysis; forming mechanism and control techniques of atmospheric combined pollution; pollution process of soil and water and their control and remediation; treatment, disposal and reutilization of solid wastes; interaction mechanism between microorganisms and environmental pollutants; green, low-carbon and new technologies and principles for pollution control; synergistic mechanism for pollution reduction, carbon reduction and

recycling; environmental exposure and health effects of emerging toxic pollutants; environmental behaviors and toxicology of micro/nano-materials; formation and control of antibiotic resistance of microorganisms; environmental computational chemistry and big data; prevention and control of radioactive pollution and utilization of radioactive nuclides; key chemical issues in the prevention and control of hazardous chemicals and radiation, etc.

Chemical Biology (B07)

Chemical biology utilizes exogenous chemicals to precisely modify or regulate the biosystem at the molecular level by interventional chemical methods. Chemical biology provides new ideas and concepts for life science research through the development of new reaction technologies and molecular tools, and it promotes the realization of visual, controllable and creative research concerning life processes (or functions).

Chemical biology focuses on the processes and dynamic rules of critical molecular events in life sciences, and it gives full play to the characteristics and creativity of chemical sciences. The research areas focus on: 1) to develop novel molecular probes to explore and regulate vital activities *quantitatively*, *in real-time*, and *in situ*; 2) to develop new biocompatible chemical reactions to modify and label biological molecules by orthogonal coupling technologies for the study on biological functions of biological macromolecules (e.g., proteins, nucleic acids, polysaccharides, lipids) as well as active small molecules and key ions; 3) to discover functional– or biogenic-oriented active natural products with novel chemical structures and skeletons, and to reveal their mechanisms of action and targets; 4) to establish and optimize small-molecule compound libraries and screening technologies to explore and interfere with biological processes in cells, thereby revealing interactions between unknown pathways in vital activities and biological molecules, to promote the study of signal transduction and gene transcription mediated by functional small molecules, to realize the identification of drug targets, discovery of biomarkers and development of lead compounds, and to reveal biological functions of active molecules; 5) to analyze biosynthetic mechanisms of substances involving in vital activities, and to use biosystem and/or biological components to develop special chemical reactions and synthesize new functional molecules or specific target molecules; 6) to carry out chemical assembly and simulation in complex living systems, to develop new theories for chemical biology, and to reveal chemical essences of life activities, on the basis of created and developed innovative chemical tools and techniques.

Chemical biology encourages innovative research with disciplinary attribute. It supports preferentially research using molecular probes to investigate the molecular function and functional regulation of major biological processes and diseases; it encourages research to solving biological and medical problems by chemical means

and methods; it supports fundamental research on chemical reaction mechanisms and chemical theories in biological systems; it explores chemical origins of life and chemical communications in living systems; it promotes the integration and cooperation of chemistry, biology and medicine.

Division V of Chemistry

The Division Ⅴ supports research in the field of chemical engineering and industrial chemistry.

Chemical Engineering and Industrial Chemistry (B08)

Chemical engineering and industrial chemistry study the flow, transfer, reaction and interrelation in the conversion processes of matter, with the missions of revealing the transfer, reaction phenomena and rules in matter conversion processes, and the correlation to the process efficiency and products properties; studying theories, methods and technologies for efficient matter conversion; and developing new technologies, new processes and new equipment for industrialization. Chemical engineering aims to provide scientific foundation and methods for national major demands in areas of modern manufacturing industries, energy security, strategic emerging industries and human health. To this end, research has been conducted on the fundamentals of engineering science and the integration with other disciplines such as chemistry, materials science, biology and information technology.

Chemical engineering and industrial chemistry encourage the research on process engineering, products engineering, systems engineering and multiscale science. There has been new changes in research content focused on the following aspects: ①measurement, simulation and modulation of micro-/meso-structure, interface, mesoscales, and revealing scientific rules for processes intensification and scale-up; ②uncommon and extreme processes as well as the relevant research of process informatization and intellectualization; ③deep integration with other research fields such as human health, ocean, electric engineering, new materials, renewable energy.

Innovative research featured in chemical engineering would be rewarded with priority support, which includes but is not limited to the following areas: spatial and temporal dynamic structure at mesoscale; big data and intelligent processes in chemical engineering; systems engineering and chemical process security; thermodynamics, transfer and reaction under unconventional conditions; green chemical engineering; clean transformation and high-value utilization of resources; agriculture and marine chemical engineering; green biological manufacturing; products engineering as well as the fundamentals of chemical sciences related to materials, energy, resources, environment and health.

Department of Earth Sciences

Earth science is a science which understands the earth and reveals the fundamental law of the influence of other celestial bodies on the earth. By exploring the evolution of the earth and celestial bodies and the origin of life and human, and studying the interaction between natural and human processes, earth science provides theoretical basis, frontier cognition, and scientific basis for the sustainable utilization of resources, disaster prevention and mitigation, protection and optimization of the living environment. Earth science includes Science of Geography, Geology, Geochemistry, Geophysics and Space Physics, Atmospheric Science, Marine Science, and Environmental Geosciences, and other related interdisciplinary subjects.

Through the support of general programs, the Department of Earth Sciences encourages original innovations, expands scientific frontiers, matches national demands, pushes disciplinary crosses, and lays a comprehensive and solid foundation for the balanced, coordinated, and sustainable development of all earth sciences disciplines. In 2023, the selection of General Programs will follow the principles: (1) The innovation and academic value of the program; (2) The research ability of applicant; (3) The rationality of the idea and the clarity of the scientific issue in the application; (4) Research basis and conditions.

Program proposal selection attaches great importance to basic and traditional disciplines, and focuses on primary data accumulation; effectively enhances the research in weak and "endangered" disciplines, and promotes the fields development of relatively weak in China but predominant in the world; strengthens the research in frontier disciplines, and encourages disciplinary cross, integration and infiltration, especially the intersection of earth sciences and other disciplines; maintains the international status of dominant disciplines and fields in China; supports the development of sub-disciplines closely related to experiment, observation, data integration and simulation. Pay attention to the accumulation of research work while advocating innovative research. For General Program proposal applied for continued support, which have had a good accumulation in previous studies and a high-quality completion of recent research, preferential support will be given under the same conditions. Applicants are required to address the relation between the proposed research work and their accomplished programs. Based on the exploratory, unpredictable, and long-term characteristics of basic research, General Program encourages scientists to face the most challenging scientific issues and actively carry out exploratory research. In current year, the Department encourages scientists to carry out research related with lunar soil and continues to pay attention to research on planetary science.

One of the most important goals of the NSFC is to nurture and support excellent young scientist continuously and steadily. The Young Scientists Fund mainly plays

the role of "cultivation", shifts the funding focus forward, and provides timely funding for early-career young scholars who are about to independently carry out basic scientific research. The Young Scientists Fund supports them in the critical period of the individual development to help them grow up as quickly as possible.

Funding of the General Program, Young Scientists Fund and Fund for Less Develop Regions of Department of Earth Sciences in 2022

Unit：10,000 yuan

Division		General Program			Young Scientists Fund			Fund for Less Development Regions		
		Projects	Direct cost	Success rate (%)	Projects	Direct cost	Success rate (%)	Projects	Direct cost	Success rate (%)
I	Science of Geography	493	25590	21.04	520	15 540	21.65	79	2 608	14.77
II	Geology	366	21009	22.47	350	10 370	21.66	30	990	14.78
	Geochemistry	88	5091	22.22	82	2370	21.81	14	462	15.22
III	Geophysics and Space Physics	235	13096	24.20	182	5390	21.69	9	297	15.00
	Environmental Geoscience	495	26375	20.51	555	16550	21.65	74	2453	14.92
IV	Marine Science	261	14356	20.91	259	7710	21.67	8	264	15.38
V	Atmospheric Science	202	11063	24.46	197	5840	21.65	12	396	14.81
Total or average		2140	116580	21.78	2 145	63770	21.66	226	7560	14.88
Direct cost per project		54.48			—			33.45		

In 2022, the Department received 9,826 General Program applications with 876 applicant institutions in total. There were 6679 applications (67.97%) from colleges and universities and 2858 applications (29.09%) from research institutions. Among these, 2,140applications were funded with a total direct funding cost of 1,165.80 million yuan and an average direct funding cost of 544,800 yuan, and the average funding rate is 21.78%. Among the funded projects, 1,493 (69.77%) were from colleges and universities, and 625 (29.21%) were from research institutions. The PIs of 1,658 projects (77.48%) were under 45 years old. In 2022, the General Programs were funded with an average funding cost of 700,000 yuan.

In 2022, the Department received 9,902 Young Scientists Fund pplications with 1,099 applicant institutions in total. Among these, 6,523 (65.88%) were from colleges and universities, and 2,893 (29.22%) were from research institutions. 2,145 applications were funded with a total funding cost of 637.70 million yuan and an average funding rate of 21.66%. Among the funded projects in 2022, 1,461 (68.11%) were from colleges and universities, and 641 (29.88%) were from research institutions.

In 2022, the Department received 1,519 applications of the Fund for Less Developed Regions from 178 applicant institutions in total. Among these, 1,353 (89.07%) were from colleges and universities, and 137 (9.02%) were from research institutions. 226 applications were funded with a total direct funding cost of 75.60 million yuan and an average direct funding cost of 334,500 yuan, and the average funding rate is 14.88%. Among the funded projects in 2022, 209 (92.48%) were from

colleges and universities, and 15 (6.64%) were from research institutions. In 2022, the programs of the Fund for Less Developed Regions were funded with an average funding cost of 440,000 yuan.

Notes:

(1) In 2023, the Department will carry out a new trial system of two-grade application code. Please carefully read the application code list and the instruction in this "Guide", and select the application code well matched the content of the application. The filled-in application code should generally be refined to the secondary application code.

(2) Please carefully read and abide by the requirements of scientific integrity in this "Guide". Do not list academic papers at the submission stage in the application.

(3) Scientific research must abide national laws and regulations. Research activities in the fields of biology and toxicology also must abide relevant national regulations. Projects involving animal experiments must abide relevant national regulations and requirements on animal ethics and welfare.

(4) The applications to multiple institutions involving ethics research need to respectively provide the proof documents approved by the ethics committee of each participating institution or the superior management departments. If the funded projects involving ethics change its research plan during the implementation of projects, it is necessary to resubmit the review certificate of the ethics committee after the change plan to NSFC according to the above requirements.

Division I of Earth Sciences

Geography (D01)

The funding scope of this Discipline is geography related research, which mainly includes Physical Geography (i.e., D0101 Geomorphology, D0102 Hydrology and Climatology, D0103 Biogeography and Soil Geography, D0104 Environmental Geography and Disaster Geography, D0105 Landscape Geography and Integrated Physical Geography, D0106 Cryospheric Science, D0107 Geographical Environmental Change and Civilization Evolution), Human Geography (i.e., D0108 Economic Geography, D0109 Urban Geography and Rural Geography, D0110 Human Geography, D0111 Land Science and Natural Resource Management, D0112 Regional Sustainable Development), Information Geography (i.e., D0113 Remote Sensing, D0114 Geographical Information Science, D0115 Geodesy and Cartography, D0116 Geographical Big Data and Spatial Intelligence), and approaches and tools for

observations, simulation and analysis in Geographical Science (i.e., D0117 Geographical Observation and Simulation Technology).

The geography science focuses on the spatial distribution, temporal evolution and regional features of the physical and human elements, geographical information and geocomplex.

The object of the geography science research is the earth surface system, which is formed from the interactions and interpenetrations of the lithosphere, hydrosphere, atmosphere, biosphere, cryosphere, and anthroposphere. The earth surface system (also known as the "water-soil-air-biology-human" complex) should be considered in its entirety in the geographyscience research.

The core of the geography science is the interrelationships between human and nature, and their interaction mechanisms in the earth surface system. Owing to the comprehensive, intersectional, and regional characteristics, the geography science must be studied systematically and comprehensively from the spatio-temporal scale-dependent multi-dimensional and dynamic perspectives.

The Discipline encourages the applications of comprehensive, exploratory, and prospective projects, urges the earth surface process research using the theories, methods and technologies of mathematics, physics, chemistry, biology, and information science, and promotes interdisciplinary frontier research on national priorities such as "Ecological Civilization Construction", "The Belt and Road Initiative", "Land Spatial Planning" and "Rural Revitalization".

In response to the changes in the scientific research paradigm caused by the big data and artificial intelligence, the Discipline encourages the research on the geographical intelligence theories, methods and technologies combining big data, artificial intelligence and geographical issues, aiming to enhance our understanding and prediction capabilities of geographical issues and to establish the scientific paradigm and technology system for spatio-temporal analytics and big data mining.

In front of the frontier sciences such as comprehensive research on terrestrial surface system, global change and sustainable development, the Discipline encourages to focus on the development, reuse and integration of the geographical observation technologies and simulation methods, and promotes the construction of the scientific research facilities such as the comprehensive geographical modeling and simulation systems, and the decision support system for sustainable development, realizing the integration of the geographical data, geographical mechanism, geographical pattern, and geographic decision-making.

Division II of Earth Sciences

Geology (D02)

The fundingscope of the Discipline is geology related research.

As an important subject of natural science, geology is the study of composition, structure, tectonics, evolution, geological process and evolutionary history of the Earth (Planet). It is not only about illustrating the structure and material composition of the Earth (Planet), the mechanisms that control the matter cycles, the Earth environment, life evolution and their correlations recorded in these substances, but also to unveil the interaction and coupling mechanisms of different layers of our planet, prospect energy, minerals and water resources, reveal geological processes, life evolution and their relationship with human activities, protect the global environment and human development, prevent (alarm) and mitigate geo-hazards.

With the development of Earth System Science in recent years, the rapid developments of geology are based on the fundamental theory and technicaladvancesof multiple disciplines. The propose of plate tectonics theory brought revolutionary leap on understanding the Earth. The exploring of geotectonic system and internal continental dynamics has become an important research direction of plate tectonics theory. With the development of Earth System Science, exploring the interior dynamics of the Earth and superficial response mechanism became the frontier. Theapplication of new technology and new methods promoted the development of geological sciences. The improvement of analytical methods on high-precision, in-situ and real-time constituent structure and geochronology strengthened the constrain on the composition and evolutionary history of the Earth. The developments of geophysical probing, earth observation and geological drilling techniques help people precisely understanding the structure and tectonics of the Earth. The application of high technology such as information system, the internet of things and photoelectron realized the goal of real-time monitoring of crustal movements, earthquakes and volcanic activities. The reproduction and prediction of important geological processes can be achieved based on the developments of high temperature and pressure tests and techniques of computational simulation. The developments of big data and artificial intelligence techniques promoted the changing of research paradigms in geology.

Insisting on facing to the global frontiers of science & technology and the major national needs, committingto original innovation, geology conducts researches on fundamental theory and applied researchfrom a global perspective. Geological researches are encouraged to stand on solid field works, on-site and real-time observations, actively promote the interdisciplinary integration of mathematics, physics, chemistry, biology and computational information science, insist on facing to the global frontiers of science& technology and the major national needs, and conduct researches on fundamental theory and applied research from a globalperspective.

Geochemistry (D03)

The funding scope of this discipline is Geochemistry related research.

Geochemistry is rooted in element geochemistry and isotope geochemistry.

Powered by state-of-the-art analytical techniques, experimental simulations and theoretical calculations, key research topics of Geochemistry include the chemical composition, formation, evolution, and the interplay (interaction and recycle) between different spheres of the Earth and extraterrestrial bodies. A specific focus of Geochemistry is the distribution, state, transformation, migration, recycling and fate of materials at Earth's surface with the presence and involvement of human beings.

The research of Geochemistry involves planet, rock, sediment, soil, water, atmosphere, ore deposit, oil and gas, organism and inner Earth's volatile et al. TheDiscipline emphasizes a quantitative constrains on the chemical compositions of a variety mediums to reveal chemical reactions/processes involved in geological processes, and eventually decode mechanism controlling these processes.The fast-developing trends of modern Geochemistry can be grouped into four areas.

Theoretical innovations and developments of new analytical methods. It has been transferred from a staticallydescriptive perspective to a dynamicallyquantitative understanding. The toolbox is expanded with a growing application of techniques with better accuracy and precision, either using less materials or with high spatial resolution. High-temperature and high-pressure experiments and new isotopic tracers also are at the heart of Geochemistry. Geological research is encouraged from an evolutionary perspective within an emphasis on its temporal and spatial dimensions. Big data and artificial intelligence also are in the toolbox. Armed by the modern toolbox, the Discipline continues to push the understanding on the frontier of Earth and Planetary Sciences from a high-dimensional perspective with the aim to inspire further developments and revolutions.

Transforming solid Earth science. The Disciplinehas transformed from understanding chemical properties, structure and processes of the deep Earth to interplay between its spheres, as well as mineral and energy resources and environmental impacts associating the interplay. Specific attention also is given to plate tectonics and global change. The research now also covers extraterrestrial bodies in addition to the Earth.

Earth surface systems at all timescales.In addition to reconstructing geological processes on prolonged timescales, now the Discipline also investigate geological processes on short timescales with an emphasis on physical, chemical and biological processes and the impact of human beings. The Discipline also encouragesresearch on the future environmental trajectories of Earth by numerical simulations.

A green future initiative. The Discipline seeks to serve the national need on reducing carbon emission for a better and healthier future. This is achieved through research on environmental changes related to human activities, and conservation and rational utilization of mineral and energy resources.

Geochemistry powers us with knowledge to understand and explore the Earth and space, it also provides scientific support for problems human beings face for surviving and continuing developments, which include supplying mineral and energy

resources, maintaining a better environment and reducing geological hazards.Following the criteria of four attributes of scientific questions, proposals (General Program and Young Scientists Fund) under the umbrella of Geochemistry classified as “exploration and highlight originality” and “cutting-edge area with the development of new methodology” have the highest proportions among all Divisions in the Department of Earth Sciences. The proportion of those classified as “demand-driven bottleneck” is relatively lower. As such, in addition to explore and expand the frontiers of Earth and space sciences, the Discipline also encourages proposals aiming at serving the national needs in the field of mineral and energy resource, environment, and people’s health.

Division Ⅲ of Earth Sciences

Geophysics and Space Physics (D04)

The fundingscope of this discipline includes geophysics, space physics and geodesy.

Geophysics, space physics and geodesy are disciplines which utilize the theories and methods of physics and related subjects, combine observational and experimental means,to understand the laws of the structures, operation and evolution of the Earth, planets and interplanetary space, to explore the internal resources of the Earth and other planets, and to reveal the variation characteristics and mechanisms of human livableresidentialenvironment.

Geophysics, through direct observations, laboratory experiments, and theoretical studies on the basic physical fields of the Earth and other planets, is to reveal their internal structures, material components, the variation of physical fields and the dynamic processes, to explore the mechanism of earthquakes, geological disasters and mineralization and accumulation, to develop the foundation of new theories, technologies and methods, to provide theoretical and technical support for the Earth system science.

Space physics is based on space borne or ground-based observations and experiments, theoretical studies and numerical simulations, to reveal physical processes and the variation laws of the middle and upper atmosphere, ionosphere, and magnetosphereof the Earth and other planets, and interactions of the solar atmosphere, interplanetary space and heliosphere, to provide scientific support for astronautic activities, communication, navigation and deep space exploration.

Geodesy, through the observation of geometry and physical quantity of the Earth and other planets, to study the geometric shape, the material movement and the response of space environment of the Earth and other planets, to determine the spatial -temporal movement of materials and carriers, as well as the geometric shape and

deformationof natural bodies and buildings (structures), to provide spatial-temporal datum and gravity datum guarantee for the national infrastructure and defense.

Geophysics and space physicsattach great importance to the basic theoretical studies, observations and experiments. According to the development trend of earth science and space science,encouragement will be focused on core scientific issues of the deep Earth, the deep ocean, the deep space, and the Earth system. In order to promote the development of earth and space science and technology, more efforts will be made to explore new growth and pioneering study, strengthen the cross integration, and develop new theories, technologies, methods, and detection instruments.

Environmental Geosciences（D07）

The funding scope of this discipline covers research on environmental geosciences.

With the rapid development of society and economy, human beings are confronted with increasingly prominent environmental problems such as the shortages of water and land resources, the frequent occurrence of disasters, the aggravated environmental pollution, the ecosystem degradation, and threats to public health, which seriously restrict the social-economic sustainable development, and the construction of ecological civilization. The historical mission of the environmental geosciences development isto scientifically solve the problem of environmental pollution, disaster, ecological and health risk.

Based on the principles of geosciences and environmental science, the environmental geosciencestake the earth surface system as the object,highlight the characteristics of geosciences and adopt interdisciplinary research methods and means to study the physical, chemical and biological processes and coupling mechanisms of the pedosphere, hydrosphere, surface lithosphere, atmosphere, biosphere and their interfaces. This discipline aims toreveal the occurrence and development laws of global environmental changes and geological disasters and construct the risk assessment and preventionsystem of eco-environment and health. It also investigates the evolution behaviors of regional environmental quality and environmental change prediction and response, and reveals the multi-media and multi -interface environmental behavior, effect and mechanism of pollutants. The final goal of this discipline is to unravel the fundamental scientific problems of environmental remediation and ecosystem restoration.

In accordance with the philosophy of the reform and optimization of discipline layout for the National Natural Science Foundation of China, the discipline of environmental geosciences proposes the optimization plan for the application code based on the challenges of theory, technology, method and discipline paradigm facing by the discipline, and also establishes the discipline framework of environmental geosciences: four basic subjects–Soil Science, Environmental Water Science,

Environmental Atmospheric Science and Environmental Biology; four interdisciplinary subjects—Engineering Geological Environment and Disasters, Environmental Geology, Environmental Geochemistry and Ecotoxicology; and four frontier areas-Environmental Behavior and Effects of Pollutants, Environment and Health Risk, Quaternary Environment and Environmental Archaeology, Environmental Information and Environmental Prediction.New Technologies and New Methods of Environmental Geosciences are the supports of the discipline, and Regional Environmental Quality and Safety, Environmental Protection and Sustainable Development are the goals of the discipline to serve the national major demands. In order to promote the development of soil science, according to its attributes, it is divided into three secondary application codes: Environmental Soil Science, Basic SoilScience, Soil Erosion and Soil Fertility. Combined with the characteristics and advantages of environmental geosciences serving national needs, the connotation of environmental geosciences is defined as: “pollution-environment, eco-environment, disaster-environment and health-environment”.

Facing the national strategic needs, the Disciplineencourages to consolidate the condensation of basic scientific issues in original, interdisciplinary and cutting-edge fields, and also inspiresthe creative application of new theories, new ideas, new methods and new technologies in this discipline. Cultivating new growth points of discipline, leading major breakthroughs and promoting discipline development to provide scientific support for a sustainable and habitat earth system.

Division IV of Earth Sciences

Marine Science (D06)

The funding scope of this discipline includes marine science and polar science.

Marine science is a knowledge system that studies the natural phenomena and changing rules of the ocean and its interaction with the atmosphere, lithosphere, biosphere, soil circle, and cryosphere, as well as the development, utilization, and protection of the ocean. It is a comprehensive discipline including the study of the Earth's natural processes (e.g., physical, chemical, biological, and geological processes) and the study of marine social attributes (e.g., resources, environment, economy, national defense, culture, international relations, etc.). Meanwhile, marine science is increasingly integrated with marine engineering technology and marine space development and utilization. It has to be recognized that marine science has multiple attributes, such as science, technology, and sociology, and there is an increasing trend of large-span cross-discipline studies guided by basic scientific issues. However, there is still insufficient attention to the comprehensive characteristics of marine science. It is urgent to strengthen interdisciplinary research and improve the cognitive level of marine science.

Marine science is a data-intensive discipline based on observations, and the promotion of its academic thoughts and research abilities which depends on long-term observation and data accumulation. To meet the demands of research projects in ocean observation, NSFC implemented the Ship-time Sharing Project (SSP). For those applications that require field sampling and observations, they need to elaborate the cruise plan, and observation content during the project implementation depending on the proposed scientific goals and technical route, and apply to participate in the research cruise supported by the SSP after receiving the funding. The guidelines and the solicitation notice for investigation demands of the SSP will be announced separately, and please pay close attention to the relevant notice from the Department of Earth Sciences. Based on the data-sharing agreement among the projects implemented during the same cruise, the SSP expanded the data-sharing platform for the historical data with different levels and classifications. Data users can log in to the website of the Ocean Data Center of NSFC (https:/ /www.nsfcodc.cn) to browse the catalogs of the shared data, and submit data usage applications as needed.

Oceans connect the poles. Polar science is a discipline studying various natural phenomena, including the processes and changing rules peculiarly in the polar region, as well as its interaction with other components of the Earth system. It includes polar space, polar atmosphere, polar ocean, polar biosphere, polar soils and lithosphere, polar cryosphere, polar observation and detection technology, polar engineering and environment, polar protection and utilization, and the relationship between the north and south poles of the earth and the environmental changes of the Qinghai-Tibet Plateau. The development of polar science would deepen the understanding of the interaction of the earth's spheres and enhance the ability of polar protection and utilization.

For the past few years, polar science in China has been facing important development opportunities. Meanwhile, significant progress has been achieved in international polar research. However, it is still the weakest area in earth science. Aiming at the key scientific issues of current global change and sustainable development, the main development trend of earth science is to focus on the integrated research for the characteristics and interactions of the different spheres of the earth system, as well as the interactions between the polar and other regions on earth.

In order to promote the research level of marine and polar sciences in China as well as to achieve continuous support and leadership of cutting-edge research in marine and polar science, it is necessary to improve the scientific funding structure, and expand cross-disciplinary integration, as well as promote the building of research talents. It is encouraged that carry out marine and polar research with coupled natural and social scientific aspects. To deepen the understanding of the earth system, the research of the earth process and the resource and environmental effects needs to be integrated. Stable and reliable support needs to be provided for the major research

subjects of marine and polar science and the sharing of information and data for marine scientific investigation needs to be accelerated. The research aspects include physical, chemical, biological, ecological, and geological processes of the oceans and polar regions; interaction between marine systems and climate change; interaction between human activities and marine space utilization; environmental protection of marine and polar regions; processes of marine disaster and its prevention and mitigation; formation, evolution, development and utilization of marine energy resources; ecological security and sustainability of marine biological resources; environmental protection of marine and polar region, land and sea coordination and global sustainable development; remote sensing and information sciences; observation and detection technology; marine and polar engineering and its environmental effects.

Division V of Earth Sciences

Atmospheric Science (D05)

The funding scope of this discipline includes meteorology, atmospheric physics, atmospheric chemistry and the atmospheric environment, and other branch disciplines, as well as their corresponding supporting technologies and development fields.

Atmospheric science is the study of various phenomena and their changes in the atmosphere of the Earth and other planets for the service of the mankind. The atmosphere is one of the most active spheres of the Earth system. Its changes are affected and controlled by other spheres of the system and celestial bodies such as the Sun. At the same time, changes in the atmosphere can directly or indirectly impact oceans, the terrestrial surface, the cryosphere, as well as the ecosystem of the earth. The atmosphere plays an important role in the interactions among different spheres of the Earth system and regulates the functions of the Earth system and its interactions with the other spheres. Besides studying dynamical, physical, chemical, and biological processes within the atmosphere, atmospheric science currently involves comprehensive investigations into the mechanisms underlying atmospheric variability and their interactions with the hydrosphere, lithosphere, cryosphere, biosphere, human activities, and global climate; the evolution of weather and the climate system, and theories of climate change and its prediction and projection methods; new techniques and methods in atmospheric observation, numerical modeling and data fusion; technologies and measures interfering weather and climate; the impact of human activities on weather, climate, and environmental systems; and the impact of weather, climate, and environmental system changes on human society. Attention should also be paid to studying the occurrence, variation, mechanisms, and predictions of various disastrous events of weather, climate, and the environment;

studying the issues of global climate and environmental changes and their impacts, adaptation, and mitigation; systematic observation, numerical simulation and comprehensive integration of various processes; and interdisciplinary fusion which could lay the scientific foundation for improving the quality of life and the sustainable development of society.

In 2023, the Division will continue to solicit proposals for exploratory, original and frontier studies in the following areas: the various phenomena, processes, and mechanisms of the atmosphere, and physical, chemical, and biological processes taking place in the atmosphere, and exchanges and interactions of energy and momentum between the atmosphere and other spheres by applying novel ideas, methods, and advanced observation technologies to study synoptic meteorology, climatology, paleoclimate, atmospheric dynamics, hydrometeorology, atmospheric physics, atmospheric chemistry, the atmospheric environment, the health and meteorology, atmospheric in situ observations and remote sensing, the boundary layer, stratosphere, and mesosphere; extreme weather and major climate events; the impact and adaptation of climate change; new theories and methods for weather forecasting, climate prediction, assessment and impact of various complex weather and climate disasters; new theories and methods for numerical modeling and data assimilation; fundamental research on satellite and radar meteorology; analysis and applied studies on the data acquired from major scientific experiments and scientific initiatives that have been conducted and are ongoing, as well as from large observation networks established in China and around the world; the principles and methods of meteorological observation, development of meteorological instruments, data analysis, and applications; interdisciplinary studies of key national interests such as defense, agriculture, forestry, hydrology, ecology, environment, energy, transportation, health, economy, among others, as well as national strategic needs such as the Belt and Road Initiatives and support of major engineering projects, serving the livelihood and sustainable development of society.

"D0509 Atmospheric Observation Techniques", "D0510 Atmospheric Data and Information Techniques", "D0511 Atmospheric Numerical Model Development", and "D0512 Earth System Model Development" are suitable for the research of new technologies and methods in the field of atmospheric science. Theoretical and applied research based on existing technologies and/or theories is not suitable for selecting such application codes.

Technological Science Section

The Technological Science Section, integrated with the Department of Engineering and Material Sciences (DEMS) and the Department of Information Sciences, mainly orients toward primary national demands and the economic battleground, aiming to enhance the fundamental research of cutting-edge technologies, solve core scientific problems behind national demands, provide sources of essential technologies, reinforce the knowledge foundation of technology and science, and generate a technological and scientific system.

Department of Engineering and Material Sciences (DEMS)

Engineering and material science provides scientific and technical support to guarantee national security, promote social progress and sustainable economic growth, and improve people's living standards. Aiming at keeping a foothold at the frontiers of disciplines, meeting the national strategic demands of social and economic development, and organically combining national goal orientations and frontier explorations, fundamental engineering and material science actively promotes the combination of fundamental research and engineering applications, strengthens self-dependent and original innovation, and enhances the sustainable development of interdisciplinary integration, to achieve a higher level of science and technology and a broader global impact of China in engineering and material science.

In 2022, DEMS received 21,213 grant applications for the General Program, which increased by 2.98% compared to 2021. Among them, 3,486 applications were granted with a total direct cost of 1,882,650,000 yuan. The average direct cost is 540,100 yuan, and the mean funding rate is 16.43% (16.06% in 2021).

In 2022, DEMS received 21,985 grant applications for the Young Scientist Fund, which increased by 6.05% compared to 2021. Among them, 3,822 applications were granted with a total direct cost of 1,138,800,000 yuan. The mean funding rate is 17.38% (17.60% in 2021).

In 2022, DEMS received 3,084 grant applications for the General Program, which increased by 8.10% compared to 2021. Among them, 435 applications were granted with a total direct cost of 143,500,000 yuan. The average direct cost is 329,900 yuan, and the mean funding rate is 14.11% (14.41% in 2021).

DEMS encourages explorations in innovative, cutting-edge research,

Funding of the General Program, Young Scientist Fund and Fund for Less Developed Region of DEMS in 2022

Unit: 10000 yuan

Divisions	General Program			Young ScientistFund			Fund for Less Developed Regions		
	Funded Projects	Direct Cost	Funding Rate (%)	Funded project	Direct Cost	Funding Rate (%)	Funded projects	Direct Cost	Funding Rate (%)
Metallic Materials	254	13 727	16.62	303	9 050	17.69	42	1 386	14.19
Inorganic Nonmetallic Materials	307	16 603	16.89	376	11 160	18.06	42	1 386	14.09
Organic Polymer Materials	222	11 965	16.57	287	8 490	17.60	24	792	14.63
Mining and Metallurgy Engineering	415	22 412	16.31	425	12 680	17.43	56	1 845	13.40
Mechanics Design andManufacturing	581	31 373	16.58	613	18 300	17.75	70	2 310	14.64
Engineering Thermophysics and Energy Utilization	223	12 063	16.65	293	8 770	17.75	18	594	14.52
Electrical Science and Engineering	235	12 697	16.69	256	7 560	17.15	23	757	14.20
Architecture and Civil Engineering	547	29 527	16.36	515	15 350	17.07	77	2 541	14.13
Hydraulic Engineering	145	7 822	17.37	171	5 100	17.98	28	924	14.51
Environmental Engineering	203	10 950	16.27	233	6 940	17.17	30	990	13.27
Ocean Engineering	115	6 236	16.31	114	3 420	17.48	3	99	17.65
Traffic and Transportation Engineering	139	7 522	14.03	137	4 110	14.54	12	396	13.19
New Conceptual Materials and Common Science of Materials	100	5 368	16.45	99	2 950	16.42	10	330	13.89
Total or Average	3 486	188 265	16.43	3822	113 880	17.38	435	14 350	14.11
Average Funding Strength	54.01			–			32.99		

emphasizing critical scientific problems and fundamental research extracted from engineering practices that are of great significance to promote the development of relevant industries and strengthen the international impact of China. Priority is given to the research of crucial scientific value and promising application prospects and of the potential to be new knowledge growth points, and to research that conforms to China's national conditions and can guide discipline development, with a possibility to acquire independent intellectual property rights. DEMS is devoted to further strengthening research integrity and creating a favorable academic environment.

Notes:

(1) Applicants must ensure the accuracy and completeness of all information in their applications. Attention should be paid to correctly filling in personal information, project funding, and academic paper publications of applicants and major participants. In particular, when filling in the

representative works, applicants must comply with the instruction and outline of the application form and refer to the scientific integrity requirements in the application rules of this guide. DEMS will strictly review the representative works provided in the proposals by applicants.

(2) Applicants are highly encouraged to propose projects with innovative and distinctive ideas, conduct substantive interdisciplinary cooperation, and promote the development of relevant disciplines. However, the proposals must contain specific scientific problems pertaining to the target discipline.

(3) Please refer to the funding budget of different programs, and put forward proposals with a reasonable budget according to the actual demands of various expenses.

Division I of Material Sciences

Metallic Materials (E01)

The Discipline of Metallic Materials supports fundamental research on materials with metallic properties. The applications are oriented towards fundamental research and presenting scientific issues and characteristic solutions to advance the discipline's frontiers and promote scientific and technological progress in areas of primary national need.

The funding scope of theDiscipline includes:

1. The chemical compositions, electronic structures, microstructures, phase diagrams and phase transformations, surfaces and interfaces, impurities and defects of Metals and Alloys, Metal Matrix Composites, Intermetallics, Metamaterials and others with metallic characters, as well as the mechanisms of their effects on mechanical, physical and chemical properties;

2. The theoretical and computational methods, modern characterization and analysis methods, big data strategy and artificial intelligence analysis for metallic materials;

3. The scientific issues in material preparation and processing, such as melting composition control, solidification and grain growth, casting, heat treatment, forging, welding, additive manufacturing, powder metallurgy, etc.;

4. The material service behaviors such as corrosion and protection, frictional wear, fatigue and fracture, creep, etc.;

5. The interaction of materials with service environment, functional degradation and failure, cyclic regeneration mechanisms and related fundamentals.

6. Behaviors under extreme conditions, such as irradiation, high/low temperature, high pressure, high strain rate, strong electric field, magnetic field, etc.;

7. The microstructures and properties of material surfaces, surface modification and coating layers;

8. Strengthening and toughening, deformation and fracture of metallic materials;

9. Mechanical properties, functional characteristics and structural design of Metal Matrix Composites;

10. Mechanical properties and functional characteristics of structure-functionally integrated materials, as well as mechanisms of material/structure interactions, matching optimized design, preparation and processing;

11.Metallic amorphous, Quasicrystalline, High-entropy and Sub-stable Alloys;

12. Optical, Electrical, Magnetic, Acoustic and Thermal Functional Materials;

13. Energy, Environmental, Catalytic Materials;

14. Information Functional Materials related to information generation, transmission and storage, conversion and processing; 15. Bio-medical, Intelligent and Bionic Materials, etc.

The Discipline encourages applicants to focus on general scientific issues beyond the limited materials system.In addition to hot spots and frontiers, attention is also paid to the recognition and new opinions of basic issues in traditional materials. Applications should pay attention to condensing scientific issues and highlighting characteristic ideas.

Inorganic Non-metallic Materials (E02)

The Discipline of Inorganic Non-metallic Materials supports fundamental research based on inorganic non-metallic materials. With the development of the basic theory of materials and the innovation in material preparation and characterization, research on inorganic non-metallic materials has been ever-increasingly active. New inorganic non-metallic materials, including new energy materials, smart materials, biomaterials, etc., continue to emerge. Presently, the development of functional materials orients toward high performance, high reliability, high sensitivity, smartness, and functional integration; and structural materials improve in respect of strength and toughness, functionalization, extreme environment endurance, eco-friendly, low-cost preparation, and high reliability. Meanwhile, conventional inorganic non-metallic materials are constantly being remolded and upgraded with the rapid development of new materials. Inorganic non-metallic materials have become increasingly indispensable for their applications in engineering sciences and technologies, including information technology, life science, energy and environmental science, aerospace technology, etc.

According to proposals submitted in the past three years, research on inorganic non-metallic materials featured broadly-involved aspects and was strongly interdisciplinary. Among those proposals, functional materials were the most active field, forming many subject hotspots, including energy conversion and storage materials, photoelectric information functional materials, low-dimensional carbon,

two-dimensional materials, multiferroic and lead-free piezoelectric materials, biomedical materials, and so on. About 30.0% of those proposals were associated with energy conversion and storage materials (E0208). In comparison, proposals on structural materials (E0201~ E0205) accounted for 36.7% of the total, with relatively concentrated organizations. It is worth mentioning that a large number of those proposals fell within the field of composite materials (E0205), and proposals on functional composite materials exhibited an increasing tendency. However, trendy applications that lack novelty and characteristics still account for a certain proportion.

This Discipline supports research projects with innovative ideas and substantive interdisciplinary research of inorganic non-metallic materials cross-cutting with other relevant disciplines. The following areas are encouraged: investigations of key novel materials under the carbon peaking and carbon neutrality goals; exploration of new inorganic non-metallic material systems based on domestic resource status; research on new theories, new effects, new characterization technologies and methods for inorganic non-metallic materials; applied basic research on advanced structural materials such as high-performance fibers and inorganic composite materials, new inorganic materials such as extreme environment– endurance ceramics, smart materials, artificial crystals, photoelectric information materials, low-dimensional carbon and two-dimensional materials, biomedical materials, new energy materials, ecological and sustainable environment materials, etc.; strengthen research on the surface, interface and composite design of materials; the basic research on "structure-function" integrated composite materials; applied basic research on the improvement and remolding of conventional inorganic non-metallic materials using new theories, new techniques, and new processes; and applied basic research on efficient recovery and recycling of inorganic non-metallic materials.

Division II of Material Sciences

Organic Polymer Materials (E03)

The Discipline of Organic Polymer Materials mainly supports the following research areas: preparation of polymeric materials; physics of polymeric materials; processing of polymeric materials; general polymer materials (plastics, rubbers, fibers, thin films, adhesives, etc.); Polymer blends and composites; polymeric materials related to ecological environment; intelligent and biomimetic polymer materials; biomedical organic and polymeric materials; organic and polymeric materials with optical-, electrical– or magnetic-function; other functional organic polymeric materials (such as separation and adsorption materials, flexible electronic materials and devices, low-dimensional functional materials, energy related organic and polymeric materials, information polymer materials, porous materials, polymer

catalyst, self-assembly functional materials, and organic-inorganic functional composite materials).

This Discipline encourages fundamental and applied fundamental research in the following areas: the preparation of polymeric materials (e.g., highly efficient and controllable synthetic methods of polymer materials, synthesis of polymer materials with high performance by new monomers, new routes and new technologies, polymer theory and simulation, new method and theory in polymer processing, the relationship between the aggregation structures and the properties of polymeric materials and their composite materials); the method and theory in the implementation of the high performance and functional properties of general polymer materials; low-cost and green method in the preparation of functional organic and polymeric materials, the structure-property relationship, and the implementation of their stability; performance -directed biomedical polymer materials and the evaluation method of their application; design and preparation of function-directed organic and polymeric materials with optical-, electrical-, magnetic-, or informatics-functions, and study on the implementation of high performance and stability of their devices; new concept in the design theory and preparation method of smart and biomimetic polymer materials; the design and preparation of novel organic polymer materials and their devices for artificial intelligence application; the controllable preparation and assembly methods of supramolecules and polymer materials with multilevel structures and their functionalization; polymeric materials related to ecological environment (i.e., the structures, properties and efficient utilization of natural polymers, the design theory and preparation method of environment-friendly polymer materials, the recycling and utilization of polymeric materials; polymeric materials for environmental control and improvement in water, soil and air pollution, and the stability and aging of polymeric materials). The Discipline also encourages enhancing the design of polymer materials with the guidance of theories to develop efficient "theoretical guidance-experimental verification" research method of polymer materials, and the methodological research of organic and polymeric material genome; basic research aiming at the difficult problems existing in the preparation, modification, and processing of the main assortments of domestic polymer materials; basic research aiming at new organic and polymeric materials and new technologies in polymer processing for the national strategic objective; research on the basic issues of the "Key & Core Technology" related to organic and polymeric materials.

New Conceptual Materials and Common Science of Materials (E13)

The Discipline of New Conceptual Materials and Common Science of Materials mainly supports research in the areas of new methods of material design and characterization, new material preparation technology and digital manufacturing, multi-functional integration of materials and devices, new composite and hybrid materials, new conceptual materials, key materials of advanced manufacturing, and

key engineering materials, *etc*.

With the rapid development of material sciences and the constant evolution of new theories and technologies, the research and application of materials are no longer rigidly adhered to the current material system. It has now become a general trend to explore new materials and cross-fused material systems to meet higher requirements put forward to the properties and functions of materials. In the paradigm of fundamental research of materials science, it is highly desired to resolve some pending common scientific problems facing new materials, such as the design, preparation, characterization, performance regulation, and fracture characteristics. At the same time, many key bottleneck issues encountered in major national projects are also expected to be solved by developing new materials and coordinating multi-material systems. Therefore, to meet the strong demand of national major industrial technology for pure, superior, unique, and new materials, theDiscipline focuses on the key common scientific issues of materials science, as well as new materials leading future technology and key materials of revolutionary technology, to advance the integrated development of material sciences and engineering technology.

This Discipline focuses on supporting fundamental research and applied fundamental research in three aspects: leading cross materials, key commonalities, and technical support. Specifically, (1) it focuses on leading materials and interdisciplinary research, such as new conceptual materials, new composite and hybrid materials, multi-functional integration of materials and devices, and new applications of materials. It encourages initiating projects to develop new materials with unique properties and superior performance to traditional materials; develop composite and hybrid materials with multi-scale, multi-dimensional, and multi-degree -of-freedom interaction; design multi-functional integrated materials and devices facing intelligence and information; and reveals the principles of collective response and cooperative function of materials, structures, and systems; explore new applications of materials. (2) It focuses on supporting the research on key commonalities of materials, including new methods of material design and characterization, new material preparation technology and digital manufacturing, etc. It encourages initiating projects to establish theories and models for materials design and performance prediction, explore new paradigms for material preparation and digital manufacturing, and develop advanced in-situ and ex-situ material characterization techniques to probe the electronic structure, surface and interface, defects, etc. (3) It focuses on supportive materials research, including key materials for advanced manufacturing and engineering. It encourages initiating projects to develop new materials facing high-end manufacturing and supporting major national demand, seek breakthroughs of key materials and technologies, and improve the whole chain connection, cross integration, and practical application of new materials in key fields of national advanced manufacturing and engineering.

Division I of Engineering Sciences

Mining and Metallurgical Engineering (E04)

The Discipline of Mining and Metallurgical Engineering supports the fundamental research on mining and metallurgical engineering, involving mainly natural resources exploitation (petroleum, natural gas, and mineral ores), safety science and engineering, mineral engineering and separation science of substances, ferrous and nonferrous metallurgy, materials preparation and processing, resource recycling and utilization, mining and metallurgy environment, *etc*.

In recent years, driven by major national needs and the world frontier of engineering science, the Discipline has significantly progressed through continuous innovations. The theory of this discipline is much deepened and improved by continuously assimilating novel methods and techniques with the changes and expansions of demands for resources, environment, mineral, and metallic materials. Basic disciplines such as earth sciences, mathematics, physics, chemistry, and mechanics are involved in this discipline more deeply and closely. New research areas have emerged one after another due to further development of interdisciplinary.

Hot research topics of this discipline include complex oil and natural gas low-carbon exploitation, intelligent green mines, geomechanics in deep formation, flexible development and low-carbon utilization of coals, dust control theory and technology of mining, environmental management and ecological restoration of mining and metallurgy, basic science of engineering and public safety, accurate control of mineral separation process, preparation of high value-added mineral materials, low carbon metallurgy of materials, high-clean and high-homogeneous metal materials metallurgy, precision hot forging for light alloy, integration of production and forming for metallic materials, resource circulation and utilization, *etc*. The following research fields are encouraged: (1) new theory and method for enhanced recovery of conventional oil and natural gas resources; (2) theory and method for high-efficiency exploitation of unconventional oil and natural gas resources; (3) safe and efficient development in drilling and production for complex oil and gas resources in deep formation and deep sea; (4) safe and efficient operation of oil and gas pipeline network; (5) theory of high-efficiency mining of geothermal resources in deep formation; (6) theory and technology for intelligent mining of mineral resources; (7) theory and technology for safe, green and low-carbon mining of mineral resources; (8) theory of rock mechanics and strata control under multiple fields; (9) theory of prevention and emergency of major disasters and accidents in the production process and occupational hazards; (10) environmental management and ecological restoration of abandoned mines; (11) theory and technology of green mineral separation; (12) theory and technology for the production of high quality mineral materials;(13) clean and efficient extraction of mineral resources; (14) theory

of green metallurgy, new theory, new technology and new process; (15) metallurgical theory and technology for high-quality metallic materials; (16) high-efficiency production, processing and near-net-shape forming of metallic materials and special materials; (17) cyclic utilization of waste gas and waste water produced in the dressing and smelting process; (18) new method and technology for low-carbon emission during the dressing and smelting process; (19) formation, transportation and control of pollutants produced in the dressing and smelting process; (20) treatment of solid waste for minimization, reclamation and harmlessness; (21) efficient cyclic utilization of secondary resources; (22) new theory and method of visualization, digitization and intelligentization for the dressing and smelting and material production processes.

The Discipline will continuously enhance interdisciplinary research, explore new methods, and pay close attention to new theories, concepts and methods, and their creative applications. TheDiscipline will attach importance to ensuring the development of the national economy and improving the quality of people's lives. In the context of carbon emission peak and neutrality, the aim is to enhance basic research on promoting the core competitiveness in China's petroleum, mining industry, metallurgy, materials preparation and processing, and engineering safety. In the aspect of natural resources exploitation, research will focus on addressing the refinement, greenization, and intellectualization of engineering and scientific issues, encouraging reengineering technology and science, improving mining efficiency and safety, accentuating the exploitation and utilization of poor resources, emphasizing source control, cyclic utilization, and environmental protection, and finally achieve both economic and environmental benefits. In the aspect of techniques, process, and equipment, emphases will be placed on structure optimization and adjustment, whole-process pollution control and innovation in greenization, and basic research for the applications of big data and artificial intelligence.

Engineering Thermophysics and Energy Utilization (E06)

The Discipline of Engineering Thermophysics and Energy Utilization supports the fundamental research on basic principles and applied technology in energy conversion, transfer and utilization. Traditional research mainly focuses on the basic laws of conventional energy conversion and utilization in the form of heat and work. At present, it has been extended to the research on the conversion, storage and utilization of a variety of energies, including renewable energy and new energy, and this would be an important contributor to the realization of Chinese 'carbon emission peak and neutrality' goals. The research involves engineering thermodynamics, refrigeration and cryogenics, the dynamic characteristics of thermodynamic systems, internal fluid dynamics, heat and mass transfer, multi-phase flow, combustion, fundamental technologies for measuring thermophysical properties, and thermal science in renewable and new energy utilization, as well as other fundamental and

innovative research related to engineering thermophysics and energy utilization.

The primary evolution trends of this discipline are as follows: (1) Fundamental research has been deepened by extending investigation from macro-scale to meso– and micro-scale, and from conventional parameters to those under extraordinary or extreme conditions. The focus will be shifted towards random, unsteady, multi-dimensional, multi-phase and complicated thermophysical investigation, and towards more quantitative, more accurate, and more intellectual studies; (2) Traditional research themes of this discipline will be extended to promote interdisciplinary research, for instance, integrated with physics, chemistry, chemical engineering, life science, information science, materials science, environment, safety, *etc*. Current hot research topics include: innovative thermodynamic cycles and non-equilibrium thermal dynamics, refrigeration and cryogenic engineering, the thermodynamics, the optimization and the control of complicated systems, turbulence properties of internal flows and the properties and the control of unsteady flows, porous media and micro-scale heat and mass transfer, radiation and heat exchange by phase transformation, clean, efficient, supersonic, micro-scale, micro-gravity and detonation combustion, combustion pollution and carbon dioxide formation and control, thermo-physical problems in public safety, the interactive mechanism between phases and thermo-physical model in multi-phase flow, new principles and methods in thermophysical measurement, and new thermophysical principles in renewable and new energy utilization, and energy-environment fields, etc.

The Discipline will prioritize fundamental research with significant theoretical significance and scientific value, which aims at international academic frontiers and might foster new knowledge generation, continuously promote discipline development and be beneficial to the economy and society. The Discipline does not support purely technical product development or repetitive research in general terms. TheDiscipline will continue to support research with substantial interdisciplinary nature or strong international cooperation background, or applicants acquired excellent achievements in their completed natural science foundation projects. It is expected to produce original research achievements with independent intellectual property rights in China, and to promote the continuous development of fundamental research in engineering thermophysics and energy utilization.

Division II of Engineering Sciences

Mechanical Design and Manufacturing (E05)

The Discipline of Mechanical Design and Manufacturing supports fundamental research in mechanical and manufacturing science.

Mechanical science is a fundamental discipline that involves the study of the functional synthesis, quantitative representation, performance control for various

mechanical products, and the development of novel design theories and methodologies. It mainly includes robotics and mechanism, transmission and drive, mechanical system dynamics, mechanical structural strength, mechanical tribology and surface technology, mechanical design, and mechanical bionics. Manufacturing science primarily involves studying theories, methods, technologies, processes, equipment, and systems concerning the high performance, high accuracy, high efficiency, low cost, and intelligent manufacturing of mechanical products. It mainly includes forming, machining, manufacturing systems and intelligence, mechanical measurement theory and technology, micro-nanomechanical systems, and biomanufacturing.

The key focuses of the Discipline are: fundamental research concerning national strategic priorities, academic frontier, and significant potential for engineering applications; research aimed at the eco-friendly, resource-saving, and energy-efficient integration of sustainable design and manufacturing; research concerning innovative design, new manufacturing principles and processing technologies, and measurement theories and equipment prototypes for ultrahigh-precision, extreme loading, and in particular, large, heavy or micro equipment and instruments; methodologies for designing, manufacturing and testing of components and parts under extreme working conditions, for instance, parameters ranging from conventional to extraordinary or extreme conditions, or aimed at extremely large or small scales. In 2023, priority funding will be provided under equal conditions by the General Program to groups in two areas, energy-efficient drive and transmission of mobile machines (E0502), and high-performance manufacturing of optical components (E0509). For the two types of proposals mentioned above, applicants should indicate the project group in the Explanatory Notes.

Based on the basic tasks of mechanical design and manufacturing, theDiscipline encourages continuous in-depth research in specific fields and high-risk exploratory research for original breakthroughs and disruptive innovation. The research that has yielded innovative achievements and is expected to achieve significant breakthroughs will be preferentially supported; moreover, substantial and profound interdisciplinary research with natural science and other engineering science is also welcome. However, it should be noted that applications should stay within the funding scope of theDiscipline.

Division III of Engineering Sciences

Environmental Engineering (E10)

The Discipline of Environmental Engineering, which aims at better understanding and solving environmental problems, is an emerging interdiscipline developed on the basis of natural science, engineering science, and humanity and social science. The Discipline focuses on major national demands on ecological

environment protection and related cutting-edge areas, and undertakes fundamental research to develop basic theories, engineering technologies and management methods in the aspects of environmental pollution control, environmental quality improvement, remediation of the contaminated environment, restoration of damaged ecosystem and recycling and safe utilization of waste resources. Environmental engineering is a strategic discipline providing support for building a community of shared future for mankind and nature and implementing sustainable development of human society. The Discipline possesses problem-oriented and interdisciplinary characteristics.

The research areas of the Discipline include drinking water engineering, urban wastewater treatment and reclamation, industrial wastewater treatment and reuse, urban and rural water system and ecological cycle, air pollution control, solid waste recycling and safe disposal, environmental pollution abatement and remediation, regional and urban eco-environmental system engineering, and eco-environmental risk control. There are 9 sub-codes for applications in total. To avoid application mistakes, applicants should carefully understand the funding scopes of the Discipline, and correctly select and use the application code together with corresponding research directions and keywords. The adoption of new theories, new technologies and new methods in interdiscipline should be integrated with related cutting-edge areas, national strategic demands and industrial bottle-necked challenges in the field of environmental engineering.

The Discipline emphasizes identifying, analyzing, and resolving key scientific problems encountered in environmental pollution control, ecosystem restoration, waste resource utilization and carbon emission reduction. It is encouraged to develop originally innovative theories, new methods and disruptive technology in high-level fundamental and interdisciplinary research in the field of environmental engineering. Innovative research is preferentially encouraged in the fields including "environmental pollution control and health security", "environmental quality improvement and ecological remediation", and "waste resource recycling and safe utilization".

Ocean Engineering (E11)

Ocean engineering is a new comprehensive engineering technology science formed around the development and utilization of the ocean and the application of related basic science and technology, which has apparent multi-disciplinary intersections. Facing the major national needs and the main battlefield of the national economy, the Discipline of Ocean Engineering studies the theories, methods, technologies, and equipment of ocean energy and resources development and utilization, ocean engineering structures and ocean engineering equipment, coastal engineering and island and reef engineering, ship engineering and navigation engineering, ocean exploration engineering, ocean dynamics, ocean physics, ocean

high-techs, ocean ecological environment, etc.

The research field of thisthe discipline Discipline includes four secondary application codes: coastal engineering and ocean engineering, ship engineering, marine technology, navigation and maritime technology, and the funding scopes include: (1) Basic basic theories of coastal engineering and ocean engineering, port channel and coastal engineering, underwater and seabed engineering, offshore and deep-sea engineering, polar engineering, equipment and systems, marine disaster prevention and reduction, marine resources development and utilization, marine renewable energy utilization; (2) Basic basic theories of ship design and manufacturing, new water carrying equipment, underwater/unmanned vehicles, marine equipment and systems, ship power and energy conservation and emission reduction, ship safety, ship vibration, and noise reduction; (3) Marine marine sensor technology, marine observation and detection, marine communication and information technology, positioning and navigation, marine materials, and anti-corrosion and anti-pollution; (4) Basic basic navigation and maritime theories, maritime communication and navigation, ship maneuvering and intelligent control, intelligent and green shipping, polar shipping, shipping safety and risk control. Applicants should carefully understand this theDiscipline's directions and funding scopes, and correctly select and fill in application codes and the corresponding research directions and keywords to avoid false positives.

The directions supported by the research area of this the discipline Disciplineinclude：For Coastal Engineering and Ocean Engineering: estuarine and coastal biogeomorphic form, coastal zone resources protection and utilization, disaster prevention and reduction under extreme sea conditions, digital twin and intelligent operation of the port, waterway and coastal engineering, marine geotechnical engineering, deepsea mining equipment and technology, polar engineering equipment and technology, island and reef engineering equipment research and development, deepsea fishery equipment and technology, development and utilization of new marine energy, development and design of deepsea engineering equipment, key technologies of the deepsea space station. For Ship Engineering: strong nonlinear ship hydrodynamics, green intelligent ship design and manufacturing, extreme environment and ship safety, ocean equipment intellectualization and informatization, marine unscrewed vehicle intellectualization, unscrewed marine vehicle, new turbine power system, special auxiliary devices and systems. For Ocean Technology: ocean environmental characteristics, ocean sensors, ocean big-data mining, acoustic and non-acoustic environment perception and target recognition, underwater communication, positioning and navigation, offshore operations and information assurance, special ocean materials. For Navigation and Maritime Technology: maritime early warning and emergency prevention and control, maritime big data and intelligent processing, mechanism analysis of shipping accidents, maritime safety and maritime search and rescue, intelligent ship

navigation, green shipping, polar navigation, intelligent water traffic system.

Division IV of Engineering Sciences

Architecture and Civil Engineering (E08)

The Discipline of Architecture and Civil Engineering supports fundamental research in architecture and civil engineering. The architecture research aims to investigate the fundamental theory, plan and design approaches, and innovations of architectures based on the strategy of sustainability and greenization, from the viewpoint of a harmonic relationship between humanity and the resources and environment, and the integrated development of region, city and countryside, and architecture. Civil engineering aims to meet the critical demands for high-quality construction, operation and maintenance of the nation's key civil projects and infrastructure. It explores the fundamental theory and cutting-edge technologies arising from engineering construction practices, promotes interdisciplinary integration and the applications of advanced experimental methods and information technologies, and enhances the development and implementation of new materials, structural systems, and constructional technologies.

For the Discipline, the field of architecture is subdivided into three categories: architecture, urban/rural planning, and building physics. Civil engineering is subdivided into seven categories: structural engineering, engineering materials, construction and service, rock and foundation engineering, underground and tunnel engineering, and engineering disaster mitigation. In 2020, the categories of theDiscipline were partially revised. Please select the correct category and keywords. Applicants are recommended to submit their applications to other divisions if their key scientific problems or research topics are out of the scope of theDiscipline.

Applications in the field of architecture should focus on new scientific problems that arise from urban/rural development practices, emphasize scientific methods in architectural design and urban/rural planning, and highlights the research and innovations of building physics, building environment control, and the fundamental theory of low carbon and energy saving. It encourages innovations in the priority field of "design principles and technical systems of architecture and urban/rural habitation environment". Applications in the field of civil engineering should focus on the synthetic design of high-performance materials and structural systems, the maintenance and performance enhancement of existing structures, the stability mechanism and control of geotechnical and foundation structures under complex and severe environments, and the life-cycle design theories and methods for civil engineering projects. It encourages innovations in key scientific problems such as the fundamental theories of the synthesis of materials and structures, the failure mechanism and performance control of engineering structures under extreme loads

and severe environments, the multi-hazard effect and enhanced resilience of civil engineering projects, modern civil engineering test and numerical simulation, the informatization and intelligentization of civil engineering.

Transportation and Vehicle Engineering (E12)

The Discipline of Traffic and Transportation Engineering mainly supports fundamental theoretical research and key technological breakthroughs in transportation engineering and vehicular technology.

With a focus on transportation modes such as roads, railways, waterways, aviation, aerospace, pipeline transportation, and operational transportation, research is conducted on the systems composed of elements such as transportation participants, transport vehicles, traffic facilities, environment, and information, as well as the interaction and inherent laws between the system and its various elements. TheDiscipline also investigates the planning and design, operation and control, integration and matching, maintenance, and management of transportation systems, aiming to achieve safety, efficiency, energy conservation, and environmental protection in various transportation modes and comprehensive transportation systems. The scope of funding includes fundamental theoretical research and key technological breakthroughs in areas such as road transportation and transportation engineering, rail transportation and transportation engineering, water transportation and transportation engineering, aviation transportation and transportation engineering, aerospace transportation engineering, pipeline transportation engineering, operational transportation and special vehicles, comprehensive transportation systems, new transportation modes, and cross-disciplinary technologies.

The Discipline will further promote engineering technology evaluation based on reliability, availability, maintainability, and safety. Priority will be given to basic theoretical research with significant theoretical significance, forward-looking, and exploratory characteristics. Cross-disciplinary research in transportation and vehicular engineering is encouraged.

Aiming to become a "Country with a Strong Transportation Network", theDiscipline researches the integration theory and key technologies of the comprehensive transportation network construction to achieve coordinated development and operation of a comprehensive three-dimensional transportation network system in specific areas. Based on practical needs such as operation/production, emergency rescue, and national defense and security, research will be conducted on the application and evaluation verification technology of autonomous driving technology in specific areas, special spaces, and specific operational environments. According to the "National Comprehensive Transport Network Guidelines" and the strategic layout of 600 km/h speed-level high-speed maglev, engineering verification and evaluation technology research will be carried out on the high-speed maglev system and key equipment. In 2023, priority funding will be given

to the above fields at a higher rate/intensity than the average, and the approved projects will be managed in the form of project groups.

Division V of Engineering Sciences

Electrical Science and Engineering (E07)

The Discipline of Electrical Science and Engineering includes two main fields: electrical (magnetic) energy science and the interaction between the electromagnetic field and matter. The funding scopes include fundamental research and applied fundamental research with objects or means of electric/magnetic phenomena and principles, orienting the related scientific problems in electric (magnetic) energy generation, transformation and conversion, transmission and utilization, as well as the mechanisms and laws of the interactions between electromagnetic field and matter. TheDiscipline is established in the fields of electrical science such as electromagnetic field, circuits (electrical networks), and electrical materials, focusing on electric machines and its system, power system and integrated energy, high voltage and insulation, electric apparatus, pulse power, discharge plasma, power electronics, electric energy storage and application, superconducting electrotechnics, bio-electromagnetic technology, and other electrical engineering fields. Research on new phenomena, new theories, new models, new methods, new devices, and new equipment is encouraged.

The areas of the electromagnetic field and circuit mainly include the electromagnetic field, circuit (electric network), static electricity, electromagnetic measurement and sensing, new energy conversion and power transmission technology, electromagnetic environment, and electromagnetic compatibility. The areas of superconducting and electrical materials mainly include superconducting conductors and magnets, superconducting power technology, engineering dielectrics, conductor/semiconductor/insulation/magnetic/energy storage/sensing materials, and other new electrical materials. The area of electric machines and its system mainly includes analysis and design of the electric machine, conversion and control of electric machine system, integration of electric machine system, and electric drive. The area of power systems and integrated energy mainly includes power system analysis, power system control, power system protection, electricity market, electricity information, integrated energy system, and energy internet. High voltage and discharge areas mainly include high voltage and large current, electrical equipment insulation, overvoltage and its protection, arc and electric contact, electrical apparatus, pulse power technology, and discharge plasma technology. The area of power electronics mainly includes power electronic devices and their applications, and power electronic systems and their control. The areas of electric energy storage and application mainly include principles of electric energy storage

and conversion, device, equipment, and system. The area of bio-electromagnetic technology mainly includes bio-electromagnetic phenomena and mechanisms, the biological effect of electromagnetic fields, electromagnetic diagnosis and treatment of disease.

In recent years, theDiscipline has presented new development trends: (1) constantly broadened research scopes, such as integrated energy systems, independent power systems, electrical materials, devices and equipment under extraordinary environments and extreme conditions, etc. (2) continuously expanded application fields, such as electric machines used in robots and servo systems, power supply, storage, and conversion in the fields of electrified traffic, new energy transport equipment, multi-electric ships and aircraft, and aeronautics and astronautics, electric transmission and drive (propulsion), electromagnetic launch, metallurgy, environmental protection technology, etc. (3) increasingly prominent interdisciplinarity, such as smart grid, energy and electricity market, electrical safety, intellisense, electric energy storage, pulse power, plasma and bio-electromagnetic technology and other fields have been intercrossed deeply with the disciplines like physics, chemistry, materials, information, management, and biomedicine, etc.

The Discipline encourages free exploration and cross-disciplines, tracking and leading the frontiers of this discipline and solving the scientific problems existing in current technical bottlenecks. Interdisciplinary research on fundamental theory and key techniques are particularly encouraged, e.g., interactions between electromagnetic energy and materials, electrical equipment, power electronic devices, bio-electromagnetic technology, and electromagnetic medical equipment.

Please carefully study the funding scope of theDiscipline and correctly select or fill in application codes and the corresponding research direction and keywords.

Hydraulic Engineering (E09)

The Discipline of Hydraulic Engineering covers two scientific areas, i.e. Hydro-science and Hydraulic Engineering, primarily targets water security as well as sustainable and efficient water utilization, and seeks a scientific understanding of natural and anthropogenic impacts on watershed-wide hydrological cycle and engineering hydrology, watershed-wide water and sediment changes and river dynamics, engineering hydraulics and hydropower utilization, watershed, and river/reservoir ecology, and addresses engineering-oriented scientific issues including sustainable and efficient water resources utilization, causes of floods and droughts and disasters prevention and mitigation, agricultural high-efficiency water conservation, sediment dynamics and fluvial geomorphological evolution, watershed and river/reservoir ecosystem and environmental regulation, water network planning and inter-watershed water transfer, safe and stable operation and regulation of hydraulic-mechanical-electrical systems, hydraulic and hydropower engineering and water network engineering construction and safe operation and maintenance, as well

as disaster risk prevention and control, etc. TheDiscipline has both fundamental theoretical and engineering/technological nature and is an essential and strategic discipline critical for safeguarding national water security.

The primary research areas of theDiscipline include six sub-disciplines: Engineering Hydrology and Water Resources Utilization, Agricultural and Rural Water Conservancy, Hydraulics and River Dynamics, Hydro-machinery and Systems, Hydraulic Geotechnical Engineering, and Hydraulic Structures.Please carefully study the funding scope of theDiscipline and correctly select or fill in application codes and the corresponding research direction and keywords. For the application whose key scientific problem and main research content does not fall into the Discipline's funding scope (or does not have any hydraulic engineering background) shall apply to other Disciplines. （此段为漏翻，已代为翻译）

In 2022, this discipline received 835 applications for general projects, a decrease of 3.02% compared to 2021. 145 projects were supported, the funding rate was 17.37%, and the average direct cost support intensity was 539400 yuan per project.

Funding applications of theDiscipline should target both major national needs and frontiers of international scientific and technological development, and focus on formulating, analyzing and solving key scientific questions, especially through theoretical innovations. The Engineering Hydrology and Water Resources Utilization sub-discipline focuses on the evolution of watershed-wide hydrological cycle under climatic and environmental changes, eco-hydrological processes and effects, water resources evolution pattern and regulation, principle and methodology of engineering hydrology, flood and drought disasters monitoring, early warning, prevention and mitigation, water resources optimized allocation, sustainable and efficient water resources utilization, etc. The Agricultural and Rural Water Conservancy sub-discipline focuses on conserving and protecting agricultural and rural water resources, agricultural water and soil ecosystem and environment, irrigation, and drainage engineering technology and equipment, ameliorating middle and low yield fields, smart irrigation areas, rural water networks, etc. The Hydraulics and River Dynamics sub-discipline focuses on water and sediment dynamics and engineering regulation, water and sediment change and engineering safety, transport and transformation of sediment and environmental substance across watersheds and rivers/reservoirs, aquatic ecosystem health maintenance, restoration, watershed-wide aquatic ecosystem evolution, etc. The Hydro-machinery and Systems sub-discipline focuses on the stable and safe operation of hydraulic-mechanical-electrical systems, intelligent monitoring, regulation, etc. Hydraulic Geotechnical Engineering focuses on methodological innovation in rock and soil physical experiments and numerical simulation, coupling effects of multiphase flow in rock and soil, monitoring and early warning technological advances, geotechnical engineering hazard and risk management, etc. The Hydraulic Structures sub-discipline focuses on novel structures in hydraulic and hydropower complex projects and water diversion projects, high-

performance hydraulic engineering material, intelligent construction, safe operation and maintenance, disaster risk prevention and control, etc.

To tackle challenges such as climate and environmental change adaptation and critical hydraulic infrastructure security, theDiscipline encourages innovative research on fundamental scientific issues, including optimized allocation and high-efficiency utilization of watershed-wide water resources, mechanisms of floods and waterlogging and disasters prevention and mitigation, drought monitoring, early warning and disasters prevention, agricultural water conservation and high-efficiency utilization, watershed-wide water network and urban/rural water system, inter-watershed water transfer, river water and sediment change and engineering safety, intelligent construction of hydraulic and hydropower complex projects, intelligent integrated regulation and control and disaster chain risk prevention and control, etc.

Department of Information Sciences

The Department of Information Sciences funds researches in areas of the generation of signals, acquisition, storage, transmission, processing and utilization of information. Information science is based on informatics, control theory and system theory, and its main method is information methodology, and its main platform and means of research are computer, integrated circuits and photo electric devices.

Based on the trends of disciplinary development and social progress, the Department gives priorities on funding research on electronics, communication and network, electric devices and integrated circuit, computer science, automation, AI, photo electronics and microelectronics, network security, quantum information. Preferential support will be given to basic researches that meet national demands and have far-reaching importance in promoting the national economic and disciplinary development.

Scientific and technical issues in information sciences are increasingly interdisciplinary in nature. Therefore, the Department pays great attention to proposals for interdisciplinary researches between information science and mathematics, physics, chemistry, life sciences, medical sciences, materials sciences, engineering, geo-sciences and management sciences, and so on. The Department encourages cooperative research among scientists with different backgrounds and knowledge to put forward cross-disciplinary research proposals in smart city, smart agriculture, health, service and education information technology sciences. It also encourages scientists to combine theory with practice and explore basic theory and key technical issues that have important application potentials for national economy and security. Research on basic theory and key technology driven by national need, and deep integration of industry and research are also encouraged and promoted. The Department will continue to encourage scientists to conduct substantial international

Funding of Program projects in Department of Information Sciences in 2022

Unit: 10,000 yuan

Divisions		General Program			Young Scientist Fund			Fund for Less Developed Regions		
		Projects	Direct cost	Success rate (%)	Projects	Direct cost	Success rate (%)	Projects	Direct cost	Success rate (%)
I	Electronics and technology	192	10 311	18.30	235	6 980	24.03	19	632	15.20
	Information and communication system	147	7 979	18.06	184	5 500	23.90	16	532	15.09
	Information acquisition and Processing	178	9 660	18.09	210	6 270	23.97	25	831	15.43
II	Theoretical computer science, computer software and hardware	269	14 522	18.05	281	8 360	24.00	35	1 176	15.22
	Computer applications, education information science and technology	277	14 972	18.09	265	7 870	23.94	47	1 590	14.92
	Artificial intelligence Network and information security	285	15 355	18.12	321	9 550	24.03	55	1 832	15.24
III	Automation I: control theory and technology	169	9 098	18.21	242	7 200	24.06	17	573	15.45
	Automation II: automation system and applications	196	10 560	18.20	240	7 140	23.98	15	472	15.63
IV	Semiconductor science and information devices	191	10 376	18.17	272	8 090	23.96	16	543	14.95
	Information optics and photoelectric devices	121	6 559	18.14	159	4 710	24.16	7	238	15.91
	Laser and technical optics	157	8 498	18.26	225	6 700	23.99	10	341	14.29
Total or average		2 182	117 890	18.15	2 634	78 370	24.00	262	8 760	15.18
Direct cost per project		54.03			—			33.44		

cooperative research with scientists abroad in frontier areas of information sciences.

In 2023, the Department encourages creative basic research that is different from traditional research ideas, and welcomes researchers conduct discussions and studies on new concepts, new theories, new methods and new technologies.

In 2022, the Department received 12,024 applications for General Program, and funded 2,182 projects with a total direct cost funding of 1.17890 billion yuan, and funding rate of 18.15%. In 2022, the Department received 10,976 applications for Young Scientists Fund, and funded 2,634 projects with direct cost of 783.70 million yuan and a. success rate of 24.00%. In 2022, the Department received 1,726 applications for Fund for Less Developed Regions, and funded 262 projects with direct cost of 87.6 million yuan and a success rate of 15.18%.

Division I of Information Sciences

Electronics and Information System (F01)

The Division mainly funds basic research in areas of electronic science and technology, information and information system, information acquisition and processing and related interdisciplinary areas.

Researches funded in areas of electronic science and technology include circuit and system, electronic science and technology, magnetic field and wave, as well as electronics and applications. Researches funded in information and information system include information transmission, exchange and application in fields information of and communication. Researches funded in information acquisition and processing include applied technology of information sensing, acquisition and processing.

In 2023, the Division will support researches in areas of electro-magnetic scattering and propagation in complex environment and targets, regulation theory and technology for artificial electro-magnetic media waves, radio end and antenna based on new materials, new structures and new mechanism, devices and circuit systems for radio tetra hertz communication and sensing, micro photon front end and integration system, high performance vacuum superconductivity micro nano devices, high performance sensors and integrated micro systems, circuit and system design in extreme and complex conditions, bio-medical data acquisition and application,medical image processing and analysis, TCM information acquisition and processing, theory of large scale coordinated integration of network, cognitive smart communications, space, sea and land information network theory and technology, communication system security and wireless connection security, optical communication, underwater communication and sensor network, new principle and method of radar, new mechanism and method for multi source detection and imaging, remote sensing image processing, multimedia information processing, space information acquisition and processing, underwater information acquisition and processing. The innovative and cross-disciplinary research and exploratory studies with good prospects will be supported, preferential funding will be given to the projects which have scored outstanding achievements in previous research. Preferential support will be given and encouraged to the combination of theory and practice to focus on innovation and to study and solve basic problems in important application areas, so as to improve China's research capabilities in this discipline.

Division II of Information Sciences

The Division mainly funds researches in computer science, artificial intelligence, education information science and technology.

Computer Science (F02)

The Division mainly funds researches in areas of basic theories, basic methods and key techniques related to computer science and technology and relevant interdisciplinary areas.The important trend of computer science and technology development is to obtain super speed, large storage, high performance, high

reliability, mobile applicability and integration of sensing, storage and computing.

In 2023, the Division welcomes research proposals with creative ideas and reasonable plans in basic and farsighted areas and interdisciplinary subjects. The Division continues to support collaborations with researchers in areas of mathematics, earth sciences, life sciences, medical sciences, management and economics and social sciences to make joint explorations on new theories, new method and technology in interdisciplinary areas so as to promote the mutual development of computer science and other sciences. The Division especially encourages and supports scientists to focus on strategic national goals and address those basic issues that are well known internationally for their complexity and significance and of strong exploratory nature, so as to increase the level and international impact of computer science research in China.

In addition, in order to promote the good development of domestic ecology in information science, researchers are encouraged to pay attention to the availability of output results on domestic chip software and hardware platforms during project implementation. （此段为漏翻，已代为翻译）

Artificial Intelligence (F06)

The AI area focuses on key scientific issues and technology in AI research. The Division supports close cooperation between AI researchers and those in other disciplines and humanities and social sciences to explore new concepts, theory, method and technology. The Division especially encourages researches to explore basic issues of great difficulties and great impacts.

Education Information Science and Technology (F0701)

For education information science and technology, the Division focuses on knowledge generation, cognition laws and learning mechanism, and original, fundamental, far-sighted and interdisciplinary research, encourage research on basic theory and method of AI driven education, education assessment method and models supported by big-data, online and mobile learning environment and key technology. The Division encourages collaborations with other disciplines including social science disciplines to explore new concept, theory, method and technology to solve education problems in China.

In 2023, the Division gives priorities on funding research in software theory and engineering, information security, network and system security, complex science and AI theory, intelligence system and AI security.

Division III of Information Sciences

Automation (F03)

The Division mainly funds basic research and far-sighted research for the

national economy and national security in areas of control science and engineering, automation system and application and related interdisciplinary areas. It includes control theory and technology, control system and engineering, automatic checking technology and devices, navigation, guidance and control, biomedical system and technology, robotics and intelligent system, smart manufacturing and automation system theory and technology, AI driven automation and other novel automation theory and systems.

In 2023, to address the problems found in recent project proposals, the Division encourages researchers to 1) select projects with application background of national interests, and provide scientific and technological support to the promotion of the economy and living standard; 2) select interdisciplinary projects and collaborate with scientists in biomedical, mathematics, economics and sociology, so as to promote development of the discipline; 3) select internationally challenging problems or creative problems so as to increase the influences of Chinese scientists in international academic circle.

Division IV of Information Sciences

The funding scope of the Division covers two disciplines, namely, semiconductor science and information devices, and optics and photo-electronics.

Semiconductor Science and Information Devices (F04)

The main scope of funding for semiconductor science and information devices includes semiconductor electronic and photo-electric material and devices, IC design, fabrication, packaging and EDA tools, and micro and nano mechanical and electrical devices and control system.

Optics and Photo Electronics (F05)

The optics and photoelectronics mainly support optical information acquisition, display and processing, photoelectric devices and integration, inferred and tetra-hertz physics, nonlinear optics, laser, spectrum technology, applied optics, micro nano mechanical electronic devices and control systems.

The Division gives priority to researches on high performance light source, low power consumption integrated circuit and radio frequency chips, new types of sensor materials and devices and technology, tetra hertz devices, micro and nano device and technology, new types of optical field control technology and devices, quantum optics and quantum devices, quantum communication and quantum computation, optical information processing and display technology, photon electronic devices and photonic integration, wide gap semiconductor materials and devices, semiconductor integrated circuit system, energy photonics, new types of laser technology and devices, new optical imaging method and technology, advanced optical

manufacturing, precision optical measurement and detection, biomedical optics, new spectrum technology, and space and astronomical optics, environment and marine optics, etc. The Division encourages studies to improve device performance, yield and reliability, including scientific issues in device physics, structure and technology development. The Division also encourages interdisciplinary studies with physics, chemistry, materials, life and medical sciences, and promote creative research on new information devices such as brain-like chips

Life and Medical Sciences Section

The life and medical science section includes the Department of Life Sciences and the Department of Medical Sciences. This section focuses on the frontiers of worldwide science, technology and people's life and health. With the continuous understanding of the essence of life, it also emphasizes the basic research on clinical medicine and agricultural sciences, in order to provide strong scientific and technological supports for the benefit of people's life and health and national food security.

Department of Life Sciences

Life sciences is one of the most active frontier fields of modern sciences to explore life phenomena and their basic rules. As a guarantee of national population health, food safety and ecological civilization, life sciences is an important support for technological progress and industrial development. Life science research is closely related to national economic and social development, and plays pivotaldual roles in promoting scientific exploration and supporting of national strategic needs.

The Department encourages researchers to carry out original studies with innovativeacademic ideas, and novel techniques and approaches, particularly for those playing a pivotal role of promoting the developmentof related disciplines with authentic ideas. Emphasis will be put on proposals with noveltheories and novelhypotheses based on previousresearch over a long period of time. The Department will continue to pay attentionto the cutting-edge frontiers and emerging fields in life sciences, and focus on the scientific researches aimed at addressing major national needs. In line with the principles of "encouraging exploration, highlighting originality; focusing on the frontier, creating novelty; demand promoted, breaking through bottlenecks; common orientation, cross-disciplines", the Department implements the fundingpolicy depending on the performance of previous funded project, and givespreferential consideration to applicants with good performance in theirprevious projects under equivalent conditions.

Due to the frequent occurrence of infectious diseases and zoonosis caused by various pathogenic microorganisms in the recent years, which has caused great harm to social and economic development and people's health, it is particularly urgent to strengthen basic research in related fields. Although the Department has funded many programsrelated to the origin, evolution, transmission, genetic variation, infection and vaccine research of viruses and other pathogenic microorganisms, the understanding of viruses and new pathogenic microorganisms is still insufficient, therebythe related researches are needed to be strengthened and deepened. In the future, the Departmentof Life Sciences will actively encourage scientific researchers to carry out systematic research in fields related to virology, pathogenic microbiology, immunology, and will also pay close attention and provide stable support to the above encouraged research fields in the funding process.

Since 2021, the application codes of all disciplines in the Department have been set as a two-level structure with only the first level application code and the second level application code. Numeral research directions have been set under the second level application code. Applicants should pay attention to the research direction under the second level application code.

Matters needing attention

(1) In the explanation part of the Guide to Programs of the Department and every disciplines, the funding scope is emphasized and the categories that will not be accepted have been clearly noted. Applicantsshould read them carefully according to the subject of application. In view of the problems in previous applications, the applicant is requested to accurately grasp the nature of scientific issues and ensure that the academic achievements provided in the application are accurate.

(2) For applications concerning the operation with highly pathogenicmicrobe, applicants should abide strictly by relevant national regulations and rules on bio-safety, and perform under proper bio-safety qualified conditions.

(3) Projects involving animal experiments should comply with relevant national regulations and requirements of animal ethics and welfare.

(4) The application code should be specified to the final level. Applications which fail to provide the detailed code will be declined. Please refer to the Discipline's guides for specific requirements on application codes.

In addition, the Department has made the following requirements for ethics-related research applications in biomedical research:

(1)To carry out research in the field of biomedicine, researchers must abide by the relevant provisions of the state, respect internationally recognized bioethical norms, and abide by the relevant requirements of the state for ethical research.

(2) Biomedical researches involving human tissues, organs, cells, *etc.* must provide the review approvals of ethics committees of supporting units or their superior departments in the application forms.

(3) Applications involving multi-unit participation in ethical researches should be supported by certification documents examined and approved by each participating unit or the ethics committee of the competent department at a higher level.

(4) When overseas institutions or individuals cooperate with domestic medical and health institutions to carry out research and declaration fund projects involving ethics, they should issue certification documents for examination and approval by ethics committees provided by domestic relying units.

(5) For research projects that need to sign informed consent, the process and procedure of signing informed consent should be described in the application forms.

(6) If the ethics-related fund project is approved and the research plan is changed during the implementation period, the review approval of the ethics committee after the change of the research plan should be submitted to the fund committee again in accordance with the above requirements.

Applicants should follow the requirements of the *Guide* and the application syllabus when writing their proposals. Otherwise, the proposals will not be accepted.

Division I of Biology

The funding scope of Division I covers three disciplines, namely microbiology, botany and zoology.

Microbiology (C01)

The Microbiology Discipline supports the basic research with microorganisms as the research objects, which has the characteristics of focusing on the cutting-edge fields and meeting the national needs.The Discipline encourages researchers to carry out fundamental and authentic studies on resources, diversity and evolution and biological characteristics in the field of microbial researches.

TheDiscipline encourages to carry out in-depth and systematic research on virology and pathogenic microbiology, and strive to promote the cutting-edge theory and technology of Virology and virus immune system interaction research. The Discipline encourages researcher to carry out microbial classification research, reveal the systematic evolution and evolution rules of microbial groups with important classification status or application potential, and further strengthen the cultivation of taxonomic talents. The Discipline encourages the proposals aiming at study on mycoplasma, rickettsia, Chlamydia, spiroplasma, prion *etc*. Moreover, the following research fields are especially encouraged: single cell, co-infection and drug resistance, population and epigenetics of microorganisms; enrichment and isolation of microorganisms which are difficult to culture; research on microbiome and its interaction with host and environment; basic scientific researches on pathogenic

microorganisms, marine and geological microorganisms; frontier researches on the major environmental problems in China; systematic and in-depth researches on basic and frontier scientific questions of life sciences usingmicroorganisms as model materials and the use of modern technologies such as microbiome and big data in combination with traditional methods.

In order to promote the development and application of novel theories, new technologies and methodology of Microbiology, gather academic ideas, research methods and techniques, break through the barriers of traditional disciplines, andresolve complicated scientific questions, applicants are encouraged to carry out interdisciplinary research with mathematics, physics, chemistry, electronics, information and engineering, especially in combination withbig data and artificial intelligence.

Botany (C02)

Focusing on the world's leading edge questions and national needs,the Discipline of Botany supports basic research projects with plants as the research objects. Research interests include plant taxonomy, plant phylogeny and evolution, plant photosynthesis and nitrogen fixation, transportation and metabolism of water and nutrients, interaction between plant and environment, plant hormones and growth regulators, plant reproduction and development, protection and utilization of plant resources, phytochemistry, new technologies and methods of botany research, etc.

Based on the applications accepted and funded in the recent years, the development of each sub-branch within the Discipline is imbalanced. There are relatively more applications in the areas including plant phylogeny, plant growth and development, and interaction with environment. Whereas there are fewer applications in the fields including paleobotany, biological symbiosis and nitrogen fixation, mineral elements and the metabolism, organic synthesize and transportation, hydrophytes and wetland plants and resources, etc. Applications focused on the above -mentioned subjects will be encouraged. Systematic and creative researches should be further strengthened henceforth.

The Discipline pays attention to natural variation and domestication mechanism of plants, environmental adaptation mechanism of plants, modeling of plant life process and function.Applicants are also encouraged to carry out researches on the fields including phytosystematics, introduction and plant germplasm conservation, the structure and function of plant cells, molecular basis of plant important traits, interaction between plants and other organisms, and plant response to environmental changes.

In 2023 the Discipline will continue to give preferential support to plant taxonomy and floristic geography, especially strengthening the support to young taxonomists. The Discipline encourages applicants to carry out researches on the worldwide species revision of certain families and genus, and plant resources

research in key areas and special environments.

The interdisciplinary studies of botany with other related fields will be strongly encouraged, especially with mathematics, chemistry, engineering and material science, and the application of big data and artificial intelligence in plant scientific research. Development of new model plants with important evolutionary nodes is encouragedforexploring the special biological phenomena. In order to achieve better use of local advantages, resources advantages, and talent training, the Discipline will encourage collaborations among applicants who have unique advantages in different institutions or groups.

Special notice for applicants:

(1) Projects accepted under the plant-environment interactioncode (C0205) do not include applications for research related to crops and other cash crops.

(2) Under the application code for Phytochemistry (C0209), it is encouraged to conduct in-depth exploration and functional research on important chemical components in plants, but applications with pharmacological research and structural modification or synthesis research will not be accepted.

Zoology (C04)

Zoology studies the life phenomena and principles in animal morphology, taxonomy, physiology, behavior, ecology, evolution and genetics. The effective application of theory and techniques has greatly promoted the development of zoology. Animal evolution and development, animal phylogeny and classification, animal physiology and behavior, animal breeding and population dynamics are still the important basic theoretical researches of this discipline. On this basis, the research of marine zoology, animal resources and protection, wild animal diseases and prevention, development of experimental animals meet the national needs. With the deepening and integration of various directions of zoology, the interdisciplinary and compatible development characteristics of zoology have been formed.

Applications accepted by the Discipline in the recent years demonstrated that researches in some fields have already formed their own features and achieved significant international impact. Not only the formulation of scientific questions and rationality of designs, but also the novelty of academic ideas of the proposals has great improved. However some problems still exist, for example, the excessive pursuit of hotspots but lack of systematism and continuity of researches, too much attention paid to the application of new technologies while ignoring the refinement of scientific issues, the inaccurate understanding of the orientation of four scientific classification properties, the lack of justification for proposed research and feasibility of technical routes, the insufficient experimental accumulation and description of detailed research progress and contents, the lack of definite scientific questions or hypothesis, the overstatement of research objectives.

In the future, the identification and description of unknown species of animals,

and the classification and revision of known species of animals will still be the key funding areas by the branching field of taxonomy. Taxonomy of marine invertebrates will also be highly encouraged. Key research areas currently focus on the animal phylogeny and zoogeography, as well as the life history around the evolution. The Discipline will encourage researches on morphology, physiology and behavior of wild animals. Support will be strengthened for researches on conservation biology for endangered animals, the sustainable utilization of important resource animals, and related biological researches for important alien invasive species and bio-safety. Basic research of zoology for specific species in China and areas with weak foundations will be continually encouraged.The Discipline attaches great importance to the study of experimental animalization of wild animals and research on experimental animal models. In addition, the Discipline will pay more attention to basic research on zoology; encourage original studies and exploration based on animal resources and regional features in China using new theory and technologies; encourage interdisciplinary research such as animal behavior and neurobiology.

Special notice for applicants: TheDiscipline does not accept the application of medical research only using model animals as research materials, the application of research using livestock and poultry as research materials, and the application of agricultural pest related research.

Division II of Biology

The funding scope of Division II covers the following three disciplines: genetics and bioinformatics; cell biology; and developmental biology and reproductive biology.

Genetics and Bioinformatics (C06)

Genetics is to study the inheritance, variation and evolution of organisms on various levels of molecules, cells, individuals and populations. The Discipline will give priority support in the following fields: structure, function and regulation of genetic materials; the study of genetic and epigenetic identification of complicated biological traits; the study on the genetic and epigenetic basis of human diseases; researches on genetic and epigenetic inheritance of economic traits of animals and plants;studies on basic genetic rules and the molecular mechanisms of gene expression and regulation using model organisms; the rules of biological evolution and population genetic; new theories, methods and applications of genetics, etc.. Research on the biological basis of human phenotypes, behaviors and diseases will be specially favored.

Bioinformatics is an interdisciplinary subject which studies the methods and applications of biological data acquisition, storage, sharing and analysis. Future

funding directions and key areas lie in the following fields: developing new theories, algorithms and analytical techniques of bioinformatics and computational biology; research on methods and applications of integration, standardization and visualization of large biological data; research on artificial intelligence methods for biological big data and application; analysis and mining of biological multi-omics data; modeling, prediction and design of biological marcromolecular structure; reconstruction and modeling of biological network; dynamic analysis and simulation of computational system biology.

Cell Biology (C07)

Cell biology is a fundamental and cutting-edge subject to study the principles and mechanisms of cell life activities, mainly aiming at revealing the structure, function, phenotypes and regulation mechanism at molecular, cellular and individual levels, as well as studies on cytological mechanisms of phenotype and functional abnormal occurrence of organisms.

Studies on structure, function and interaction of cells and organelles have been the major aspects supported by the Discipline. TheDiscipline encourages applicants to focus on the structural assembly, dynamic changes and functional mechanisms of biological macromolecules in the process of cell life activities, organelle remodeling and organelle interaction, the relationship between abnormal cell function and the development of diseases, and the interactions between cells and the microenvironment. The Discipline also encourages applicants to use cell models, model organisms and pathological samples, in combination with techniques and methods from multiple disciplines including genetics, developmental biology, biophysics, biochemistry, chemical biology, and medicine, to carry out systematic and innovative researches at molecule, cell, tissue and individual levels. Applicants in the fields of life and medical research are encouraged to focus on practical needs, carry out multidisciplinary research which takes into account both basic and practical considerations, for understanding the pathogenesis of disease at the molecular and cellular level.

Compared with previous years, the number of accepted applications in theDiscipline has increased steadily in 2022. Among the applications accepted in 2022, there were fewer applications in the areas of cell polarity and cell movement, cell variation and dysfunction, and new technologies and methods for cell biology research, whereas the these areas are pivotal in cell biology. The Discipline will give priority to support the above aspects. In 2023, the key areas of theDiscipline lie in the following fields: the molecular basis and regulatory mechanisms of cell membranes, membranous organelles, and non membranous organelles, cell signal transduction and intracellular and extracellular communication, cell microenvironment, metabolite sensing and cell homeostasis maintenance, cell fate determination, cell tracing, and lineage, cell proliferation, mutation, movement, aging, death, and intervention,

abnormalities in cell structure and function, and the occurrence of major diseases.

During the acceptance process of the projectsin 2022, it was found that some applicants did not attach enough importance to medical ethics and did not provide ethics committee review opinions as required for research involving individuals (see the overall requirements of the Department of Life Sciences for details). Applicants should pay special attention.

Developmental Biology and Reproductive Biology (C12)

The funding scope of developmental and reproductive biology includes three fields: stem cells, development, and reproduction. This discipline is a fundamental and cutting-edge discipline that studies the basic biological laws of gametogenesis, embryonic development, organ formation, homeostasis, and aging in multicellular organisms. Its research objects include humans, animals, and plants. Scientific issues include gametogenesis, fertilization, implantation, pregnancy establishment, and maintenance; The basic laws of biological processes such as embryonic development, cell lineage establishment, tissue and organ formation, homeostasis maintenance, regeneration/repair, and aging; And stem cell identification, cell reprogramming, pluripotent stem cell induction, and organ like establishment and application. Developmental and reproductive biology research emphasizes in vivo, continuity, and dynamics, emphasizing the use of model organisms to explore the synergistic effects and regulatory mechanisms among multiple genes, cells, and organs during development and reproduction. The research objects of theDiscipline include humans, animals and plants. TheDiscipline focuses on the basic rules of gametogenesis, fertilization, implantation, pregnancy establishment and maintenance, embryonic development, cell lineage establishment, organogenesis, homeostasis maintenance and regeneration, aging, stem cell identification, establishment, reprogramming, pluripotent stem cell induction and the mechanism of individual phenotype and functional defects caused by abnormal reproductive development.

In 2022, the number of project applications in theDiscipline increased steadily. Compared to previous years, the number of applications for General Programs has increased, while the number of applications for Young Scientists Fund programs has decreased. In 2022, among the applications received, the number of applications under secondary application codes such as C1204 (tissue and organ development and in vitro construction) and C1206 (reproductive cells and gender determination) was relatively large, while the number of applications under application codes such as C1202 (stem cell application) and C1207 (fertilization, implantation, and maternal fetal interaction) was relatively small.

In 2023, the Discipline will continue to encourage applicants focusing on the world's scientific frontier and conducting cross cutting research. Research focusing on the following fields is specially encouraged: cell proliferation and differentiation, embryonic morphogenesis, tissue and organ formation, damage repair and

regeneration, homeostasis and aging during reproduction and development, as well as the regulatory effects of genetic, environmental, and metabolic factors on reproduction and development. The Discipline encourages research on the biological mechanism and application of stem cells based on the development and aging process; basic research on developmental and reproductive disorders; and the development of new models, technologies, and methods in developmental and reproductive biology.

Division of Biomedicine

The Division of Biomedicine covers the following three disciplines: Immunology, Neurosciences &Psychology, and Physiology & integrative biology.

Immunology (C08)

Immunology studies the structure and function of immune system. It isa frontier and leading discipline which bridges biology and clinical medicine.

In 2021, the number of applications in innate immunity, tumore immune microenvironment, and vaccine, antibody, and immunity intervention is relatively large. The number of applications in research areas including adaptive immunity, mucosal immunity and regional immunity, autoimmunity and immune tolerance, reproductive immunity and transplantation immunity is relatively few. It is clearly demonstrated from the applications in 2021 that the number of projects applied to this discipline has increased steadily, and the number of projects applied in innate immunity, autoimmunity and immune tolerance, and tumor immune microenvironment has increased significantly compared with that in 2020. The number of projects in the fields of adaptive immunity, vaccines, antibodies and immune intervention, reproductive immunity and transplantation immunity remained unchanged, while the number of applications in infection and non-infectious inflammation decreased compared with 2020.

It is worth noting that some of the projects applied in 2022 did not pay enough attention to biomedical ethics and fail to provide ethics permission as required. In addition, the applicants had inaccurate understanding of the classification of scientific problems, especially the “encouraging exploration and highlighting originality”category, and the content of “originality” was not correctly reflected in the applications. The writing of some applications was not complete, especially for the part of feasibility analysis.

In 2023, the Discipline will continue to support applications with creative academic thoughts; encourage interdisciplinary studies; encourage applicants to refine scientific issues from basic research and clinical practice, to conduct in-depth mechanism discussions, and to propose new hypotheses and theories; encourage

research on new theories and mechanisms of reproductive and transplant immunization; encourage research on key scientific issues in the fields of vaccines, antibodies, and immune interventions for major diseases and new infectious diseases; encourage research on immunologic issues targeting external factors such as extreme environments and pollutants; encourage research in emerging directions such as structural immunity, metabolic immunity, and synthetic immunity; encourage research on new pathways and mechanisms on interaction among multiple organs and the immune system; encourage research on new methods and technologies that could form original scientific thoughts.

Neuroscience and Psychology (C09)

The funding scope of theDiscipline includes neuroscience, psychology and cognitive science. The core scientific goal of neuroscience research is to analyze the essence of human nervous activity, from primary sensation, activate and instinctive behavior to advanced language, learning, memory, attention, consciousness, thinking and decision-making, etc. Psychology is the science of studying human psychology and behavior, aiming at clarifying rule and mechanism of occurrence, development, expression and function of psychological phenomena including cognition, emotion, motivation, thinking, consciousness, personality. Cognitive science is a science that studies the nature and rule of cognition and intelligence including cognitive and intellectual activities at all levels and aspects including perception, attention, memory, reasoning, choice, consciousness and even emotional motivation.

The number of applications in 2022 clearly indicated that the development of neuroscience and psychology was imbalanced. A large number of the proposals submitted and projects funded were focused on molecular and cellular neurobiology, behavior and emotional neurobiology, cognitive neurobiology, structure and function of nervous system, cognitive psychology, developmental and educational psychology, whereas there were fewer applications in fields of novel technology and paradigm of cognitive simulation, computing and artificial intelligence, neuroscience and psychology.

In 2023, the Discipline will continue to encourage the exploration of the neurobiological basis of cognition and behavior, and using the research concept of systems biology to analyze the functions of the nervous system from the molecular, cellular and neural circuits and neural network levels. Interdisciplinary studies will be encouraged to clarify the occurrence, development and mechanism of nervous system diseases. Cross-species neuroscience researches from an evolutionary perspective are encouraged. Researcheson development of novel technologies and methods to solve bottleneck problems in neurosciences are encouraged.For psychology and cognitive sciences, the Discipline will continue to support the dominant areas, while encouraging interdisciplinary integration, using modern neuroimaging, genomics, deep brain stimulation, big data analysis, longitudinal tracking, computational models

and other technologies and methods to promote in-depth research on psychological activities and cognitive processes and their material basis, and to encourage the development of new theories, technologies and models.

Special reminder to applicants: due to the large number of research areas in the Discipline, applicants need to correctly select the secondary code.

Physiology and Integrative Biology (C11)

Physiology and integrative biology is an interdiscipline of biology and basic medicine, which reveals the phenomena, rules, regulation and mechanisms of life activities. The funding scope of theDiscipline mainly focus on the morphological structure, physiological function and homeostasis maintenance from molecule, cell, organ/tissue, to bodysystem. In addition, the Discipline also supports researches on the physiological and pathological mechanism of life activities such as development, aging and diseases, as well as under condition of stress, disease, aging or extreme environment.

The Discipline encourages applicants to conduct in-depth and systematic research around the internal regulatory mechanisms of life phenomena, as well as the mechanisms of the body affected by external factors. Research focuses on the following fields are specially encouraged: network regulation and homeostasis maintenance of functional activities among important tissues and organs, the interaction between cells within tissues and organs, and the homeostasis regulation of microenvironment, the regulatory mechanism and intervention in the aging process, the regulatory effect of metabolic remodeling on the homeostasis of body functions, the impact of biological clock remodeling on physiology and behavior, the regulation of health effects of exercise, the barrier and important scientific issues of material transport between tissues and organs, such as neurohumoral immune regulation of functional homeostasis and stress states.

In 2022, the applications tended to be multidiscinplinary integrative researches, but the growth of each subdiscipline branch is imbalanced. There are more applications in integrative biology, sensory organs and exercise physiology. The applications in circulation and blood physiology, nutrition and metabolism physiology, aging and biological rhythm, endocrinology, urology and reproductive physiology are less than the above subdiscipline branches. There are few applications in respiratory and digestive physiology, extreme environmental physiology and comparative physiology, and pathophysiology.

In 2023, the Discipline will continue to encourage the comprehensive and multi-level integrative researches usingtraditional, cutting-edge and original technologies; encourage interdisciplinary investigations, especially those aiming to further improve and expand frontiersof human physiology and injury adaptabilitywithvarious novel methods and techniques; and encourage thepathophysiologic researches involving various tissues or physiological states .

In 2023, biomedical researches involving human tissues, organs, cells, *etc.* must provide the review approvals of ethics committees of supporting units or their superior departments in the application forms. (Please refer to the overall requirement of Department of Life Sciences)

Special reminder to applicants: Please note that applications concerning researches on plants, algae, traditional Chinese medicine, and wild animals (except comparative physiology) are not accepted in theDiscipline.

Division of Interdisciplinary Research

The Division covers three disciplines as follows: biophysics and biochemistry; bio-materials, imaging and tissue engineering; and molecular biology and biotechnology.

Biophysics and Biochemistry (C05)

Biophysics and biochemistry is a cross discipline, combining and applying the theory and method of biology, physics and chemistry to investigate mechanisms of biological problems and phenomena, to study chemical composition of living organisms as well as chemical changes during the process of life, and to investigate the life phenomena and activities of life process at the biological molecule level. By exploring the characteristics of bio-molecules and their interactions, the Discipline has gradually extended to grasp the whole process of important life activities, showing a distinct progressive feature.

The funding scope of theFiscipline mainly includes: structural biology, molecular biophysics, cell sensing and environmental biophysics, physical biology, protein, peptide and enzyme biochemistry, sugar and lipid biochemistry, nucleic acid biochemistry, inorganic biochemistry and environmental monitoring, biological process and metabolism, etc.

Considering the contents of applications received in the recent years, fields with more applications and approved grants include structural analysis and function of biomolecules and complexes, interaction of biomacromolecule, biochemistry of protein and poly peptide, biochemistry of enzyme, modification of biomacromolecule, etc., whereas the applications and researches in environmental biophysics, physical biology, systems biology, environmental biochemistry, glucose and lipid metabolism and regulation are less funded in terms of the number and quality of applications. The Discipline encourages applicants to apply heavy metal pollution, ionization and electromagnetic radiation, etc..

The Discipline encourages cross-disciplinary researches on biophysics and biochemistry, especially the application of new theory, disruptive ideas as well as novel technology to understand life activity from a different angel. In order to further

encourage the researches with original scientific significance and respond to the national needs, theDiscipline will give appropriate preference to the projects within the categories of "encouraging exploration, highlighting originality" and "demand traction, breaking through bottlenecks".

Special reminder to applicants: Applicants need to correctly select the secondary code ; For high-resolution imaging, biomolecular labeling and other instrument investigation projects, please select the corresponding application code of molecular biology and biotechnology. For projects related to molecular modification of biomaterials, please select the corresponding application code of biomaterials, imaging and tissue engineering.

Biomaterials, Imaging and Tissue Engineering (C10)

TheDiscipline is a branch intercrossing of life science with other research areas，with clear feature which is demand orientation and cross disciplinary interaction. The funding scope covers biomechanics and biorheology, biomaterials and biological effects, tissue engineering, tissue regeneration and artificial organs, biological imaging, electronics and probe, bionics and artificial intelligence, nano-biology and biomedical engineering and technologies, etc.

The application and approval in 2022 showed that in biomechanics and biorheology field, studies on cell-molecular biomechanics, musculoskeletal tissue and motor system biomechanics, blood circulatory system biomechanics and biorheology, oral and maxillofacial biomechanics and other biomechanics programs were rare; the field of biomaterials increased rapidly, which currently focused on biomaterials and advanced manufacturing, material-body interaction, biomaterials and tissue regeneration, slow-release materials and materials biology; in the field of tissue engineering, most projects focused on bone, cartilage, cardiovascular and other research directions, but there were few applications on complex tissue and organ bionics construction, and artificial organs; there were few applications in bioimaging and bioelectronics fields; in the field of nano biology, nano carriers and deliverywere dominant, while only a few studies were proposed on nano-bio detection, nano-bio safety evaluation or nano technology; in addition, there were few applications for bionics and artificial intelligence, new technologies and methods of biological and medical engineering.

TheFiscipline encourages applications to carry out cutting-edge and multidisciplinary research in fields of biomechanics and biorheology, biomaterials,tissue engineering, bioimaging and bioelectronics, bionics and artificial intelligence, nanobiology, as well as new technologies and methods for biological and medical engineering. Researches should aim at key scientific questions in tissue and organ repair and regeneration, biological imaging and nano diagnosis and treatment, cross-scale tissue and organ biomechanics, biomaterial and body interaction; the novel methods and new technology of biomedicine, and use the principles and

technologies of tissue engineering to explore the basic research of disease pathogenesis and treatment.

Special notes for applicants: biomaterial and bionic research other than biology/biomedical applications is excluded in theDiscipline.

Molecular Biology and Biotechnology (C21)

Molecular biology is a discipline to clarify the essence of life phenomena at the molecular level. Biotechnology is a subject aiming at research, development and application of biological technology and methodologies, providing novel powerful techniques and methods for the research and understanding of life sciences. The outstanding feature of molecular biology and biotechnology is the interdisciplinary integration of biology, physics, chemistry and computer science, providing original exploration and source innovation for technology breakthrough and method innovation. The subject analyzes and processes the existing knowledge, intergradations of the life system, and finally provides potential solutions for breaking through the related technology bottleneck.

Funding scope of the Discipline includes: basic theories of frontier technology including pilot theories and principles in the field of molecular biology and biotechnology; synthetic biology and biological transformation technology; biomics technology; generic biotechnology; cross fusion biotechnology; applied biotechnology; disruptive biotechnology, etc.

In the recent years, most projects focus on synthetic biology, histology technology, gene editing and biomolecular manipulation and application of biotechnology, while there are still short of researches on molecular biology, biomolecular detection technology, protein and vaccine engineering, single molecule and single cell technology, stem cell and tissue engineering, biological imaging, artificial intelligence biology, cutting-edge biotechnology, reagent development and new instrument development.

In 2023, the Discipline will continue to support interdisciplinary and original studies, encourage applicants to carry out new technology, new methods and new application research in the fields of synthetic biology, gene editing, *in situ* and *in vivo* analysis of bio-molecules, single molecule and single cell analysis of complex systems, multi-scale multi-model imaging, experimental automation technology, bio-molecular delivery technology, omics technology and artificial intelligence.It should be noted that sugar related research is the current technical bottleneck of life science development. TheDiscipline will continue to encourage applicants to carry out principle exploration and technology research and development in this field, and will give it appropriate preference. Meanwhilegreat importance will be attached to the subject focuses on the development of reagents and new instruments related to basic research of life science.

Division of Environment and Ecology

The Division supports researches in areas of ecology, and forestry and grassland science.

Ecology (C03)

Ecology studies the interaction between organisms and other organisms or environment. It plays a pivotal role in solving the national ecological issues which are increasingly important.The scope of funding includes basic and applied basic research in the fields of ecological theory and methods, behavioral ecology, physiological ecology, population ecology, community ecology, ecosystem ecology, landscape and regional ecology, global change ecology, environment and biological evolution, pollution ecology and restoration ecology, soil ecology, conservation biology, sustainable ecology, etc.

In the recent years, significant progress has been achieved in ecological studies in China. Ecology in China has made important progress in the fields of system construction and monitoring of field observation stations and experimental platforms, ecosystem response to global change, protection of important biological groups, etc. However, from the perspective of project applications accepted in 2022, the development of each subdiscipline branch is imbalanced: there were more applications in the fields of ecosystem ecology, soil ecology, global change ecology, pollution ecology and restoration ecology, community ecology etc., whilethere were short of applications in the fields of ecological theories and methods, sustainable ecology and behavioral ecology, etc. Some of the applicants had inaccurate understanding of the classification of scientific problems (especially the “encouraging exploration and highlighting originality”category).

In 2023, facing the forefront of ecological research, the Discipline will further give priority to support long-term field observation and research, application of new technologies and interdisciplinary integration, integration and analysis of ecological big data, ecological research based on carbon neutrality goals. It will be encouraged to carry out research in biodiversity and ecosystem functions, ecological security, natural ecosystem protection and restoration, and support the development of ecological research on evolutionary ecology and adaptation, ecological model and ecological prediction, ecological effects and mechanisms of pests and infectious diseases, urban ecology, regional sustainable development, etc.

In 2023, applicants need accurately grasp the connotation of the four categories of scientific issues, provide accurate information of the academic contribution, highlight the research focus and moderate content, pay attention to the scientific feasibility of the technical route, research methods and data processing, and strengthen the satisfaction of the national needs.

Forestry and Grassland Science (C16)

Forestry and Grassland science is to reveal the essence and mechanisms of the biological phenomena by taking forest and grassland as research objects. The scope of funding includes: grass germplasm resources and genetic breeding, grass cultivation, protection and utilization, wood physics, forest product chemistry, tree biology, forest soil science, forest cultivation, forest informatics and forest management, forest protection, forest genetic breeding, economic forestry, landscape architecture, desertification and soil and water conservation, bamboo science.

In the recent years, the fields of landscape architecture, forest product chemistry, grass cultivation, protection and utilization have developed rapidly, whereas the project of homologous cloning and heterologous function verification in forest genetic breeding is mostly following research.The studies of forest product chemistry and wood physics are lack of novel theories and methodology to promote industrial development. In 2022, the number of proposals submitted to branches including landscape architecture, forest genetics and breeding, grass cultivation, protection and utilization, forest product chemistry and wood physics is large, while there were fewer applications to the sub-disciplines includingforest soil science and bamboo science. Some of theapplicants had inaccurate understanding of the classification of scientific problems (especially the “encouraging exploration and highlighting originality”category).

In 2023, the Discipline will keep focusing on the national major needs, continue to vigorously promote the development of basic research on forest and grass cultivation, protection and resource utilization; give priority to continuous long-term field research; focus on supporting conventional genetic breeding, formation and maintenance mechanism of mixed forest, relationship between forest management measures and wood properties, grassland utilization and interference mechanism, restoration and function improvement of degraded grassland.The Discipline will encourage the researches on the genetic transformation and gene function verification system of model tree species, the mining and innovation of forest and grass germplasm resources, and vigorously support the economic resources and utilization under the forest, the prevention and control of major forest disease and insect pests, forage cultivation, storage, processing and utilization.

In 2023, applications should accurately grasp the connotation of the four categories of scientific issues, provide accurate information of the academic contribution. TheDiscipline doesn’t accept theapplications in the following fields : (1) proposals on pharmaceutical functional verification of effective components using animals as research objects; (2)research and development projects for forestry machinery, wood cutting tools, road and bridge design, forest engineering machinery and equipment, forest engineering and civil construction in forest areas; (3) projects in the forest product chemistry field

without forest biomass research; (4) projects in landscape architecture field should based on forest and grass resources.

Division of Agriculture and food sciences

The Division covers two disciplines: basic agriculture and crop sciences, and food sciences.

Basic Agriculture and Crop Science (C13)

The Discipline of basic agriculture and crop sciences mainly supports basic and applied basic research on crops and their growing environment, aiming at the major needs of national agriculture to carry out basic research with prominent features of "demand traction, breakthrough bottleneck".To implement the strategy of "storing grain in the ground and technology" and strengthen the basic research of crop seed industry, the research fields, which theDiscipline needs to focus on, include: the excavation and innovative utilization of crop germplasm resources, the formation, regulation law and environmental adaptability of excellent traits of crop germplasm, genetic control network of important traits of main crops, crop genome, the theory and method of molecular design breeding, and crop yield potential mining, cultivation physiological mechanism of quality improvement and resource efficiency collaborative improvement, crop germplasm resources research.

It is reflected from the applications in 2022 that there was a climbing number of proposals with basic issues on topics meeting the national demand of agriculture, an obvious increase in interdisciplinary studies around basic agricultural issues. However, some major problems remain as the following: (1) In the basic field of agronomy, many projects lack the combination of agricultural informatics, agronomy and agricultural machinery, agricultural biological system engineering and agricultural biology, and the scientific problems and application objectives are not clear; (2) Following-up work with the international frontier is increasing, but it should be performed in close combination with practical issues of our national agricultural production, so that to provide potent support of basic research to applied research; (3) There were relatively large number of applications on researches on crop genome and genetic function based on sequencing are generally concerned, but more attention is yet to pay on further exploration of the key genes regulating traits and their natural variation in crop genetics and breeding; (4) Some projects have weak foundation in the early stage, and the research work is not systematic and sustainable, so in-depth and long-term research on essential scientific issues cannot be carried out; (5) Some proposals are not standardized with accurate information, especially in the part of representative publications.

The Discipline encourages applicants to condense scientific issues from the

reality of agricultural production in China; encourages the close combination of current biotechnology, information technology, intelligent equipment technology and crop production to carry out interdisciplinary research; encourages the development of germplasm resources mining and innovative research by using new technologies and methods; focuses on the research of agronomic characters suitable for mechanized production and encourages the development of high-yield, light cultivation and resources around crops and industrialized application of biological breeding; encouragescrop cultivation regulation and tillage system.

Applications in the subdiscipline of basic research of Agronomy (C1301, C1302 and C1303), only studying agricultural materials, agricultural machinery and facilities will not be accepted; The Discipline of Agricultural Biosystems Engineering (C1303) does not accept the application of taking livestock, poultry, aquatic products and other agricultural animals as the research object. In the field of crop science research (C1304 ~ C1312), crops should be taken as the research objects, and applications with horticultural crops, trees, forages and lawn grasses, medicinal plants and traditional Chinese medicine, model plant Arabidopsis, etc. as the research object are not accepted.

Food Sciences (C20)

The Discipline of Food Sciences mainly supports basic research in food biology, food chemistry, food safety and quality with food and its raw materials as the research objects.In the recent years, the Discipline focuses on the following research fields: the selection, regulation and fermentation of food microbial strains with independent intellectual property rights; the preparation of food enzyme expression system and food enzyme engineering; the changing and interaction mechanism of food nutrient components and their processing process; the biological basic research of organic food processing and comprehensive utilization; the regulation of food storage and transportation as well as post harvest quality control mechanism; formation mechanism, detection methods and control mechanism of food harmful substances; food authenticity detection and traceability; and separation, analysis and formation mechanism of food flavor substances.

In 2022, the number of projects focusing on the actual scientific problems of food processing and manufacturing in China increased, and the trend of carrying out interdisciplinary research on food production is obvious. Major problems existing in proposals include: (1) There were lack of projects to put forward and refine scientific problems according to the bottleneck of food production in China; (2) Some projects focused on product development, while pay more attention should have been paid to the scientific problems behind the industrial bottleneck; (3) Many food inspection applications focused on detection methods, and ignored the impact of food matrix and practical application goals; (4) Some projects followed the international research hotspots one-sidedly, especially for food nutrition and food detection, but without

consideration of the actual needs of Food Science in China; (5) Some applications in food components and nutrition, food and intestinal miscrobiota were not closely related to food and beyond the funding scope of Food Sciences; (6) Some proposals were not standardized with accurate information, especially in the part of representative publications.

In 2023, the Discipline willcontinue to encourage projects facing major national strategic needs, close to the scope of funding, with condensed scientific issues from the actual food production, especially the key technical issues that restrict the food processing and manufacturing in China. It is encouraged to adhere to the guidance of scientific issues, and attach importance to traditional Chinese food, special food and food quality and safety. Applicants are encouraged to focus on interdisciplinary research with food science as the main interest, integrate new theories, methods and technologies of other related disciplines, and analyze key scientific issues of food science in China.

The Discipline does not accept the following applications: (1) research on disease treatmentand drug development, and clinical trials with human; (2) research on product development of health products and medicines; (3)research on the growth, development and metabolic physiology of animal and plant cultivation and aquaculture.

Division of Agricultural Environment and Horticulture

The funding scope of the Division covers two disciplines: plant protection, horticulture and plant nutrition.

Plant Protection (C14)

Plant protection is a subject that studies the biological characteristics, occurrence regularity and disaster mechanism of crop diseases, insects, grass and rats, and carries out technological innovation on this basis to establish green control strategies for pests.Research on plant protection should meet the major national needs of agricultural production. The Discipline covers basic and applied researches in plant pathology, agricultural entomology, crop immunity and resistance, agricultural weeds, agricultural rats and other pest, plant chemical protection, biological prevention and cure, new techniques of plant protection, crop and biological factor interaction, and ecological regulation etc. Recently, the development trend of plant protection is the use of current biological theory, technology and big data to deeply reveal the rule of pest disaster and the mechanism of pest's virulence and crop resistance; application of the principles and methods of ecology to establish and improve the capacity of agricultural production, protection the biological diversity, prevention of environmental pollution, and sustainable pest management with high efficiency, low

poison, and environment-friendly property, etc.

The following problems existed in the 2022 applications: (1) The topic selection failed to better enhance the independence, autonomy and security of China's agricultural development;(2)Some applications are not innovative enough; (3)The scientific problems of some applications are not concise enough, and the research content is not focused; (4) The writing of a few applications was not rigorous and standardized.

In 2023, the Discipline will continue to encourage the following fields: as for research contents, it is encouraged to carry out explorations of the reciprocity mechanisms of crop-pest-environment (biotic and abiotic) at either microscopic or macroscopic level; mining the molecular markers of disaster of hazardous organisms; resistance of crop pests and sustainable application of biological breeding; the creation and scientific use of green pesticides, and the sustainable prevention and control of harmful organisms. Special attention should be paid to new scientific issues, combining with the factors of the national crop of ecological features of different regions, to study the adjustment of industrial structure, improvement of cultivation measures, and the global climate change, etc.. As for the research approaches, emphasis should be on the combination of new theory and new technologies with traditional methods, as well as integration of laboratory work with field experiment. For interdisciplinary studies, the specific aim of solving major scientific questions in the plant protection field should be elaborated.

Application to theDiscipline should focus on the research object of crop pests, and taking the prevention and control of pest hazards as the scientific goals, otherwise it will not be accepted. Applications taking woods or model organisms such as Arabidopsis and Drosophila as main research objects will not be accepted.

Horticulture and Plant Nutrition (C15)

The funding scope of theDiscipline covers two research subjects, namely horticulture and plant nutrition.

Horticulture studies germplasm resources and genetic breeding, physiology and cultivation of horticultural crops under natural conditions, as well as horticultural facilities and post harvest quality maintenance under artificial control.The funding scope of horticulture covers pomology, olericulture sciences, ornamental horticulture, horticultural facilities, tea science, post-harvest biology of garden crops and food mycology. In the recent years, there has been a rapid development of genome research in horticulture in China. Great achievement has been made in the study on the basis of trait formation of horticulture crops, regulating measures, gene mining and function identifying, germplasm excavations and innovation, mechanisms and control of quality formation, response mechanisms to adversity, mechanisms of root-stock-scion interaction, the formation and regulation of unfavorable components of

horticultural products.

Plant nutrition is the study of plant nutrition basis and fertilizer and nutrient technology management.The funding scope of plant nutrition covers the basis of plant nutrition, nutrient resources and recycling, manure and fertilizer science, nutrient management, etc. In the recent years, plant nutrition has made significant progress in the genetic mechanism of plant nutrition, nitrogen and phosphorus recycling and efficient utilization of soil plant system, and the creation and application of new fertilizers.

In 2022, common problems in both horticulture and plant nutrition lay in the following aspects: There were short of scientific issues based on national practice and industry development;There were a large number of proposals pertaining to copying and following research. Major problems with the Ddiscipline of horticulture is that some projects relied too much on high-throughput technology and molecular biology research methods, not closely related to horticultural biological problems, and lack of biological significance mining for genomic data; Researches of high quality are not comprehensive enough; Research on the interaction between horticultural crops and the environment needs to be strengthened.Major problems with the Discipline of plant nutrition lay in the followingaspects: insufficient research on nutrient synergistic optimization; insufficientresearch on green new fertilizer; The research on plant nutrition of commercial crops needs to be strengthened; There were few research projects on water fertilizer coupling mechanism.

In 2023, the Discipline will continually encourage to concentrate scientific issues based on frontiers of the discipline and the needs of national industry development. Funding priority will be given to original, continuous and systematic and distinctive researches. The Discipline of Horticulture will support proposals which aim at green, high-quality and efficient variety creation, cultivation technology innovation and post harvest quality maintenance of horticultural crops; actively support the exploration and utilization of excellent germplasm resources with wild and local characteristics; pay attention to the diversification of quality traits and the interaction between horticultural crops and environment; encourage basic research on horticulture application that can guide production practice. The Discipline of Plant Nutrition encourages the researches on crops and cash crops; actively supports projects in the fields of "fertilizer and fertilization" and "nutrient management"; encourages the development of green new fertilizers, pollution reduction and other application basic research related to industrial demand, and promotes the balanced and coordinated development of plant nutrition in all branches.

Applications using forest or model plant like Arabidopsis as research objects will not be accepted in theDiscipline. Application of medical health research will not be accepted in theDiscipline.

Division of Agriculture Animal

The funding scope of the Division covers three disciplines: animal husbandry, veterinary sciencesand aquatic sciences.

Animal Husbandry (C17)

Animal husbandry is a discipline which studies the germplasm resources, genetic breeding and reproduction, nutrition and feed of livestock and poultry (including special economic animals), behavior and welfare, breeding environment and facilities.

Applications received and funded in 2022 covered all branches of this discipline, among which, there were more proposals in fields of animal genetics and breeding, animal reproduction, animal nutrition and feed science, whereas fewer in animal husbandry foundation, animal germplasm resources, animal behavior, intelligent breeding, and beekeeping, etc.,and imbalance of applications in some secondary codes is more prominent. Peer review and evaluation of project indicated that the innovation of academic ideas has been improved overall, and the characteristics and advantages have been formed in animal genetics and breeding and animal nutrition. However there are still some obvious shortcomings, including the inaccurate understanding of the four categories of scientific problems, some projects blindly following the research hotspots and new technologies, and the refinement of specific scientific problems remained to be improved; not enough attention paid to focus on major national needs and some project topics were out of touch with the actual problems of animal husbandry production, failing to aim at solving the basic questions behind the bottleneck of animal husbandry production technology.

In 2023, the applicants are expected to accurately understand the attributes of the four categories of scientific problems and continue to carry out original, systematic and continuous research guided by national strategy and industrial demand. The Discipline will continue to encourage research on the evaluation and utilization of germplasm resources in livestock, poultry, silkworm and bee resource, the discovery of excellent genes, regulation mechanism and important scientific issues related to breeding of good breeds; encouragethe basic research on germplasm resources, genetic breeding, reproduction, nutrition and feed of livestock and poultry, especially large animals. Appropriate support should be given to the research on animal husbandry foundation, environment and health of livestock and poultry, facilities and equipment of livestock and poultry and bee and silkworm breeding, behavior and welfare, companion animals such as dogs and cats.

Special notes for applicants: Research objects should be livestock, poultry, grass, silkworm, bee, etc.; Interdisciplinary studies with other subjects are not

allowed to depart from the main research interests above, otherwise the proposals will be not accepted.

Veterinary Science (C18)

Veterinary science is to study the occurrence, development, diagnosis, prevention and cure of animal diseases. The discipline covers the following fields: animal diseases, zoonoses, public hygiene, laboratory animals, veterinary medicinal industry, etc., and other related novel interdisciplinary research areas.The discipline supports basic researches taking animal diseases as major objects on animal infectious diseases, zoonoses, most common diseases and comparative medicine.

Proposals received and funded in 2022 covered all subjects of theDiscipline. Among them, the majority of applications focused on veterinary virology, veterinary immunology, veterinary pharmacy. The number of applications of the newly established subdiscinpline on zoonosisi, animal and pathogenic microorganism transmission was relatively few. Some applications were able to aim at the international frontiers, highlight the creativeness in the selection of their research themes, and actively promote the international standard of research work. However, problems still existed: Some applications paid much attention on the international hotspot, but were lack of enough concentration of scientific issues; There was not enough attention paid to the research on the major national needs. Veterinary science is based on the national strategic needs of animal health, food safety, public health, human health and environmental and ecological security. The Discipline will continue to encourage studies on the epidemiology, pathogenic biology, pathogenesis and cross species transmission mechanism of important animal epidemic diseases and zoonoses, meanwhile strengthen researches on the veterinary pathology, veterinary public health, basic veterinary immunology and Chinese veterinary medicine.

In 2023, applicants are expected to accurately understand the attributes of the four categories of scientific problems. It is required that the application aiming at preventing and controlling animal diseases and ensuring animal health and public health safety, and interdisciplinary studies should not deviate from the research objects. TheDiscipline encourages innovative research on new, recurrent and potential animal diseases facing major industrial demands.

Special notes to applicants: For applications involving highly pathogenic microbes, all the operations must strictly abide by the relevant provisions of the state, with the biological safety of the appropriate conditions. Projects involving animal experiments shall comply with the relevant provisions and requirements of national animal ethics and welfare.

Aquatic Science (C19)

Aquatic science is to study basic rules of the development, growth, breeding, genetics, behavior, physiology and immunology of aquatic organisms and their

breeding ecology, breeding engineering, nutrition and foodstuff, control of diseases and pests, and the protection and utilization of aquatic resources, etc.

In 2022, most of proposals received and funded were in areas of immunology and disease control of aquatic organisms, basic biology of aquatic organisms, nutrition and feed science of aquatic animals, genetics and breeding of aquatic organisms, etc., whereas there were few applications in aquaculture ecology and engineering. It can be seen from peer review and panel meetings that the creativeness of academic thoughts of proposals were obviously improved. Relatively in-depth studies conducted on important economic traits of aquatic animals, molecular characters of important pathogens and their pathogenesis, etc.. However, only a small portion of applications were able to propose original research on the important scientific issues of aquiculture, whereas for most of the studies, concentration of specific scientific questions needs to be improved.

In 2023, the applicants are expected to accurately understand the attributes of the four categories of scientific problems and continue to carry out original, systematic and continuous research guided by industrial demands. The Discipline will request applicants to focus their studies on research fields of aquatic science, and aim at the frontiers and important demands of production. The interdisciplinary studies on aquaculture subjectively with other disciplines will be encouraged. It will be strengthened to support proposals with original ideas. Applicants should choose topics based on new development of subjects concerned at home and abroad, and their research background, aiming at scientific questions, focusing on original innovation, and avoiding over emphasis on R&D of technology while lacking of key scientific issues. Research on model organisms should be based on aquaculture sciences. The Discipline will encourage cooperation of applicants with superior units and teams, so as to fully exert regional and resource priority, and enforce cultivation of talents. The Discipline will prioritize applications in the following areas: genetic rules and gene function of economic traits of important breeding organisms; epidemiology and pathogenesis of important aquatic organisms; host immunity and diseases prevention and treatment; molecular basis and regulation mechanisms of breeding and development of important aquatic organisms; regulation mechanisms of the utilization as well as metabolism of nutrient stuffs for aquatic animals. Moderate support will be provided in the following areas: basic research on interaction with eco -environment, conservation of aquatic resource, new models and new techniques of breeding, etc.

Department of Health Sciences

The Department of Health Sciences adheres to target the global science frontiers, serve the main economic battlefield, strive to fulfill the significant needs of the

country, and benefit people's lives and health. It mainly supports basic research that aims at scientific issues in disease prevention, control and treatment, and focuses on the structural, functional, developmental, genetic and immune abnormalities of human body, as well as the occurrence, development, outcome, diagnosis, treatment and prevention of disease. It also supports researchers to conduct innovative research in basic medicine, clinical medicine, preventive medicine, material medica, pharmacology, Traditional Chinese Medicine, Chinese Materia Medica and interdisciplinary fields of medicine and engineering, so as to improve the levels of medical scientific research in China.

The Department encourages research areas as follows: innovative academic questioning and methodological research on the scientific issues emerging from clinical practices; systematic and original research on key scientific issues; translational medical research combining basic medicine with clinical medicine; integrative medical research on the occurrence, development and regression of diseases at multiple levels from molecular, cellular, tissue level to organ, individual and population level by using new multidisciplinary and comprehensive techniques or methods; interdisciplinary research integrated in other fields; substantive international joint research. The Department will give priority to funding basic research on major diseases, public health emergencies and newly emerging infectious disease, and common and frequently occurring diseases. The Department will also highlight research in distinctive fields, support relatively weak research fields, and ensure balanced, coordinated and sustainable development in all fields.

Instructions:

1. Specific instructions for applicants

(1) Applicants are encouraged to perform in-depth basic research toward scientific issues, especially the original research. Applications with solid previously accumulated research work are encouraged to carry out further research. Applications merely pursuing new high-technology, or research hotspots rather than scientific innovation will not be in consideration for grant.

(2) Applicants are expected to elaborate the scientific and potential clinical values of the anticipated research results in detail. Applicants are suggested to propose a defined scientific issue or a specific hypothesis based on analysis of the relevant latest research trends and progress in the field. Furthermore, elucidation of theoretical and applicable value of the research is clearly warranted.

(3) Applicants are expected to elaborate whether the proposed research will possibly solve the specific scientific problems or verify the hypothesis, and the proposed research is supposed to be specific, feasible and logical. Furthermore, applicants are expected to propose adequate research contents, detailed research designs, clear research methods and reasonable budgets.

(4) Applicants are expected to provide detailed information about relevant previous research. In case of extension of previously funded project, the innovative

ideas and further scientific issues of research are expected to be elaborated in detail. Besides, all the relevant published papers are expected to be listed, and relevant unpublished results including experimental data, tables or graphics, etc., are suggested to be provided.

(5) Applicants are expected to provide accurate and reliable information in their applications, including resumes of the applicant and major participants, previous grant information and relevant publications. Applicants are expected to write the applications carefully according to the relevant instructions in a scientific and truth-seeking attitude. The published academic papers should be filled in according to the instructions and outlines of the application form. Patents and awards should also be listed according to the format and requirements of the application form.

(6) Applicants are expected to provide a signed institutional certification or approval (the scanning copy should be attached to the electronic proposal) to meet the related ethical or informed consent requirement. Applications that do not provide certification or approval as required above will not be considered for funding.

(7) Applicants are expected to follow all appropriate guidelines for the use and handling of pathogenic microorganisms, including the guideline "*Bio-safety Administrative Rules of Pathogenic Microorganism in Lab*" released by the State Council of China and the ethical and bio-safety regulations by other governmental agencies. If applications were involved in human genetic resources, applicants should strictly follow "*Regulations on Management of Human Genetic Resources*". Additionally, a commitment letter to guarantee bio-safety should be provided by the research institutions when applications were involved in the study of highly pathogenic microorganisms. Applications that do not provide certification or approval as required above will not be funded.

(8) Further emphasis will be placed on the late-stage management of funded projects, such as performance assessment, continuous funding for systematic and continuing research projects, etc. Applicants with good scientific reputations in their previous grants will be given priority under equal conditions.

(9) Applicants are expected to notice that: in 2023, the Department will generally give no further funding for General Program to applicants who either have got intensive funding in 2022 from NSFC [such as Key Program, Key International (Regional) Joint Research Program, International (Regional) Cooperation Programs under Agreements/MoUs, Major Program, Key Program or Integrated Programof Major Research Plan or Programs of Joint Funds, Special Fund for Research on National Major Research Instruments], or are applying for repetitive or similar research to their ongoing national scientific projects funded by other governmental agencies.

1. Overview of applications in the Department in recent years and instructions to host institutions

The number of applications has been increasing in the Department ever since its

establishment. In 2022, the number of applications was 90,532 from 1109 research institutions, accounting for 29.52% of the total applications (306,681) in NSFC, including 33,976 applications for General Program which account for 29.15% of the total applications (116,561), 42,458 applications for Young Scientists Fund which account for 32.86% of the total applications (129,193), and 8,654 applications for Fund for Less Developed Regions which account for 35.61% of the total applications (24,300). Rapid growth in applications brings great difficulty for peer review and administration of the science funds. To enable the healthy, stable and sustainable development of both NSFC and medical research in China, the research institutions are required to further strengthen their management in the process of NSFC grant applications, and make efforts to further improve the scientific quality of applications (rather than increasing the number of applications) under the guidance of "*Requirements of NSFC for Host Institutions to Improve Management of Scientific Projects*".

1. Specific explanations on application codes

The application codes of the Department are composed of 35 primary application codes (H01 to H35) and their corresponding secondary codes. The basic characteristics of the application codes system are as following: 1 The primary application codes, which are mainly arranged in the order of organs or systems, addressing scientific issues, integrating basic medicine and clinical medicine, and putting the common scientific issues of each "discipline" and "department" into one application and review system. 2 The secondary application codes, which are arranged in the order from basic to clinical research and from structural, functional and developmental abnormalities to diseases, and give considerations to disease related basic research.

The applicants are expected to carefully choose the primary application code and the relevant secondary one.

Special instructions for applicants are as follows:

The Department of Health Sciences sets up the Oncology Discipline separately. Please select the corresponding secondary application code under Oncology (H18) for all kinds of tumor-related medical scientific researches except for hematological tumor, epidemiology of tumor, oncological pharmacology, medical imaging of tumor and Traditional Chinese Medicine oncology. The applications on hematological tumor should be submitted to the corresponding secondary application code under Hematological System (H08); The applications on tumor epidemiology should be submitted to the Epidemiology of Noncommunicable Diseases (H3010); The applications on oncological pharmacology should be submitted to Anti-tumor Pharmacology (H3505); The applications on medical imaging and biomedical engineering of tumor should be submitted to the corresponding secondary application code under Medical Imaging/Nuclear Medicine (H27) and Biomedical Engineering/Regeneration Medicine (H28); The applications

on Traditional Chinese Medicine oncology research should be submitted to Traditional Chinese Medicine (H31), Chinese Materia Medica (H32), or Integrated Chinese and Western Medicine (H33).

The field of Radiation Medicine (H29) mainly covers the research of radiology pathology, protection, and non-oncology radiotherapy, and does not fund applications of radio diagnostics and oncology radiotherapy. For the applications of radio diagnostics, please select the appropriate secondary application code under Medical Imaging/Nuclear Medicine (H27). For the applications of tumor radiotherapy, the application code (H1816) should be selected.

The field of Gerontology (H19) only funds research on the pathogenesis and intervention of diseases related to the mechanisms of aging. Applications that focus on aging of single organ or system, and gerontology researches that do not involve pathophysiological mechanisms of aging should be submitted to other proper divisions.

Applications that focus on neonatal diseases should be submitted to Reproductive System/Perinatology/Neonatology (H04). For other scientific issues in pediatrics, application code of the corresponding system should be selected.

Applications that focus on sexually transmitted diseases should be submitted to the application code (H2208) under Human Pathogens and Infections (H22).

1. Funding plan and budget

The applicants are expected to prepare the budget reasonably according to their actual needs and fill in the funding budget table accordingly.

1. Special Projects of General Programs: guidelines for "Exploration of Scientific Problems Derived from Clinical Practice"

The aim of the Special Projects of General Programs "Exploration of Scientific Problems Derived from Clinical Practice" is not only targeting major medical scientific issues and original innovations, but also focusing on promoting translational medicine research that applying the achievements of basic research to clinical practice and people's life and health. Based on clinical practice, it is of great value to innovate research methods, carry out research on the occurrence, development, diagnosis, prevention and treatment of diseases, discover and explain new mechanisms, improve the level of medical innovation, promote the translation medicine, and improve the funding pattern of medical research.

The Department encourages the combination of clinical practice and basic research, the interdisciplinary research and the innovation of clinical research methods. In 2023, the Special Project of "Exploration of Scientific Problems Derived from Clinical Practice" in General Programs will continue to be programmed, with about 80~100 projects be funded and an average funding amount of 700,000 yuan in direct cost.

The following research are to be supported: ①important scientific issues derived from clinical phenomena or clinical questions, utilizing clinical tissue samples and

clinical information and other resources to carry out basic research that has important guiding significance for disease diagnosis, treatment and prevention;②clinical translational exploratory research based on the innovative results obtained from previous basic research;③exploring the new paradigm of clinical research, and establishing novel techniques and methods for clinical translational research.

In 2022, a total of 1, 485 applications were received for this Special Project. After the peer review and group committee discussion, 80 projects which met the guidelines were funded with 700,000 Yuan each. According to the overall applications accepted during the past two years, the common inadequacy of proposals that fail to comply with the guidelines includes: ①lack of innovation with the scientific issues merely summarized from publications rather than clinical practices; ②insufficient value for clinical translation with the results of previous research not having the potential for translational medicine research. ③lack of rigorous clinical study design or high-quality preliminary data.

Funding in Department of Health Sciences in 2022

Unit: 10,000 Yuan

Divisions		General Program			Young Scientists Fund			Fund for Less Developed Regions		
		Projects	Direct cost	Success rate (%)	Projects	Direct cost	Success rate (%)	Projects	Direct cost	Success rate (%)
I	Respiratory system, circulatory system, hematological system	536	28,158	15.67	559	16,700	13.40	106	3,500	12.99
II	Digestive system, urinary system, endocrine system, metabolism, and nutrition support, ophthalmology, otorhinolaryngology head and neck science, oral and craniomaxillo-facial science	657	34,271	14.77	747	22,250	12.39	118	3,877	11.47
III	Nervous system, mental health and psychological health, gerontology	436	22,861	14.63	447	13,380	12.45	65	2,118	9.19
IV	Reproductive system/perinatal medicine/ neonatology, medical immunology, medical genetics	281	14,699	14.91	315	9,350	12.69	43	1,424	10.29
V	Special medicine, forensic medicine, medical imaging/nuclear medicine, biomedical engineering/regenerative medicine	269	14,134	13.41	287	8,580	10.56	37	1,226	10.42
VI	Locomotor System, emergency and intensive care medicine, trauma/burns/plastic surgery, rehabilitation medicine, medical virology and virus infection, human pathogens and infections, laboratory medicine	439	22,962	12.63	469	14,010	11.22	88	2,880	10.16
VII	Oncology (hematological system not included)	883	45,996	13.02	1070	31,930	12.83	157	5,175	10.15
VIII	Dermatology, radiation medicine, preventive medicine	257	13,325	16.98	282	8,440	15.06	56	1,932	14.70
IX	Materia medica, pharmacology	277	14,436	16.13	370	11,070	17.35	64	2,121	13.45
X	Traditional Chinese medicine, Chinese materia medica, integrated Chinese and western medicine	650	33,798	11.26	774	23,170	11.16	254	8,367	12.34
Total or average		4,685	244,640	13.79	5,320	158,880	12.53	988	32,620	11.42
Direct cost per project (10,000 Yuan/ project)		52.22						33.02		

In 2023, according to the research field, applicants should independently choose the secondary application code under the primary application codes of H01～H35, and indicate "Exploration of Scientific Problems Derived from Clinical Practice" in the annotated column of the application form. **The research should be in line with the above-mentioned three directions. Application that does not meet the guidelines and requirements will not be funded.** It should be clearly introduced in projects that the new phenomenon of clinical discovery or the new discovery that can be transformed into clinical practice from the previous basic research, the originality and innovation of the research, and its potential and importance for clinical usage, and the protection of independent intellectual property rights. This Special Project does not fund clinical trials being carried out by hospitals and enterprises. For projects involving clinical research, the host institution should be qualified as a drug clinical trial center. The applications for the Special Projects are limited to the General Program.

Division I of Health Sciences

The Division mainlysupportsbasic research in the fields of respiratory, circulatory and blood systems.

Respiratory System (H01)

The Discipline mainly supports basic and clinical-related basic research on the diseases of lung, airway, pulmonary circulation, mediastinum, pleura, thoracic cage, diaphragm and related diseases. The funding scope includes: respiratory system structure, function and developmental abnormalities (including pulmonary nodules); respiratory infections, inflammation and immunity; environmental factors and airway diseases; bronchial asthma; chronic obstructive pulmonary disease; bronchiectasis; pulmonary circulation and pulmonary vascular diseases; interstitial lung disease; acute lung injury and acute respiratory distress syndrome; sleep disordered breathing and breathing regulation; respiratory failure and respiratory support; pleura, mediastinum, thoracic and diaphragm related diseases; respiratory intervention, tracheal reconstruction and lung transplantation, etc.Research on new methods, techniques and research methods related to research on respiratory diseases are also within thefunding scope.

Respiratory diseases are common and serious diseases that seriously affect human health, and their etiology, pathogenesis, diagnosis and treatment have always been the key supported areas. The Discipline will continue to support studies of the occurrence, development and prognosis of respiratory diseases; support the research on imbalance of respiratory immune function, the pathological and physiological changes of airway and lung, the lung microenvironment, alveoli and air-blood barrier,

lung nodules, lung stem cells and lung regeneration; support research on pulmonary hypertension and other pulmonary vascular diseases; support research on finding new methods, potential molecular markers and intervention targets for precise diagnosis and treatment of diseases. Research relating to theimpacts of environmental factors (such as fine particulate matter, harmful gases, smoke and allergens) on the pathophysiological changes of airway and lung, and the interaction between microbiota and respiratory diseases will also be emphasized.

Respiratory infections are receiving increasing attention, and the Discipline also encourages applicants to conduct research on demonstration of the interaction between pathogens and hosts,and their pathogenic roles to drive clinical outcomes.

The utilization of new techniques and methods plays an important role in promoting basic and clinical research in the respiratory field. The Discipline encourages applicants to use new techniques and methods, such as multi-omics analysis, big data, animal disease models, etc., to solve basic and clinical research questions in respiratory system.

Based on thestatistical data of accepted applications in the Discipline in 2022, research mainly focused on respiratory inflammation and infection, inflammation and immunity, bronchial asthma, acute lung injury and acute respiratory distress syndrome, interstitial lung disease, chronic obstructive pulmonary disease, pulmonary circulation and pulmonary vascular disease, etc.The number of applications focusing on sleep breathing disorders and respiratory regulation is steadily increasing, whilethe number of applications in other fields of respiratory system is relatively small. For research on lung nodules, the Ddiscipline only supports applications focusing on the occurrence, development, diagnosis and treatment of lung nodules, and does not accept applications on developed lung cancer and on related diseases that will potentially develop lung cancer.

Circulation System (H02)

The Discipline mainly supports scientific research related to various cardiac and vascular (including lymphatic vessels) diseases, as well as microcirculation and shock.In recent years, the largest number of applications was in the field of cardiac/vascular injury and protection, followed by atherosclerosis, coronary heart diseases, arrhythmia and heart failure. Applicants are encouraged to carry out original basic research, cooperating with clinicians, developmental and genetic biologists, regenerative medicine specialists and related disciplines to study the mechanisms in the development and therapeutic strategy of cardiovascular diseases. In the cutting-edge fields of cardiovascular diseases, researchers are encouraged to establish international collaborations, to propose innovative hypotheses based on their own research data, and eventually gain achievements with independent intellectual properties. Researches on the regulatory and damage mechanisms of the biological active substances on the heart and vessels are encouraged to find the potential

biomarkers for diagnosis, therapeutic targets and innovative treatment technologies. Studies on the molecular etiology, regulatory network and intervention targets of the metabolic disorder-related cardiovascular diseases are encouraged, and studies as to the effects of other systemic diseases on the cardiovascular system are also encouraged. Infectious cardiovascular diseases, immune-related circulatory system diseases, microcirculatory diseases, lymphatic circulatory diseases, and tumor-related cardiovascular diseases are still the relatively weak fields, and the relevant researches are encouraged. Studies on cardiovascular diseases in children, elderly and women in pregnancy as well as cancer patients will be prioritized. Researches and applications of new techniques, new methods and new materials in the cardiovascular field are endorsed. The basic researches for important clinical issues in the circulatory device implantation and perioperative period of cardiovascular surgery are encouraged.

Hematological System (H08)

The main funding areas of the Discipline comprise basic and clinical based basic research of hematopoietic tissues/organs, blood and its related diseases including hematopoiesis and its regulation and microenvironment; erythrocyte and its related diseases; leukocyte and its related diseases; megakaryocyte, platelet and their related diseases; bleeding, coagulation, fibrinolysis and thrombosis; aplastic anemia and bone marrow failure; myelodysplastic syndromes; myeloproliferative diseases; leukemia; lymphoma and lymphocytic diseases; myeloma and plasma cell diseases; infection associated with blood system diseases and its treatment; hematopoietic stem cell transplantation and its complications; immunotherapy and cell therapy for hematologic diseases; blood transfusion, blood regeneration and blood products; new researchtechnologies and methods for hematological diseases.

Hematopoiesis and its regulation, hematopoietic cell development and its abnormalities have always been the main fundamental research areas for hematology. Thus, the Discipline will continue to support basic research in the areas of hematopoietic stem/progenitor cells, hematopoietic microenvironment, blood cell heterogeneity, abnormal hematopoietic cell development and dysregulation, and studies of hematopoietic tissues and organs.

Diseases in hematological system are a category of diseases that severely affect the health of human beings. The etiology, pathogenesis, diagnosis and treatment have always been the main support focus in hematologic research fields. The Discipline thus will continue to encourage applicants to carry out etiology studies of hematological disease in basic and clinical-based basic researches related to genetic and epigenetic mechanisms of the blood system diseases; hematopoietic microenvironment and the development of hematologic malignancies; cellular metabolism in hematological malignancies; precision subtyping, diagnosis and treatment, drug resistance, disease reoccurrence etc.

More and more attention has been paid to immunotherapy in treating

hematologic malignancies. The Discipline thus adds a new application code: H0814 for “the immunotherapy and cell therapy for blood diseases” direction.It covers mechanisms of immunotherapy, therapeutic effectiveness and side effects. Any related basic and clinical-based basic researches may apply under this code.

Hematological ecology is a new concept proposed recently by scientists in China. It mainly refers to a balance of homeostasis in blood system under physiological condition after internal and external exchange of materials and energy. The formation of this homeostasis, maintaining mechanisms, and the prediction of major diseases when such balance is broken are the major focuses of the area. The Discipline encourages to follow the development of the field and to propose related applications.

The applications of new technologies and methods have greatly advanced the width and depth of hematological research. Thus, the Discipline strongly recommends applicants to propose researches that use new biotechnologies and methods to study normal or abnormal blood cells.

In view of the application numbers in various hematologic fields, grants were mainly under these three application codes: leukemia (H0809), lymphoma and lymphocytic diseases (H0810), and myeloma and plasma cell diseases (H0811). The applications under other codes are relatively few. Although infection in blood system is very common under clinical setting, the application is rare. The Discipline encourages applicants to propose studies in areas ofpathogenic infection and the occurrence of blood diseases, and infection during blood disease treatment.

There is an excellent researchfoundation in basic and clinical-based basic researchin thehematological fieldin China. Applicants are thus encouraged to make full use of the rich clinical resources in the field, to bring upimportant scientific questions derived from clinical problems, and to carry out the proposed researches, including translational medical research.

For projects involving research contents of pulmonary circulation and pulmonary vascular diseases in Division I, applicants shall choose the appropriate application code from the respiratory system (H01) and the circulatory system (H02) basedon their specific research direction.Division I does not support the applications of non-hematological malignancy projects. For details, please refer to the general introduction of the Department of Health Sciences.

Division II of Health Sciences

The Division mainly supports basic researches on digestive system, urinary system, endocrine system/metabolic abnormalities and nutritional support, ophthalmology, otorhinolaryngology, head and neck science, as well as oral and

craniomaxillofacial science.

Digestive System (H03)

TheDiscipline primarily supports studies on scientific questions regarding non-neoplastic diseases of digestive system.The supporting scopes are as following: digestivesystem textural abnormality, dysfunction and dysplasia; immune-related diseases;abnormal gastrointestinal motility;abnormal gastrointestinal homeostasis, mucosal barrier disorders and related diseases; gastric acid-related diseases and neuroendocrine dysregulation in digestive system; gastrointestinal and abdominal infectious diseases; liver metabolic disorders and related diseases; drug, toxin and alcohol-induceddigestive diseases; inflammatory and infectious liver diseases; liver injury, repair and regeneration; liver protection and artificial liver; cholelithiasis and biliary inflammation; pancreatic exocrine dysfunction and pancreatitis; digestive systemorgan transplantation; new techniques and methods for research in digestive diseases, etc.

The research areas of project application in digestive system in 2022are comparatively focused on liver diseases.Among them, thetopnumber of applications were projectson liver injury, repair and regeneration, followed by liver metabolic disorders and related diseases, as well asinflammatory and infectious liver diseases. As for gastrointestinal diseases,the top number of applications were projects on inflammatory bowel disease, followed by abnormal gastrointestinal homeostasis, mucosal barrier disorders and related diseases, as well as abnormal gastrointestinal motility. There were continuously increasingapplication onpancreatic exocrine dysfunctionand pancreatitis, whilethe application projects ongastric acid-related diseases and neuroendocrine dysregulation in digestive system,gastrointestinal and abdominal infectious diseases, as well ascholelithiasis and biliary inflammation were few. The Discipline encourages the basic and clinical research on the cutting-edge issues in the above-mentioned research fields, andalso encourages the studies on the interrelationbetween different organofdigestive system and the interaction with other systems, as well as the basic translational research according to the unmet medicalneeds of major digestive diseases in China.

Urinary System (H05)

This Discipline mainly supports non-tumor researches in relation of thestructural and functional disorders, injury repairs, etiologies, urolithiasis andurinary tract infections of the kidney, ureter, bladder, prostate and urethra.Supported areas include the structural, functional and development disorders ofurinary system, injuries and repairs of urinary system, primary kidney diseases,secondary kidney diseases, chronic kidney diseases and its related complications,hemodialyses and renal replacement therapies, kidney transplantations, urolithiasisand urinary tract infections, benign diseases of prostate and bladder, voidingdysfunction, new techniques and methods for

the study of urological diseases.

In 2022, the majority of the proposals are still concentrated on areas of the preventionand treatment of acute kidney injuries and chronic kidney diseases. The mostapplied research areas are injuries and repairs of the urinary system, followed bysecondary kidney diseases, chronic kidney diseases and its related complicationsand primary kidney diseases. The number of proposals related to new techniques and methods for the study of urological diseases is markedly increased compared to 2021,which shows that interdisciplinary research using new technologies and methods has further attracted researchers' attention.The number ofproposals related to injuries and repairs of urinary system, primary kidney diseases, secondary kidney diseasesis similar to that in 2021. The number of proposals related to urolithiasis and urinary tract infections has decreased slightly, the number of research applications for hemodialyses and renal replacement therapies is still small.The number of applications in voiding dysfunction, thestructural, functional and development disorders of urinary system is increased slightly compared to2021.However, the overall number of the above proposals is still small. Moreextensive and in-depth researches to these fewer application areas will beencouraged. Meanwhile, the sustainable and innovative researches in urinarysystem will be continuously supported in the future.

Endocrine System/Metabolic Abnormalities and Nutritional Support (H07)

This Discipline mainly supports researches on abnormalities of endocrine organ structure and/or function and relative non-neoplastic diseases. The Funding scope include endocrine system immune-related diseases, pineal gland, hypothalamus, pituitary and related diseases, thyroid, parathyroid and related diseases, adrenal gland associated diseases, gonads and related diseases, physiological regulation and dysfunction of islets, imbalance of glucose homeostasis and insulin resistance in target organs, diabetes mellitus, abnormal regulation of energy metabolism and obesity, abnormal lipid metabolism, physiological regulation and dysfunction of adipose tissue, bone turnover, abnormal bone metabolism and abnormal calcium and phosphorus metabolism, amino acids and nucleic acid metabolic abnormalities, abnormal metabolism of water, electrolyte, trace elements and vitamins, acid-base imbalance, malnutrition and nutritional support, new technologies and methods in the field of endocrine system diseases/metabolic abnormalities and nutritional support.

In 2022, the majority of the proposals are still centered on diabetes mellitus and its related complications, physiological regulation and dysfunction of islet tissue,imbalance of glucose homeostasis and insulin resistance in target organs, bone turnover, abnormal bone metabolism and abnormal calcium and phosphorus metabolism, abnormal regulation of energy metabolism and obesity and abnormal lipid metabolism. The number of proposals related to autophagy, exosomes, mesenchymal stem cell and intestinal microecology is dramatically increased.

However, there is still lack of original researches. There are few applications on gonads and related diseases, adrenal gland and related diseases, malnutrition and nutritional support, abnormal water metabolism, electrolyte, trace elements and vitamins, acid-base imbalance. These areas with minor applications but significant clinical research value will continue to be emphasized and supported in the future. Researches on the discovery of new phenomena，new questions in the clinic and innovative approaches/designs will be encouraged. The fields involving important clinical studies will continue to be emphasized and considered preferentially for funding in the future.

Ophthalmology (H13)

The scope of the Discipline mainly supports research on the structural composition, function, and vision formation of eye and its accessory organs, as well as the occurrence and development mechanism, the diagnosis and prevention strategies for ocular diseases. The field of ophthalmology is focused on corneal and ocular surface related diseases; lens and cataract; sclera, uvea and ocular immunology related diseases; glaucoma, optic nerve and visual pathway related diseases; retina, choroid and vitreous related diseases; vision, optometry and myopia, amblyopia and ocular muscle disorder related diseases; ocular manifestations due to systemic disease and orbital diseases; ocular tissue transplantation; innovative technologies and methods in ophthalmic research.

According to the statistical analysis of ophthalmology applications in 2022, the research on fundus diseases, such as retinal, choroid and vitreous-related diseases remains to be the most concentrated area, followed by corneal and ocular surface related diseases; glaucoma, optic nerve and visual pathway related diseases; vision, optometry and myopia, amblyopia and ocular muscle disorder related diseases, lens and cataract. Diabetic retinopathy, retinal and choroidal neovascularization, age-related macular degeneration, refractive errors and visual abnormalities remain to be the hot fields of ophthalmic research. The Discipline encourages extracting the scientific issues around clinical bottlenecks such as the prediction, diagnosis, treatment, rehabilitation, environment and vision of ocular diseases; combining the innovative theories and technologies in neuroscience, molecular medicine, biomechanics information science, and materials science to conduct multidisciplinary and interdisciplinary integration research; clarifying mechanisms of the occurrence and development in ocular diseases; obtaining original scientific achievements and promoting basic research to guide the clinical diagnosis and treatment for ophthalmology.

Otorhinolaryngology Head and Neck Science (H14)

The Discipline supports basic researches in related fields such as morphology, physiology and pathology etc., as well as innovative technology researches on disease

pathogenesis, prevention, treatment and rehabilitation. The scope includes olfactory, nasal and anterior skull base diseases, throat and neck diseases, ear and lateral skull base diseases, auditory abnormalities and balance disorders, otorhinolaryngology head and neck development related diseases, new technologies and methods of otorhinolaryngology head and neck scientific research.

Among the applications in 2022, the auditory abnormalities and balance disorders, olfactory, nasal and anterior skull base diseases, throat and neck diseases are still the focus of research. The mechanisms involved in various types of hearing loss as well as the reconstruction of auditory function are the key issues of otology, including genetic and pathogenesis research, and development of noveltherapeutic strategy. In the field of rhinology, researches mainly focus on mechanisms underlying the pathogenesis and development of rhinitis,rhinosinusitis and nasal polyp, and new therapeutic intervention. Researches on laryngopharyngeal diseases focus on respiratory disorders, phonetic disorders, and functional reconstruction. The mechanisms and interventions of auditory development and degeneration, deafness, tinnitus, hyperacusis, vertigo, olfactory disorder,rhinitis and rhinosinusitis are the important research directions, and the interdisciplinary studies with information science, new imaging technology, biomaterials, biomechanics, simulation technology, biotherapy and other fields have attracted more and more attention, and will be continuously funded. The related nerve damage, olfactory disorder, sleep breathing disorder, phonation disorder, swallowing disorder and laryngotracheal stenosis still need more attention.

Oral and Craniofacial Sciences (H15)

The Discipline mainly supports researches on diseases of oral organs, craniomaxillofacial soft and hard tissues, temporomandibular joint, salivary glands and other oral craniomaxillofacial related non-neoplastic tissues. Supported areas include diseases related to the development of oral craniomaxillofacial tissues and organs; the defect restoration and regeneration of oral craniomaxillofacial tissues and organs; dental pulp and periapical tissue diseases; periodontal and oral mucosal diseases; saliva, salivary glands, oral and maxillofacial, nerves and jaw benign diseases; taste, oral and maxillofacial pain, occlusion and temporomandibular joint diseases; restoration of tooth defects or missing and correction of dentognathic deformities; biomechanics and biomaterials of oral craniomaxillofacial tissues. New technologies or methods of oral craniomaxillofacial scientific research are also within the scope of funding.

Among the applications in 2022, the majority of the proposals are still concentrated on periodontal and oral mucosal diseases, followed by the defect repair and regeneration of oral cranio-maxillofacial tissues and organs. Restoration of tooth defects or missing and correction of dentognathic deformities, biomechanics and biomaterials of oral cranio-maxillofacial tissues, and dental pulp and periapical tissue

diseases are also attracting attentions and the number of applications in each field is similar. The number of applications in saliva, salivary glands, oral and maxillofacial vessels and nerves and jaw benign diseases and new technologies or methods of oral craniomaxillo-facial scientific research is relatively small. The field related to the occurrence and prevention mechanism of periodontitis receives more attention, especially the periodontal immunity and regeneration. Stem cells or oral biomaterials-induced osteogenesis and odontogenesis mechanism and correction of dentognathic deformities have also become hot topics. Some emerging research areas, such as oral microecology, digitization and artificial intelligence are also involved. The Discipline encourages long term and systematic basicresearch or appliedbasicresearch that already has a good foundation or new investigation direction. The interdisciplinary researches between different directions of stomatology or with other related research fields will be encouraged in the future.

The Division does not support cancer research. Please refer to the general introduction of proposal guidance from Department of Health Science in detail.The Division does not support the research on drug design and pharmacology as well. Please submit the related applications to Division IX of Health Sciences (H34, H35). Applications on the male reproductive system and male sexual dysfunction are not included in code H05. Please submit related proposals to Division IV (H04).

Division III of Health Sciences

The Division mainly supports basic research in the fields of nervous system,mental health, and geriatrics.

Nervous System (H09)

The Discipline mainly supports researches on the etiology,pathogenesis, diagnosis, treatment, and prevention of various non-neoplasticneurological diseases, includingcerebrovasculardiseases, cognitive dysfunction, dyskinesia, neurodevelopmental disabilities, injury and rehabilitation of nervous system, neurodegenerative disorders, epilepsy, pain & analgesia, anesthesia and sedation. The Division also supports projects on neurobiological mechanism and intervention of comorbidity of neurological diseases and psychiatric disorders.

In recent years, funded projects in the field of nervous system predominantly have focused on cerebrovascular diseases, cognitive dysfunction, injury and rehabilitationof nervous system, pain and analgesia, in which there is a significant increase in applied projects from the perspectives of glia, non-coding RNA, neural cell-fate, exosomes, and microecology. However, most of the applied projects were follow-up studies and/or lack of novelty. The Division prioritizes the innovative basic

research on important scientific issues originated from clinical phenomena and clinical problems, interdisciplinary studies using non-human primates, drosophila, zebrafish animal models and/or mankind organoid models, and the critical techniques and mechanisms of strengthening neural modulation to promote the recovery of nerve function after injury. Investigations on cerebrovascular diseases around clinical concerns are encouraged, especially on key mechanisms, early intervention, functional reconstruction and precise diagnosis and treatment of neurovascular injury. Basic and clinical collaborations need to be strengthened in researches on pain biology, especially on the mechanisms and intervention of chronic pain, the transition from acute to chronic pain and neuropsychiatric comorbidity of pain. It is encouraged to strengthen the basic research on the mechanisms of general anesthesia and anesthesia-related complications. Investigations on related diseases of the nervous system in children are encouraged. In addition, substantial collaborative researches in clinical/basic medicine and materials, bioinformatics or artificial intelligence are also encouraged.

Mental Health and Psychological Health (H10)

The Discipline mainly supportsresearcheson the etiology, pathogenesis, diagnosis, treatment, and prevention of mental and behavioral disorders, including schizophrenia or other psychotic disorders, mood disorders,anxiety disorders, stress-related disorders,drug dependence and other addictive disorders, sleep disorders, psycho-behavioral disorders in children and adolescents, as well as psychological assessment and intervention of mental disorders, andnewtechnique/method used for the investigation on mental disorders and psychological health.

In recent years, the prevalence of mental disorders increased rapidly. Projects funded in the field of mental and psychological healthpredominantly focused on mood disorders, schizophrenia, and anxiety or fear-related disorders, less in related diseases of biological rhythm disorders and psychological assessment/intervention for mental disorders. The research basis in the field of psycho-behavioral disorders in children and adolescents is relatively weak. It's encouraged to investigate the role of genetic, environmental, metabolism, immunity and other multiple factors in the occurrence and development of mental disorders, to identify potential etiologies and interventionaltargets, to establish biological markers that can monitor the occurrence, developmentand prognosis of mental disorders, to optimizepsychological and behavioral examination techniques, in order to achieve the early detection and diagnosis of mental disorders. It will be strengthened for researches on the comorbidity of mental disorders and its impact onphysical health. The interdisciplinary collaboration between psychiatry and otherdisciplines are also encouraged, aiming at improve the diagnosis and treatment of mental and behavioral disorders through early intervention and treatment utilizing pharmacological or non-pharmacological strategies in China.

Gerontology (H19)

The Discipline mainly supports researches on the pathophysiological mechanism of aging and aging-related diseases. The pathophysiological changes, mechanisms and biomarkers of aging at population, systemic body, organ, tissue, cell, subcellular and molecular levels for elucidating the relationship between aging and aging related diseases and other factors (e.g., genetics, epigenetics, stress, metabolism, immunity and inflammation). It is encouraged to utilize new techniques, methods and models to carry out mechanism investigations on aging and aging-related diseases, and interdisciplinary researches, as well as investigations on aging interventions of drugs, cells, genes, and proactive health, to provide theoretical basis for the early warning, prevention and treatment of aging related diseases.

The Division does not provide funding support for tumor related applications, for which please refer to the general introduction of the Department of Health Science. The field of gerontology does not fund applications for geriatric disorders in organs or systems unrelated to the aging mechanism, for which please select other corresponding application codes.

Division IV of Health Sciences

The Divisionmainly supports basic and translational research in the areas of reproductive system/perinatal medicine/neonatology, medical immunology and medical genetics.

Reproductive System/Perinatal Medicine/Neonatology (H04)

The Discipline mainly supports basic and translational research on structure/function/development abnormalities, injury and repair, inflammation and infection, endocrine abnormalities and related disease of the reproductive system; the mammary structure/function/development abnormalities; sexual dysfunction; gametogenesis and fertilization; embryo implantation, maternal-fetus interaction, reproductive immunity and related diseases; placental structure/function and development abnormalities; pregnancy related diseases; assisted reproduction; fetal development and fetal diseases; neonatal diseases; and development of novel techniques on diagnosis and treatment for diseases of reproductive system and neonates.

Novel multidisciplinary technology platform is encouraged to study the development of human germ cells and reproductive organs, damage, remodeling and fertility protection of human reproductive organs, the principle and abnormalities of human sperm-ovum recognition, fertilization and early embryonic development, regulation of pregnancy establishment and maintenance and the pathogenesis of related diseases; the effect of maternal, intrauterine and extrauterine environment on the pregnancy outcome and descendant health; the novel mechanisms, diagnosis and

treatment strategy of neonatal diseases; assisted reproduction and related safety evaluations based on the advances in regenerative medicine, organoid and artificial intelligence. It is encouraged to condense the scientific questions from clinical practice and to carry out original and translational research by means of the abundant clinical resources in China. The novel research paradigm is needed to be established in the study of reproductive medicine, perinatal medicine and neonatology by interdisciplinary cooperation.

In 2022, the proposals mainly focused on the following areas: pregnancy related complications (H0417), neonatal diseases (H0421), female reproductive endocrine abnormalities and related diseases (H0411), damage and repair of female reproductive system (H0409), spermatogenic abnormalities and male infertility (H0405), etc. Less attention was paid to the following research areas: pubertal endocrine regulation; pathogenesis of perimenopause related diseases; inflammation and infection of reproductive system; mammary structure/function/development abnormalities; the effect of maternal nutrition, environmental and genetic factors on pregnancy outcomes and descendant health; physiology of parturition and abnormal labor, and neonatal nutrition, etc. The deficiencies in proposals were as follows: The proposals' scientific hypothesis could not be supported by the weak preliminary experimental basis or were just derived from references; the research contents of some projects lacked mechanism research in-depth; A few of projects were descriptive, presupposition, transplantation and programmatically designed without innovation.

The field of reproductive system/perinatal medicine/neonatology (H04) does not support research related to tumor.

Medical Immunology (H11)

The Discipline mainly supports basic and translational research on the structure, function, dysplasia of organs, tissues and cells of immune system, as well as researches on immunological mechanisms, strategies for immunodiagnostic, immunotherapy and immunoprophylaxis of various diseases.

The Discipline supports to elucidate essentially immunological scientific questions focusing on human immune diseases, including the development, differentiation, residence, senescence and death of immune cells, the identification and function of novel immune cell subtypes, the immunological functions of nonimmune cells, the structural basis and activation of immune recognition, the dynamic balance of protection and injury in immune response, the immune tolerance and evasion, the formation and maintenance of immune memory, the epigenetic regulation in immune, the correlation of metabolism and immune regulation, microbiota and immune system, the interaction among neural, endocrine and immune system, the crosstalk of trauma, stress and immunity, the mechanism and novel targets of immunotherapy, and the new vaccines and adjuvants. It is advised to investigate the immunological mechanism, diagnosis and intervention strategies in

infectious diseases, autoimmune, cancer, organic transplantation and systemic diseases using immunology theory and technology. The Discipline encourages interdisciplinary research between immunology and synthetic biology, biomechanics, nanoscience, bioinformatics, etc., and the study of the process of immune homeostasis and immune response by using new technologies such as imaging and single-cell sequencing, etc. It is also encouraged to condense scientific hypothesis of immunology from previous discovery and clinical practice, explore the immunological spectrum of severe human diseases, and carry out innovative studies based on clinical practice.

In 2022, the proposals mainly focused on the following areas: autoimmune diseases (H1107), inflammation, infection and immunity (H1104), immunotherapy and its mechanisms (H1112), etc. The deficiencies in proposals were as follows: the experimental basis of some research projects was weak, which was not enough to support its scientific hypothesis; The research contents of some projects were limited to the description of the phenomenon and lacked in-depth investigation of underlying mechanism.

Medical Genetics (H23)

The Discipline mainly supports research on the pathogenesis, diagnosis, prevention and treatment of human genetic diseases and rare diseases, as well as development of new technologies and methods in medical genetics.

The Discipline encourages to identify new pathogenic genes, study the pathogenic mechanisms of gene structure, function and mutations, clarify the epigenetic mechanisms of genetic diseases, explore new genetic diseases and their genetic principles by use of the advantages of human genetic and clinical resources in China. It is advised to excavate and make full use of the resources of rare diseases in China, and carry out basic research in depth in the fields of pathogenic mechanisms, diagnosis, treatment and prevention for rare diseases. The Discipline encourages to strengthen the research on the etiology, pathogenic mechanism, diagnosis and treatmentof difficult and undiagnosed diseases and to employ multidisciplinary techniques including bioinformatics, computational and structural biology to perform cross-research on human genetic and rare diseases.

In 2022, the deficiencies in proposals submitted to the Discipline were as follows: the proposals' scientific hypothesis could not be supported by the weak preliminary experimental basis or preliminary analysis of clinic data; the research contents of some projects only included pathogenic gene or mutation identification without in-depth research on the mechanism.

Division V of Health Sciences

The Division mainly supports basic research in the fields of special medicine,

forensic medicine, medical imaging/nuclear medicine, and biomedical engineering/ regenerative medicine.

Special Medicine (H24)

Special Medicine is aimed at the unique medical support needs under special environments (aviation, aerospace, navigation, deep diving, plateaus, polar regions, etc.), studies and solves various special medical problems, and provides theoretical and technical support for major national strategic needs. These studies will aim atunderstanding the physiological and pathological changes and related mechanisms on the molecular, cellular, tissue, organ, and organism levels, and revealing the regulatory mechanism of the body's adaptive changes and pathological damage under the special environment, as well as the critical factors of the body's tolerance to extreme environments. On this basis, research on risk prediction and damage assessment of organisms, and the development of novel protection technology in special environments are carried out. The Discipline mainly supports research on pathophysiological changes and prevention methods of related diseases in special and/or extreme environments such as weightlessness, hyper gravity, radiation, hypoxia, hyperbaric, hyperthermal, high humidity, cryogenic, and narrow confined space. It is encouraged to apply physics, chemistry, biology, and biomedical engineering in the above-mentioned fields, to carry out in-depth and systematic research on specific medical problems under extreme environments, and to explore new theories and techniques for maintaining and enhancing body functions and vitality under special environmental conditions. Multipleintegrated and interdisciplinary research within special medicine are also encouraged.

Forensic Medicine (H25)

The Discipline mainly funds the studies of using human body and other related forensic biological samples/materials as the research object, aiming at solving medical problems through technical and theoretical research in judicial practice. The funding fields mainly include the identification of the complicated cause of death; estimation of postmortem interval; mechanisms and forensic biomarkers of stress injury and death; novel methods for evaluation of head injury by deep learning technology; mechanism and assessment of personal injury caused by environmental pollution; toxicant (drug) abuse and dependence; toxicant metabolism and analysis; automatic identification of damage mechanism and region by artificial intelligence; estimation of wound time with the combination of multi-omics and artificial intelligence; objective evaluation of capacity and responsibility in the mentally disabled; individual identification of miscellaneous samples; identification of complex parentage testing; identification of tissue source and ethnic origin inference; multi-omics identification of identical twins; creative technology in the identification of mixed stain; and basic theory and application research on forensic epigenomics;

and exploration of function extension for molecular aptamer and evaluation of its application, etc. Applications of theories and technologies in disciplines such as medicine, biology, genetics, physics, chemistry, law, psychology, and information science are encouraged in the fields to conduct in-depth and systematic research on forensic science issues. Interdisciplinary studies between forensic medicine and other disciplines such as medical imaging and biomedical engineering are strongly encouraged.

Medical Imaging/Nuclear Medicine (H27)

The Discipline mainly funds research directly on medical imaging and other medical imaging-introduced medical issues. The funding fields include diagnostic radiology (such as conventional X-ray imaging, computed tomography, and magnetic resonance imaging), ultrasound medicine, nuclear medicine, interventional medicine, etc. The Discipline encourages multidisciplinary exploratory research in the fields of multimodal cross-scale imaging, molecular imaging, functional imaging, intelligent imaging, precise intervention, integration of diagnosis and treatment, and related frontier sciences of translational medicine. The Discipline supports the development and application of new imaging technologies in the research on the pathogenesis, early diagnosis, treatment planning and monitoring, efficacy and prognosis evaluation, and drug screening of various diseases. The Discipline encourages the basic exploration and advanced pre-clinical application research on optical imaging and biological electromagnetic imaging and is leaned to the translational application potential of diverse imaging probes.

Biomedical Engineering/Regenerative Medicine (H28)

Biomedical engineering is to devote engineering principles and designing concepts to settle biology and medical issues for the purpose of improving the diagnosis and treatment of disease, which refers to cross-disciplinary biomedicine studies that integrate knowledge from electronic information, instrument science, material science, etc. The Discipline mainly funds basic research related to medical electronic engineering, regenerative medicine, and nanomedicine for the prevention and early warning of disease, test and diagnosis, minimally invasive/non-invasive treatment, and rehabilitation of clinical. The funded projects are expected to target biomedical sensing, biomedical photonics, biomedical system modeling and simulation, medical information systems, brain-computer interaction, neural engineering, rehabilitation engineering, treatment planning and navigation, medical robots, imaging nano-probe, gene and drug carriers and delivery systems, medical biological materials, tissue engineering and regenerative medicine, artificial organs, etc. The Discipline encourages the advanced exploration of interdisciplinary research for the biomedical development of novel methods, systems and mechanisms, and is leaned to biomedical materials and nanoparticles with the potential to translate into

routine healthcare settings.

The Division is always committed to promoting a comprehensive and balanced development of special medicine, forensic medicine, medical imaging/nuclear medicine, and biomedical engineering/regenerative medicine. The Division encourages the collaboration of interdisciplinary researchers to conduct cross-sectional studies to advance medical optical imaging, bioelectromagnetic imaging and physical therapy, etc. The Division also encourages and supportstheoretical research and hardware development in interdisciplinary research fields such as medical sensing, signal detection, medical instruments, brain-computer interaction, and rehabilitation engineering, etc. The Division also emphasizes clinical application and the transformation of clinical outcomes of imaging probes, nanomedicine and biomedicine materials. Special support would be given to young scholars who conduct research with high originality in the above-mentioned fields.

Regarding medical imaging/nuclear medicine and biomedical engineering/ regenerative medicine, the Division does not support applications on radiation oncology or radiation prevention, which should be submitted to related codes in Division VII (H18) or Division VIII (H29). The Division does not support applications in pharmacology and drug administration, which instead should go to related codes in Division IX (H34, H35).

Division VI of Health Sciences

The Division mainly supports basic research in the fields of locomotor system, emergency and critical care medicine, trauma/burns/plastic surgery, rehabilitation medicine, medical virology and viral infection, medical pathogen and infection, and laboratory medicine.

Locomotor System (H06)

The Discipline mainly supports researches on basic scientific issues related to the structure, function, dysplasia, pathogenesis, diagnosis and treatment of bone, joint, muscle, ligament and related tissues, including metabolism, immunity and infection, fatigue and recovery, degenerative disease, sports injury, injury and repair, transplantation and reconstruction, deformity and correction, biological treatment, and other related scientific issues. Meanwhile, the researches on the emerging scientific issues, such as medical biomaterials and artificial intelligence in musculoskeletal fields, are highly encouraged. In 2022, applications were mainly focused on the research fields in the musculoskeletal damage and repair, and the degenerative diseases of bone, joint and soft tissue.Osteoarthritis, intervertebral disc degeneration, fracture, and bone healing are research hotspotsin the field of locomotor system. In contrast, there were a small number of applications in

musculoskeletal fatigue and recuperation. TheDiscipline encourages the innovative and translational research based on clinical needs, the systematic and original research on major scientific issues in locomotor system, the interdisciplinary research using new techniques and methods, the cross-talk research between locomotor system and other organs and tissues.

Emergency and Critical Care Medicine (H16)

TheDiscipline mainly supports researches on new theories, technologies and methods in the field of emergency and critical care medicine, including sepsis, organ function failure and support, cardiac-pulmonary resuscitation, poisoning, and heatstroke. The pathogenesis, accurate diagnosis and treatment and scientific prevention in the field of emergency and critical care medicine are highly focused. Meanwhile, researches on pathophysiological changes, inflammation and immune response, organ system interaction, and systems biological changes in this field are also encouraged.

Trauma/Burns/Plastic Surgery (H17)

The Discipline mainly supports researches on trauma, burns and chimatlon, woundhealing and scar management, surface tissues and organs malformation, injury andrepair, regeneration, transplantation and reconstruction of surface tissues and organs,craniomaxillo-facial deformity and its correction, new technologies and methods in thefield of trauma/burns/plastic surgery. The pathophysiological process, accurate diagnosis andtreatment and scientific prevention in the field of trauma/burns/plastic surgery related diseases are highly focused. Meanwhile, researches on the followingaspects are also encouraged,including injury mechanisms, prevention and treatment of complications of trauma and burns, tissue repair and function reconstruction, wound healing,scar prevention and treatment, repair of body surface tissue and organ deformity anddefect, reconstruction and reengineering.

Rehabilitation Medicine (H20)

The Discipline mainly supports researches onrehabilitation mechanism of structural abnormalities, function impairments, activity andparticipation limitations caused by system damage/disease of neural, locomotor,circulatory, and respiratory systems, the researches on standardization and intellectualization of rehabilitation assessment, development and application of new evaluation methods of rehabilitation, and the researches on the basic scientific issues and related new therapies of physiotherapy, occupational therapy and speech therapy.TheDiscipline also encourages interdisciplinary and original basic research surrounding rehabilitation needs and functional reconstruction.

Medical Virology and Viral Infection (H21)

TheDiscipline mainly supports researches on diseases caused by medical viruses

andtheir infections, including respiratory viruses and infections, digestive tract viruses,picorna viruses and infections, hepatitis viruses and infections, retroviruses andinfections, herpes viruses and infections, arboviruses and infections, hemorrhagic feverviruses and infections, human papilloma virus, rabies virus, parvovirus, prion andother viruses and infections, and the new technologies and new methods of medicalvirology and viral infection. The main focus is on etiological characteristics, mechanism of virus transmission,virus-host interaction, and mechanisms of pathogenesis. With the guarantee of ethics andbiosafety, the Discipline encouragesresearches on highly pathogenic infectious diseases, highlytransmissible viral infections and other rare viral infections.

Medical Pathogens and Infection（H22）

TheDiscipline mainly supports researches on diseases caused by non-viral medical pathogensand their infections, including pathogenic bacteria and infections, pathogens fungi andinfections, parasites and infections, mycoplasma, Chlamydia, rickettsia, spirochetes andinfections, infectious diseases and vectors, mutation and drug resistance of pathogens,hospital-acquired infections, sexually transmitted diseases, and the development ofnew technologies and methods for the study of non-viral medical pathogens and their infections. It is focused ongenetic variation and evolution of non-viral pathogens, molecular mechanisms of drugresistance, and pathogen-host interaction mechanisms. With the guarantee of ethicsand biosafety, it encourages researches on emerging infectious diseases,tropical diseases and other rare infectious diseases.

Laboratory Medicine (H26)

The Discipline mainly supports researches on biochemical test, microbiologicalanalysis, cytological examination, hematological examination, immunological test,molecular biology test, and new technologies and methods in the field of laboratorymedicine. Researches on new strategies, new theories, new technologies and applications of rapid andaccurate inspection, and discoveries and identification of new biomarkers of diseasesare highly focused. The interdisciplinaryresearches coupled with chemistry, physics, material science, biosensing and artificialintelligence are highly encouraged.

For Medical Virology and Viral Infection (H21) and MedicalPathogens and Infection (H22), the Department provides onehigh-intensity General Program funding per field which supports researches on highlypathogenic microorganisms mainly up to the biosafety level-3 laboratories or higherlevel.

The fields of Locomotor System (H06), Emergency and Critical CareMedicine (H16), and Trauma/Burns/Plastic Surgery (H17) do not support oncology-related research. Please select the appropriate secondary application codeunder Oncology (H18). The field of Rehabilitation Medicine (H20)

supportsneither research that is not directly related to rehabilitation mechanism, evaluation andtreatment, nor the applications related to rehabilitation engineering or rehabilitation oftraditional Chinese medicine. With regards to researches only related to the pathologicalmechanism occurrence and development of diseases, please select appropriate application code of the corresponding systems. For applications related to rehabilitation engineering or rehabilitation of traditional Chinese medicine, please select the correspondingsecondary application code under Biomedical Engineering/ Regenerative Medicine(H28) of the Division V of Health Sciences, and Traditional Chinese Medicine (H31) of the Division X of Health Sciences. The field of Laboratory Medicine(H26) does not support the research on pathogenesis and regulation pathways of diseases,or clinical laboratory reference system and standardization. Forapplications related to genetic resources, ethics, and highly pathogenicmicroorganisms, please refer to the general introduction of the Department of HealthSciences.

Division VII of Health Sciences

The Division mainly funds oncology research.

Oncology (H18)

Oncology research seeks to understand the mechanisms of tumorigenesis, development and outcome and the science and technology for tumor prevention, diagnosis and treatment. It emphasizes to decipher cancer etiology and molecular mechanisms governing tumorigenesis and development and investigate the strategies for tumor prevention, diagnosis and treatment.

Oncology research encompasses basic, translational, and clinical research. For proposals related to basic scientific questions including mechanisms of tumor development, progression and outcome, applicants should select corresponding application codes for tumor etiology, tumorigenesis, tumor cell-fate, tumor genetics and evolution, tumor epigenetics, tumor immunology, tumor metabolism, tumor microenvironment, tumor recurrence and metastasis, tumor stem cells, and interdisciplinary oncology (H1801～H1811). For proposals related to translational research and clinical applications including cancer prevention, diagnosis, and treatment, applicants should choose corresponding application codes for cancer prevention, cancer diagnosis, cancer chemotherapy, targeted cancer therapy, cancer radiotherapy, cancer physical therapy, cancer immunotherapy, cancer biotherapy, comprehensive cancer therapy, cancer therapy resistance, cancer rehabilitation, and research for cancer with special clinical characteristics, big data and artificial intelligence for oncology, clinical translational research in oncology, and innovative

technology and method in oncology (H1812～H1826).

Oncology research is one of the most active fields in medical science. With the constant deepening understanding of tumor, there are some emerging features and trends in this field. (1) The paradigm of cancer research switches from a micro and local view to a macro and systemic view. Thus, instead of focusing on molecular and cell levels alone, oncology research is extending to tumor microenvironment, macroenvironment and emphasizes to study the interactions between tumors and the whole human body by comprehensive investigation layer by layer at molecular, cellular, tissue, organ and systematic levels. (2) Due to the biological nature and complexity in the law of development for tumor, multidisciplinary integration becomes increasingly important in cancer research. Advanced techniques from other frontier fields have been increasingly introduced in tumor diagnosis and treatment. Thus, paradigm of oncology research switches from a model mainly based on medicine and life science toward a new one which is featured by cross-integration and coordinated development of multi-disciplines. The new paradigm emphasizes the employment of interdisciplinary methods, including biochemistry, immunology, neurobiology, bioinformatics, as well as clinical medicine, preventive medicine, pharmacology, radiology,materials science, big data and artificial intelligence technology, mathematics, physics, chemistry, etc., to promote the systematic advances in oncology research. (3) Advance in oncology research increasingly depends on close cooperation of basic research and clinical practice. On the one hand, due to insufficient understanding of the nature of tumor, clinical prevention, diagnosis and treatment remain to be innovated and improved. Translational and clinical research in oncology depends on the progress and breakthrough of basic research in oncology. On the other hand, the diversity and complexity of tumor clinical features, as well as treatment responses, continue to raise new scientific questions for basic research. A high degree of integration of clinical and basic research activities should be strengthened to foster innovation in the development and clinical application of basic research. (4) Additionally, the exploration of cancer research continues to integrate the concepts, models, and practical experiences of traditional medicine in the world to evoke a comprehensive and complementary model of modern medicine and traditional medicine. Thus, clarifying theeffectiveness, safety and mechanism of traditional medicine in tumor prevention, diagnosis and treatment becomes one of the important directions of oncology research.

The genesis and progression of tumor is a complex multi-level, trans-scale and intertwined process. It requires close cooperation of multidisciplinary investigators, as well as integration of basic research and clinical practice, to unveil the mesoscopic structure and law of evolution and regulatory mechanisms of tumor that between the unit scale and the system scale from different points and multiple layers, and to define the interactions and boundary conditions inside and outside the system, as well as the connections between multiple layers. A new paradigm of oncology research helps to

change the understanding of mechanisms governing tumorigenesis and progression, prompting the development of more effective approaches for tumor prevention, diagnosis and treatment.

Applicants are encouraged to discover and refine scientific questions from preliminary research and clinical practice, to deeply and systemically investigate the mechanisms of malignant tumors, and to launch basic research intending to improve the clinical diagnosis and treatment and to translate for clinical practice, as well as to develop multidisciplinary techniques and new methods for oncology research. It is also encouraged to take advantage of the clinical resources in China to carry out basic research effectively combined with clinical practice and studies focusing on common and frequently-occurring tumors or rare cancers in Chinese population. In order to reduce cancer-related hazards and improve survival time and life quality of cancer patients, applicants are also encouraged to integrate multiple resources and techniques originated from modern medicine and traditional medicine to innovate the research for the strategies of tumor comprehensive prevention, diagnosis, treatment and rehabilitation, .

Notice:

(1) For biomedical studies related to human and animals, applicants must provide ethic approval from medical and animal ethic committees from their institution or supervisor department (PDF version should be attached; medical and animal ethic approval should be provided individually). Application without the above-mentioned proof will not be supported.

(2) For proposals focusing on rare tumors, pediatric tumors, and other special tumor types, applicants should select research fields under the corresponding application codes for research of tumor with special clinical characteristics (H1823)..

TheDiscipline does not support tumor epidemiological research. Applicants should note that the proposals on tumor epidemiology should be submitted to Division VIII (H30), and proposals on hematological malignancies such as leukemia and lymphoma should be submitted to Division I (H08).

Division VIII of Health Sciences

The Division mainly supports the basic research in fields of dermatology, radiation medicine, and preventive medicine.

Dermatology (H12)

The funding scope of the Discipline is basic research on the abnormal structure, function, and development of skin and its appendages, as well as immune-mediated, infectious, hereditary, metabolic, traumatic, and physicochemical skin diseases. In recent years, the results of the project application and approval show that the level of

basic research on skin-related diseases has improved rapidly, especially on skin and its appendages. The basic research on epidemiological, diagnostic and therapeutic techniques and methods, as well as the relationships between the skin and systemic diseases, should be strengthened. The Discipline encourages original innovations. Interdisciplinary and integrated research involving life science, physics, chemistry, materials science, computer science, and other disciplines should be encouraged.

The Discipline does not support oncology-related research, which should be applied to Division VII (H18).

Radiation Medicine (H29)

The funding scope of the Discipline is basic research on radiation injury and intervention, radiation toxicology andradiopathology, radiological hygiene and protection. In recent years, the number of projects application and the quality of funded projects indicate that great progress has been made in scientific research and some studies have reached the internationally advanced levels, although the volume of the researchers engaged in Radiation Medicine is small. While the funded projects mainly focus on radiological injury and intervention, basic research on early diagnosis and prevention of radiation damage should be further strengthened. The Discipline attaches importance to the biological effects of low-dose radiation and radiation-induced bystander effects, and encourages the fundamental research of medical radiobiology.

About the Discipline does not support cancer radiotherapy, which should refer to categories under Division VII (H18), while those about medical imaging and radiological diagnosis are also not accepted, which should refer to categories under Division V (H27).

Preventive Medicine (H30)

The funding scope of the Discipline is basic research on environmental hygiene, occupational health and diseases, food hygiene, human nutrition, children and adolescent health, maternal and child health care, hygienic toxicology, hygienic analytical chemistry, infectious disease epidemiology, epidemiology of non-communicable diseases, epidemiological methods and health statistics, behavior/psychological factors and health, and endemiology. In recent years, the number of projects application is increased. The level of basic research related to preventive medicine is on a steady upward trend. Expanding disciplinary fields and research directions is an inevitable requirement for the development of preventive medicine. Interdisciplinary and integrated research needs to be further strengthened, and the combination of laboratory mechanism research and population research with the core of population health is encouraged.

Food Hygiene (H3004) does not support the study only about food processing, and relevant divisions of Life Science (C20) are recommended.

Projects about gynecologic diseases and pediatric diseases are not accepted in the field of Maternal and Child Health Care (H3005), or Children and Adolescent Health (H3006). The former may refer to categories under Division IV (H04), and the latter depends on the classification of diseases.

Projects about drug toxicology are not supported by Hygienic Toxicology (H3007), which may refer to categories under Division IX (H35).

Research on clinical tests is not included in the category of Hygienic Analytical Chemistry (H3008), which may refer to categories under Division VI (H26). Pharmaceutical analyses excluded from H3008 may refer to Division IX (H34).

The category of Epidemiology (H3009, H3010) does not fund purely laboratory research projects that are non-population-based. Projects about health economics and policy, hospital administration, and other health management-related projects are not accepted in the category of Epidemiology, which may refer to other relevant codes.

Non-population-based studies of clinical and experimental research on psychosocial diseases will not be accepted in Behavioral/Psychological Factors and Health (H3012), which may refer to other relevant codes.

Disease projects without geographical features are not accepted under the category of Endemiology (H3013). For related applications, please select the application code of the relevant disease system.

Division IX of Health Sciences

The Division mainly supports basic researches in the discipline of material medica and pharmacology targeting human diseases.

Materia Medica (H34)

The funding scope of Materia Medica in the Division covers research areas or sub-disciplines including synthetic medicinal chemistry, medicinal chemistry of natural products, microbial drugs, biotechnological drugs, marine drugs, special drugs and rare disease drugs, drug design and informatics, pharmaceutics, pharmaceutical materials, pharmaceutical analysis, drug resources, New technologies and methods in pharmaceutical research, etc.

The Discipline puts emphasis on interdisciplinary researches, basic researches of innovative drugs and druggability. Funding in synthetic medicinal chemistry focuses on the research of active molecules based on new targets, new mechanisms, new technologies or new structures, and generally does not support the simple optimization research of active compounds for known targets. Funding in medicinal chemistry of natural products and microbial drugs mainly supports innovative

theories, technologies and approaches for drug discovery from plants, animals and microorganisms. Funding in biotechnological drugs mainly supports researches on innovative biotechnologies or approaches to obtain biotechnological drugs; meanwhile, exploratory researches on new types of expression systems and large scale culture techniques will also be supported. Funding in marine drugs mainly supports chemical, pharmaceutical and ecological researches of marine creatures (animals, plants, microorganisms) in typical habitats. Funding in special drugs and rare disease drugs supports drug researches involving special environments and rare diseases. Funding in drug design and informatics mainly supports researches on innovative theories, approaches, or software systems for drug design and drug ability prediction, and meanwhile, on the discovery and structural optimization of completely new chemical structures of hit molecules. Funding in pharmaceutics mainly supports researches on innovative theories, technologies and methods, in physical pharmacy, biopharmaceutics, molecular pharmaceutics, industrial pharmacy, novel drug pharmaceutical dosage forms and delivery systems. Funding in pharmaceutical materials mainly supports basic researches on the establishment and safety evaluation of new pharmaceutical excipient, focusing on special pharmaceutical functions and structures distinguished from researches in the area of pharmaceutics. Funding in pharmaceutical analysis mainly supports basic researches on the establishment and development of innovative approaches and techniques for analysis of the pharmaceutical molecules, drug targets, the in vivo effector molecules, and the interaction between drug molecules and target molecules or effector molecules to solve key scientific questions in the fields of material medica and pharmacology, and supports integrated investigations on the novel techniques for multi-omics with the important scientific problems of drug targets and biomarkers. Funding in drug resources mainly supports researches on key scientific problems associated with discovery, exploration, sustainable utilization and protection of new pharmaceutical resources.

Pharmacology (H35)

The funding scope of the Discipline of Pharmacology supports researches on target discovery and validation, drug action mechanism or drug resistance mechanism, drug metabolism and pharmacokinetics, clinical pharmacology and drug toxicology etc. The involved drugs should be therapeutic drugs, drug candidates or bioactive substances with some advantages in treatment of diseases.

The Discipline puts emphasis on in-depth study of actionmechanism of drugs or bioactive products and their targets, exploring the basic rule of life and the pathologic mechanism of disease by using drug molecules as probes.In-depth and systematic studies should be strengthened in proposals related withresearch fields as below: discovery and validation of new targets, disease-specific and sensitive biomarkers, discovery of new pharmacological actions of drugs or bioactive compounds and

elucidation of their action mechanisms, strategies and methods to effectively overcome multi-drug resistance, new targets, novel drugs and newstrategies of drug combination based on pharmacogenomics, epigenetics, systematic biology, etc. Basic research should be strengthened in proposals as below: molecular regulatory network of complex diseases or emerging infectious diseases andmechanisms of drug intervention, individualized drug therapy and new treatment approaches, translational medicine, innovative pharmacological models, techniques and approaches. In the sub-discipline of drug metabolism and pharmacokinetics, new approaches and new models should be constructed and developed to strengthen the integrated researches on the drug target, pharmacodynamics, toxicology, clinical medication and drug intervention, and the regulation mechanism researches on the drug-metabolizing enzymes and transporters. In the sub-discipline of clinical pharmacology, the researches should focus on the exploratory research ofindividualized medication and the interaction between drugs and human body, and lay more emphasis on rational administration of special community such as children, pregnant women and the highest-risk population, etc. In the sub-discipline of drug toxicology, researches should be strengthened in the fields as below: molecular mechanism, intervention strategy to drug toxicity, mechanism on metabolite toxicity, novel models and approaches for drug safety evaluation, and systematic toxicology. In view of translational pharmacology, the research should focus on the new mechanisms and new applications of commercial available drugs.

Innovative fundamental research and continuous in-depth projects will be supported with priority. Because translational medicine is of far reaching significance in improving clinical application value of basic research, laboratory basic research on discoveries of new drugs, clinical therapeutics and diagnostics will be strengthened to identify new targets for drug therapy, new biomarkers for disease diagnostic in the course of exploring the mechanisms on occurrence and development of diseases, furthermore, to lay theoretical and experimental foundation for developing innovative drugs and diagnostic reagents with independent intellectual property.

To the innovative basic research with a great prospect for new drug development, the entire chemical structures or backbone of compounds should usually be provided in application, but the applicants should pay special attention to the protection of intellectual property and carefully handle the relationships between application and secrecy. Confidential core contents or techniques, which are not suitable to be illustrated or described in proposals such as chemical structures, should be sent directly to the office of Division IX by confidential letters and explained in proposals. The young scholar should ask for the consent of the supervisor and attach the authorization letter signed by the supervisor with the proposal, if the research proposal is closely related to the supervisor's research work.

Division X of Health Sciences

The Division aims to highlight the advantages of Traditional Chinese Medicine （TCM） and develop the theory of TCM, provides funds to basic research and clinic research programs in TCM, Chinese material medica (CMM) and integrated Chinese and western medicine.

Traditional Chinese Medicine (H31)

The Discipline mainly supports: ① Basic theory of TCM: zang-fu organs, qi, blood and body fluids, constitution, etiology and pathogenesis, basis of syndromes, treatment principles and methods, TCM prescriptions, TCM diagnostics; ②the clinical basis of TCM: internal medicine of TCM, surgery of TCM, orthopedics of TCM, gynecology of TCM, pediatrics of TCM, ophthalmology of TCM, otolaryngology of TCM, stomatology of TCM, oncology of TCM, geriatrics of TCM, health preservation and rehabilitation of TCM; ③Acupuncture and tuina: Acupoints and Meridians, acupuncture and moxibustion of TCM, tuina massage; ④ Ethnic medicine; ⑤ New technologies and methods in TCM research.

Chinese Materia Medica (H32)

The funding scope of CMM mainly includes: ① CMM: resources, identification, substances inpharmacodynamics, quality evaluation, processing, pharmaceutics and theories in theproperties of Chinese herbs; ② pharmacology of TCM: neuropsychopharmacology, cardiovascular and cerebrovascular pharmacology, anti-tumor pharmacology, endocrinological and metabolic pharmacology, anti-inflammatory pharmacology, immunopharmacology, antiviral and anti-infective pharmacology, respiratorypharmacology, digestive pharmacology, urinary and reproductive pharmacology, metabolism of CMM, pharmacokinetics and toxicology in CMM; ③ ethnopharmacy; ④ novel techniques and methods in CMM research.

Integrative Medicine (H33)

The funding scope of the Dscipline mainly includes: ① basic theory of integrated traditionalChinese and Western medicine; ②the clinical basis of integrated traditional Chinese and Western medicine; ③new technologies and methods in research on integratedtraditional Chinese and Western medicine.

In recent years, the characteristics of the funded projects in the fields of TCM, CMM and integrative medicine are: ①The funded projects are guided by the theory of TCM, based on the clinical efficacy, combined with the macroscopic and microscopic, to explore the overall law of human life activities and the integration and regulation of TCM; ②Theories, methods and technologies are applied in the frontier fields of medical science and other sciences to constantly innovate research ideas and methods; basic research of TCM with the theories and research ideas of related emerging disciplines are organically combinedto promote the development of

TCM; ③ Attention is paid to the basic clinical research of TCM and minority medicine in the treatment of some functional diseases, metabolic diseases, senile diseases, immune diseases, viral infectious diseases, etc., in order to explore mechanisms responsible for the clinical efficacy.

Under the guidance of the basic theory of TCM, the Division supports the research on the key scientific issues in the field of TCM, and deeply explores its modern scientific connotation and the essence of inheritance and innovation. The Discipline focuses on the following areas: the theory of Zangxiang (visceral organ function), the theory of disease prevention and the biological basis of syndromes, animal models for the combination of diseases and syndromes, the law of compatibility of classical prescriptions and the material basis of drug effects, and the combination of macroscopic and microscopic differentiation of syndrome, the basis of the dominant diseases and the crucial links for which TCM treatment is indeed effective, the methodology of efficacy evaluation in line with the clinical characteristics of TCM, the specificity of acupoints, the rules of acupoint compatibility and acupuncture manipulations, the basis for the prevention and treatment of diseases by acupuncture, massage, and rehabilitation; the methodological research of data mining based on ancient documents and big clinical data; the basic theory, diagnosis and treatment law and mechanism of action of integrated traditional Chinese and Western medicine in the prevention and treatment of major, refractory, rare diseases and emerging infectious diseases, the basic theory of combined use of Chinese and Western medicine; ecological planting, wild tending and bionic cultivation of Chinese herbs and substitutes for rare and endangered Chinese herbs, principles and methods of Chinese medicine identification, Chinese medicine quality evaluation methods and their principles, Chinese medicine processing principles, Chinese medicine preparation principles and methods that reflect overall efficacy; new drug delivery system, medicinal properties of traditional Chinese herbs, efficacy substances of traditional Chinese herbs, internal process of traditional Chinese herbs and its regulation mechanism, pharmacological action and mechanism of traditional Chinese herbs, correlation between toxicity, toxicology and toxicity-effect of traditional Chinese herbs; ethnic medicine; innovative technologies and methods of TCM research etc.

The Discipline does not fund projects without Chinese medicine research content. For pure modern medical research proposals, please submit to the related medical discipline (H01~H30); For natural medicine research proposals, please submit to Pharmacy (H34) or Pharmacology (H35); The research on traditional Chinese herbs resources should reflect the unique attributes of traditional Chinese medicinal materials, such as the output and quality-related characteristics of the traditional Chinese herbs during production process; carry out research on the protection, production and new resources of traditional Chinese herbs resources. The Discipline does not support researchonthe

resources of non-medicinal plants, animals and minerals. Pharmacodynamic substances and pharmacology research of Chinese herbs must indicate the correlation with the efficacy of Chinese herbs or the academic value to the development of Chinese herbology discipline; minority pharmacy research should indicate the relationship with the ethnic minority medical theory or traditional drug use principles. The Discipline does not fund the research proposals of TCM that are not of natural science attributes. For the research proposals of traditional Chinese herb compound or acupoints, the prescription composition or related acupoints, which is not able to be provided in the case, you may mail it directly to NSFC by confidential post and account for it in the proposal. Applications that do not meet the above requirements will not be funded.

Interdisciplinary & Integration Section

The Interdisciplinary and Integration Section is formed by the integration of the Department of Management Sciences and the Department of Interdisciplinary Sciences. Oriented to major interdisciplinary scientific issues, it explores new scientific research paradigms and new mechanisms to support multidisciplinary research. It cultivates major original breakthroughs in emerging interdisciplinary fields, solves practical problems, and expands common knowledge and principles. It coordinates the development of disciplines and serves social and economic development. It pays attention to the major needs of the modernization of the national governance system and governance capabilities. It promotes the application of natural science knowledge and forms the characteristics of discipline development.

Department of Management Sciences

The Department of Management Sciences supports fundamental scientific research on the objective law of management and economic activities in various complex social and economic organizations.The research findings can provide theories and methods to optimize the utilization of limited resources. The Department of Management Sciences consists of three divisions, handling proposals of four disciplines, which are Management Science and Engineering, Business Administration, Economic Sciences, and Macro-Management and Policy.

The Department will be more active to encouragescientists to confront the frontier of management and economic science, as well as the needs of the nation's economic growth and social development, so that to propose their research topics, promote the innovation on theory and methodology, and enhance the capability for serving to the national strategy and economic and management practices. Meanwhile, it also encourages integrated development and innovation based on multidisciplinary, including Mathematical Sciences, Information Sciences and etc., driving the emergency and development of new fields in science. It also encourages the international cooperation and exchanges.

The Department emphasizes applying "scientific method" to explore the objective laws of management and economic activities, and encourages the revolution of research paradigm. The Department supports research that observes and describes the management phenomena based on data obtained from experiment, observation, investigation, measurement and etc. The Department also supports research that aims

at addressing management issues by analyzing and explaining management phenomena through modeling, computation, induction, deduction, etc.

The Department encourages interdisciplinary research, and supports scientists from diverse academic backgrounds to take an active part in management science research and contribute to the development of Management Sciences from basic law and theoretical method. However, applications focusing on social science and humanities, as well as those within the funding scope of other scientific departments of NSFC, will not be handled by the Department.

In 2021, the Departmenthas adjusted the application codes for the four disciplines according to the arrangements of the NSFC. Therefore, the aims and the orientation are clearer for the four different disciplines. The applicants should choose the appropriate code in the disciplines.

Funding for Projects of General Program, Young Scientist Fund and Fund for Less Developed Regions in Department of Management Sciences in 2022

Unit: 10,000 yuan

Divisions		General Program			Young Scientist Fund			Fund for Less Developed Regions		
		Projects	Direct expenses	Funding rate (%)	Projects	Direct expenses	Funding rate (%)	Projects	Direct expenses	Funding rate (%)
Division I	Management science andengineering	253	11 385	18.66	289	8 610	18.09	35	980	14.46
Division II	Business administration	172	7 740	17.60	251	7 530	14.99	35	980	15.84
Division III	EconomicSciences	168	7 550	16.36	252	7 540	14.73	35	980	15.63
	Macro-management and policy	235	10 575	16.02	283	8 460	14.23	40	1 120	14.87
Total or average		828	37 250	17.15	1 075	32 140	15.42	145	4 060	15.17
Direct expenses of funding per project		44.99			—			28.00		

General requirements for applications are as follows:

1. No repetitive funding with the National Social Science Fund of China

To optimize the allocation of the National Natural Science Fund and to ensure that principal investigators invest adequate time and energy in their on-going national projects, the Department will decline proposals by the following applicants in 2023 (except for the applications of Excellent Young Scientists Fund and National Science Fund for Distinguished Young Scholars), except for otherwise indicated in this Guide:

(1) Applicants who were supported by the National Social Science Fund of China as a principal investigator within the past 5 years (from Jan. 1, 2018), and have not yet got the project completion certificate awarded by the National Planning Office of Philosophy and Social Scienceby the deadline of this year's fund application.

Notes: If an applicant has gained the project completion certificate from the National Planning Office of Philosophy and Social Science, and is applying for an NSFC project with the application code starting with G in 2023, he/she must provide a copy of the certificate with an official signature and seal of his/her home institution, and submit the electronic version of this certificate online.

(2) Applications who apply for National Social Science Fund as a principal investigator in the year of 2023.

2. Accuracy and integrality of information

Applicants are responsible for the accuracy, integrality, and reliability of the contents of their applications, and their home institutions are obligated to undertake serious check on the relevant information. The following requirements should be complied with when applicants prepare and submit the project proposals:

(1) Applicants are required to give a detailed description on their previous research work related to the proposed work, as well as the publications published in previous work. The five representative works should be papers and books that have already been published (including those published online). When the applicant fills out the information of the representative works, he/she should carefully read the requirements of application form and must comply with it.

(2) The Department treats it unacceptable that applicants submit the same proposals to more than one science funding agency. Applicants who propose new research topics based on their previous NSFC projects are required to describe the progress of the previous NSFC projects and clarify the relations and differences between the newly submitted proposal and the previous ones. For applicants who are undertaking projects funded by other agencies, such as MOST, MOE, NSSF or local science funding organizations, they are required to clarify the similarities and differences between their on-going projects and the new proposal submitted to NSFC.

3. Special requirements for principal investigator starting NSFC projects in recent years

To ensure that principal investigators invest adequate time and energy in their on -going projects, the applicants in 2023 who has been approved any kind of NSFC projects as a principal investigator in 2021 or 2022 (especially for the year of 2022) will be reviewed and assessed through stricter procedures.

4. Consideration of the performance of accomplished projects

The Department conducts performance evaluation for all General Program projects, Young Scientists Fund projects, and Fund for Less Developed Regions projects one year after these projects were completed. Researchers with good performance evaluation results will be given priority for funding when they apply for new projects. By contrast, researchers with poor performance evaluation results will undergo stricter review procedures when they apply for new projects.

Division I of Management Sciences

Management Science and Engineering (G01)

The Discipline mainly supports basic research on management theory and

method, including Complex Systems Management, Operations Management, Decision-making Theory and Game Theory, Evaluation and Forecasting Theory and Method, Management Statistics Theory and Method, Management Psychology and Behaviors, Management System Engineering, Industrial Engineering and Quality Management, Logistics and Supply Chain Management, Service Science and Engineering, Data Science and Management, Information System and Management, Risk Management, Financial Engineering, Engineering Management and Project Management, Transportation Management, Digital Platform Management Theory, Intelligent Management and Artificial Intelligence, New Technology-driven Management Theory and Method, etc.

The orientation of theDiscipline is more focused on basis theoretical research, emphasizing innovative research on management theory and method integrated with China's management practices. The Discipline encourages interdisciplinary research and international frontiertheoretical research .

During the last few years, the discipline has experienced rapid development in China. Its performance and reputation in the international scientific society has been unceasingly raised up in many research areas. However, the number of application varied significantly across different research areas. The application number in some fields was relatively large, including of Operations Management, Logistics and Supply Chain Management, Industrial Engineering and Quality Management, Transportation Management, Engineering Management and Project Management and etc. Meanwhile, the number of applications in the field of basic theory and method on management science was relatively small, like Management Statistics Theory and Method, etc.

In 2023, the Discipline will continue to encourage and support basic theoreticalresearch on management science, method on frontier as well as original studies based on China's management practices, which includes as follows: supporting pioneering research to explore the frontiers of management science and achieve innovative research findings with international influence; providing support forscientiststo link the frontiertheory and method with problems within China, so that to solve the common and important issues from management practices in China and propose the general management theory and method; supporting the frontier research confronting the important national demand, encouraging the scientists to pay more attention to the scientific management problems in the new field like digital economy, intelligent manufacturing, new generation of information technology and etc., and the one behind the technical problems of "neck-lock"; encouraging the integration of management science with Mathematics, Economic Sciences, Behavior Sciences, Information Sciences, as well as other disciplines, and supporting the interdisciplinaryfrontier research facing to the complex social systems and complex engineering systems, seeking breakthroughs of theories, methods and techniques.

Division II of Management Sciences

Business Administration (G02)

The Division mainly supports basic research and applied basic research on management theories and new management techniques and methodologies, taking micro-level organizations (all types of industries, enterprises, institutions, and nonprofit organizations) as research objects. The funding areas of the Division include Strategic Management, Theory of Firm, Enterprise Technology Management and Innovation Management, Human Resource Management, Financial Management, Accounting and Auditing, Marketing, Organization Theory and Organization Behaviors, Business Intelligence and Digital Business, Corporate Finance, Enterprise Operation Management, Corporate Governance, Entrepreneurship, International Business Management, Tourism Management and so on.

In recent years, all fields of Business Administration have been well developed. The number of applications in some fields was relatively large, which includes Marketing, Financial Management, Accounting and Auditing, Enterprise Technology Management and Innovation Management, Enterprise Operation Management, Organization Theory and Organization Behaviors, and etc. Correspondingly, the number of funded projects in these fields was also much larger than the one in other fields. In general, it has shown certain innovativeness for the proposals onbasic research expanding the frontier theory, exploring new techniques and methods. Meanwhile, it has steadily increased for the basic applied research focused on the national strategic demands and Chinese firms' practical needs.

In 2023, the Division will continue to support the innovative basic research aiming at the national strategy demands and scientific frontier. The Division will give priority to the proposalsthat will bring out new theory and discovery, to the pioneering research employed various methods including behavioral experiments, quantitative models, machine learning, text mining, and etc., from different disciplines including Information Science, Data Science, Behavioral and Psychological Science, Economic Science, and etc., verified by different sources of data, and being backed by multidisciplinary studies. The Division advocates scientific spirits, encourages original exploration, and supports original research that focused on the management theory and paradigm revolution based on practices of Chinese enterprises, as well as the one is beneficial to the high-quality development of Chinese firms.

In order to promote the balance development, the Division will focus on all the 15 codes in the discipline of Business Administration and give priorities to basic research that pushing the cutting edge of this discipline. The Division will pay more attention to the new areas, like corporate finance, corporate governance, tourism management, etc. Meanwhile, the Division encourages the research focused on topic

of management process and activities under the background of dual circulation,"Dual Carbon" goals, digital economics and artificial intelligence, which includes the firms' organization, production, operation, service and business.

Division III of Management Sciences

The Division supports 2 basic research areas: Economic Sciences and Macro-Management and Policy.

Economic Sciences (G03)

The Economic Sciences Discipline mainly supports basic research on unveiling rules of economic activities, explaining economic phenomena, and deriving economic theories through scientific research methods, such as empirical study, quantitative study, and behavior study and etc. The funding areas covers14 different disciplines, including Econometrics and Economic Statistics, Behavior Economics and Experimental Economics, Mathematical Economics and Computational Economics, Microeconomics, Macroeconomic Management, International Economics and Trade, Financial Economics, Public Finance and Public Economics, Industrial Economics, Economic Development and EconomicInstitution, Agricultural and Forestry Economics and Management, Regional Economics, Population, Labor and Health Economics, Resources and Environment Economics, etc.

In 2022, there have been a large number of applications in the fields of Econometrics and Economic Statistics, Financial Economics, Resources and Environment Economics, International Economics and Trade, Agricultural and Forestry Economics and Management, Industrial Economics, and the number of funded projects was correspondingly large. There were fewer applications and fewer funded projects in the fields of Mathematical Economics and Computational Economics, Microeconomics, Behavior Economics and Experimental Economics, Economic Development and Economic Institution, Public Finance and Public Economics. Due to the adjustment of discipline application code in 2021, applications in some new disciplines were muchless. On the whole, the research on exploring new methods and technologies is growing rapidly, and the research on paying attention to new problems and practicalproblemsin China increasing steadily.

In 2023, this Discipline willface the main field of national social economy, stress support basic research which is innovative and aimed at cutting-edge science of the Discipline, pay attention to theoretical innovation, method innovation and research on new knowledge discovery and creation, and give priority to supporting quantitative research, such as mathematical modeling and empirical analysis, interdisciplinary perspective, scientific discovery and accumulation research highlighting China's background. It will be given priority to supportfortheresearch on scientific issueswith

potential application value from Chinese economic practices, as well as the onewith substantive international cooperation. It advocates the spirit of science, encourages free exploration and gives priority to the original theoretical exploration based on Chinese economic practices.

In order to promote the balanced development of the discipline, subsidies will be given to new fields such as Mathematical Economics and Computational Economics, Microeconomics, Public Finance and Public Economics, Economic Development and Economic Institution, as well as small fields such as Digital Economics, Green Finance and etc.

Macro-Management and Policy (G04)

The Macro-Management and Policy Discipline is a group of disciplines that study the behavior of government and related public sectors in formulating macro policies and implementing comprehensive governance, in order to achieve the social and economic development goals. It covers 15 branches of basic research on Public Administration and Public Policy, Theories and Methods of Policy Science, Governance and Policy of Science and Technology, Governance and Policy of Innovation, Governance and Policy of Health, Governance and Policy of Medicine, Governance and Policy of Education, Governance and Policy of Culture, Public Safety and Emergency Management, Social Governance and Social Security, Governance of Environment and Ecology, Governance and Policy of Resource, Regional Development and Urban Governance, Digital Governance and Information Resource Management, Global Governance and Sustainable Development, etc.

In recent years,thenumber of applications for Governance and Policy of Healtharethe largest, accounting for about 30% (This field does not fund the Pathology, Clinical and Nursing Research of certain diseases. For related project applications, please choose the relevant application code under the Department of Health Sciences), but the funding rate is relatively low. Relativelymore projects have been funded in advantageous fields such as Governance and Policy of Resource, Public Safety and Emergency Management. There are fewer applications and fewer funded projects in the fields of Governance and Policy of Culture, Theories and Methods of Policy Science, Global Governance and Sustainable Development.

The Discipline aims to facilitate discipline development, promote academic innovation, and support talent scientists and research teams. In particular, the Discipline encourages researchers to provide scientific support and evidences for macro policy makers while developing theories and methods. It encourages researchers to provide scientific support and evidences for macro policy makers while developing theories and methods. The applications should take China’s practical governance issues as the main research objects, and bring up scientific theoretical issues from the research objects accurately. Special attention should be paid to the scientificity and normativeness of the research methods. Applicants are advised to

differentiate between management science research and practical management work, differentiate between an NSFC project and a project on humanity and social science in terms of research methods.The scope of the research topic needs to be appropriate.The research goal should be concentrated. The research content should be specific and concrete. The research method and technology roadmap, as well as how to address the key scientific issues, need to be clearly clarified in the proposal.

Department of Interdisciplinary Sciences

Interdisciplinary sciences refer to the group of disciplines at various levels that stem from deep interactions and inter-penetrations involving multiple academic disciplines. It is composed of trans-disciplinary structures of knowledge, logic of thoughts, frames of theories, system of methodology, and reconstructs these components based on certain principle. Distinguished from the original academic disciplines, interdisciplinary sciences are featured with comprehensiveness, extensiveness, uniqueness, and novelty. It is the outcome of evolutionary process of science, from the initial stage of general knowledge about nature to the intermediate stage of highly classified disciplines, and to the stage of recombination of knowledge. It also represents an additional novel stereotype for human beings to explore the nature. Interdisciplinary science is the milestone for the development of scientific studies. It aims to generate and provide revolutionary viewpoints, stereotype, and tools to search for solutions to important and sophisticated issues that human beings are contemporarily facing.

Motivated by solving important and sophisticated issues and aiming at interdisciplinary research, the Department of Interdisciplinary Sciences (DIS) organizes and deploys research activities on interdisciplinary science in order to meet important national strategic needs and to push the frontier of science forwards. The responsibility of the Department includes: 1. to develop a complete and sound system to support interdisciplinary research in all disciplines; 2. to promote collaborations from multiple disciplines to solve sophisticated issues of science and technology; 3. to facilitate the development of new academic disciplines and scientific breakthroughs; 4. to probe for revolutionary stereo type of scientific research; 5. to cultivate scholars of interdisciplinary science and to create culture of interdisciplinary research.

In 2022, the Department received 274 applications for Excellent Young Scientists Fund, and funded 30 projects with a funding rate of 10.95%, and a total direct cost funding of 60 million yuan with each project receiving 2 million yuan in funding.

In 2022, the Department received 318 applications for National Science Fund for Distinguished Young Scholars, and funded 28 projects with a funding rate of 8.81%,

Funding for Projects of all kinds in Department of Interdisciplinary Sciences in 2022

Unit:10,000 yuan

Divisions	Excellent Young Scientists Fund			National Science Fund For Distinguish Young Scholar			Science Fund for Creative Research Groups			Basic Science Center Program		
	Projects	Direct cost	Funding rate (%)	Projects	Direct cost	Funding rate (%)	Projects	Direct cost	Funding rate (%)	Projects	Direct cost	Funding rate (%)
Division I	11	2 200	14.47	11	4 400	10.78	2	2 000	33.33	1	6 000	33.33
Division II	3	600	7.14	5	2 000	8.20	1	1 000	7.14	0	0	0
Division III	10	2 000	10.42	10	4 000	9.35	2	2 000	14.29	1	6 000	12.50
Division IV	6	1 200	10.00	2	800	4.17	0	0	0	0	0	0
Total	30	6 000	10.95	28	11 200	8.81	5	5 000	13.16	2	12 000	13.33

and a total direct cost funding of 112 million yuan with each project receiving 4 million yuan in funding.

In 2022, the Department received 38 applications for Science Fund for Creative Research Groups, and funded 5 projects with a funding rate of 13.16%, and a total direct cost funding of 50 million yuan with each project receiving 10 million yuan in funding.

In 2022, the Department received 15 applications for Basic Science Center Program, and funded 2 projects with a funding rate of 13.33%, and a total direct cost funding of 120 million yuan with each project receiving 60 million yuan in funding.

Notes:

I. Types of projects accepted by the Department of Interdisciplinary Sciences in 2023

(1) During the centralized acceptance period of project applications in 2023, the types of programs will be accepted by the Department include: Excellent Young Scientists Fund, National Science Fund for Distinguished Young Scholars, Science Fund for Creative Research Group, Basic Science Center program and Research Fund for International Scientists.

(2) Out of the centralized acceptance period of 2023 program applications, the types of programs that will be accepted by the Department include: the Special Fund for Research on National Major Research Instruments (recommended by departments), Major Program, Major Research Plan and Key International (Regional) Joint Research Program, as well as other special funds. Among of the above mentioned Programs, the guideline of the Special Fund for Research on National Major Research Instruments (recommended by departments) has been published in this *Guide*, guidelines for other programs will be published in due time on NSFC's website.

II. Application Requirements.

In addition to meeting the application conditions specified in this *Guide*, the program application of the Department shall also meet the following conditions:

(1) The proposed research work must have obvious characteristics of

interdisciplinary scientific research and be necessary to carry out interdisciplinary scientific research;

(2) The applicant has an educational background in at least two different first-level disciplines (including undergraduate, master, doctoral) or experience in conducting interdisciplinary scientific research in which he or she has played a key role.

III. Application Documents

In addition to meeting the requirements of the application materials in this *Guide*, the program application documents of the Department shall also meet the following requirements:

(1) The special application form of the DIS shall be used for all program applications of the DIS.

(2) When applying for the program of the DIS, the applicant shall first select the acceptance code and then the application code.

i. The Department sets up acceptance codes for four fields, which are T01 (Physical Sciences), T02(Intelligence sciences), T03(Life and Health Sciences) and T04(Convergence Sciences). The applicant shall select one of the acceptance codes according to the applied research field.

ii. There is no separate application code for the DIS. The application codes can be found in the section "NSFC Application Codes" in this *Guide*. Applicants should accurately select 2 to 5 application codes, paying particular attention to:

- when selecting the application codes, choose application codes that belong to at least two different scientific departments and are from different research fields, and try to select the secondary application code (4 digits).

- fill in the "Research direction" and "Key words" accurately when filling in the short form of application.

IV Additional Notes

1 When filling in the application form, please read carefully the instructions and outline of each type of program.

2 Basic Science Center program and Major Program may be applied by one applicant alone or two applicants together:

(1) For joint application, the two applicants shall be differentiated as the first applicant and the second applicant.

(2) If the second applicant and the first applicant are not in the same host institutions, the host institution of the second applicant shall be regarded as the cooperative research institution.

(3) In the case of joint application, the online filling and submission of the application form in the information system shall be completed by the first applicant and the host institution.

Division I of Interdisciplinary Sciences (T01)

The funding scope of the DivisionI includes: interdisciplinary researches based on fundamental natural sciences such as mathematics, physics, chemistry, etc, aiming to promote research at the global frontier of science and meet important national needs, to solve fundamental scientific problems associated with information science, life science, material science, energy and environmental science, and to achieve significant breakthrough or to develop new academic discipline and research fields.

Division II of Interdisciplinary Sciences (T02)

The funding scope of the Division includes: interdisciplinary researches based on advanced materials, contemporary engineering, information technologies, etc., aiming to promote research at the global frontier of science and meet important national and economical needs, to solve problems during the development of Chinese society, including key scientific and technological problems of engineering, control and advanced manufacturing, etc.

Division III of Interdisciplinary Sciences (T03)

The funding scope of the Division includes: interdisciplinary researches associated with life and health, and based on science, engineering, medical science etc., aiming to develop advanced technology and methodology in life and medical science, to clarify the regulatory mechanism in sophisticated life system from the aspect of multi-layer and trans-scale, to unveil the scientific law and principles governing biological phenomena, and probe for novel mode of research in life science to face major challenges of human health and disease prevention and control.

Division IV of Interdisciplinary Sciences (T04)

The funding scope of the Division includes: interdisciplinary researches based on theory and methodologies of natural science and convergence of knowledge and tools from multiple disciplines, aiming to study the sophisticated system of resource development and utilization, globalization, evolution of human culture, and to solve major problems associated with sustainable development of human beings.

General Program

General Program supports scientists engaged in basic research on self-selected topics within the funding scope of NSFC to conduct innovative research and promote a balanced, coordinated and sustained development of all disciplines.

An applicant must meet the following qualifications:

(1) Have the experience of undertaking basic research projects or conducting other basic research;

(2) Hold a senior professional position (title) or doctoral degree, or be recommended by two professionals with senior academic positions (titles) in the same research field.

Full time post graduate students are not eligible to apply for the General Program, but on-the-job graduate students may apply through their host institutions with the consent of their supervisors.

Applicants should be familiar with the current situation of relevant research in China and the world, capable of leading a group to conduct research. Applicants should prepare proposals in accordance with the guideline. The proposed research should be of scientific significance and research merits, and have sufficient thematic basis, novel academic ideas, clear-cut objectives, reasonable and detailed research contents and feasible research schemes. The number of collaborative institutions for General Program projects should not exceed 2, and the duration is 4 years (Pls as in-site post-doctoral researchers, whose duration of the project should be determined based on the written commitment from their host institutions, and not more than 4 years and the host institution is not changeableafter the project is awarded).

In 2022, NSFC funded 20472 General Program projects, with a direct cost of 10.87 billion yuan. The average funding was 531 400 yuan per project. The success rate was 17.56 %. The funding of the General Program projects in 2022 is shown in the table below.

In 2023, the pilot review based on four natures of science topics will be implemented for the General Program. When preparing the application for General Program, the applicant should select the nature of science topic based on the key scientific issues to be solved and the research content, and clarify the reasons for choosing the science feature concerned. In the case of multiple science features, the applicant should choose the science feature that best

matches, and is most focused and characteristic. NSFC shall organize respective review by experts based on the science feature that the applicant chooses.

The average funding intensity for direct cost in 2023 for General Program is basically the same as that in 2022. Please refer to the funding areas and announcements of the relevant science departments for detailed funding scope and situation in recent years and other relevant requirements about General Program. Applicants are advised to prepare their research proposals in line with the funding intensity and the instructions by respective science departments.

Young Scientists Fund

The Young Scientists Fund supports young scientists to freely select their research topics within the funding scope of NSFC to conduct basic research, particularly focus on fostering the ability of young scientists to independently undertake research projects and conduct creative research, stimulates their creative thinking and trains backup talents for basic research.

1. An applicant for Young Scientists Fund must meet the following qualifications:

(1) Have the experience of conducting basic research;

(2) Hold a senior professional position (title) or doctoral degree, or be recommended by two professionals with senior academic positions (titles) in the same research field.

(3) By January 1 of the year of application, male applicants must be younger than 35 (born on or after January 1, 1988) and female applicants must be younger than 40 (born on or after January 1, 1983).

On-the-job doctoral students who satisfy the above criteria may apply through their host institutions with the consent of their supervisors. Those who are studying for a graduate degree are not allowed to apply for the Young Science Fund.

2. In 2023, scientific and technical personnel from host institutions in Hong Kong and Macao can apply for the Young Scientists Fund. In addition to meeting the basic requirements, the applicants shall also meet the following qualifications:

(1) Abide by the Basic Law of the Hong Kong Special Administrative Region of the People's Republic of China, the Basic Law of the Macao Special Administrative Region of the People's Republic of China, and the provisions on the management of science funds;

(2) Formally employed in hostinstitutions in Hong Kong and Macao. Those who are engaged in postdoctoral research or studying for postgraduate degrees shall not apply for the Young Scientists Fund through the host institutions in Hong Kong and Macao.

3. Special reminders to the applicants:

(1) Those who are the Pls of ongoing project of Young Scientists Fund or have undertaken it, including one-year Small Fund for Exploratory Studies, or terminated or withdrawn projects, cannot apply again.

(2) For Young Scientists Fund, the creative potential of the applicant is mainly evaluated.

(3) Applicants should compose proposals in accordance with the outlines of application for Young Scientists Fund. The project duration is 3 years. (Pls as in-site post-doctoral researchers, whose duration of the project should be determined based on the letter of commitment from their host institutions, and not more than 3 years, however they cannot change the host institution after the project is awarded).

(4) In 2023, the funding contract system of the Young Scientists Fund will be implemented, and the funding will no longer distinguish between direct and indirect costs. The funding for each project is 300,000 yuan (100,000 yuan if the funding period is one year; If the funding term is 2 years, the funding shall be 200,000 Yuan)

(5) In 2023, the pilot review based on four natures of science topics will be implemented for the Young Scientists Fund. When preparing the application for Young Scientists Fund, the applicant should select the mature of science topic based on the key scientific issues to be solved and the research content, and clarify the reasons for choosing the science feature concerned. In the case of multiple science features, the applicant should choose the science feature that best matches, and is most focused and characteristic. NSFC shall organize respective review by experts based on the science feature the applicant chooses.

In 2022, a total of 22,262 Young Scientist Fund projects were funded. The direct cost was 6628 million yuan. The success rate was 17.23% (please refer to the table below for the funding situation).

Funding of the Young Scientists Fund Projects in 2022

Unit: 10,000 yuan

Departments	No. of applications	Awards			Success rate (%)
		No. of Awards	Funding for direct costs	Share of NSFC total funding for direct costs (%)	
Mathematical and Physical Sciences	8 623	2 224	66 100	9.97	25.79
Chemical Sciences	10 739	2 042	60 490	9.13	19.01
Life Sciences	17 538	3 000	89 170	13.45	17.11
Earth Sciences	9 902	2 145	63 770	9.62	21.66
Engineering and Materials Sciences	21 985	3 822	113 880	17.18	17.38
Information Sciences	10 976	2 634	78 370	11.82	24.00
Management Sciences	6 972	1 075	32 140	4.85	15.42
Health Sciences	42 458	5 320	158 880	23.97	12.53
Total or average	**129 193**	**22 262**	**662 800**	**100.00**	**17.23**

Fund for Less Developed Regions

The Fund for Less Developed Regions supports scientists of some host institutions in specified regions of China to conduct innovative research within the funding scope of NSFC, so as to foster and support researchers in the regions, to stabilize and gather outstanding talents to facilitate the construction of the regional innovation system as well as the social and economic development of the regions.

An applicant of Fund for Less Developed Regions must meet the following qualifications:

(1) Have the experience of undertaking basic research projects or conducting other basic research;

(2) Hold a senior academic position (title) or doctoral degree, or be recommended by two professionals with senior academic positions (titles) in the same research field.

Full-time researchers meeting the above qualifications and working in Inner Mongolia Autonomous Region, Ningxia Hui Autonomous Region, Qinghai Province, Xinjiang Uyghur Autonomous Region, Xinjiang Production and Construction Corps, Tibet Autonomous Region, Guangxi Zhuang Autonomous Region, Hainan Province, Guizhou Province, Jiangxi Province, Yunnan Province, Gansu Province, Yanbian Korean Prefecture of Jilin Province, Enshi Tujia and Miao Prefecture in Hubei Province, Xiangxi Tujia and Miao Prefecture in Hunan Province, Liangshan Yi Prefecture in Sichuan Province, Ganzi Tibetan Prefecture in Sichuan Province, Aba Tibetan and Qiang Prefecture in Sichuan Province, Yan'an City and Yulin City in Shaanxi Province, may apply for the Fund. Researchers seconded by the Organization Department of the Central Committee of the CPC to Xinjiang Uyghur Autonomous Region and Tibet Autonomous Region for 3 or more years are also eligible to apply for this Fund during their tenure.If the host institution where an aid scientist is working in Xinjiang or Tibet is not a registered host institution at NSFC, he/sheis allowed to apply for the Fund for Less Developed Regions through the eligible host institutions in the aided autonomous regions, on the condition that they provide the scanning copy of certificate documents issued by the organization departments or personnel department of their host institutions to prove their identity of aid scientists when applying for this Fund.

Researchers from the affiliated institutions to the central government or the PLA and part-time researchers working in the eligible host institutions in the above regions

and provinces cannot apply, but may join the application as main participants. Graduate students cannot apply, but on-job students may apply through their host institutions with the consent of their supervisors. Researchers without an institution or whose host institutions have not been registered at NSFC cannot apply for the Fund for Less Developed Regions.

In order to provide balanced support for qualified applicants for the Fund for Less Developed Regions and encourage them to apply for projects of General Program and other competitive programs of NSFC, so as to improve basic research in less developed regions, researchers who have been granted 3 or more projects under the Fund for Less Developed Regions are not allowed to apply for this Fund again since the year 2016, but the Fund for Less Developed Regions grants approved in 2015 and earlier will not be counted in.

Applicants should prepare proposals in accordance with the outline of application. The number of collaborative institutions for Fund for Less Developed Regions should not exceed 2, and the duration is 4 years (Pls as in-site post-doctoral researchers, whose duration of the project should be determined based on the written commitment from their host institutions, and not more than 4 years. However, they cannot change the host institution after the project is awarded).

In 2022, the Fund supported 3,521 projects with a total funding for direct cost of 1150.8 million yuan. The average funding was 326,800 yuan per project, and the success rate was 14.49% (please refer to the table below for the funding situation).

Funding of the Fund for Less Developed Regions in 2022

Unit: 10,000 yuan

Departments	No. of applications	Awards				Success rate (%)
		No. of Awards	Funding for direct costs	Average funding for direct costs	Share of NSFC total funding for direct costs (%)	
Mathematical and Physical Sciences	1 262	240	7 310	30.46	6.35	19.02
Chemical Sciences	1 749	298	9 830	32.99	8.54	17.04
Life Sciences	5 350	927	30 590	33.00	26.58	17.33
Earth Sciences	1 519	226	7 560	33.45	6.57	14.88
Engineering and Materials Sciences	3 084	435	14 350	32.99	12.47	14.11
Information Sciences	1 726	262	8 760	33.44	7.61	15.18
Management Sciences	956	145	4 060	28.00	3.53	15.17
Health Sciences	8 654	988	32 620	33.02	28.35	11.42
Total or average	**24 300**	**3 521**	**115 080**	**32.68**	**100.00**	**14.49**

In 2023, the average funding for direct costs is expected to be consistent with that of 2022. Please refer to the funding intensity of direct cost of relevant departments and make budget request in a realistic manner.

Key Program

The Key Program supports scientific and technical personnel engaged in basic research to carry out in-depth, systematic and innovative research on well-founded research directions or disciplinary growth points, promote disciplinary development, and promote breakthroughs in several important fields or scientific frontiers.

Key Program should reflect the principles of limited goals, limited scale, and prominent priorities, attach importance to interdisciplinary and infiltration, make effective use of the existing important scientific research bases of the state and departments, and actively carry out substantial international cooperation and exchanges.

Applicants for Key Programs should meet the following qualifications:

(1) Have experience in undertaking basic research project;

(2) Hold a senior professional and technical position (title).

Postdoctoral researchers in the station, researchers who are studying for a postgraduate degree, or those who do not have a work unit or whose unit is not a registered host institution of NSFC, are not allowed to apply as applicants.

Each year, NSFC determines the research fields or research directions of Key Programs, for which applications are accepted, and issue guidelines to guide applications. Applicants should write applications in accordance with the requirements of this Guide and the outline of Key Program application writing, condense scientific issues within the research field or research direction, determine the project name according to the research content, and avoid the project name covering the entire field or direction.

Key Programs are generally undertaken by one host insitution, and if it is really necessary to conduct cooperative research, the number of cooperative research institutions shall not exceed two. The funding period is 5 years.

Special reminder to applicants:

In 2023, NSFC will continue to select Key Program proposals to carry out classification reviews based on the attributes of four types of scientific problems. The applicant should select the attribute of the scientific problem according to the key scientific problem to be solved and the research content, and explain the reasons for selecting the attribute of the scientific problem. If the application proposal has multiple scientific problem attributes, the applicant should select the one type of scientific problem attribute that is most consistent, focused, and

best reflects the characteristics of the application proposal. NSFCwill organize review experts to conduct classified review according to the attributes of the scientific problem selected by the applicant.

In 2022, a total of 761 Key Programs projects were funded, with a direct cost of 2,052.82 million yuan and an average direct cost of about 2.69 million yuan per project (the funding of the Key Program in 2022 is shown in the table below).

Funding of Key Program Projects in 2022

Unit: 10,000 yuan

Departments	No. of applications	Awards			
		No. of awards	Funding for direct costs	Average funding for direct costs	Share of NSFC total funding for direct costs (%)
Mathematical and Physical Sciences	475	91	25 480.00	280.00	12.41
Chemical Sciences	357	68	19 040.00	280.00	9.28
Life Sciences	675	110	29 660.00	269.64	14.45
Earth Sciences	664	112	30 450.00	271.88	14.83
Engineering and Materials Sciences	819	118	31 742.00	269.00	15.46
Information Sciences	385	106	30 210.00	285.00	14.72
Management Sciences	121	29	5 510.00	190.00	2.68
Health Sciences	841	127	33 190.00	261.34	16.17
Total or average	**4 337**	**761**	**205 282.00**	**269.75**	**100.00**

For the research fields or research directions funded by Key Program and related requirements, please refer to the introduction of each science department in this part.

Basic Science Section

Department of Mathematical and Physical Sciences

In 2022, the Department announced 129 areas for Key Programs, and received 475 applications. 91 projects were funded with direct cost funding of 254.80 million yuan. The average funding amount of direct cost was 2.8 million yuan per project, and the success rate was 19.16%.

In 2023, the Department plans to fund about 90 Key Program projects. The average direct cost funding will be about 2.6 million yuan per project for Mathematics, and 3.2 million yuan for Mechanics, Astronomy, Physics I and Physics II. The funding period will be 5 years. Please provide with the proper application code when applying.

Please indicate the proposed research directions in the "Annotations" section of the application form, otherwise the application will be returned without review.

In 2023, the main research directions are as follows:

1. Frontier problems in mathematical physical logic (A01, A02)
2. Key problems in arithmetic algebraic geometry (A01, A02)
3. Analytical and combination method in number theory (A01, A02, A04)
4. Algebraic structure and representation (A01, A02)
5. algebraic and transcendental method for algebraic clusters (A01, A02)
6. Sub manifold geometry and topology (A01, A02)
7. Geometry analysisand applications (A01-A03)
8. Modern method in mathematical physics (A01-A03)
9. Low dimension topology (A01, A02)
10. Complex analysis and complex geometry (A01-A03)
11. Fractal geometry and fractal analysis (A01, A02)
12. Theory and application of harmonic analysis (A02, A03)
13. Variation method and applications (A02, A03)
14. non exchange analysis, geometry (A01, A02)
15. Statistic analysis in disordered system (A02, A03, A06)
16. Theory and application of random equation (A02, A03, A06)
17. Frontier problems in dynamical system (A02, A03)
18. Qualitative theory of differential equation (A02, A03)
19. theory of nonlinear partial differential equation (A02, A03)
20. Applied partial differential equation (A02, A03)
21. Infinite dimensional dynamical systems and integrable systems (A01-A03)
22. Statistic analysis of complex data (A04)

23. Statistical basis and method of big data (A04)
24. Optimization theory and method driven by model or data (A04)
25. Optimized modeling and efficient algorithm for large scale problems (A04)
26. Theory and application of combination mathematics (A04)
27. Key problem, algorithm and application of graph theory (A04)
28. Basic computational methods and theoretical analysis (A05)
29. Computable modeling and simulation (A05)
30. Problem-driven science and engineering computation (A05)
31. Mathematical model and computation method for industrial software (A04-A06)
32. Mathematical method in modern control theory (A06)
33. Mathematical theory and algorithm for quantum computation and and quantum information processing (A04-A06)
34. Mathematical theory and algorithm in new generation of information technology (A04-A06)
35. Theory and method of uncertainty mathematics (A04-A06)
36. Key mathematical problems in economy and finance (A04-A06)
37. Mathematical theory and application in biology and medicine (A04-A06)
38. Mathematical theory and method of AI and data science (A01-A06)
39. Basic mathematics in modern cryptography (A01, A06)
40. Theory and method of computer mathematics (A04-A06)
41. Modeling, analysis and control of complex system dynamics (A07)
42. Nonlinear dynamic theory and experiment for high dimensional system (A07)
43. Nonlinear dynamics of rotor system (A07)
44. Vibration characteristics and control of complex structures and system (A07)
45. Solid deformation and constitutive relations (A08)
46. Strength, failure and damage of materials and structure (A08)
47. Mechanical behavior of new materials and structures in multi-field environment (A08)
48. Soft matter and flexible structure mechanics (A08)
49. Structural optimization theory and design method (A08)
50. Integrated design and manufacture of multi-functional materials and structures (A09)
51. Unsteady complex flow mechanism and control (A09)
52. Aerodynamics and thermodynamics of aircraft (A09)
53. Hypersonic and reaction gas dynamics (A09)
54. Hydro dynamics of marine vessels and structures (A09)
55. Theory and method of complex fluid and multi-phase and interface flow (A09)
56. Biomechanical problems in human health and medicine (A10)
57. Mechanics and biological problems of cells and tissues (A10)
58. Theory and method of bionic mechanics (A10)

59. Theory and method of physical mechanics (A11)
60. Mechanism of energy release and damage in energy containing material explosion (A12)
61. Mechanical behavior of material and structure in dynamics loading (A12)
62. Rock mechanics in high temperature and high pressure conditions (A13)
63. Key mechanical problems in environmental evolution and catastrophe (A13)
64. New methods and technology in experimental mechanics (A07-A13)
65. New method of computation mechanics and software (A07-A13)
66. Fluid solid coupled mechanics (A07-A13)
67. Mechanical behavior of media and structure in extreme conditions (A07-A13)
68. Key mechanical problems in high end equipment and advanced manufacturing (A07-A13)
69. Key mechanical problems in energy and environment areas (A07-A13)
70. Key mechanical problems in aerospace (A07-A13)
71. Theory and method of data driven mechanics (A07-A13)
72. Origin of the cosmos and nature of dark matter and dark energy (A1401)
73. Formation and evolution of large cosmos structure and galaxies (A1402, A1403)
74. Activities of super large mass black holes and active galaxies (A1404)
75. History, structure, and evolution of the Galaxy (A1405)
76. Formation of stars, internal structure and evolution of stars (A1501, A1502)
77. Star catastrophic eruption, dense celestial body formation and evolution (A1503)
78. Fine structure of the sun and mechanism of corona heating (A1601)
79. Generation, storage and release of energy of the Solar magnetic field (A1602)
80. Formation, detection and dynamics of planetary system (A1701-A1703)
81. Spatial and temporal standard, orbital dynamics and its applications (A1801-A1804)
82. Key technology of optical/infrared/ultraviolet instruments (A1901)
83. Radio/millimeter wave/sub millimeter wave telescope and detection technology (A1902)
84. High energy radiation and particle detection technology and method (A1903)
85. Strong correlated system and superconductivity (A20, A24)
86. Topological matter state and quantum self spin liquid (A20)
87. Physics of confined quantum systems (A20, A24)
88. Surface and interface and membrane physics (A20)
89. Physics of semiconductor materials and devices (A20)
90. Magneto electro coupling and multi-field regulation (A20)
91. Solid magnetism and device physics (A20)
92. Physics of soft matter and bio systems (A20)
93. Method and software of computational solid state physics (A20)
94. New physics in energy transformation process (A20, A22)

95. New matter state and effect in extreme conditions (A20)
96. Interaction of light and condensed matters (A20)
97. Basics and application of photonic quantum information physics (A22, A24)
98. Atomic, molecular and cluster structures and dynamics (A21)
99. Atomic and molecular physical studies in extreme conditions (A21)
100. Regulation and quantum effect of cold atoms and molecules (A21, A24)
101. Physics of atom and molecule based precision measurement (A21, A24)
102. Nonlinear optics and precision spectral physics (A22)
103. Ultra fast and strong optical physics and applications (A22)
104. Super high spatial temporal resolution optical measurement (A22, A24)
105. Physics of the interaction of light and matters in Nano micro scales (A22)
106. Physics of optical field regulation and its applications (A22)
107. Acoustic propagation, inversion and control in complex media (A23)
108. Optical field information processing in ocean (A23)
109. Acoustic sensing and application of multi-physical field (A23)
110. Frontier problems in mathematical physics (A25)
111. Basic theory of statistical physics and its application in complex systems (A25)
112. Frontier problems in theory of gravitation and cosmology (A25)
113. Higgs physics and new physics (A26)
114. New method in quantum field, flavour physics and high precision measurement of standard models (A26)
115. Strong interaction and hadron physics (A26)
116. Dark matter, particle celestial physics and nuclear celestial physics (A26, A27)
117. Quark gluon plasma and quantum chromo dynamics (A27)
118. Novel structure and reaction mechanism (A27)
119. Heavy ion nuclear physics and laser nuclear physics (A27)
120. Accelerator physics and technology (A28)
121. Material, mechanism, method and technology of radiation detection (A28)
122. Particle detection mechanism and method (A28)
123. Technology and method of nuclear electronics (A28)
124. Reactor physics and neutron technology (A28, A30)
125. Inertia confined fusion and laser, Z-pinch plasma physics and technology (A29)
126. Magnetic confined fusion plasma physics and technology (A29)
127. Low temperature plasma physics,diagnosis and applications (A29)
128. Basic research on nuclear technology applications in new materials and energy areas (A30)
129. Basic research on nuclear technology applications in biomedical and agriculture and environmental areas (A30)
130. Key problems related to radiation physics and radiation protection (A30)
131. Studies on advanced technologies and experimental methods of synchrotron radiation and free electron laser (A30)

Department of Chemical Sciences

In 2022, the Department funded 68 Key Program projects with direct cost funding of 190.4 million yuan in total. The average direct cost funding amount is 2.8 million yuan per project for a period of 5 years. In 2023, the Department issues guidelines for Key Program applications in 97 research areas and the average direct cost funding is 2.5~3.5 million yuan for each project. Basically, the funding in each research area is limited to 2 projects. To enhance the quality and impact of the projects, proposals from groups/teams with excellent research foundation and experiences are preferred, and joint research in interdisciplinary areas are encouraged.

Applicants shall indicate the specific research area in the "Annotations" section of the application form, otherwise the application will be returned without review.

In 2023, the main research directions are as follows:

1. New methodologies/mechanisms of inorganic synthesis (B01)
2. New methodologies/reagents/mechanisms of organic synthesis (B01)
3. New methodologies/mechanisms of polymer synthesis (B01)
4. Precise synthesis and structure-function relationship of solid materials (B01)
5. New synthetic strategies for natural products and complex drug molecules (B01)
6. New building blocks, strategies and systems for supramolecular assembly (B01)
7. Precise synthesis of polymers with controllable chain structures (B01)
8. Synthesis of functional molecules, structures and materials (B01)
9. Synthesis and reaction mechanism under extreme conditions or external fields (B01)
10. Big data and artificial intelligence-assisted synthesis (B01)
11. Synthesis, structure and properties of organometallic/organo-element compounds (B01)
12. Organometallic catalysis (B01)
13. Characterization and reactivity of reactive intermediates in synthetic chemistry (B01)
14. Green synthesis and sustainable chemistry (B01)
15. Chemistry-driven biological and biomimetic synthesis (B01)
16. Fundamentals for efficient catalytic reaction (B02)
17. Design and construction of efficient catalyst (B02)
18. Operando characterization and theoretical simulation of catalytic process (B02)
19. Fundamentals of physical chemistry for surface/interface reaction (B02)
20. Scientific fundamentals and application of colloid and interface chemistry (B02)
21. Spatiotemporal-resolved characterization of dynamic processes of surface/interface chemistry (B02)
22. Electrocatalytic conversion of substances (B02)
23. Scientific issues of surface/interface chemistry for photoelectric functional systems

(B02)

24. Fundamental issues of electrochemistry in advanced manufacturing (B02)
25. Assembly and functionalization of colloids and interfaces (B02)
26. Interfacial function regulation in electrochemical energy conversion and storage (B02)
27. Construction of energy-related system integration based on homogeneous/ heterogeneous/ enzymatic catalysis (B02)
28. Quantum theory and methodology in chemistry (B03)
29. Chemical kinetics and dynamics of complex molecular systems (B03)
30. Theory and simulation of multiscale systems (B03)
31. Structure and evolution mechanism of polymer aggregation state (B03)
32. Chemical theory and mechanism based on artificial intelligence (B03)
33. Design and mechanism of optical function materials (B03)
34. New methodology and application of spectroscopy (B03)
35. Experimentation and theory of structural chemistry (B03)
36. Molecular-scale transport properties and spin manipulation (B03)
37. Theory and application of excitation state (B03)
38. New theory and principle of chemical measurement science (B04)
39. New analytical methods for life and health (B04)
40. Chemical imaging and analysis (B04)
41. Measurement of single molecule/particle/cell (B04)
42. Chemical measurement based on in vivo methods (B04)
43. Separation and analysis of complex systems (B04)
44. Micro-nano analysis method and devices (B04)
45. In situ and operando analysis (B04)
46. Intelligent sensing and measurement (B04)
47. Environment and energy oriented chemical measurement (B04)
48. Inorganic functional materials chemistry (B05)
49. Organic optoelectronic materials chemistry (B05)
50. Biomedical materials chemistry (B05)
51. Sustainable polymer materials chemistry (B05)
52. Energetic materials chemistry (B05)
53. Biomimetic and smart materials chemistry (B05)
54. Porous functional materials chemistry (B05)
55. Molecular aggregation structure and materials chemistry (B05)
56. Interfacial behaviors, migration and chemical transformation mechanisms of typical pollutants in multimedia environment (B06)
57. Fundamental study of environmental catalysis in pollution control (B06)
58. Pollution process and green remediation mechanism in soil/groundwater (B06)
59. Environmental exposure and toxic effect of emerging pollutants (B06)
60. New technologies and methods for the detection of emerging pollutants (B06)

61. Design and applied research on new environmental functional materials (B06)
62. Treatment, disposal and reutilization of solid wastes (B06)
63. Health risks and the molecular mechanism of fine particulate matter (B06)
64. Interaction mechanism and risk control between microorganisms and environmental pollutants (B06)
65. Synergetic controlling mechanism of environmental pollution and carbon emissions, and carbon circular utilization (B06)
66. Chemical biology of life essence (B07)
67. Recognition mechanism and molecule intervention of biomacromolecules (B07)
68. Structure, function and formation mechanism of natural products (B07)
69. Molecular mechanism and chemical intervention of immune regulation (B07)
70. Chemical genetics based on important molecular targets (B07)
71. Small-molecule recognition and chemical regulation of membrane protein (B07)
72. Chemical regulation of tumour microenvironment (B07)
73. Chemical biology of precise gene editing (B07)
74. In situ probing and mechanism analysis of vital processes (B07)
75. Rational design and directed evolution of enzyme (B07)
76. New green chemical processes for carbon emission reduction (B08)
77. Interfacial phenomena and regulation in chemical processes (B08)
78. Chemical engineering of catalyst design and preparation (B08)
79. Key basic chemicals and high-end specialty chemicals (B08)
80. Basic data and theoretical methods of chemical engineering (B08)
81. New separation materials and process intensification (B08)
82. New chemical industrial equipment and intellectualization (B08)
83. Engineering basics of electrochemical energy storage (B08)
84. Preparation and purification of specialty gases (B08)
85. Chemical engineering fundamentals for efficient resource utilization (B08)
86. Environmental chemical engineering and waste recycling (B08)
87. Chemical engineering fundamentals and creation of energetic compounds (B08)
88. Chemical engineering fundamentals for efficient utilization of biomass (B08)
89. Biomanufacturing and synthetic biology techniques (B08)
90. Chemical engineering of pharmaceutical production and drug delivery (B08)
91. Multi-field coupling mechanism in energy chemistry (B09)
92. Production and storage of green hydrogen by photo/electro-chemical processes (B09)
93. Energy chemistry of CO_2 conversion (B09)
94. Chemistry of key materials for solidum-ion batteries (B09)
95. Key chemical mechanism of carbon resource conversion (B09)
96. Chemistry of energy storage and conversion in extreme conditions (B09)
97. In situ study of energy conversion mechanism (B09)

Department of Earth Sciences

Earth science is a basic science to understand the planetary earth system, including Science of Geography, Geology, Geochemistry, Geophysics and Space Physics, Atmospheric Science, Marine Science, Environmental Geoscience, and other related interdisciplinary subjects. It mainly explores all kinds of phenomenon, processes, and interaction, change and causality among these processes occurred in the planetary earth system, and provides scientific and technical support for solving key issues such as resource supply, environmental protection, and disaster prevention and mitigation. Innovation study of earth sciences will continuously improve the new understanding of the planetary earth system, updating the knowledge hierarchy about the origin and evolution of the Earth and planet. Scientists, not only from different disciplines of earth sciences, but also from mathematics, physics, chemistry, biology, medicine, material sciences and engineering, informatics and management sciences, are encouraged to jointly apply for Key Program of the Department of Earth Sciences, and note the application codes for interdisciplinary studies in the application form.

The relevance and academic contribution to the specific priority themes must be stated in the proposals. To avoid repetitive funding, applicants shall state clearly the relations and differences between the application and related projects funded by other national agencies.

Each priority field of the Department of Earth Sciences emphasizes the integration to different traditional disciplines. The topic of Key Program is not restricted to traditional disciplines. The application codes for Key Program proposals should be selected by the applicant according to the research theme.

In 2022, the Department of Earth Sciences received 664 Key Program proposals, and 112 were funded with a total direct cost fundingof 304.50 million yuan and an average direct cost funding amount of 2.7188 million yuan. In 2023, 115 projects are planned to be funded with an expected funding amount of 3.00 million yuan per project and a funding period of 5 years.

In 2023, 8 Key Program priority fields in the Department of Earth Sciences are listed as follows:

New techniques and methods of the Earth and planet research;

Habitability and Evolution of the Earth and Planets

Deep Earth processes and dynamics

Ocean processes and polar environment

Earth System Processes and Global Change

Weather, climate, and associated sustainable development

Human activities and environment

Formation mechanism and supply potential of resources and energy

In the “Annotations” section of the proposal, applicant must select one appropriate field from the above eight fields in the pull-down menu. Proposals with incorrect “Annotations” or without “Annotations” will be returned without review.

The applicants may determine the title, content, and research plan for their own proposals according to the key themes listed in the 8 fields based on previous research, new breakthrough points, and approaches of breakthrough. The application text should explain the relationship between the project and the selected field, as well as the research direction.

1. New techniques and methods of the Earth and planet research

Scientific objectives: Towards the technological breakthroughs in the observation of key processes or key components of the earth and the scientific frontiers of planetary exploration, develop relevant basic theories, and novel techniques such as experimental methods, observation and information extraction, and simulation and prediction; and promote the innovation of remote sensing, in-situ detection, and simulation and prediction with the targets of the physical and chemical properties of the earth or other planets, as well as the integrated application of new technologies from microscopic processes to macroscopic features. Stimulate the establishment of the data-model-driven scientific research system, and lead the comprehensive innovation of the multi-spheres, multi-scales, quantitative, and integrated research methods of the earth system.

Preferred research themes:

New theories, techniques and methods of earth observation, lunar and planetary exploration, and interplanetary space exploration;

New observation methods and detection techniques oriented by deep space, deep earth, deep time, deep ocean, habitable Earth strategy and social sustainable development;

New techniques and methods for the analysis of the material composition and structure of earth, planet, and interplanetary space;

Methods of assimilation, fusion, analysis, and integration techniques for spatio-temporal big data;

Establishment and key techniques of earth observation system and multi-sources data fusion platform.

New methods for modeling and predicting the coupling mechanism of the Earth system.

2. Habitability and Evolution of the Earth and other Planets

The scientific objectives of this field are to study the transportation, conversion, coupled evolution processes of the matter and energy on the Earth and other planets, as well as multi-layer systems, to explore the origin and early evolution of life, to understand the formation and evolutionary processes of the habitable environments of

the Earth and other planets. The evolution of life on the Earth is closely related to the change of environment, and the habitability of the Earth is closely related to its multi-layer interaction and human activities. It is important to understand the reciprocal feed-back process between the Earth habitability and the evolution of the Earth life and environment from the perspective of multidisciplinary integration.

Preferred research themes:

Origin and evolution of the sun and solar system;

Sun-Earth space physics and space weather;

Planets and interplanetary space environment and variation;

Evolution of the Earth and planetary magnetic fields, atmosphere, and their effects on habitability;

Key geological processes constraint and the life habitability evolution of the Earth and other planets;

Evolution of environment and life of the Earth and other planets;

The impact of human activities on the habitability of the Earth.

3. Deep Earth processes and dynamics

Scientific objectives: Adhering to Earth planetary science concept, obtaining the information of Earth interior material, structure and dynamics by applying multidisciplinary means of geology, geophysics and geochemistry; Deciphering the interactions among the internal spheres of the Earth by studying the multiscale running laws of solid-Earth; Exploring the coupling between deep Earth and surficial processes to promote development and innovation in solid Earth science.

Preferred research themes:

Deep architectures and dynamics of typical regions and global scale;

Coupling of deep and surficial Earth processes and its environmental and disaster effects;

Early Earth evolution, the beginning of plate tectonic system and the formation, growth and reconstruction of continents;

Processes and dynamics of continental integration and breakup;

Deep process and material cycling and their effects on resource and environment;

Plate subduction, mantle plume and the interactions among Earth’s multiple spheres;

Multiple-scale geodynamic experiment and simulation;

Activities of earthquakes, volcanos, geotherms and their deep mechanisms;

Deep tectonics and dynamic mechanisms of strong earthquake preparation;

Comparisons and interactions between Earth and terrestrial planets.

4. Ocean Processes and Polar Environment

Scientific goals: Constructing a theoretical framework for multi-scale motion in

the ocean, revealing the mechanisms of the material-energy cycle in multi-layers of the ocean, clarifying the interaction mechanism of marine dynamic processes with biological and chemical processes, and the dynamic ocean floor evolution, and exploring the regulation mechanism relating to the variation of the earth system in the deep sea, polar regions, and land-sea interaction zone, revealing the formation and evolution mechanism of the oceanic lithosphere from nascent to extinction, and providing scientific and technological support for national coordination of land and marine development, blue economy, marine sustainable development, and deep sea and polar national strategies.

Preferred research themes:

Ocean dynamics and its coupling with biogeochemical and ecological processes, including the study of observation, mechanism, and simulation prediction;

Rapid changes in the polar environment and multi-layer interaction;

Deep sea fluid-solid coupling, material energy cycle, and environmental resource effects;

High and low latitude ocean processes, sea-land-atmosphere interactions, and their driving and responses to global change;

Multi-interface coupling process and sustainable development in offshore and coastal zones;

Formation and maintenance mechanism of Marine biodiversity;

Linkage effect of high-latitude and alpine ecosystem changes.

5. Earth system processes and global change

The scientific objectives: The evolution and operation laws of the different spheres need to be explored associated with the Earth surface system at multiple spatio-temporal scales, to understand the co-evolution and coupling relationship among the biosphere, hydrosphere, cryosphere, atmosphere, lithosphere and anthroposphere of the Earth surface, thereby, to reveal the impacts of the Earth system evolution on the resources and environment; and to comprehend the interactions of the Earth surface processes and climate change with the development of the Earth's life and human society, thus providing key scientific evidence and theoretical support for the future prediction of the Earth surface processes, biodiversity, resources and environment, and environmental change trends.

The following 7 research themes are preferred to be funded in this field, with 2 to 3 projects for each research theme. The application should clarify the relationship with one of the following research themes in the project basis.

Interactions among diverse spheres and evolution mechanism of earth surface processes-climate system coupling;

Coupling and feedback mechanism of hydrologic-ecological processes in fragile environment zones and sensitive climate change zones;

Simulation of water cycle, carbon, nitrogen and phosphorus cycle processes and

systems at global and regional scales;

Evolution law of the complex and compounded system of "Land-Food-Population-Ecology" in the context of global change;

Coupling law and regulation of the key processes in human-nature system;

Changes law of natural synthesis of earth surface and human adaptation;

Intelligent cognition of the Earth system model and simulation prediction of earth system processes.

6. Weather, climate, and associated sustainable development

By investigating the physical and chemical processes in the atmosphere and their interactions with other spheres, this direction aims to reveal the principles and mechanisms of the evolution of and variations in weather, climate, and the atmospheric environment; to develop high-resolution numerical models and observational techniques; and to improve the theories and technologies for forecasting and predicting weather, climate, atmospheric environment, and especially the extreme disastrous events; to elucidate the impact, mitigation and adaptation of extreme weather events and climate change by focusing on national needs of people's livelihood and sustainable development, thus enhancing our capabilities in disaster prevention and adaptation to global climate changes and providing the scientific basis for the sustainable development of social economy.

Preferred research themes:

Mechanisms, forecasting, and prediction theories and technologies for weather, climate, and atmospheric environmental variations;

Physical and chemical processes in the atmosphere and the mechanisms underlying their interactions;

Biogeochemical processes and weather/climate;

Multi-spheres coupling and evolution mechanism of the earth's climate system;

Research and development of atmospheric models and Earth system models;

Atmospheric environment, weather, climate change, and its health effects;

Impacts, mitigation and adaptation of extreme weather and climate change.

7. Human activities and environment

The scientific goals in this area are: revealing the evolution processes and the affecting factors of environmental geosciences, clarifying the effects of human activities on water, soil, air, and surface rock interference and transformation based on the complex human-earth systems, and providing theoretical support for understanding the formation mechanism of earth surface environmental habitability and relationship of features.

Preferred research themes:

Regional environmental pollution process, health effects and regulation;

Mechanism of soil degradation and restoration;

Disaster-causing mechanism and risk prevention and control of major engineering geological disasters;

Interaction mechanisms, coupling processes and environmental effects of human -earth system.

8. Controls on the formation of mineral and energy resources and their supply potential

Scientific objectives: aiming to serve the national need via realizing the security of supply chain of mineral and energy resource and supporting high-quality developments. To reach this goal, we focus on scientific problems related to a sustainable future in the field of mineral and energy resources. We will support theoretical and experimental studies surrounding efficient exploration of traditional energy resources, prediction of unconventional energy resources, and enrichment of mineral resources. These efforts will lay a solid foundation for innovations leading by Chinese scientists in the field of mineral and energy resources.

Preferred research themes:

Interplay between different spheres of the Earth and its controls on the distribution of mineral and energy resources;

Controls on ore formation and theory and technology for mineral exploration;

Controls on the formation of conventional and unconventional oil and gas, and theory and technology for their exploration;

Controls on the formation and distribution of new energy resources and technology strategies for their exploration;

Controls on the formation of mineral and energy resources on the seafloor and technology for their exploration;

Polar and space resources

Technological Science Section

Department of Engineering and Material Sciences

In 2023, the Department of Engineering and Material Sciences (DEMS) plans to prioritize 14 funding areas forKey Program in engineering, materials, and the interdisciplinary areas of engineering and materials.

In 2022, DEMS received 819 proposals for the Key Program, among which 118 were granted. The total direct cost funding was 317.42 million yuan, and the average funding amount was 2.69 million yuan per project. In 2023, DEMS plans to support around 110 projects in the following 14 areas, with an average funding amount of 3 million yuan per project and a period of five years.

The 14 priority areas of DEMS' s Key Program in 2023 are as follows:

(1) Design, preparation, processing and application of metallic materials (E01);

(2) Design, preparation and application of inorganic nonmetallic materials (E02);

(3) Design, preparation and application of organic polymer materials (E03);

(4) Efficient exploitation and green machining and utilization of resources (E04);

(5) Scientific problems in mechanical design, manufacturing and service (E05);

(6) Engineering Thermophysics and energy utilization (E06);

(7) Scientific basis and key technology of electrical engineering (E07);

(8) High-performance civil engineering structure and green building design (E08);

(9) Research on key scientific questions of hydraulic science and engineering (E09);

(10) Regional environmental compound pollution control and ecological restoration (E10);

(11) New ocean engineering structures and ocean equipment (E11);

(12) Intelligent transportation and vehicle engineering intellectualization (E12);

(13) New conceptual materials, material commonness and inter-discipline with engineering (E13);

(14) Common software support platform in engineering and material fields (E01 ~E13).

Applicants should select a specific research area of the Key Program in the pull-down menu of the "Annotations"section. Applications without a specific research area or with an incorrect research area will be returned without review.

Applicants can determine the project titles, research contents, and research

schemes according to the specific research area of the funding areas of Key Program. The first-tier application code or the second-tier application code corresponding to the funding areas of Key Program that contain the specific research area should be accurately selected in the column of "Application Code 1". For example, if "2.1 Frontier Scientific Issues of Inorganic Nonmetallic Materials" is selected in the "Annotations" section, one should then choose E02 or a second-tier application code of E02 in "Application Code 1". "Application Code 2" can be selected as a supplement.

1. Fundamentals of Design, Preparation, Processing and Application of Metallic Materials (E01)

Key research areas to be supported include:

1.1 Key issues in design, preparation, processing, service and application of Steels and Non-ferrous Metals;

1.2 Superalloys, Intermetallics and Metal Matrix Composites;

1.3 Key issues in the properties improvement of Structural Materials;

1.4 Metastable and Nano-metal Materials;

1.5 Metallic Functional Materials;

1.6 Metallic Biomedical, Intelligent and Bionic materials;

1.7 Structural characterizations, surfaces and interfaces of metallic materials;

1.8 Exploration of new theories, new technologies and new effects of metallic materials.

2. Design, preparation and application fundamentals of Inorganic non-metallic materials (E02)

Key research areas to be supported include:

2.1 Research on frontier scientific issues of inorganic non-metallic materials;

2.2 Research on basic issues in bottleneck technologies of inorganic non-metallic materials;

2.3 Research on multi-scale structure effects of high-performance inorganic non-metallic materials;

2.4 Exploration of new theories, new techniques, new systems, and new effects of inorganic non-metallic materials;

2.5 Research on basic issues of inorganic non-metallic materials under extreme environment;

2.6 Basic research on inorganic non-metallic new materials towards the strategy of carbon peaking and carbon neutrality;

2.7 Basic research on multifunctional integration and intelligent application of inorganic non-metallic materials;

2.8 Basic research on the design, low-cost fabrication and engineering application of high-performance inorganic non-metallic materials;

2.9 Research on the design of high-performance multi-component inorganic non-

metallic materials and their synergistic control and preparation based on crystallization thermodynamics and kinetics.

3. Design, preparation, and application of organic polymer materials (E03)

Key research areas to be supported include:

3.1 New synthetic methods and principles of polymeric materials;

3.2 Manipulation of the aggregation structure of polymeric materials and its influence on properties;

3.3 New theories, methods, and technologies for the processing (including micro -nano processing and additive manufacturing) of polymeric materials;

3.4 Biomedical polymeric materials;

3.5 Optoelectronic organic polymeric materials and devices;

3.6 Intelligent polymeric materials;

3.7 Eco-environmental polymeric materials;

3.8 Polymeric composite materials

3.9 Fundamental research on polymeric materials orienting for major national demands.

4. Safety and high efficiency mining and resource green processing and utilization (E04)

Key research areas to be supported include:

4.1 Basic scientific issues for the high-efficient drilling and extraction for deep formation, deep sea and unconventional oil and natural gas resources

4.2 Key scientific issues for the safety and reliability of oil and gas storage and transportation

4.3 Safe, efficient and intelligent exploitation theory and key technology of deep strategic mineral resources

4.4 Theory and key technology for the restoration of abandoned mines and low-carbon treatment and efficient utilization of solid waste

4.5 Theory and method for the accurate pre-control of industrial production safety and public safety

4.6 Low-carbon separation and extraction theory for key strategic minerals and the regulatory mechanism of process intensification

4.7 New process and technology for low-carbon iron and steel metallurgy and the relevant basic environmental issues

4.8 Theory and technology for the low-carbon metallurgy, production and cyclic utilization of difficult-treatment complex metallic resources

4.9 New technology for high-purity smelting, solidification control and shaping control of metals and alloys

4.10 Basic research on the processing technology of short process, composite forming and intelligent processing for high-performance metallic materials

5. Scientific problems in mechanical design, manufacturing and service (E05)

Key research areas to be supported include:

5.1 New design theories and methods driven by synthetic performance of advanced equipment;

5.2 Design and manufacturing of high-performance drive systems and high-reliability basic components ;

5.3 Design, performance evaluation and prediction of dynamics for mechanical systems and equipment;

5.4 Strength design and life assessment for mechanical structures under extreme environment;

5.5 Mechanism, test and control of complex mechanical surface/interface mechanics and tribological behavior;

5.6 Data-driven intelligent design theories and methods;

5.7 Bionic design and biomanufacturing;

5.8 Theories, methods and technologies of precision forming manufacturing for high-performance complex components;

5.9 Theories and methods of ultra-precision, ultrahigh-speed and superstrong-power-field machining;

5.10 New principles, methods, equipment, systems and modes for intelligent manufacturing;

5.11 New mechanism and methods of multi-dimensional and multi-parameter sensing and measurement;

5.12 Principles, methods and systems of micro-nano manufacturing

6. Engineering thermophysics and energy utilization (E06)

Key research areas to be supported include:

6.1 Analysis, control and optimization of low carbon energy system;

6.2 Fluid mechanical energy work conversion, flow mechanisms and flow control;

6.3 Fundamental of heat and mass transfer in energy conversion and utilization;

6.4 Fuel combustion theory, the mechanism of pollution and emission mitigation, and new combustion technique;

6.5 Fundamental of multi-phase flow in energy and power systems;

6.6 Measurement principles and methods for complex thermophysical fields;

6.7 New and renewable energy utilization.

7. Scientific fundamentals and key technologies of electrical engineering (E07)

Key research areas to be supported include:

7.1 Common fundamentals and new technologies of electrical engineering, such

as electromagnetism and plasma (including sensing and testing, multi-field coupling, digital twinning, new type of power generation, power transmission, discharge plasma and its application);

7.2 Electrical materials, devices and equipment;

7.3 Smart grid and integrated energy system;

7.4 Electromechanical energy conversion and electric drive;

7.5 Electric energy conversion and control;

7.6 Electric energy storage and its application;

7.7 Bio-electromagnetic technology.

8. High-Performance Civil Engineering Structures and Green Architecture Design (E08)

Key research areas to be supported include:

8.1 Theory and Methods for Sustainable Architecture Design

8.2 Theory and Methods for Urban-Rural Space and Landscape Ecology Planning

8.3 Fundamental Theory and Key Technology for Low-carbon Healthy Architecture

8.4 Civil Engineering Design and Construction in Complex and Harsh Environments

8.5 High-Performance Civil Engineering Materials and Structures

8.6 Fundamental Theory and Key Technology for Intelligent Civil Engineering Construction and Maintenance

8.7 Service Safety and Performance Enhancement of Civil Engineering Infrastructure

8.8 Fundamental Theory of Geotechnical Engineering under Complex Conditions

8.9 Life-Cycle Design and Disaster Prevention of Road and Underground Engineering

8.10 Multi-Hazard Effects, Disaster-Preventing Resilience Theory, and Technology in Civil Engineering

9. Key Scientific Research Issues for Hydro-science and Hydraulic Engineering under Climatic and Environmental Changes and Extreme Weather Impacts (E09)

Key research areas to be supported include:

9.1 Sustainable and efficient utilization of watershed water resources;

9.2 Causes and prevention of watershed and urban catastrophic floods;

9.3 Watershed drought monitoring and disaster prevention;

9.4 Agricultural high-efficiency water conservation;

9.5 Water-salinity transport and drainage-irrigation regulation of alkali soil;

9.6 Alteration of water and sediment processes and evolution and adaptation mechanisms of river bed;

9.7 River-lake-reservoir ecosystem modelling and regulation;

9.8 Hydraulic-mechanical-electrical system regulation and safe operation mechanisms;

9.9 Intelligent operation and maintenance and disaster risk prevention and control of hydraulic and hydropower engineering;

9.10 Intelligent disaster risk prevention and control of hydraulic geotechnical engineering;

9.11 Regional intelligent water network and water transfer and distribution projects.

10. Compound pollution control and ecological restoration for regional environment. (E10)

Key research areas to be supported include:

10.1 Low-carbon regeneration of urban wastewater and water quality security

10.2 Car reduction and pollution restriction in key areas

10.3 Establishment of sustainable urban/rural water system and aquatic ecology security

10.4 Fast air purification and disinfection in indoor public places and health risk control

10.5 Multi-dimensional and coordinative control of regional air pollution sources

10.6 Safe disposal and recycling of emerging solid wastes

10.7 Ecological remediation of compound contaminated sites

10.8 Process simulation of urban/rural and regional substance and energy cycles and ecological risk control

10.9 Multi-medium and safe pollutant conversion and accurate regulation

11. New Ocean Engineering Structures and Ocean Equipment (E11)

Key research areas to be supported include:

11.1 Development of ocean resources and exploitation of seabed resources;

11.2 Ocean engineering structures and Ocean dynamics;

11.3 New principles, new structures, new technologies and new equipment for ocean and polar development and utilization;

11.4 Coast engineering and safety protection;

11.5 Ocean renewable energy development and technical equipment;

11.6 Green intelligent ships and intelligent navigation;

11.7 Ocean environmental observation and deep-sea exploration;

11.8 Ocean intelligent unmanned vehicle.

12. Intelligent transportation and vehicle engineering (E12)

Key research areas to be supported include:

12.1 Key evaluation and verification technology of automatic driving technology/application technology under special scenarios (specific areas/special spaces/typical operation and transportation environment);

12.2 Theory and key technology of multimodal transportation network integration;

12.3 key theory and technology for reconfigurable and polyxeny specialized vehicle considering complex operating transportation conditions;

12.4 Key theory and technology for performance evaluation and collaborative optimization of the 600 km/h speed class Electromagnetic Suspension high-speed Maglev system;

12.5 Fundamental theory and technology of energy integration and propellant management for space transportation systems fueled with supercooled cryogenic propellants;

12.6 Fundamental Theory and Key Technology for Integrated Operation and Management of National Airspace System;

12.7 Basic Scientific Issues of LNG pipeline transportation.

13. New conceptual materials, material commonalities, and engineering intersection

Key research areas to be supported include:

13.1 Research on key common science issues of new material designs, preparations, processing, and characterizations;

13.2 New conceptual materials and new properties facing frontier crossing;

13.3 New composite and hybrid materials;

13.4 Multi-functional integration of materials and devices for intelligence, informatization, and miniaturization;

13.5 Key new materials for high-end manufacturing and major national projects;

13.6 Key new materials for major national needs, including energy, environment, life, and health;

13.7 Key new materials for “Carbon Peaking and Carbon Neutrality” targets.

14. Common software support platform in engineering and material fields (please select an appropriate first-tier application code of DEMS according to the relevant software application fields)

The common software support platform aims to break through core software technologies in engineering and material fields, solve fundamental scientific problems and fundamental theories with commonness in general-purpose software and industrial software, and provide fundamental support to develop autonomous and controlable key tool software.

Key research areas to be supported include:

14.1 Modelling, simulations, and optimization design of coupled multi-physical fields in engineering systems;

14.2 Fundamental theory and numerical simulations of multi-space-time / multi-scale engineering and material systems;

14.3 Theoretical modeling and simulation methods of discrete-continuous mixed systems in engineering and material fields;

14.4 Data-and-target-driven modeling and simulation optimization methods of engineering systems;

14.5 Theory and algorithms of AI enabling industrial software.

Applications failed to meet the requirements of this Guide, or failed to reflect software features in engineering and materials fields will be returned without review. Applications of mere information science will not be supported.

Department of Information Sciences

In 2022, the Department announced 6 groups of Key Program in 32 research directions, and 74 areas for the application of Key Program, and received 385 applications, of which 106 projectswere funded with direct cost funding of 302.10 million yuan, and an average direct cost funding amount of 2.85 million yuan per project.

In 2023, the Department will announce 4 groups of Key Program in 20 priority directions, and104 areas for Key Program. 120 projects with an average direct cost funding amount of about 3 million yuan per project for 5 years are planned to be funded. Applicants should follow the guidelines of research directions in relevant areas, in accordance with the trend of development in the research area and basis of their research team and the actual research object or process, propose key scientific problems and conduct systematic and in-depth theoretical studies or experimental verification. Apart from high level papers, research results should be verified in experimental system or in practical applications.

The deadline for proposing areas of Key Program for 2024 is April 30, 2023; please refer to the department's website for relevant details. (http://www.nsfc.gov.cn/publish/portal0/xx/).

Priority areas (Key Program project groups) for 2023

1. Theory, method and applications in frontier research on medical image information processing

Medical image information processing is important in health services, and new theory and technology for medical imaging will provide more direct evidence for precise diagnosis. We hope research in this key project group will make some breakthrough in imaging resolution, super fast multi dimensional image acquisition,

digital reconstruct and visualization, so as to establish high precision, personalized and more interpretative technological and application systems.

Five projects in the following 5 research directions are planned to be funded.

1) Key technology of digital pathogenic imaging and computation (F0125)

2) Method and key technology of smart processing and analysis of prostate cancer imagines (F0125)

3) Synchronized imaging of multiple magnetic resonance parameters of heart (F0125)

4) Multidimensional dynamic matching and integration of orthopaedics imagining (F0125)

5) Dynamic High resolution magnetic resonance imaging method for digestive systems (F0125)

2. Basic theory and key technology for novel man machine interactions in complex scenario

Man machine interactions in complex scenarios in key areas such as aerospace and navigation has tough challenges such as environmental impact on man machine interaction, complex mission interactions, lack of robustness and limited space for interactions. We hope research in this group will focus on basic theories and key technologies so as to provide basis for for making progress in key areas.

Four projects in the following 4 research directions are planned to be funded.

1) Theory and technology of man machine interactions involving 3-D complex motions (F0209)

2) Theory and technology of man machine coordination for complex mission interactions (F0209)

3) Multimode 2 direction robust interaction for complex equipment (F0209)

4) Method and platform of enhanced reality man machine interactions with insensitive domain crossing (F0209)

3. Automatic sensing and detection techniques

Sensing and detection are key techniques widely used in smart manufacture and aerospace industries. New sensing devises, new measurement principles and detecting method are urgently needed in complex environment for high precision and reliable sensing and detection. This key project group will be focusing on difficulty problems in flexible sensing, gas sensing, photon sensing, brain cognition information sensing, angular acceleration measurement, and multi field imaging in complex environment, so as to provide basic theory and key technology. Applicants should have good background in research, and expected research results should be verified in typical environment.

Six projects in the following 6 research directions are planned to be funded.

1) New types of flexible sensing system in complex sensing environment

(F0306)

2) High performance gaseous sensor and in situ detection in industrial process (F0306)

3) New photon sensor based on optical micro cavities (F0306)

4) Sensing and detection techniques for spatial cognition information of the brain (F0306)

5) Direct measurement of system of angular acceleration for complex working environment (F0306)

6) Super high resolution spatial and temporal imaging for thermo/electric/magnetic fields (F0306)

4. Integration of chips for multidimensional and multifunctional applications

Wide range of applications of semiconductor devices require more functions and high performance, which means higher level of integration of system function. We hope research in this group study problems in hetero integration of materials and structure, band regulation in multiple field and scales, so as to reduce power assumption, and enhance performance of the devices.

Five projects in the following 5 research directions are planned to be funded.

1) Wide band spectroscopy based on Van der Waals hetero junction (F0403)

2) Array chips of laser receiving and emitting in safe ranges of the human eyes (F0403)

3) High dimensional optical information sensing and imaging chips (F0408)

4) Extended multiple wave length silicon based semiconductor laser arrays (F0403)

5) Visual sensor arrays integrating sensing, storing and computation (F0402)

Key Program project areas funded by the Department in 2023 are as follows:

1. Theory of real time interaction mechanism and services for multimode holographic communication (F0102)

2. Theory and method of smart super surface aided millimeter wave communication and sensing integration (F0103)

3. Edge smart coordination computing mechanism in non reliable transmission conditions (F0104)

4. Theory and method of medium and short coding elastic coding for 6G (F0105)

5. Modeling and communication of extremely low frequency electromagnetic transmission across ice layers (F0107)

6. Video coding technology for mixed screen contents (F0108)

7. High certainty wireless optical transmission and insert for mobile industry network (F0109)

8. High efficiency optical transmission system based on combined coding

and modulation (F0109)

9. Leveled modeling and optimization for computing power opened optical network (F0109)

10. Theory and method of high resolution in aperture confined electro-magnetic domain (F0111)

11. Theory and technology of Space borne SAR Non-Along-Track imaging (F0112)

12. Tetra hertz scanning video level imaging technology (F0112)

13. Coordinated reasoning of multidomain multisource observation data (F0113)

14. Acquisition and processing of polarized SAR salt lake resources information (F0113)

15. Theory and method of multisource merging and positioning of hetero space based radio signals (F0113)

16. Theory and method of super resolution SAR smart cognition and identification (F0113)

17. Smart sensing and autonomous resistance in complex electro-magnetic environment (F0114)

18. All day whole space high precision computation and videoing for the Moon detection (F0117)

19. Whole light physiology computation and imagine for meso-scale brain function loop analysis (F0117)

20. Theory and technology of band open to all scenarios for 5G/6G (F0118)

21. Small antenna and radio circuit for sensing end (F0119)

22. Smart modeling and optimization of new low loss microwave hetero circuit (F0119)

23. Theory, technology and application verification of tetra hertz scanning smart super surface chips (F0120)

24. Parallel transmission and coordinated positing of super wide band signal (F0121)

25. High flux detection of physical chemical properties of single cells (F0123)

26. Theory and technology for genome variation detection of cancer (F0124)

27. Distributive noise tolerant quantum computation theory (F0201)

28. Logical fault discovery and protection for smart contract (F0205)

29. Credible analysis and protection for open source software (F0203)

30. Real time measurement and credible analysis for high speed network flows (F0207)

31. Theory and key technology of light expandable data management (F0202)

32. Unified large memory parallel computation architecture (F0204)

33. Video enhancement and collaring method for classic film repair (F0210)

34. Theory and method of digitization of cultural relic (F0209)

35. Theory and method of multimode pre-training modeling enhanced by integration of data and knowledge (F0210)

36. Basic theory and efficient algorithm of assembly and model mining of third generation sequencing (F0213)

37. Key technology of multiparty privacy computation (F0206)

38. Large scale mobile groups based on participating cognition (F0208)

39. Distributive micro core operating system (F0202)

40. Molecular computer by simulating human brain mechanism (F0214)

41. Dynamic scenario neural network expression and modeling (F0209)

42. Computing power network architecture and system (F0207, F0204)

43. Theory and method of life time formalization of software (F0203)

44. Real time positioning and map construction for mobile network (F0208)

45. Detection and defence method for deep operating pictures (F0604)

46. Visual basic large model driven by integrated data and knowledge (F0604)

47. Interpretation of human interactive cognition in the teaching process (F0701)

48. Self coding theory and method for personalized brain atlas (F0609)

49. Federate learning of credible graphs (F0603)

50. Natural language processing guided by causality (F0606)

51. Mathematical reasoning based on neural symbol system (F0610)

52. Man machine interactive smart technology for sport teaching (F0701)

53. Dynamic optimization theory and method for group intelligence (F0608)

54. Key technology for large scale multilanguage multimode neural machine translation (F0606)

55. Theory and technology of invasive brain computer interface for the Chinese language (F0609)

56. Data mining and analysis of TCM based on meridian channel and pulse condition network (F0610)

57. Nonlinear system stability analysis ans control for multilevel decision making (F0301)

58. Environmental sensing and coordinated control for deep sea exploration (F0301)

59. Autonomous diagnosis and coordinated fault tolerance control for drone/boat groups (F0301)

60. Failure analysis of lithium battery and smart prediction of thermo failure (F0302)

61. Theory and technology of smart monitoring and close circuit prevention for

training clothing in high plateau oxygen lacking environment (F0302)

62. Optimization and and control theory and technology for mixed traffic system in the vehicle internet environment (F0302, F0304)

63. Sensing and control technology for smart emergency system of urban rail transport (F0303)

64. Modeling, analysis and numerical simulation of time lagging stochastic system for targeted applications (F0303)

65. Smart construct and intervention of brain network for nerve decaying diseases (F0305)

66. Multigenome integration and smart interpretation for major cancer treatment (F0305)

67. Coordinated guidance theory and method for unmanned groups in weak information conditions (F0307)

68. Theory and technology of internet controlled system security in chemical industry (F0308)

69. Basic theory and method of controllable life robot with cross media integration (F0309)

70. Smart sensing and control of organ repair robot (F0309)

71. Precision operation and whole process monitoring of early embryo (F0309)

72. Autonomous unmanned system navigation control in all condition and sea land transformation (F0309)

73. Key technology of man machine wearable robot for enhanced loading (F0309)

74. Unmanned driving system for special mission (F0310)

75. Nitrogen polar gallium nitrite based radio power materials and devices (F0401)

76. Self powered sensing and computation integrated circuit for geo-disaster monitoring (F0402)

77. Architecture and circuit of highly digitized analog to digital converter (F0402)

78. CMOS tetra hertz wide band radar chips (F0402)

79. Asynchronized brain computation chips and related technologies (F0402)

80. High pressure resisting low flux gallium nitrite power devices (F0407)

81. Instantaneous extreme damage mechanism and strengthening techniques for high power silicon carbonate devices (F0404)

82. High density super conductive integrated circuit technology (F0406)

83. Design, preparation and detection of Exciton scintillation crystal devices in strongly limited domains (F0408)

84. Large field of view naked eye video large size real 3-D display technology (F0501)

85. Partial interference digital holographic 3-D layered analysis micro

imaging method (F0501)

86. Quantum imaging based on optical simulation computations (F0501)

87. Photon integration technology based on piezoelectric effect (F0502)

88. Wave guided in situ inferred spectroscopic detection (F0502)

89. Light MIMO decoding chips for long distance multi fibre communications (F0503)

90. Flexible wearable optical sensing and decoding integrated circuit (F0503)

91. Optical field regulation and computing chips based on super media materials (F0503)

92. InAs based type 2 super lattice inferred detectors (F0504)

93. Tetra hertz chiral spectroscopy and sensing technology for bio-chemical material detection (F0504)

94. Tetra hertz super surface spatial optical regulators (F0504)

95. High precision wide band inferred optical thermo spectroscopy technology and device integration (F0507)

96. Photo electric sensing for the detection of tumor markers (F0508)

97. Key technology and related basic research on high average power ultraviolet photo etching light source (F0506)

98. Generation and control of high power super fast vortex lasers (F0506)

99. Super fast acoustic pulse in situ photo induction and super high spatial and temporal resolution imaging (F0507)

100. Mechanism and key technology of on chip ion trap preparations (F0508)

101. large size laser material surface activation mechanism and bonding (F0509)

102. Super high resolution spatial temporal resolution cell organ dynamic imaging and correlated spectroscopic analysis (F0511)

103. Polarized optical bio tissue structure imaging and its applications (F0511)

104. Fast detection method and technology based on surface plasmon CRISPR (F0516)

Life and Medicine Section

Department of Life Sciences

The research fields funded by the Department of Life Sciences cover biology, agricultural science, ecology and population health. According to the orientation of Key Program, funding of Key Program projects are carried out in line with the principle of "limited objectives, limited scale and prominent focus". The Department of Life Sciences will carry out projects peer-review and funding focusing on the following development layout: the forefront of scientific development, major national needs, promoting revolution innovation, and solving the core scientific problems behind needs and key technologies. In 2022, the Department of Life Sciences received 675 applications, all of which were reviewed and 110 projects were finally approved.

In 2023, the Department of Life Sciences will continue to follow the principles of "encouraging exploration, highlighting originality; focusing on the frontier, creating new paths; demand traction, breaking through bottlenecks; common orientation, cross-linking". Key Program encourages scientists to aim at the frontier of science, select fundamental and global scientific problems and carry out systematic innovative work, form key project groups in important research directions of disciplines, and promote the development of fields. Meanwhile, more emphasis will be put on "curiosity-driven disruptive research" and trans-disciplinary research will be encouraged. In 2023, based on the overall arrangement for the Key Program of NSFC, the Department of Life Sciences will allocate a total budget of 300 million yuan, to support a similar numberof Key Program projects as that of 2022, with similar funding amount. Applicants should put forward reasonable budget according to the actual financial needs of their research.

In order to apply for the Key Program, applicants should read the application requirements, special notes, and the funding plan of the department in this chapter carefully. Moreover, since the research areas in the Department of Life Sciences cover a broad spectrum from fundamental biological sciences and basic medicine to agricultural science, the designated areas of Key Program in each discipline is closely correlated with the funding areas of the discipline. Please note that applicants should correctly apply for the Key Program according to the funding areas. Those as described in "matters needing attention" as described in "Scientific departments" parts are equally applicable to Key Program.

The requirements for application to the Key Program projects of the Department

are as follows:

(1) Applicants should propose research topics and compose every parts of the proposal following the guidelines of designated areas issued by the Department in 2023. In the section of Annotations on the basic information table of the application form, applicant should fill in the research area in which they intend to apply for a grant; with the corresponding application code lined out in each discipline's designated areas correctly.

(2) Applicants for the Key Program of the Department are required to attach the first pages of five representative research articles (published in the recent five years) closely related to the proposal (upload as attachment with application).

The designated areas of each Division in the Department of Life Sciences in 2023 are as follows:

1. Microbial diversity, evolution, and metabolic regulation(C01)

2. Interactions between microorganisms and their host or environment(C0106)

3. Molecular Mechanisms of Plant Diversity Formation and Environmental Adaptation (C02)

4. Analysis and Reconstruction of Plant Metabolism and Active Substance Pathways (C0204)

5. Animal Diversity and Adaptive Evolution (C04)

6. Threatened Mechanism and Protection of Important Endangered Animals (C0405)

7.Cellular communication, signal transduction, and cellular homeostasis (C07)

8. Intracellular structure and regulation (C07)

9. Stability, Variation, and Evolution Mechanism of Genetic Material (C0601)

10. Epigenetic regulatory mechanisms of development, aging, and disease (C0603)

11.Molecular basis of cell fate determination and tissue and organ formation (C1203)

12. The regulatory mechanism of gametogenesis, embryo implantation, and placental function (C1206)

13.Study on the Mechanism of Neural System Steady State Maintenance and Brain Health (C09)

14. Neurological and Psychological Mechanisms of Cognition and Emotion (C09)

15. The Mechanism and Intervention of Psychological and Mental Disorders (C09)

16. Study physiological and pathophysiological processes of the body with new technical methods or models (C11)

17. Interactive regulation between tissues and organs under conditions such as exercise, extreme environment, physiology and pathology (C11)

18. Mechanisms of immune cell development, differentiation and response

(C08)

19. Mechanism, abnormality and intervention of Immune regulation (C08)

20. Dynamic Process Mapping, Signal Transduction, and Regulatory Mechanisms of Biological Functional Molecules (C05)

21. Molecular Basis of Multilevel Interactive Communication in Life Systems (C05)

22. Biomimetic/engineered tissue and organ construction and regulation (C10)

23. Intelligent Material Design, Biological Effects, and Mechanisms (C10)

24. Bioinformatics Big Data Acquisition, Mining, and Application (C21 or C0609)

25. Metabolic pathway analysis, precise design, and intelligent biological manufacturing (C21)

26. Response and Adaptation of Life Systems to Global Change (C03)

27. Ecosystem protection, restoration, and governance (C03)

28. Directional Cultivation and efficient utilization of forest and grass biomass (C16)

29. Exploitation and Innovation of Forest and Grass Germplasm Resources (C16)

30. Molecular basis and genetic regulatory network of crop complex traits (C13)

31. The Synergistic Mechanism of High Yield, High Quality, and Stress Resistance of Crops and the Basis of Green and Efficient Production (C13)

32. Biological basis and regulatory mechanism of food processing, manufacturing and storage (C20)

33. Mechanisms of food nutrition, flavor formation and safety control (C20)

34. Mechanism and control basis of crop pest disaster and evolution (C14)

35.Discovery of Original Molecular Targets and Creation of New Pesticides (C14)

36. Mechanism and regulation of growth and quality formation of horticultural crops (C15)

37. Mechanism and Regulation of Crop Soil Biological Interaction and Efficient Utilization of Nutrient Resources (C15)

38. Occurrence and control mechanism of important diseases in aquaculture (C19)

39. Breeding and formation mechanism of economic characters of aquaculture organisms (C19)

40.The Formation and Regulation Mechanism of Important Characters in Livestock, Poultry, Bee and Silkworm (C17)

41. 42. Pathogenic biology, pathogenic mechanism and drug resistance mechanism of zoonoses (C18)

43. Pathogenesis and host response mechanism of important diseases in livestock and poultry (C18)

Moreover, considering common problems in the past years, the Department of Life Sciences particularly reminds applicants of avoiding the following mistakes. Otherwise, proposals will be returned without review.

(1) Applications do not specify the title of designated research areas in the section of “Annotations” on the basic information table in main body of the application text;

(2) Applications do not fill in the corresponding application code specified by this guide;

(3) Applications forKey Program, without submitting the 5 representative publications within 5 years (since 2018) as first author or corresponding author.

(4) Applications indicate the designated areas in the “Annotation” section, but the actual research contents do not match the scope of funding;

(5) Applications submitted by applicants who are still holding a full time position abroad, or who cannot ensure necessary time and efforts for implementing the proposed research in China.

For other issues to be noted for proposal preparation, please refer to the guide to the "matters needing attention" as described in "Scientific departments" parts.

Department of Health Sciences

In 2022, a total of 841 applications for the Key Program in 39 thematic areas and macroscopic areas were received, 127 of which were finally funded with a total funding amount of 331.90 million Yuan (direct cost) and an average funding amount of 2.6134 million yuan (direct cost) per project. In 2023, the funding plan for the Key Program will still be divided into two categories: 100 projects in the listed thematic areas and 25 projects in macroscopic areas. The average funding amount (direct cost) is about 3 million yuan per project, and the duration is 5 years.

According to the significant national needs, combining the discipline development strategy and the priority funding direction in the field of health science, a total of 42 thematic areas for solicited Key Program were proposed by the Department following expert appraisal in 2023. Applicants are encouraged to decide project title, research contents and approach on their own based on the scope of the key program. **In the “Annotations” section, one of the following 42 areas of Key Program should be selected; in the column of Application Code 1, the corresponding application code for the area should be chosen.**

To ensure timely support of the key scientific issues facing significant national demands and science frontiers in the world, the Department of Health Sciences continues to fund the Key Program in macroscopic areas. **For those fields that have achieved significant progress or innovative findings in the initiation,**

development, prognosis, diagnosis, treatment and prevention of critical illness, applicants may choose research directions for the Key Program if the planned research content falls out of the scope of the Key Program. They should indicate "macroscopic areas" in the "Annotations"seciton, butcan choose the application code on their own. The proposal should be attached with a description of 1000 words regarding the progress of achieved vital innovation. Applicationthis description will be returned without review.

Applications for Key Program fail to provide relevant materials as required above will be returned without review. For the requirements and precautions of the proposals, please refer to the general introduction of Key Program in this *Guide*.

(1) The Department's requirements in the "Funding and Instructions" section remain valid for the Key Program. Thus, applicants should carefully read and follow the instructions.

(2) In 2023, the Department will generally not fund applicants who were either intensively funded in 2022by NSFC [such as Key Program, Key International (Regional) Joint Research Program, Major Program, Key Program of Major Research Plan or Programs of Joint Funds, Special Fund for Research on National Major Research Instruments], or are applying with a proposal of similar research to their ongoing national scientific projects funded by other governmental agencies.

Proposals for the Key Program will be returned without review if they fail to conform to the regulations or the required materials are not attached.

In 2023, the research fields of Key Program in Department of Health Sciences are as follows:

Pathogenesis and intervention strategies of pulmonary fibrosis (H01)

Heterogeneity of response to hematological tumor immunotherapy and its mechanism (H08)

The role of inflammation in cardiac injury, repair and the intervention strategies (H02)

Study on the effect and mechanism of protein/nucleic acid modification in vescular disease, and intervention strategies (H02)

The role of crosstalk between organs of the digestive system in disease (H03)

Molecular and interventional study of intrinsic renal cells' modulation after injury (H05)

Coordinate abnormalities of endocrine hormones' network and metabolic diseases (H07)

Pathogenesis of critical ophthalmic diseases and the corresponding precise diagnosis and treatment strategies (H13)

Acoustic function preserving, repair and reconstruction (H14)

Pathogenesis and intervention strategies for structural abnormalities in cerebral vessels and related disorders (H09)

Pathogenesis and intervention for movement disorders (H09)

The role of interactions between metabolism and immunity in the occurrence and development of prevalent psychological disorders (H10)

Pathogenesis and modulation of systemic aging (H19)

The parent substance's disorder of internal environment and the reproductive outcome (H04)

Pathogenesis and diagnostic biomarkers for congenital anomalies/rare disorders (H23, H04)

The synergistic effect and mechanism of immunotherapy among combination therapy for the disease (H11)

Immune-neurological modulation and the occurrence, development, and treatment of disease (H11)

Mechanism for the injury and adaptation of hypoxia and extreme cold in the plateau areas (H24)

Multi-omics study based on the innovations of MRI/CT (H27)

Application of robotic intellectual interaction and sensory manipulation in precision medicine (H28)

Applied basic research on the brain-machine interface for significant diseases (H28)

Pathogenesis and treatment strategies of articular injury/disease (H06, H20)

Interactions between tissues and organs and the regulatory mechanism of multiple organ failure in critical illness (H16)

Immunoregulation of continuous infection by pathogens (H21, 22)

Novel strategies and techniques for the laboratory test of significant illness (H26)

Key mechanisms and innovative technologies of repair in tissue and organ trauma (H17)

Pathogenesis and intervention strategies for tumor transplant to tendentious organs (H18)

Key mechanisms of remodeling the tumor microenvironment with physical therapeutics (H18)

The impact of organelles malfunction on the occurrence and development of the tumor (H18)

The regulatory mechanism of biological rhythm in tumor occurrence and evolution (H18)

Study on the innovative mechanisms for the happening and development of significant dermatology diseases and novel interventional target (H12)

Research on organ injury after exposure to ionizing radiation (H29)

The occurrence and development pattern of infectious diseases and intervention strategies (H30)

Exposure burden of environmental chemical substances and health effects (H30)

Drug molecules design and target identification using big data and artificial

intelligence (H34)

Target identification and lead discovery of drug molecules for drug-resistance bacteria (H34)

The study identifies potential drug targets and regulatory mechanisms for the major disease's inflammation procedure (H35)

Target identification and lead discovery established upon the tumor pathogenesis (H35)

Effect of Tonic Chinese Medicine on the modulation of the neuroendocrine-immune network (H32)

Prevention strategy and mechanical study to inflammatory bowel disease using integrated traditional Chinese and western medicine (H33)

Biological basis of treating reproductive disorders with the "Kidney Dominating Reproduction" theory (H31)

Effects and mechanisms of acupuncture on the autonomic nervous system (H31)

Interdisciplinary and Integration Section

Department of Management Sciences

In 2022, the Department received a total of 121 Key Program applications, and funded 29 projects. The average funding amount(direct cost) was 1.90 million yuan per project.

During the 14th Five-Year Plan period, the Department will release funding fields of Key Program annually. The Key Program should be focused on the following three aspects: (1) scientific frontier issues that can promote discipline development, obtain great innovative achievement, and generate international impacts; (2) important theoretical and application issues regarding economy development, society development, reform and opening-up, and the improvement of China's comprehensive competitiveness, which need to be urgently addressed, and are possible to be addressed; (3) systematic and in-depth innovative research, which explores management theories and laws for Chinese characteristic and has sound research background or good potential for discipline development.

The funding priority areas described in this *Guide* outline the main contents and scopes. Please note that the title of application is not required to be exactly the same as the areas of Key Program listed below. Applicants are required to possess solid research experiences and abilities in the areas that they are applying for. Applicants are encouraged to exploit their full advantages, present deep academic thoughts in their applications, make the research goals clear and concrete, emphasize the key points of research, focus on one or several key points of the research and actually address them, and have theoretical breakthroughs. In addition, applications are required to combinetheories with practice, discover key scientific issues from important practical management issues from perspectives of China's situations and the nation's key demands, and conduct in-depth research, and try to provide new approaches to address practical management issues. Applicants should focus on scientific methodologies, emphasize the application of scientific approaches, and take real data and actual cases as the fundamental information of their research.

Priority areas for Key Program in 2023 are as follows:

Applicants who apply for Key Program of the Department should choose the codes noted after the areas of the Key Program as Application Code 1, and fill the name of the corresponding areas in the Appendix of the application. Applications that

fail to do so will be returned without review.

In 2023, the Department proposes the following priority areas for Key Program, and plans to support 35 projects. The funding amount (direct cost) will be about 2.00 million yuan per project with a duration of 5 years.

1. Research on data-driven operation management behavior

(1) Behavioral cognition and experimental design of operation management decision-making (G0103, G0106)

(2) Behavioral decision-making and operations management from the perspective of complexity (G0103)

(3) Behavior-based service-oriented manufacturing operations management (G0108, G0110)

2. Theory and method of complex system management for mega-city governance (G0101)

3. Research on new power system dispatching optimization for the goal of "dual carbon" (G0102)

4. Theory and method of urban intelligent operation and scheduling for major emergencies (G0102, G0116)

5. Trading mechanism and decision-making of integrated energy system (G0103)

6. Forecasting theory and method of demand and price of important strategic resources (G0104)

7. Statistical theory and method of incomplete data under the background of big data (G0105, G0111)

8. Supply chain collaboration mode innovation and decision optimization under the background of digital intelligence transformation (G0109)

9. Theory and method of risk management under multi-risk interaction (G0113)

10. Research on the theory of Chinese enterprise management in the new development pattern (G0201, G0202, G0203)

(1) Research on the theory and method of enterprise value co-creation under the background of common prosperity.

(2) Research on enterprise growth model and theoretical paradigm in complex situations.

(3) Research on the innovation model and evolution path theory of inter-enterprise financing.

(4)Theoretical research on the breakthrough path and mechanism of enterprise key core technology.

(5) Theoretical research on the cultivation and development model of Specialized and Sophisticated Small- and Medium-sized Enterprises.

Note: these project groups pay attention to the enterprise management problems in the new development pattern from the perspectives of enterprise

value co-creation, growth model, financing innovation, technology research and development and so on. Through the deployment of the project to promote the theoretical research of enterprise management around the elements of new environment, new organization and new technology, the project strives to make an original theoretical contribution to serving the management practice of Chinese enterprises. The application code should be selected according to the content of the study.

11. Research on corporate finance, accounting, and audit behavior under environmental governance objectives (G0205, G0206)

12. Research on artificial intelligence-driven marketing model and consumer behavior (G0207)

13. Research on the integrated development of culture and tourism and the theory of tourist experience management (G0207, G0215)

14. Research on the theory of enterprise's data flow and risk management (G0209, G0211)

15. Research on the theory and method of enterprise green finance guided by "DualCarbon" goal (G0210)

16. Spatial / Network econometric modeling theory and economic application (G0301)

17. Research on the resilience of industrial chain under the background of great power competition and cooperation (G0306, G0309)

18. Study on key scientific issues of food safety and security in China (G0311)

19. Basic theory of digital economy development

(1) Research on open-economy modeling and risk prevention and control when introducing digital currency (G0305, G0307)

(2) Research on the effects of digital economy on employment (G0313)

(3) Choice of fiscal and taxation policies based on big data's analysis and its effect evaluation (G0305, G0308)

20. Research on the Mechanism, path, and policy of digital technology innovation (G0404)

21. Research on the mechanism and mode of educational innovation of digital empowerment (G0407)

22. Research on the optimal allocation mode and policy of medical insurance resources under the environment of big data (G0405)

23. Research on the mechanism and governance system of new urbanization and regional coordinated development (G0413)

24. Research on digital supervision mechanism and policy of platform economy (G0414)

25. Public security and crisis management

(1) Research on urban safety risk assessment, emergency response

mechanism and decision support (G0409, G0410)

(2) Research on risk assessment theory and security strategy of strategic scarce resources (G0412)

(3) Research on risk assessment, monitoring and early warning and comprehensive response mechanism of science and technology security (G0403, G0409)

Major Program

Aiming at the science frontiers and serving the major needs of national economic, social and S&T development and national security, Major Program is deployed in advance to conduct multidisciplinary research, and play a supporting and guiding role in improving the capability of original innovation in China's basic research.

Each Major Program application can contain no more than 5 sub-projects and the overall application and the sub-project applications should be written separately. All the applications for a Major Program project should be submitted as a whole. The applicant should be the Principal Investigator of one of the sub-projects. The duration of the Major Program project is 5 years.

Applicants should have the following qualifications: (1) Have experience of undertaking basic research projects; (2) Have senior academic position (title).

Post-docs, graduate students and those without employment at a host institution or whose institution is not registered at NSFC are not qualified to apply.

If the applicant and the participant of the Major Program application are not from the same host institution, the host institutions of the participantsare considered as the collaborative research institutions (foreign research institutions are not considered as such). The total number of collaborative research institutions for each sub-project application shall not exceed two. The total number of host institutions and collaborative research institutions (including the collaborative research institutions of each sub-project application) for each application shall not exceed five.

Specific call for Major Program will be published separately.

Major Research Plan

Major Research Plan is designed to be a program cluster which contains a number of projects with relatively unified objectives and orientations by focusing on critical scientific issues in accordance with major national strategic demands and key scientificfrontiers, strengthening the top-level design, encapsulating scientific goals and gathering advantageous research resources, so as to facilitate crossing and convergenceof multiple-disciplines, foster innovative talents and teams, promote the original innovation ability of the basic research in China and provide scientific

support for thenational economy, social development and national security.

The Major Research Plan follows the principle of "definite objective, stable support, integration and promotion, and leap-forward development". The funding period for Major Research Plan projects is 8 years in general. An applicant must meet the following eligibilities: (1) Have the experience of undertaking basic research projects. (2) Have a senior professional position (title). In-site post-doctors, or graduate students, or researchers without a research institution or whose host institutions have not been registered at NSFC cannot apply as the Principal Investigator. The Major Research Plan consists of three subcategories, namely, the Fostering Program, Key Program and Integrated Program, of which each one is open to application. Proposals shall be prepared in accordance with the requirement for the Major Research Plan and outlines of application, highlighting definite objective and key breakthrough, featuring interdisciplinary research, emphasizing on the contributions to solving critical scientific issues and fulfilling the overall goals of theMajor Research Plan. Applicants should select "Major Research Plan" for the columnof the funding type in the application form, and Fostering Program, KeyProgram, or Integrated Program for the column of sub-type, and input the title of theMajor Research Plan in the annotation.

Generally, the duration of Fostering Program projects is 3 years, and 4 years for Key Program projects, and that for Integrated Program project is determined by the Steering Committee of each Major Research Plan based on the actual need. For Fostering Program projects and Key Program projects, the number of collaborative research institutions shall not exceed two. The number of collaborative research institutions in one Integrated Program project may not exceed 4. The main participants must be the actual contributor to the Integrated Program project, and the total number of main participants may not exceed 9.

Regulations on managing and sharing of data and information should be observed in order to implement the overall scientific objectives and multi-disciplinary integration of the Major Research Plan. During the progress of project, attention should be paid to the supporting relationship among various programs. Annual academic seminar on funded projects of the Major Research Plan and a periodic academic symposium on relevant research area should be held, so as to strengthen academic exchange, achieve the overall scientific objectives and encourage multidisciplinary convergence and integration. The PIs of the granted projects are obliged to participate in these activities.

Specific call for Major Research Plans will be published separately on the NSFC website.

Excellent Young Scientists Fund

The Excellent Young Scientists Fund supports young scholars with good achievements in basic research to conduct innovative research in areas of their own choice, so as to promote fast growth of creative young talents and foster a number of outstanding talents on the international science frontiers.

The applicant for Excellent Young Scientist Fund based in the host institution should meet the following qualifications:

(1) Abide by the laws of the People's Republic of China and the management regulations of NSFC. Have good scientific integrity, and consciously practice the spirit of scientists in the new era;

(2) Be under the age of 38 (for male, born on or after January1, 1985) or 40 (for female, born on or after January1, 1983) by January1 of the year of application;

(3) Have senior professional position (title) or PhD degree;

(4) Have the experience of conducting basic research projects or other basic research;

(5) Have no employment with foreign institutions;

(6) Be able to work in host institution for no less than 9 months per year.

2. The following people shall not apply:

(1) Grantees of the National Science Fund for Distinguished Young Scholars or the Excellent Young Scientists Fund;

(2) Applicants for the National Science Fund for Distinguished Young Scholars in the same year;

(3) Post-doctors and graduate students;

Special reminder:

In 2023, the Excellent Young Scientists Fund will adopt the financial contracting system, and thefunding will no longer consist of direct costs and indirect costs, with 2 millionyuan for each grant. The duration is 3 years.

In 2023, according to the requirements of the overall planning of the national scientific and technological talent plan, the applicant can only have one grant of the national scientific and technological talent plan at the same level during the funding period, and cannot apply inversely fora talent program at lower level. Those who have received any kind of grant from the same level of the national science and technology talent plan and are in the funding period, and those who have received any kind of funding from the national science and

technology talent plan at the higher level shall not apply for the Excellent Young Scientists Fund.

In 2022, 6946 applications were received and 630 projects were funded, with a total funding amount of 1.26 billion yuan.

Funding for Projects of Excellent Young Scientists Fund in 2022

Departments	No. of applications	No. of awards	Success rate (%)
Mathematical and Physical Sciences	804	71	8.83
Chemical Sciences	854	86	10.07
Life Sciences	921	86	9.34
Earth Sciences	772	59	7.64
Engineering and Materials Sciences	1 320	110	8.33
Information Sciences	955	90	9.42
Management Sciences	216	22	10.19
Health Sciences	830	76	9.16
Interdisciplinary Sciences	274	30	10.95
Total or average	**6 946**	**630**	**9.07**

Excellent Young Scientists Fund (Hong Kong and Macao)

In order to support the scientific and technological innovation and development of the Hong Kong and Macao Special Administrative Regions (hereinafter referred to as the Hong Kong and Macao), encourage patriotic scientific researchers who love Hong Kong and Macao to participate in the central science and technology funding plan, and contribute to the construction of a strong country in science and technology, NSFC will continue to launch the Excellent Young Scientists Fund (Hong Kong and Macao) to scientific researchers of the host institutions of the Hong Kong and Macao Special Administrative Regions in 2023.

1. The applicant for Excellent Young Scientist Fund (Hong Kong and Macao) based in the host institutions should meet the following qualifications:

(1) Abide by the Basic Law of the Hong Kong Special Administrative Region of the People's Republic of China, the basic law of the Macao Special Administrative Region of the People's Republic of China and the management regulations of NSFC, have good scientific integrity and consciously practice the spirit of scientists in the new era;

(2) Be officially employed by a host institution in Hong Kong or Macao;

(3) Guarantee to work in the host institution of Hong Kong or Macao during the funding period be more than 9 months per year;

(4) Be under the age of 38 (for male, born on or after January1, 1985) or 40 (for female, born on or after January1, 1983) by January1 of the year of application;

(5) Have a senior professional position (title) or PhD degree;

(6) Have the experience of conducting basic research projects or other basic research.

2. The following people shall not apply:

(1) Grantees of the National Science Fund for Distinguished Young Scholars or the Excellent Young Scientists Fund;

(2) Post-doctors and graduate students.

In 2023, the Excellent Young Scientists Fund (Hong Kong and Macao) will continue adopting the financial contracting system, and the funding will no longer consist of direct costs and indirect costs, with a funding amount of 2 million yuan per project.

In 2022, 153 applications were received and 25 projects were funded by the Excellent Young Scientists Fund (Hong Kong and Macao), with a total funding amount of 50 million yuan. The duration is 3 years.

Funding for Projects of Excellent Young Scientists Fund (Hong Kong and Macao) in 2022

Departments	No. of applications	No. of awards	Success rate (%)
Mathematical and Physical Sciences	27	5	18.52
Chemical Sciences	14	2	14.29
Life Sciences	17	4	23.53
Earth Sciences	8	2	25.00
Engineering and Materials Sciences	26	4	15.38
Information Sciences	24	4	16.67
Management Sciences	13	1	7.69
Health Sciences	24	3	12.50
Interdisciplinary Sciences	**153**	**25**	**16.34**

National Science Fund for Distinguished Young Scholars

The National Science Fund for Distinguished Young Scholars supports youngscholars who have made outstanding achievements in basic research to select their ownresearch directions and conduct creative research, so as to speed up the growth of youngscientifictalents, attractoverseastalentsandfosteragroup of prominentacademicpacemakersintheforefrontofinternationalscience andtechnology.

1. The applicant for National Science Fund for Distinguished Young Scholarsbasedinthe hostinstitutionshould meet thefollowingqualifications:

(1) Abide by the laws of the People's Republic of China and the managementregulations of NSFC, have good scientific integrity and consciously practice the spiritofscientists inthenewera;

(2) Beunder the age of 45 by January 1 of the year of application (born on orafter January1,1978);

(3) Havea seniorprofessionalposition(title)orPhDdegree;

(4) Have the experience of presiding over basic research projects or conductingotherbasicresearch;

(5) Notbe employedbyforeigninstitutions;

(6) Beabletoworkinhostinstitutionfornolessthan9monthsperyearwithinthe Funding period.

2. The followingpeopleshall notapply:

(1) Post-doctorsorgraduatestudents;

(2) GranteesofongoingprojectoftheExcellentYoungScientistsFund(application is allowable on the year of completion of the funding of the Excellent Young Scientists Fund);

(3) Applicants fortheExcellentYoungScientistsFundinthesameyear;

(4) Peoplestudyingforapost-doctoral degreeorgraduatedegree.

Inparticular, theapplicantisremindedthat:

In 2023, National Science Fund for Distinguished Young Scholars will continue adopting the financial contracting system, and the funding will no longer consist of direct costs and indirectcosts. The funding amount for each project is 4 million yuan (2.8 million yuan for mathematicsandmanagement science). The funding duration is 5 years. In 2023, accordingtotherequirementsofontheoverallplanning of the national

scientific and technological talent plan, the applicant can only have onegrantofthenationalscientificandtechnologicaltalentplanatthesamelevelduringthe funding period. Those who have received any kind of grant from the same level ofthe national science and technology talent plan and are in the funding period shall notapply for the National Science Fundfor Distinguished Young Scholars.

Funding for Projects of National Science Fund for Distinguished Young Scholars in 2022

Departments	No.ofapplications	No.ofawards	Successrate(%)
Mathematicaland Physical Sciences	561	50	8.91
Chemical Sciences	610	55	9.02
Life Sciences	557	50	8.98
Earth Sciences	468	42	8.97
Engineeringand Materials Sciences	831	75	9.03
Information Sciences	581	52	8.95
Management Sciences	139	13	9.35
Health Sciences	547	50	9.14
Interdisciplinary Sciences	318	28	8.81
Totaloraverage	**4 612**	**415**	**9.00**

In 2022, National Science Fund for Distinguished Young Scholars received 4612 applicationsandsupported 415 projects, with atotal funding amount of 1.6288 billion yuan.

Science Fund for Creative Research Groups

The Science Fund for Creative Research Groups supports outstanding academic leaders at home and abroad to independently choose research directions, independentlyestablish and lead research teams to carry out innovative basic research, overcome difficulties, and cultivate research teams that occupy a place in the forefront of international science.

Applicants and participants should meet the following requirements:

(1) Have the experience of conducting basic research projects or other basic research;

(2) Guarantee to work in host institutions for no less than 6 months per year within the funding period;

(3) Be composed of one academic leader, an independent team, no more than 5 key participants, with the foundation of long-term cooperation;

(4) As a project applicant, academic leaders should have senior professional and technical positions (professional titles), high academic attainments and international influence, and be under the age of 55 on January 1 of the application year (born after January 1, 1968);

(5) Backbone researchers or group members should hold senior professional position (title) or have PhD degrees;

(6) Applicants and participants should be in the same host institution.

PIs who have been awarded the Science Fund for Creative Research Groups before shall not apply again. PI and participants with senior academic title of an ongoing project supported by the Science Fund for Creative Research Groups shall not apply or participate in the application. Participants who quit from a project supported by the Science Fund for Creative Research Groups are not permitted to apply again inthe next two years.

Applicants with senior academic titles may only apply for one project of the Science Fund for Creative Research Groups each year. **The total number of Science Fund for Creative Research Groups and Basic Science Center Program that an applicant applies for or participates in the application shall not exceed 1.**

In 2022, a total of 333 applications for the Science Fund for Creative Research Groups were received and 43 awards were made with a total funding

amount (direct cost)_of 424 million.

The funding duration of the Science Fund for Creative Research Groups is 5 years.The direct cost is 10 million yuan and the indirect cost is 2 million yuan per award (8 million yuan for direct cost and 2 million yuan for indirect cost for awards by mathematical and management sciences).

Awards Granted by the Science Fund for Creative Research Groups in 2022

Unit: 10,000 yuan

Departments	No. of applications	Awards		Success rate (%)
		No. of awards	Direct cost	
Mathematical and Physical Sciences	36	5	4 800	13.89
Chemical Sciences	36	5	5 000	13.89
Life Sciences	31	5	5 000	16.13
Earth Sciences	44	5	5 000	11.36
Engineering and Materials Sciences	54	6	6 000	11.11
Information Sciences	48	5	5 000	10.42
Management Sciences	9	2	1 600	22.22
Health Sciences	37	5	5 000	13.51
Interdisciplinary Sciences	38	5	5 000	13.16
Total or average	**333**	**43**	42 400	**12.91**

Basic Science Center Program

The Basic Science Center Program aims to gather and integrate domestic advantageous scientific research resources, targets at international science frontiers, advance deployment, gives full play to the advantages and characteristics of the science funding system, relies on high-level academic leaders, attracts and assemble outstanding S&T talents from different disciplines, and promotes in-depth cross-disciplinary integration, supports scientific personnel to conduct research and exploration in a relatively long-term and stable way, so as to produce a number of original achievements at international leading level, seize the dominant position in international scientific development and establish a number of academic highlands with important international influence.

Applicants and key participants for the Basic Science Center Program should meet the following qualifications:

(1) Have the experience of undertaking basic research project or doing other basicresearch;

(2) The applicant should be an excellent research team with multi-disciplinary crossings at the scientific frontiers, including 1 academic leader and at most 4 key participants.

(3) As the applicant, the academic leader should be an internationally well-known scientist in the field, with senior academic position (title), outstanding academic abilityand a proven track record of coordinating and managing large-scale projects, strong coordination and cohesion, and able to assemble excellent researchers from various scientific backgrounds, under the age of 60 by January 1 of the year of application (born on or after January 1, 1962);

(4) Key participants should be mainly young or middle-aged, with senior academic position (title) and outstanding research achievements in related scientific fields and potential for continuous growth.

Notes to applicants:

There is a restriction on the total number of projects for researchers applying for and undertaking Basic Science Center Program (limit for academic leader and key participants), Major Program, Special Fund for Research on National Major Research Instruments (limit for PI and major participants with a senior professional rank or title of the departmental recommended projects), National Key Research and Development Program (excluding Young Scientist Program, Technological Innovation Fund for Technology-based Small and Medium-sized Enterprises,

International Cooperation Programs, limit for PI and project leader), the Sci-Tech Innovation 2030 Agenda - Major Program (excluding Young Scientist Program, limit for PI and subject leader). The number of projects applied for and undertaken by the applicant at the same time shall not exceed 2 in principle. Unless specified otherwise, projects whose funding period terminates in the year of application are not included in the limit of the total number of applying and undertaking. Before submitting the application, the academic leader should confirm that he or she and key participants meet the above requirements.

The total number of host institute and cooperative research institute cannot exceed 3.

At the stage of application, the Basic Science Center Program is not counted in the total number of application and on-going projects, but counted before receiving NSFC's formal funding decision and after approval. Moreover, the applications that have not reached the on-site investigation are not counted. After receiving and before the termination of the funding period of Basic Science Center Program and before the completion of the funding of the, the applicant and the key participants cannot apply for or participate in other types of program except for the National Science Fund for Distinguished Young Scholars and the Excellent Young Scientist Fund.

The total number of applications for National Major Instrument Equipment R&D Program and Basic Science Center Program for one applicant within the same year cannot exceed one.

The total number of Science Fund for Creative Research Group and Basic Science Center Program that one researcher applies for either as the applicant or the main participants (including key participants and key research personnel) cannot exceed one.

The applicant and the participant with senior academic positions (titles) of the on -going project of the Basic Science Center Program cannot apply for the same program either as the applicant or participant, unless it is in the last year of the funding.The participants who quit from the project of the Science Fund for Creative Research Groups or the Basic Science Center Program shall not apply as a PI or participant in the next 2 years.

In the course of application, select "Science Center Program" in the funding category, "Basic Science Center Program" in the subclass introduction and the correct application code according to the actual research content.

The funding duration of Basic Science Center Program is 5 years. The direct cost shall not exceed 60 million yuan (for mathematics and management sciences, the directcost shall not exceed 50 million yuan)

Tianyuan Fund for Mathematics

Tianyuan Fund for Mathematics is a special fund to integrate the collective wisdom of mathematicians, explore funding method that suits the unique features of mathematics, and make China a mathematical powerhouse. This fund supports researchers to conduct research while considering the features and demands of mathematics, fostering young talents, promoting academic exchanges, optimizing the research environments, and cultivating mathematical culture, so as to strengthen the innovation capability of China in mathematics. The fund mainly supports the following 5 types of programs in 2023.

1. Tianyuan Center of Mathematics Program

The Tianyuan Center of Mathematics Program aims to set up a platform to promote research cooperation and exchanges in various mathematical topics and interdisciplinary areas of study. Through a variety of academic exchanges and seminars, this program aims to bring together research teams to solve core scientific problems, deepen collaboration between experts from various fields at home and abroad, foster research talents, and promote interdisciplinary research between mathematics and other related disciplines or sub-fields, thus enhancing overall research of mathematics in China, forming leading research directions and advancing the development of the mathematical discipline.

The projects should aim at broad frontier areas and important directions in mathematical research, and support academic exchange activities in China, including summer schools and training workshops for young teachers of mathematics. The project title should be in the form of “Tianyuan xx Center of Mathematics”. Please include the significance, scope, working plan, background of the proposed activity, and possible collaborators and personnel in the application proposal.

Funding renewal for the funded projects will be prioritized in 2023. One project will be funded with 15 million yuan for a duration of 5 years.

2. Tianyuan Mathematics Exchange Center Program

Aiming at building an international academic exchange platform, the Tianyuan Mathematics Exchange Center Program supports international high-level mathematics exchanges around cutting-edge research fields and important development directions of mathematics and its applications, so as to promote in-depth exchanges and cooperation between domestic and international mathematicians on

important questions in the research field. Each exchange and seminar project should invite a number of globally renowned mathematicians and domestic scholars leading the frontier of mathematical research to deliver academic reports and participate in free discussions.

Each exchange and seminar project should be organized and implemented by 3-5 main organizers who are internationally renowned experts in the field. The application for the project shall be submitted by an organizer who has Chinese nationality and works full-time in a Chinese host institution, together with the written consent of every major organizer. The participants should be no more than 50 in the exchange project, and the duration of the exchange activity is around 1 week. The application shall include the scientific significance, scope, specific agenda, organizers, and a preliminary list of participants.

3. Tianyuan Visiting Mathematicians Program

This program aims at promoting a balanced development of mathematical research in China by supporting talented young mathematicians in less developed regions in China to work with leading mathematicians in China. This project aims to leverage the strong mathematical research foundation and resources of the host institution to nurture young academic talents for less developed mathematical institutions in China, encouraging them to conduct high-level research, therefore facilitating deeper cooperation and communication among domestic institutions, and ultimately boosting the overall level of mathematical research in China.

Requirements on application:

(1) Joint application. The visiting scholar and the cooperating supervisor should pair up, submit their own application and list each other as research partners in application forms. The visiting young mathematician should come from a less developed region, be born after January 1, 1984, and have not undertaken NSFC general program. The host mathematician should be a nationally famous mathematician with international influence and has no teacher-student relationship with the visiting mathematician. The visiting mathematician should not be working in the same city as the host mathematician. The applicant should provide detailed information such as scientific significance, research contents, and research background. The name and the application code of applications submitted by the visiting scholar and the paired-up should be the same. The visiting time should not be less than 9 months. Please note that failure to implement properly by the sending or receiving institution may affect its future applications for the science fund.

(2) Please attach a letter of commitment as supplement material to the application. Both the sending and receiving institutions are required to issue a letter of commitment stamped with the seal of the secondary unit of their respective institutions. The letter of commitment from the sending institution should clearly state that the visiting scholar's treatment during the visit will remain the same and that no

work will be arranged for them. The letter of commitment from the receiving unit should clearly outline the work and study arrangements for the visiting scholar during their stay, and include a commitment to effectively manage and evaluate the scholar.

(3) Please attach an agreement as a supplement document to the application. The visitor and host should sign the agreement regarding the contents, funding, and sharing of intellectual property rights

(4) Only one application per year may be submitted by each host under this program.

Funding Intensity: The host can apply for a grant of 200,000 RMB per project, mainly for providing necessary living and working support for visiting scholars. Visiting scholars can apply for a grant of 100,000 RMB per project, mainly for subsidizing the sending institution of the visiting scholar and supporting their research.

4. Special lectures, high-level workshops on mathematics

Special lectures are organized for postgraduate students focusing on one or several related themes to introduce frontier topics in mathematical research. Lectures could include basic courses and special courses with large audiences lasting for 3 weeks. The application should include a teaching outline, teaching contents, and name list of the lecturers.

High-level workshops mainly support research groups consisting of highly skilled and exceptional mid-career and young mathematicians who collaborate to host regular workshops and seminars on specific mainstream topics and important international mathematical issues. **At least one review paper should be published after the workshop.**

The funding amount for each project will be 200,000 yuan.

5. Mathematical culture and communication program

This program supports the publication of mathematics communication series or books, which includes organizing domestic scholars to write or translate outstanding foreign works. This program also supports the publication of influential national journals related to mathematical culture, mathematical communication, mathematical education, and mathematical modeling, with the goal of improving the quality and expanding the reach of these journals among the public. This program supports important national mathematical communication activities organized by colleges and universities, research institutions, science associations at or above the provincial level, and mathematical societies.

6. Tianyuan Mathematics Frontier Key Special Program

Aiming at the international academic frontier, the Tianyuan Mathematics Frontier Key Special Program supports basic mathematical research targeting major international forefront issues in mathematical science, and cultivates research teams

that are willing to explore the most challenging scientific problems. The Mathematics Tianyuan Fund Academic Leading Group conducts research and analysis based on the development trends of international mathematics and is responsible for approving the research topics to be supported each year. The annual application guide for this program will be released separately.

7. Interdisciplinary Mathematics Joint Funding Program

The Interdisciplinary Mathematics Joint Funding Program is jointly funded with other research organizations and government departments to promote the deep integration of mathematics with other disciplines and specialized fields. The program aims to facilitate the application of mathematics in other disciplines/fields, solve key mathematical problems in related fields and major projects, and cultivate interdisciplinary research teams. The Mathematics Tianyuan Fund Academic Leadership Group is responsible for approving the prioritized interdisciplinary areas and joint funding institutions. In order to form stable interdisciplinary research teams and expand the scope of mathematics, interdisciplinary areas will be changed every 2-3 years and remain the same for the same period of time. The annual application guide for this program will be released separately.

The submission period for the online application of the mathematics Tianyuan Program is divided into two periods: from March 1, 2023, to 16:00 on March 20, 2023; and from July 1, 2023, to 16:00 on July 20, 2023. After completing the application, the applicant shall submit the electronic application and its attachments online. All the attachment materials required in the application (the original version of relevant supporting materials, approval documents, and other paper materials required by special instructions) should all be uploaded as electronic scanned copies, and there is no need to submit a paper application. After the project is approved, the paper signature and seal page of the application shall be bound at the end of the funded project plan and submitted together. The information signed and sealed shall be strictly consistent with the electronic application.

The funding category of the application form is “Tianyuan Fund for Mathematics Program”, the sub-category description is “Tianyuan Fund for Mathematics”, and in the “Annotations” section, one of the above five types of projects should be filled in according to the content of the application. For all projects, application code 1 should select the application code for the Mathematics subject. Applications with incorrect or unselected selections above will not be accepted. The funding period of the Tianyuan Fund for Mathematics projects generally does not exceed 1 year.

The Tianyuan Fund for Mathematics has no indirect costs, and the applied funds are direct costs. During the implementation of the Tianyuan Fund for Mathematics projects, it is necessary to acknowledge that “the project is supported by the Tianyuan Fund for Mathematics of the National Natural Science Foundation of China”.

Special Fund for Research on National Major Research Instruments

Aiming at the science frontiers and national demands and guided by scientific goals, the Fund supports the development of original scientific research instruments and core components that play an important role in promoting scientific development, exploring natural laws, and broadening research fields, in order to enhance China's original innovation.

Funding for Projects of Special Fund for Research on National Major Research Instruments in 2022

Unit: 10,000 yuan

Category	No. of applications	No. of awards	Direct cost	Average funding for direct costs
Departmental recommendation	51	5	42,369.88	8,473.98
Free application	642	76	62,955.72	828.36

Special Fund for Research on National Major Research Instruments comprises two categories: department-recommended projects and free application projects.

The funding duration for projects of the Special Fund for Research on National Major Research Instruments is 5 years, and the number of collaborative institutions in one project should not exceed 5.

1. Eligibility criteria

To be eligible for the Special Fund for Research on National Major Research Instruments, applicants should meet the following criteria:

(1) Have the experience of presiding basic research;

(2) Hold a senior professional position (title).

In-site postdoctors, full-time graduate students, researchers without host institutions, and researchers whose host institutions have not been registered at NSFC are not eligible for application.

2. Requirements for application and budget for direct cost

(1) For free application projects, applicants may submit research proposals via their host institutions. The budget for direct costs is less than 10 million yuan per project.

(2) For departmental recommended projects, the following 13 departments are entitled to recommend projects of the Special Fund for Research on National Major Research Instruments: Ministry of Education, Chinese Academy of Sciences, Ministry of Natural Resources, Ministry of Industry and Information Technology, Ministry of Ecology and Environment, Ministry of Agriculture and Rural Affairs, National Health Commission, China Earthquake Administration, State Administration for Market Regulation, China Meteorological Administration, China Academy of Engineering Physics, Equipment Development Department and Logistic Support Department of Central Military Commission. The budget for direct costs of the departmental recommended projects of the Special Fund for Research on National Major Research Instruments should be 10 million yuan or above per project.

3. Notes on the application

(1) Applicants should read this *Guide* carefully and prepare research proposals in accordance with the outline of applications of the Special Fund for Research on National Major Research Instruments. Please select the "Special Fund for Research on National Major Research Instruments" from the funding categories, and choose either "free application" or "department recommendation" as the funding subcategory. Please choose the application code in all departments except the Department of Management Sciences based on your research content.

(2) Project leaders and primary participants with senior professional titles applying for the National Major Research Instruments Development Project are limited to applying for and undertaking no more than two projects (topics) concurrently with the following programs, including the Basic Science Center Project (for academic leaders and core members), the Major Project (for project leaders and topic leaders), the National Key R&D Program Project (for project leaders and topic leaders, excluding young scientist programs, science and technology-based SME projects, and international cooperation projects), and the Science and Technology Innovation 2030 - Major Project (for project leaders and topic leaders, excluding young scientist programs). Projects that end in the same year as the application will not count toward the project limit. Applicants should confirm that they and their primary participants meet the above joint application requirements before submitting their project proposals.

For researchers with senior academic rank (title), the total number of Special Fund for Research on National Major Research Instruments (including Special Program on National Major Research Instruments) and the National Major Instrument R&D Program and the Key Special Program for Basic Scientific Research Infrastructure and Major Research Instrument R&D (Scientific Equipment direction) by Ministry of Science and Technology one may apply for (including as applicant and main participant) and undertake (including as PI and main participants) shall not exceed one.

(3) Applicants should make their budget requests in an objective and practical manner according to the real costs of the development of instruments. The NSFC will invite experts to assess the budget requests.

International (Regional) Cooperation and Exchange Programs

In order to improve the quality of China's scientific research and its international competitiveness, the International (Regional) Cooperation and Exchange Programs aim at creating and deepening cooperation opportunities by funding Chinese scientists to conduct substantial cooperation with their international collaborators in the scientific frontier and take full advantage of international scientific and technological resources on the basis of "equal cooperation, mutual benefits, and equal sharing of results".

The funding system of the International (Regional) Cooperation and Exchange Programs is comprised of Key International (Regional) Joint Research Programs, International (Regional) Joint Research and Exchange Programs funded under the Agreements/MoUs between NSFC and its foreign partners.

Key International (Regional) Joint Research Program

The Key International (Regional) Joint Research Program (hereafter referred to as Key Joint Research Program) gives priority to research in the following areas: the priority funding areas of NSFC, areas that China urgently needs to develop, international mega research projects and programs with Chinese participation, and utilizing large-scale scientific facilities to conduct collaborative research with partners abroad.

Researchers applying for this program shall, in accordance with the priority funding areas announced by relevant scientific departments in the Guide, choose innovative joint research subjects centering on major scientific issues, and clarify the necessity and complementarities of the cooperation. Chinese applicants in the mainland and their partners shall have long-term steady collaboration (e.g., coauthored publications and continued personnel exchanges and interactions) and the partners shall have matching resources for this research. In the process of

cooperation, attention shall be given to the sharing of outcomes and the protection of intellectual property rights.

In 2022, a total of 436 applications were submitted for the Key Joint Research Program. Among them, 79 were accepted and granted a total of 194.46 million yuan in direct cost funding.

In 2023, the Key Joint Research Program plans to fund 80 projects with the same average funding for direct costs per project as in 2022, and the duration of each project is 5 years.

Applicants must meet the following criteria:

(1) Hold the position/title of professor or associate professor;

(2) As the PI of an on-going or completed NSFC research project with a duration of no less than 3 years.

(3) Having a good foundation for cooperation with international (regional) partners.

Partners should meet the following criteria:

(1) Engage in scientific research abroad and being in charge of research laboratories or key research projects independently;

(2) Hold the position/title of professor or associate professor in the host countries/regions.

Appendix Documents and requirements:

Apart from the Chinese application form, the applicant must also submit the following documents as required:

(1) English Application Form: The English Application Form can be downloaded from the NSFC's Grants System and should be submitted online at the time of submission.

(2) Letter of Agreement: A copy of the Letter of Agreement signed between/ among the collaborating PIs must be provided. Unilaterally signed letters are not valid. The Letter of Agreement must include:

(i) Research contents and objectives;

(ii) List of collaborating Pls and participants;

(iii) Duration, mechanism and plan of joint research;

(iv) Ownership, use and transfer of IPR;

(v) Relevant budgetary arrangements.

Please refer to the sample Letter of Agreement which can be downloaded at http://www.nsfc.gov.cn/Portals/0/fj/fj20161230_02.doc

(3) Documents that confirm the partners' involvement and participation in research projects that are relevant to the submitted application, or a list of publications related to the submitted application by the international partners in the past 3 years.

(4) Letter of confirmation by the partner. If the partner cannot sign the English Application Form, a letter of confirmation by him/her should be provided. The letter

of confirmation must be written and printed on official forms including the title, logo, and contact information of the foreign collaborator's institutions, containing contact information, address, and other detailed information about the partner, such as the title of the research, the content and period of cooperation, the way to share IPR, etc. In the confirmation letter, your partner should confirm that he/she has read and agrees with the English Application Form.

Priority areas for the Key Joint Research Program in 2023

1. Department of Mathematical and Physical Sciences

1) Modern theory of algebra and geology
2) Modern analytical theory and its applications
3) Theory and method of problem driven applied mathematics
4) Understanding, design and control of complex system dynamics
5) Mechanics of new materials and new structures
6) Theory, method and control of high speed flows
7) Dark matter, dark energy and galaxy survey
8) Multi-messenger probe and study of the Galaxy, stars, the sun and planetary system
9) Dynamic properties and monitoring of near earth asteroid
10) Key technology of next generation telescopes
11) Quantum materials and devices
12) Quantum information and quantum precision measurement
13) Mechanism and control of electro magnetic field and acoustic field in complex structures and media
14) Basic fermion and its interactions
15) Nature of strong interactions
16) Key scientific problems in nuclear fusion
17) Research based n large scientific facilities

2. Department of Chemical Sciences

(1) Precise construction of molecular functional systems;
(2) Transmission, reaction and measurement under unconventional conditions;
(3) Surface/interface fundamentals of physical science;
(4) Molecular state selection and kinetics;
(5) Electrochemical energy beyond the traditional system;
(6) Molecular chemical engineering under the new paradigm;
(7) Multifunctional coupled chemical sensing and imaging;
(8) Immunology and neurochemical biology;
(9) Green synthesis method and process;
(10) Fundamentals of chemical sciences and engineering for efficient conversion and utilization of energy and resources;

(11) Traceability and safe transformation of key chemicals in environmental ecosystems;

(12) Application of big data and artificial intelligence in chemical sciences and engineering;

(13) Chemical creation of new materials;

(14) Design, regulation and theory of soft matter functional system;

(15) The molecular basis of multi-level interactive communication in living systems;

(16) Molecular science research driven by large research infrastructures.

Please refer to the research fields mentioned above when applying. The content should embody the complementarity and necessity of research in terms of fundamentals, interdisciplinarity and collaboration.

3. Department of Life Sciences

(1) The evolutionary mechanism of important biological traits and environmental adaptation;

(2) Pathogenesis and host interaction mechanisms of pathogenic microorganisms and immune regulation;

(3) The molecular basis of cell fate plasticity and organogenesis, aging, and regeneration;

(4) Biological information flow of body functional activities;

(5) The neurobiological basis of cognition and perception;

(6) Detection and analysis of biological and molecular events across time, space, and scale;

(7) Precise design, transformation, and simulation of living organisms;

(8) Response and adaptation of ecosystems to global change;

(9) Targeted cultivation and efficient utilization of forest and grass biomass;

(10) Biological basis and regulatory mechanism of food safety, nutrition, and quality;

(11) Theoretical basis for gene discovery and molecular design breeding of important genetic resources of crops;

(12) Mechanism and control basis of crop pest disasters and evolution;

(13) Formation and regulation mechanism of quality traits in horticultural crops;

(14) The biological basis for the formation of important traits in agricultural animals;

(15) The biology of important infectious diseases in agricultural animals.

4. Department of Earth Sciences

Land surface critical processes and their multiple effects;

Environmental pollution processes and prevention;

Human activities and consequent eco-environmental effects;

System and mechanism of mineralization and accumulation;

Dynamics processes of continental plates interiors and boundaries;

Coupling relationship between earth's deep and surface processes;

Mechanism, monitoring, early-warning and risk prevention of geological disasters;

Solar-Earth energy transfer processes and the impacts on human activities;

Water cycle and ecohydrological process;

Key processes of weather and climate system, and extreme weather events;

Monsoon, drought and global change;

Origins and major evolutionary events of key biological taxa and the environmental backgrounds;

Life processes in the extreme environment;

The dynamic processes and mechanisms of multi-scale interactions in the ocean;

Marine ecosystems and abyssal biological resources;

Advanced science and technology platforms to promote the development of Earth and planetary sciences;

Human activities and environment along the Belt and Road regions;

Nano-geoscience research platform;

Global comparison of major geo-environment-biological events;

Polar science research;

Planetary Earth science;

Interfacial structure and properties of global subduction zones;

Comprehensive observational research of "Two Oceans and One Sea" (Pacific Ocean, Indian Ocean, and South China Sea);

Development and application of earth system model;

Formation of mineral and oil and gas resources and global environment;

Health and Geoscience.

5. Department of Engineering and Material Sciences:

(1) High-performance light metallic materials;

(2) New metallic functional materials;

(3) New inorganic nonmetallic materials;

(4) New organic polymer materials;

(5) Secure and efficient exploitation and green machining and utilization of resources;

(6) Intelligent manufacturing, bio-manufacturing, and sustainable manufacturing;

(7) Digitized and intelligent design of complex electromechanical systems;

(8) Renewable energy sources, new energy sources, and efficient and clean utilization of energy sources;

(9) Efficient systems of electrical energy conversion and transformation;

(10) Comprehensive disaster prevention and mitigation and full-time design of

intelligent construction and civil engineering of smart cities;

(11) Water security and water resources utilization influenced by climate change, environmental evolution, and extreme whether;

(12) New-generation urban water environmental protection under global climate change;

(13) Multimedium pollution control and ecological restoration;

(14) New Ocean engineering structures and Ocean equipment;

(15) Marine technology and marine transportation engineering;

(16) Intelligent transportation and vehicle engineering;

(17) Flexible wearable materials;

(18) Intelligent materials;

6. Department of Information Sciences

1) Basic theory and key technologies for B5G mobile communication and network

2) Detection imaging theory and key technologies

3) Remote sensing information process

4) Medical information detection and processing

5) New theory of computation and software method

6) Architecture and system of large complex computation scenarios

7) Theory and application of big data computation

8) Brain-like model and information processing

9) New control theory and system

10) Smart robot

11) Semiconductor electric devices and integration

12) Micro nano mechanical electrical devises and control system\

13) Biomedical optics and photonics

14) Photon integration technology ad devices

7. **Department of Management Sciences**

(1) Law of behavior in management system

(2) Analysis, experiment, and modeling of complex management system

(3) Data-driven financial innovation and risk law

(4) Enterprise innovation behavior and national innovation system management

(5) Management science problems in service economy

(6) Research on the transformation of China's economic structure and mechanism reconstruction

(7) Basic management law of national security

(8) Management law and mechanism of new urbanization

(9) Mobile Internet based healthcare and health management

(10) International macroeconomic policy coordination mechanism and international economic governance structure

(11) Climate change and public health

(12) Scientific ethics and scientific research integrity

8. Department of Health Sciences

(1) New mechanisms of the common pathology of development, inflammation, metabolism, probiotics, microenvironment, etc.;

(2) Pathogenesis and precise diagnosis and treatment of major chronic diseases;

(3) Epidemiology of chronic diseases and injuries and related prevention and intervention strategies;

(4) Rapid identification, pathogenesis, prevention, early warning new treatment of emerging and emergency infectious diseases;

(5) Infectious diseases and antibiotic resistance;

(6) Frontier research on first aid, trauma, rehabilitation and regenerative medicine;

(7) Women and children's health;

(8) Research on the frontier of reproduction, development, aging related diseases;

(9) Nutrition, environmental, genetic and health;

(10) Stem cells and diseases;

(11) Organ fibrosis and prevention mechanism;

(12) Tissue and organ damage, dysfunction and intervention;

(13) Protection of organs and replacement therapy;

(14) Pathogenesis and intervention of neuropsychiatric disorders;

(15) Mechanisms of immune-related diseases and new immunotherapy strategies;

(16) Interdisciplinary scientific research on diseases;

(17) Medical imaging and biomedical engineering;

(18) Innovative medical technologies and personalized medicine;

(19) Biomarkers and personalized medicine;

(20) Discovery of new drug targets and pharmacological validation;

(21) Modern scientific connotation of traditional Chinese medicine theories;

(22) Material basis and mechanism of traditional Chinese medicine;

(23) Basic research on special and forensic medicine.

In principle, PIs in programs with large funding amounts such as Key Program, Key International (Regional) Joint Research Program, International (Regional) Cooperation Programs under Agreements/MoUs, Major Program, Key Program or Integrated Program of Major Research Plan or Programs of Joint Funds, Special Fund for Research on National Major Research Instruments in 2022, will not be considered by the Department of Health Sciences for funding under the Key International (Regional) Joint Research Program in 2023.

International (Regional) Cooperation and Exchange Programs under Agreements/MoUs

Jointly organized and funded by NSFC and international science funding agencies(or research institutions and international organizations), the International (Regional) Cooperation and Exchange Programs under Agreements/MoUs support bilateral and multilateral joint research and academic exchanges between Chinese scientists and their partners. For years, NSFC has continued to strengthen the research on the policies of international collaboration with its partners, expanded its cooperation network and funding areas with the U.S. and Canada, and enhanced its collaboration and exchanges with partners in South America. NSFC promotes its comprehensive partnership with European partners through diversified collaborative activities with respective European partner countries, and cooperates with the EU as a whole. The collaboration mechanisms with Japan and South Korea have been further improved, and areas for collaboration further refined. NSFC continues to seek scientific cooperation in wider research areas with Israel and Singapore, and further the bilateral cooperation with partners of developing countries with potential and impacts, such as BRICS countries, Thailand, Egypt and Iran. NSFC further expands its multilateral cooperation through international organizations by leveraging its unique role of coordinating cross-border scientific research programs to engage more Chinese researchers in the participation, planning and implementation of cross-border regional research plans with scientific significance. In addition, NSFC promotes the cooperation between Chinese researchers and their partners through the Sustainable Development International Cooperation program. Adhering to the One country, Two systems Policy of the central government, NSFC has attached significance to the scientific collaboration between the Chinese mainland and Hong Kong, Macao Special Administrative Region, and the Taiwan region. NSFC has by far signed 101 cooperation agreements/MoUs with science funding agencies and research institutions in 54 countries/regions. After NSFC and its partners agree on the modes of cooperation and exchange, funding areas, types of grants, funding intensity, and review mechanisms through negotiation, both sides will release

guides on their websites to call for proposals and organize reviews.

The International (Regional) Cooperation and Exchange Programs under Agreements/MoUs consist of 2 types of programs: the Joint Research Program and the Exchange Program.

Applicants from host institutions who want to apply for the Joint Research Program must meet the following qualifications:

Hold the position (title) of professor or associate professor;

As the PIs of an on-going or completed NSFC research project with the duration of no less than 3 years.

Have a good foundation for cooperation with foreign (regional) partners.

The Joint Research Program: In this category, NSFC and its international partnersfund bilateral or multilateral joint research projects to support Chinese researchers and their partners to conduct basic research under the framework of cooperation agreements/MoUs.

The Exchange Program: This category aims at supporting Chinese researchers who have ongoing NSFC projects to participate in international cooperation and exchange activities to promote innovation, cultivate talents, and improve the development of disciplines and research quality of ongoing NSFC projects. The Exchange Program featured by mutual visits consists of Personnel Exchange Program and Academic Conference Program. The Personnel Exchange Program enables Chinese researchers to maintain sound bilateral or multilateral relations with their partners through cooperation and exchange activities, so as to lay a solid foundation for future in-depth and substantial collaboration. The Academic Conference Program aims at supporting researchers to organize bilateral or multilateral international conferences in and outside of China to keep pace with the latest research frontiers and hotspots in the international academic arena, establish and deepen cooperation between Chinese researchers and their foreign peers, strengthen the publicity of the research results of NSFC projects and enhance the international influence of China's scientific research.

Applicants from host institutions who want to apply for the Joint Exchange Program must meet the following qualifications:

As PI of an on-going NSFC research project with the duration of no less than 3 years.

As the participant of an on-going NSFC research project with the duration of no less than 3 years, and having a senior academic rank (title) or a doctoral degree, or recommendation from two researchers who are in the same research field and have a senior academic rank (title), and having consent from the PI of the said NSFC project.

Applicants from host institutions who want to participate in the application for the Joint Exchange Program must meet the following qualifications:

As PI or participant of an on-going NSFC research project with the duration of

no less than 3 years.

Having consent from the PI of the said NSFC project.

Please note that Joint Exchange program is not NSFC research project.

More information of the International (Regional) Collaborative Research and Exchange Program is listed below. Please refer to the Guidelines for International (Regional) Collaborative Research and Exchange Program published in the "Notices" section of the NSFC website for further information.

Asia and Africa

Japan

Japan Society for the Promotion of Science (JSPS)

NSFC and JSPS jointly fund the exchange projects and bilateral workshops.

(1) Exchange Program

NSFC and JSPS jointly fund the exchange projects between Chinese and Japanese researchers. The funding period is 2 years and 9 months. The maximum funding amount for each project is no more than 200,000 yuan for Chinese researchers from NSFC, supporting the traveling cost of the Chinese researchers to Japan and the local expenses of the Japanese researchers in China. The traveling cost of Japanese researchers to China and the local expenses of the Chinese researchers in Japan will be covered by JSPS. The number of projects to be funded will be decided by both sides through negotiation.

(2) Bilateral Workshop

Participants of a bilateral workshop from each side must come from at least 3 institutions. The maximum funding amount for each project is 2 million yuan from NSFC. For bilateral workshops held in China, the local cost of the attendees and the expense of the workshop will be covered by NSFC, while the cost of the international traveling of Japanese attendees will be covered by JSPS. For bilateral workshops held in Japan, the local cost of the attendees and the expense of the workshop will be covered by JSPS, while the cost of the international traveling of Chinese attendees will be covered by NSFC. The number of workshops to be funded will be decided by both sides through negotiation.

NSFC supports approximately 10 outstanding doctoral students and young researchers each year to attend the international HOPE Meeting hosted by JSPS. The conference invites Nobel laureates to deliver reports to young researchers from Asia and Africa through poster exchanges, group discussions, cultural experiences, and other ways that facilitate in-depth communication. JSPS covers the costs of the conference organization and local activities, while the NSFC funds the international travel expenses and related costs for Chinese participants.

South Korea

National Research Foundation (NRF)

NSFC and NRF jointly support joint research projects, exchange projects, and bilateral workshops.

(1) Joint Research Program

NSFC and NRF jointly fund research projects in areas of common interests between Chinese research and Korean researchers. The maximum funding amount for each project is 2 million yuan from NSFC with a funding period of 3 years.

(2) Exchange Program

NSFC and NRF jointly fund the exchange projects between Chinese and Korean researchers. The funding period is 2 years. The maximum funding amount for each project is 150,000 yuan for Chinese researchers from NSFC, supporting the traveling cost of the Chinese researchers to Korea and the local expenses of the Korean researchers in China. The traveling cost of Korean researchers to China and the local expense of the Chinese researchers in Korea will be covered by NRF. The number of projects to be funded will be decided by both sides through negotiation.

(3) Bilateral Workshop

Participants of a bilateral workshop from each side must come from at least 3 institutions. NSFC provides a maximum funding amount of 150,000 yuan for each project. For bilateral workshops held in China, the local cost of the attendees and the expense of the workshop will be covered by NSFC, while the cost of the international traveling of Korean attendees will be covered by NRF. For bilateral workshops held in Korea, the local cost of the attendees and the expense of the workshop will be covered by NRF, while the cost of the international traveling of Chinese attendees will be covered by NSFC. The number of workshops to be funded will be decided by both sides through negotiation.

Three Asian Countries (China, Japan and South Korea)

A3 Foresight Program

The A3 Foresight Program is a joint research program set up and sponsored by NSFC, Japan Society for the Promotion of Science (JSPS), and the National Research Foundation of Korea (NRF) together. NSFC, JSPS and NRF support researchers from China, Japan and South Korea to conduct collaborative world-class research in selected strategic areas with the aim to foster outstanding young researchers and address common regional challenges.

The priority areas of the A3 Foresight Program for each year are consistent with the themes of the Northeastern Asian Symposium jointly organized by NSFC, JSPS and NRF, with NSFC funding up to 4 million yuan per project for 5 years.

Mongolia

Mongolian Foundation for Science and Technology (MFST)

Joint Research Program

NSFC and MFST jointly fund research projects in areas of common interests between Chinese research and Mongolian researchers. The maximum funding amount for each project is 2 million yuan from NSFC with a funding period of 3 years.

Thailand

National Research Council of Thailand (NRCT)

NSFC and NRCT jointly fund research projects in areas of common interests between Chinese research and Thai researchers. The maximum funding amount for each project is 2 million yuan from NSFC with a funding period of 3 years.

Pakistan

Pakistan Science Foundation (PSF)

NSFC and PSF jointly support joint research projects, exchange projects, and bilateral workshops.

(1) Joint Research Program

NSFC and PSF jointly fund research projects in areas of common interests between Chinese research and Pakistani researchers. The maximum funding amount for each project is 2 million yuan from NSFC with a funding period of 3 years.

(2) Exchange Program

NSFC and PRF jointly fund the exchange projects between Chinese and Pakistani researchers. The funding period is 2 years. The maximum funding amount for each project is 150,000 yuan for Chinese researchers from NSFC, supporting the traveling cost of the Chinese researchers to Pakistan and the local expenses of the Pakistani researchers in China. The traveling cost of Pakistani researchers to China and the local expense of the Chinese researchers in Pakistan will be covered by PSF. The number of projects to be funded will be decided by both sides through negotiation.

(3) Bilateral Workshop

Participants of a bilateral workshop from each side must come from at least 3 institutions. NSFC provides a maximum funding amount of 150,000 yuan for each project. For bilateral workshops held in China, the local cost of the attendees and the expense of the workshop will be covered by NSFC, while the cost of the international traveling of Pakistani attendees will be covered by PSF. For bilateral workshops held in Pakistan, the local cost of the attendees and the expense of the workshop will be covered by PSF, while the cost of the international traveling of Chinese attendees will be covered by NSFC. The number of workshops to be funded will be decided by both sides through negotiation.

Iran

Iran National Science Foundation (INSF)

Joint Research Program

NSFC and INSF jointly fund research projects in areas of common interests between Chinese research and Iranian researchers. The maximum funding amount for each project is 2 million yuan from NSFC with a funding period of 3 years.

The United Arab Emirates (UAE)

Ministry of Education (MOE) of UAE

Exchange Program

NSFC and MOE jointly fund exchange projects.

Egypt

Academy of Scientific Research and Technology (ASRT)

Joint Research Program

NSFC and ASRT jointly fund research projects in areas of common interests between Chinese research and Egyptian researchers. The maximum funding amount for each project is 2 million yuan from NSFC with a funding period of 3 years.

Israel

Israel Science Foundation (ISF)

NSFC and INF jointly fund research projects in areas of common interests between Chinese research and Israeli researchers. The maximum funding amount for each project is 2 million yuan from NSFC with a funding period of 3 years.

Other Cooperation Channels

NSFC has signed bilateral cooperation agreements with the National Research Foundation of Singapore (NRF), the Department of Science and Technology of India (DST), and the Council of Scientific and Industrial Research of India (CSIR) to jointly support collaborative research projects, exchange programs, and academic conferences for researchers.

America and Australasia

USA

The National Science Foundation (NSF)

According to the cooperative agreement between NSFC and NSF, both sides

jointly support research and exchange projects in areas of common interests.

(1) Joint Research Program

NSFC and NSF jointly solicit collaborative research proposals in the areas of Biodiversity on a Changing Planet (BoCP), Ecology and Evolution of Infectious Diseases (EEID)and Sustainable Regional System (SRS).

NSFC and NSF will release the call for proposals together. The Chinese and U.S. applicants should submit the proposals to NSFC and NSF respectively. NSFC and NSF will jointly make final funding decisions based on the review conducted in the agreed-upon approach and procedures.

(2) Exchange Program

NSFC and NSF will fund 3- to 5-year exchange projects in the areas of Biodiversity on a Changing Planet (BoCP) and Ecology and Evolution of Infectious Diseases (EEID) to support network building and preliminary research.

NSFC and NSF will release the call for proposals together. The Chinese and U.S. applicants should submit the proposals to NSFC and NSF respectively. The proposals will be reviewed by NSFC and NSF according to the agreed-upon approach and procedures. And the final funding decisions will be mutually made.

Bill & Melinda Gates Foundation (BMGF)

According to the cooperative agreement between NSFC and BMGF, both sides jointly support research projects and bilateral workshops in areas of common interests.

(1) Joint Research Program

NSFC and BMGF will jointly solicit collaborative research proposals in the areas of global health, and support Chinese scientists to conduct collaborative research with international partners.

NSFC and BMGF will release the call for proposals together. NSFC and BMGF will jointly make final funding decisions based on the review conducted in the agreed -upon approach and procedures.

(2) Bilateral Workshop

NSFC and BMGF will fund bilateral workshops in areas of global health and agriculture. The topics of the workshops will be mutually identified by both parties.

Latin America

NSFC will support research projects and workshops with São Paulo Research Foundation (FAPESP), the National Research and Development Agency of Chile (ANID) and National Scientific and Technical Research Council of Argentina (CONICET) respectively based on the bilateral cooperative agreements.

(1) Joint Research Program

NSFC will solicit collaborative research proposals with FAPESP, ANID and CONICET respectively in the areas of common interests, and make final funding decisions jointly based on the review conducted in the mutually agreed approach and procedures.

(2) Bilateral Workshop

NSFC will fund bilateral workshops with FAPESP, ANID and CONICET respectively in areas and numbers mutually identified.

Other Cooperation Channels

NSFC has signed bilateral cooperative agreements for funding joint research projects, personnel exchange projects and bilateral workshops with the U.S. National Institutes of Health (NIH), the Gordon and Betty Moore Foundation (GBMF), Canadian Institutes of Health Research (CIHR), the Research Foundation of Quebec (FRQ), the Health Research Council of New Zealand (HRC), the Brazilian Federal Agency for Support and Evaluation of Graduate Education (CAPES), the Ministry of Science, Technology and Environment of the Republic of Cuba (CITMA), and the National Council of Science and Technology of Mexico (CONACTY), and etc. The specific programs are jointly decided on a case-by-case basis through mutual agreements.

Europe

European Union

European Research Council (ERC)

Talent Program

NSFC and ERC will jointly fund the Chinese researchers to visit European countries for a single long-term or multiple short-term research stay (3 to 12 months in total). The Chinese researchers should join the ERC-funded project teams to carry out collaborative research based on the common interest. The international traveling cost will be covered by NSFC,with a maximum funding amount of 30,000 yuan for each project. The local and research costs in Europe will be covered by the ERC-granted projects.

Russia

Russian Science Foundation (RSF)

Joint Research Program

NSFC and RSF will jointly fund the collaborative research in areas of common interests between the Chinese and Russian researchers. The maximum funding amount for each project will be 1.5 million yuan from NSFC. The funding period will be 3 years.

Germany

German Research Foundation (DFG)

Joint Research Program

NSFC and DFG will jointly fund the collaborative research in areas of Mathematical and Physical sciences, Earth sciences, Engineering and Materials sciences, and information sciences between Chinese and German researchers. The maximum funding amount for each project will be 3 million yuan from NSFC. The funding period will be 3 years.

UK

UK Research and Innovation (UKRI)

Joint Research Program

NSFC and UKRI (EPSRC, BBSRC, NERC, MRC, ESRC and STFC) will jointly fund the collaborative research between the Chinese and UK researchers based on the research fields of common interests. The maximum funding amount for each project will be 2 or 3 million RMB from NSFC. The funding period will be 3 to 4 years.

Royal Society (RS)

Exchange Program

NSFC and RS will jointly fund the exchange visits between the Chinese and UK researchers. The maximum funding amount for each project will be 100,000 yuan for Chinese researchers from NSFC and 12,000 pounds for UK researchers from RS. The cost for the international traveling, accommodation, meals and intercity transportation will be covered by the granted projects. The funding period will be 2 years.

Royal Society of Edinburgh (RSE)

Workshops

NSFC and RSE will jointly fund the bi-lateral workshops between researchers in China and UK. The maximum funding amount for each project will be 150,000 yuan from NSFC and 17,000 pounds from RSE. For bi-lateral workshops held in China, the local cost of the attendees and the expense of the workshop will be covered by NSFC, while the cost of the international traveling of British attendees will be covered by RSE. For bi-lateral workshops held in UK, the local cost of the attendees and the expense of the workshop will be covered by RSE, while the cost of the international traveling of Chinese attendees will be covered by NSFC.

British Council (BC)

Workshops

NSFC and BC will jointly fund the bi-lateral workshops between researchers in China and UK. The maximum funding amount for each project will be 150,000 yuan from NSFC and 24,000 pounds from BC. For bi-lateral workshops held in China, the local cost of the attendees and the expense of the workshop will be covered by NSFC, while the cost of the international traveling of British attendees will be covered by BC. For bi-lateral workshops held in UK, the local cost of the attendees and the expense of the workshop will be covered by BC, while the cost of the international traveling of Chinese attendees will be covered by NSFC.

Netherlands

Dutch Research Council (NWO)

Joint Research Program

NSFC and NWO will jointly fund the collaborative research in areas of common interests between Chinese and Dutch researchers. The maximum funding amount for each project will be 4 million yuan from NSFC. The funding period will be 4 years.

Exchange Program

NSFC and NOW will jointly fund the collaborative research between the Chinese and Dutch researchers. The funding period will be 2 years. The fields, quantity and intensity of funding shall be determined through consultation between the NSFC and NWO.

Workshops

NSFC and NWO will jointly fund the bi-lateral workshops between Chinese and Dutch researchers. The fields, quantity and intensity of funding shall be determined through consultation between the NSFC and NWO.

Belgium

The Research Foundation-Flanders (FWO) and the Fund for Scientific Research (FNRS)

Exchange Program

NSFC, FWO and FNRS will jointly fund the exchange visits between researchers from China, Flemish and Wallonia-Brussels Federation (BWF) researchers from Belgium. The maximum funding amount for each project will be 100,000 yuan from NSFC, supporting the traveling cost of the Chinese researchers to Belgium and local expenses of the Chinese researchers in Belgium. The traveling cost of the Belgian researchers to China and local expense of the Belgian researchers in China will be covered by FWO and FNRS. The funding period will be 2 years.

Sweden

Swedish Research Council (VR)

Joint Research Program

NSFC and VR will jointly fund the collaborative research in areas of common interest between Chinese and Swedish researchers. The maximum funding amount for each project will be 3 million yuan from NSFC. The funding period will be 3 years.

Swedish Foundation for International Cooperation in Research and Higher Education (STINT)

Exchange Program

NSFC and STINT will jointly fund the exchange visits and bi-lateral workshops between the Chinese and Swedish researchers. The maximum funding amount for each project will be 400,000 yuan from NSFC, supporting the traveling cost and local

expenses in Sweden of the Chinese researchers as well as the expenses of the workshops held in China. The maximum funding amount for each project will be 600,000 Swedish Kroner from STINT, supporting the traveling costs and local expenses in China of the Swedish researchers as well as the expenses for the workshops held in Sweden. The funding period will be 3 years.

Belarus

Belarusian Republican Foundation for Fundamental Research (BRFFR)

Exchange Program

NSFC and BRFFR will jointly fund the exchange visits between Chinese and Belarusian researchers. The maximum funding amount for each project will be 200,000 yuan from NSFC, supporting the traveling cost and local expenses of Chinese and Belarusian researchers as well as the expenses for the bi-lateral workshops. The funding period will be 2 years.

Switzerland

Swiss National Science Foundation (SNSF)

Joint Research Program

NSFC and SNSF will jointly fund the collaborative research in areas of common interests between Chinese and Swiss researchers. The maximum funding amount for each project will be 3 million yuan from NSFC. The funding period will be 4 years.

Poland

Narodowe Centrum Nauki (NCN)

Joint Research Program

NSFC and NCN will jointly fund the collaborative research in areas of Mathematical and Physical sciences, Earth sciences, Information sciences and Management sciences between Chinese and Polish researchers. The maximum funding amount for each project will be 1.5 million yuan from NSFC. The funding period will be 3 years.

Finland

Academy of Finland (AF)

Exchange Program

NSFC and AF will jointly fund the exchange visits between the Chinese and Finnish researchers. The maximum funding amount for each project will be 100,000 yuan from NSFC, supporting the traveling cost and local expenses for the Chinese researchers in Finland. While the traveling cost and the related expenses for the Finnish researchers in China will be covered by AF. The funding period will be 2 years.

Workshops

NSFC and AF jointly fund the bi-lateral workshops between Chinese and Finnish researchers. For the bi-lateral workshops held in China, the expenses for the workshop, the traveling cost and local expenses for Chinese attendees will be covered by NSFC. While the cost for the international traveling and local costs of Finnish attendees will be covered by AF. To the bi-lateral workshops held in Finland, the cost for the international traveling and the local costs for Chinese attendees will be covered by NSFC. While the expense for the workshops, the traveling cost and local expenses of Finnish attendees will be covered by AF.

Norway

Research Council of Norway (RCN)

Joint Research Program

NSFC and RCN jointly fund the collaborative research in areas of common interests between Chinese and Norwegian researchers. The maximum funding amount for each project will be 2 million yuan from NSFC. The funding period will be 3 years.

Turkey

The Scientific and Technological Research Council of Turkey (TUBITAK)

Joint Research Program

NSFC and TUBITAK will jointly fund the collaborative research in areas of common interests between Chinese and Turkish researchers. The maximum funding amount for each project will be 1.5 million yuan from NSFC. The funding period will be 3 years.

International Scientific Organizations and Multilateral Cooperation

International Center for Theoretical Physics (ICTP)

About 50 Chinese young researchers are funded by NSFC every year in the areas of mathematics, physics, and earth sciences to participate in various research activities at ICTP, such as summer seminars and short-term joint research. NSFC provides funding for international travel expenses and related costs for Chinese participants, while ICTP covers accommodation and meal expenses for Chinese participants.

International Institute of Applied Systems Analysis (IIASA)

NSFC encourages Chinese scientists to conduct multilateral cooperation with

researchers from IIASA Programs in the areas of energy, environment, land use, water, population, etc., and to jointly apply for research funding from governmental organizations, private and national science foundations, World Bank and EU Framework Program.

NSFC funds 5-7 young scientists to participate in the 3-month IIASA Young Scientists Summer Program (YSSP) in Vienna each year. Relevant information and application forms can be downloaded from the IIASA website (http://www.iiasa.ac.at).

Consultative Group on International Agricultural Research (CGIAR)

NSFC has reached agreements with 11 CGIAR-affiliated institutes/centers, including the Center for Bioversity International, International Center for Tropical Agriculture (CIAT), Center for International Forestry Research (CIFOR), International Maize and Wheat Improvement Center (CIMMYT), International Potato Center (CIP), International Center for Agricultural Research in the Dry Areas (ICARDA), World Agroforestry (ICRAF), International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), International Food Policy Research Institute (IFPRI), International Livestock Research Institute (ILRI), and International Rice Research Institute (IRRI), to fund joint research projects conducted by researchers from both sides. The maximum funding amount for each project is 2 million yuan from NSFC with a funding period of 5 years.

United Nations Environment Program (UNEP)

NSFC and UNEP jointly support scientists to conduct collaborative research in the fields of eco-system, climate change, resource efficiency and environmental governance and other sustainable development related areas. Cooperation with developing countries in Africa and Asian-Pacific regions will be given special focus. The maximum funding amount for each project is 3 million yuan from NSFC with a funding period of 5 years.

Belmont Forum (BF/IGFA)

NSFC supports Chinese researchers to participate in multilateral cooperation under the framework of the Belmont Forum.

International Centre for Integrated Mountain Development (ICIMOD)

NSFC and ICIMOD jointly fund research projects to support researchers from China and ICIMOD member countries to advance research in the fields of sustainable development related areas in the region of Hindu Kush-Himalayas in China and the neighboring countries.

BRICS STI Framework Program

Chinese Ministry of Science and Technology (MOST), NSFC, Brazil National

Council for Scientific and Technological Development (CNPq), Foundation for Assistance to Small Innovative Enterprises of Russia (FASIE), Russia Ministry of Education and Science (MON), Russian Foundation for Basic Research (RFBR), Department of Science and Technology of India (DST), Department of Science and Technology of South Africa (DST), and National Research Foundation of South Africa (NRF), jointly fund multilateral research projects under the framework of BRICS STI Framework Program. The maximum funding amount for each project is 2 million yuan from NSFC with a funding period of 3 years.

Sustainable Development International Cooperation Program (SDIC)

Aiming at realizing the United Nations Sustainable Development Goals (SDGs), NSFC will work with other funding agencies and international organizations to fund multilateral scientific research projects to address global challenges and major scientific problems faced by all countries around the world, especially developing countries, through three types of programs: Capacity Building Projects, Key Projects and Integrated Projects. The Capacity Building Projects aim to enable further research and collaboration among Chinese and foreign researchers through various exchange activities including collaborative research, researcher mobility, networking, workshops, training, fieldwork, etc. Meanwhile, the Key Projects support Chinese and foreign researchers to conduct collaborative research in selected fields, fostering outstanding scientific talents to solve regional scientific issues and enhance the region's research level and global impact.

Hong Kong and Macao SARs and Taiwan Region of China

NSFC has established cooperations with the Research Grant Council of Hong Kong (RGC), Beijing-Hong Kong Academic Exchange Centre(BHKAEC), Macao Foundation for the Development of Science and Technology(FDCT), and K.T. Li Foundation for the Development of Science and Technology in Taiwan Region, jointly funding cooperation and exchange between researchers from the inland of China and Hong Kong and Macao SARs, and between researchers from two sides of the Taiwan Straits in areas of common interest. Types of activities that can be funded are joint research projects and exchange projects (including exchanged visits and academic workshops).

Hong Kong

The Research Grant Council of Hong Kong

NSFC and RGC will continue to fund join research in areas of natural sciences in 2022. The priority funding areas include information sciences, biological sciences, new materials, marine and environmental sciences, medical sciences, and management sciences. Meanwhile, to further encourage academic exchanges between young researchers from Hong Kong SAR and the inland of China, academic forums are organized and funded in areas of common interest.

Beijing-Hong Kong Academic Exchange Centre

NSFC and BHKAEC will continue to organize and fund academic workshops in areas of common interest.

Macao

NSFC and Macao Foundation for the Development of Science and Technology (FDCT)will, under the framework of the signed cooperative agreement, together fund joint basic research projects between scientists from the inland of China and Macao SAR. The priority areas include information sciences, TCM research, marine sciences, environmental sciences, biological sciences,new material sciences,as well as space sciences. Meanwhile, NSFC and FDCT will organize and fund academic workshops in areas of mutual interest for academic communities from the inland of China and Macao SAR.

Taiwan

NSFC has been dedicated to encouraging and promoting scientific cooperation and exchange between scientists on both sides of the Taiwan Straits. In 2023, NSFC will continue to support cross-Straits academic workshops held by scientists from the mainland of China and the Taiwan region. NSFC will also fund substantial joint research projects according to the consensus reached with K.T. Li Foundation for the Development of Science and Technology.

Sino-German Center for Research Promotion

The Sino-German Center for Research Promotion (abbreviated as SGC) is a research funding agency, jointly set up by NSFC and German Research Foundation (DFG). SGC's legal status is NSFC's affiliated institution. It aims at promoting scientific cooperation and exchange between Chinese and German researchers with its diverse funding instruments for researchers at various stages of their careers, and thus is able to push forward in-depth cooperation and development in fundamental science between China and Germany.

1. Subjects Covered

The SGC supports the cooperation activities between Chinese and German scientists in fundamental research in all fields of natural sciences.

2. Eligibility of Applicants

An applicant from China must be a PI or participant in an NSFC granted project (either ongoing or already completed) with a duration of at least 3 years; or an excellent young researcher who is less than 35 years old (born on January 1, 1988 or later) and holding a doctorate (applicable only to certain programs). Applicants from Germany must be eligible to apply for funding from DFG. Eligible Chinese and German scientists may submit a proposal jointly to the SGC.

3. Application Limit

The projects funded by the SGC are not subject to NSFC's regulation on the limit of the number of projects that an individual researcher could undertake or apply for.

4. Programs

(1) Preparatory Visit

Chinese and German scientists may apply to the SGC for funds to pay a short visit to their partners' institutions in order to make preparations and plans for proposing a Bilateral Workshop, Summer School, Young Scientist Forum, Mobility Program or NSFC-DFG Joint Research Project. Through the short visit, the two sides could work out a plan for a joint project efficiently, complete the preparation and submit their joint proposal as soon as possible.

(2) Bilateral Workshop

The most fundamental program supported by the SGC is Bilateral Workshop which aims at promoting setting up new partnerships, deepening existing partnerships, and stimulating new joint research projects between Chinese and German scientists. The workshops must have specific scientific themes, and be coordinated and co-hosted by senior scientists from both sides. To ensure the authoritativeness and representativeness, participants of the workshops must be representative scientists in related fields in both countries, and should come from different institutions and regions. The workshop could be held either in China or Germany. The SGC could provide funding for up to 40 participants for each workshop, i.e., not more than 15 participants from the travelling party and at most 25 participants from the hosting party. The number of participants from the same institution should not exceed one third of all the participants from that party. In addition, scientists from a third party can be invited to the workshop and the total number of such scientists should be no more than 3. Formal representatives from Germany must have doctorates. The SGC provides funding for domestic and international travel expenses, local subsistence of all formal participants, venue fees and other necessary costs of the workshop according to its current funding rates standard.

(3) Post-Workshops Young Scientist Academic Visit

The SGC encourages early career researchers participating in a Sino-German workshop to spend an immediately following additional research stay in a cooperation partner's group. Applicants for Post-Workshops Young Scientist Academic Visit should be formal representatives of Bilateral Workshops funded by SGC, and who have received an invitation letter for scientific visit from cooperation partner. Up to 2 participants from each Bilateral Workshop can apply for this visit. The funding duration is up to 14 days, and the funding rates cover travel expenses inside China or Germany, catering and hotel accommodation costs.

(4) Mobility Program

The Program aims at supporting in-depth cooperation and exchanges between Chinese and German scientists in a specific field over a period of 3 years. It mainly supports scientists' short-term visits and small-scale workshops. The SGC covers domestic and international travel expenses, accommodation costs, meal cost and venue fees according to its current funding rates standard. A maximum of 1.5 million yuan (or equivalent sum of Euros) per project would be provided to both Chinese and German teams.

(5) Summer School

The Program aims to introduce advanced scientific methods, techniques and their applications to young scientists and provide them with training and discussion on specific issues in a certain area. The SGC attaches great importance to the selection of the young scientists to attend the Summer School and requires that the participants of the seminars must be selected according to an open and competitive selection procedure. The SGC may fund 4 to 6 senior experienced scientists from both countries as lecturers. The applicants on both sides must be among the funded lecturers. Participants are mainly university undergraduates, graduates or young researchers from both countries. The number of participants is decided according to specific conditions, such as equipment and infrastructure of the laboratory, but it shall not exceed 40 persons in total. The number of participants shall not exceed 15 from travelling party, and 25 from the hosting party. The Summer School can be held either in Germany or in China and usually lasts 14 days at most, including one day for arrival and one for departure. The SGC provides funding for all formal participants and lecturers for domestic and international travel expenses, local accommodation & meal costs and venue fees according to its current funding rates standard.

(6) Young Scientists Forum

The Program aims at providing a venue for Chinese and German young scientists active in their own fields to meet and discuss with each other, providing them with an opportunity to introduce their own work to the outstanding scientists and learn new research methods. The forum could be held either in China or Germany. The SGC in principle provides 5 to 7 days' funding including one day's academic visit and arrival & departure. The total number of participants shall not

exceed 42 persons. The travelling party shall not be more than 16 persons (15 young scientists and 1 senior scientist). The receiving party shall not exceed 26 persons (25 young scientists and 1 senior scientist). In addition, scientists from a third party can be invited to the workshop and the total number of such scientists should be no more than 3, that is, 20% of the number of participants from the travelling party. Apart from the basic eligibility required, the participants shall be less than 40 years old (as of the holding date of forum). The German participants must have doctorates. The Chinese assistant professors (lecturer) are also eligible to attend. The organization of the forum shall be coordinated by a young scientist from each side. The SGC provides funding for international travel expenses, inter-city travel expenses, local subsistence costs and venue fees according to its current funding rates standard.

(7) Excellent Early Career Scientists from Germany

The Program is established in order to further promote scientific cooperation between China and Germany, strengthen scientific and technological exchanges between young scientists of these two countries. The program will fund excellent Early Career Scientists from Germany to carry out researches for a period of time in China, so as to familiarize them with Chinese research system, and establish and strengthen the interaction and long-term cooperation with Chinese scientists. This program can be funded in the following two terms: the short term and the long term. The Short-term funding covers domestic and international travel expenses, catering and hotel accommodation costs for up to two months; the Long-term funding period is three years, supporting up to 3 research stays in China with a whole duration of 6 months completed within three years. Funding rates cover domestic and up to three round trips of international travel expenses, catering and hotel accommodation costs, and an add-on for research expenses of up to 300,000 yuan.

(8) Lindau Program

Lindau Nobel Laureate Meeting is held in late June each year in Lindau, Germany. Excellent young scientists from around the globe are also invited to attend the event. The SGC, together with Lindau Nobel Laureates Foundation, invites and funds 30 excellent Chinese PhD students to participate in the Nobel Laureate meeting in Lindau, Germany, followed by a week-long academic visit to the German research institutions well-known in relevant disciplines solely organized by the SGC. Candidates are selected throughout China and must be recommended by their home institutions. The final approval list is decided by correspondence review and interviews by a panel of Chinese and German experts. The SGC provides funding for formally selected students for international travel expenses, inter-city travel expenses and accommodation costs according to its current funding rates. The SGC will handle the visa affairs for the selected students and pay for the related fees.

(9) Post-Lindau Program

Grantees of Lindau Program who has got the PhD degree and a fixed position in a Chinese research institution (which should also be an NSFC-registered institution)

may apply for the funding from the SGC for an academic stay of less than 12 months in Germany if they get invitations from German research institutions or universities, and approval from their host institutions. The SGC provides funding for international travel expenses, inter-city travel expenses, accommodation costs and insurance expenses according to its current funding rates standard.

The detailed requirements, application forms and processes of each type of program in 2023 can be found at the website of the SGC: https://sinogermanscience.dfg.nsfc.cn

Research Fund for International Scientists

Aiming at providing more research opportunities for and contributing to the career development of researchers at different academic stages, the Research Fund for International Scientists (hereinafter referred to as the **RFIS**) is set up by the National Natural Science Foundation of China (NSFC) to support international scientists with foreign citizenship who are ready to conduct basic research in China's mainland. The RFIS is open to all research areas within the NSFC's funding scope. The RFIS will also enhance the long-term, sustainable academic collaboration and exchange between Chinese and international scientists.

The RFIS consists of three sub-types:

1. The Research Fund for International Young Scientists (RFIS-I)
2. The Research Fund for International Excellent Young Scientists (RFIS-II)
3. The Research Fund for International Senior Scientists (RFIS-III)

I.Eligibility

Scientific and technical personnel from host institutions applying for research fund projects for foreign scholars shall meet the following conditions:

1. The Research Fund for International Young Scientists (RFIS-I)

(1) Doctoral degree obtained within the past 6 years (PhD must have been obtained after January 1, 2017);

(2) Experience of conducting basic research or postdoctoral research;

(3) Commitment of working for no less than 9 months each year (calendar year) at the host institution during the implementation of the project;

(4) Compliance with China's laws and NSFC's relevant rules and regulations while conducting research in China.

2. The Research Fund for International Excellent Young Scientists (RFIS-II)

(1) Doctoral degree completed within the past 15 year (PhD must have been obtained after January 1, 2008);

(2) Senior academic title;

(3) Experience of conducting basic research projects as Principal Investigator (PI);

(4) Commitment of working for no less than 9 months each year (calendar year) at the host institution during the implementation of the project;

(5) Compliance with China's laws and NSFC's relevant rules and regulations while conducting research in China.

3. The Research Fund for International Senior Scientists (RFIS-III)

(1) Senior academic title;

(2) Outstanding academic achievements and significant international influence;

(3) Commitment of working for no less than 9 months per year (calendar year) at the host institution during the implementation of the project;

(4) Compliance with China's laws and NSFC's relevant rules and regulations while conducting research in China.

II. Provisions on limited application

1. The applicant who has (had) a RFIS project will not be granted in the same sub-type of RFIS. The applicant can only be granted for each sub-type of the RFIS once.

2. An applicant shall only apply for one RFIS in a year. The grantee of an on-going RFIS project shall not apply for a new RFIS project.If the applicant has submitted an application for any of the sub-types of the RFIS, the application shall not apply for the following programs in the same year:

- Young Scientists Fund (YSF)
- Excellent Young Scientists Fund (EYSF, including EYSF for scholars in Hong Kong and Macao)
- National Science Fund for Distinguished Young Scholars (NSFDYS)
- Science Fund for Creative Research Groups (SFCRG)

3. An applicant shall not apply for the RFIS-I if the applicant has been the PI of an on-going or completed project of the RFIS-II, the RFIS-III, the YSF, the EYSF, the NSFDYS and the SFCRG.

4. An applicant shall not apply for the RFIS-II if the applicant has been the PI of an on-going or completed project of the RFIS-III, the EYSF, the NSFDYS and the SFCRG.

5. An applicant shall not apply for the Research Fund for International Senior Scientists (RFIS-III) if the applicant has been the PI of an on-going or completed project of the NSFDYS and the SFCRG.

III. Area and intensity of funding

The RFIS is open to all research areas within the NSFC's funding scope in 2023, which include mathematics and physics, chemistry, life sciences, earth sciences, engineering and materials sciences, information sciences, management sciences,

health sciences, and interdisciplinary sciences.

The RFIS are divided into one-year and biennial projects. For the RFIS-I, applicants can apply for up to 200,000 RMB per year (per project). For the RFIS-II, applicants can apply for up to 400,000 RMB per year (per project). For the RFIS-III, applicants can apply for up to 800,000 RMB per year (per project). All the funding is direct cost.

IV. Proposal submission

For application matters in 2023, please pay attention to the application guide of Research Fund for International Scientists published in the "Notice" column on the website of NSFC.

NSFC Application Code

A. Department of Mathematical and Physical Sciences

A01 Algebra and Geometry

A0101 History of Mathematics, Mathematical Logic, and Axiomatic Set Theory
A0102 Analytic Number Theory and Combinatorial Number Theory
A0103 Algebraic Number Theory
A0104 Structure of Groups and Algebras
A0105 Lie Theory and Its Generalizations
A0106 Representation Theory and Homology Theory
A0107 Algebraic Geometry and Complex Geometry
A0108 Global Differential Geometry
A0109 Geometric Analysis
A0110 Symplectic Geometry and Mathematical Physics
A0111 Algebraic Topology and Geometric Topology
A0112 General Topology

A02 Analysis

A0201 Complex Analysis in One Variable
A0202 Complex Analysis in Several Variables
A0203 Complex Dynamical Systems
A0204 Geometric Measure Theory and Fractals
A0205 Harmonic Analysis and Approximation Theory
A0206 Nonlinear Functional Analysis
A0207 Operator Theory
A0208 Space Theory
A0209 Markov Processes and Statistical Physics
A0210 Stochastic Analysis and Stochastic Processes

A0211 Probability Limit Theory and Randomized Structures

A03 Differential Equations and Dynamical Systems

A0301 Ordinary Differential Equations
A0302 Difference Equations
A0303 Dynamical Systems and Ergodic Theory
A0304 Elliptic and Parabolic Partial Differential Equations
A0305 Hyperbolic Partial Differential Equations
A0306 Mixed and Degenerate Partial Differential Equations
A0307 Infinite Dimensional Dynamical Systems and Dispersion Theory
A0308 Integrable Systems and Their Applications

A04 Statistics and Operations Research

A0401 Theory and Methods of Data Sampling
A0402 Statistical Inference and Statistical Computing
A0403 Bayesian Statistics and Statistical Applications
A0404 Statistics for Big Data
A0405 Continuous Optimization
A0406 Discrete Optimization/Combinatorial Optimization
A0407 Stochastic Optimization and Statistical Optimization
A0408 Combinatorial Mathematics
A0409 Graph Theory and Its Applications
A0410 Algorithm Complexity and Approximation Algorithm

A05 Computational Mathematics

A0501 Fundamental Theories and Construction Methods of Algorithms
A0502 Numerical Algebra
A0503 Numerical Approximation and Computational Geometry
A0504 Numerical Solutions of Differential Equations
A0505 Modeling and Computation of Inverse Problems
A0506 Computable Modeling and Numerical Simulation of Complex Problems
A0507 Novel Computational Methods

A06 Mathematics Intersects with Other Disciplines

A0601 Mathematical Methods in Control
A0602 Mathematical Theory and Methods of Information Technology and Uncertainty
A0603 Economic Mathematics and Financial Mathematics
A0604 Mathematics in Biology and Life Sciences
A0605 Symbolic Computation and Automated Theorem Proving

A0606 Mathematical Theory and Methods in Artificial Intelligence
A0607 Mathematical Theory and Methods in Data Science
A0608 Mathematical Theory in Security
A0609 Intersection with Other Fields

A07 Dynamics and Control

A0701 Analytical Mechanics
A0702 Nonlinear Vibration and Control
A0703 Stochastic Dynamics and Control
A0704 Nonlinear Dynamics of Multibody and High-Dimensional Systems
A0705 Dynamics of Aircraft and Transport Systems
A0706 Rotor Dynamics
A0707 Dynamics of Neural and Intelligent Systems
A0708 Design and Inverse Problems in Dynamics

A08 Solid Mechanics

A0801 Deformation and Constitutive Theory of Solids
A0802 Strength, Damage, Fracture and Fatigue of Solids
A0803 Wave, Vibration and Noise
A0804 Contact, Friction, Surface and Interface Mechanics
A0805 Micro-Nano Mechanics and Multiscale Mechanics
A0806 Optimal Design, Manufacture and Reliability of Materials and Structures
A0807 Mechanics of Composite Materials and Structures
A0808 Mechanics of Multi-Field Coupling and Smart Structures
A0809 Mechanics of Soft Matter and Flexible Structures
A0810 FluidSolid Coupling Mechanics
A0811 Chemomechanical Coupling
A0812 Experimental Solid Mechanics
A0813 Computational Solid Mechanics
A0814 Mechanics of Materials and Structures under Extreme Conditions

A09 Fluid Mechanics

A0901 Turbulence and Flow Stability
A0902 Vortex and Separation Flows
A0903 Aerodynamics
A0904 Hydrodynamics
A0905 Multiphase Flow, Porous Flow and Non-Newtonian Fluid Mechanics
A0906 Flow Noise and Aeroacoustics
A0907 Micro-Nano Flows and Interfacial Flows
A0908 Multi-Field, Multi-Medium Coupling Flow and Flow Control

A0909 Experimental Fluid Mechanics
A0910 Computational Fluid Dynamics
A0911 Fluid Mechanics in Aircraft and Engine Design

A10 Biomechanics

A1001 Biomechanics of Solids and Fluids
A1002 Multiscale Mechanobiology
A1003 Biomechanics and Bionics of Natural Materials, and Sport Mechanics
A1004 Mechanical Principles and Design of Medical Materials and Devices

A11 Physical Mechanics

A1101 Physical Mechanics of Solids and Fluids
A1102 Physical Mechanics of Complex and Intelligent Media

A12 Explosion and Impact Dynamics

A1201 Explosion Mechanics
A1202 Impact Dynamics

A13 Environmental Mechanics

A1301 Mechanics of Rock and Soil
A1302 Environmental Fluid Mechanics and Granular Flows
A1303 Mechanics in Extreme Environments and Disasters

A14 Cosmology and Galaxies

A1401 Dark Matter, Dark Energy, Early Universe and Cosmological Models
A1402 Formation and Evolution of Cosmic Structures
A1403 Formation, Structure and Evolution of Galaxies
A1404 Interactions and Nuclear Activities of Galaxies
A1405 Formation, Structure and Evolution of the Milky Way

A15 Stars and Interstellar Medium

A1501 Interstellar Medium and Star Formation
A1502 Structure and Evolution of Stars, Stellar Atmosphere, Variable Stars, Binary Stars and Multiple Star Systems
A1503 Late Stellar Evolution and Explosion, Compact Objects and Related High-Energy Astrophysical Processes

A16 Solar Physics

A1601 Solar Structure, Solar Activity Cycle, Solar Atmosphere and Solar

Magnetic Fields

A1602 Solar Eruption and Its Effects on Interplanetary Space

A17 Planet Science

A1701 Formation and Evolution of the Solar System, Characteristics and Exploration of Solar System Small Bodies

A1702 Exploration, Structure and Atmosphere of Terrestrial Planets and Giant Planets of the Solar System

A1703 Detection and Characteristics of Exo-Solar Planets, Formation and Evolution of Planet Systems

A18 Fundamental Astronomy

A1801 Astrometry, Astronomical Reference System, Astrogeodynamics, History of Astronomy

A1802 Time and Frequency

A1803 Methods and Theories of Celetial Mechenics, Relativistic Fundamental Astronomy

A1804 Application of Fundamental Astronomy on Space Target Monitoring, Navigating and Locating

A19 Astronomical Techniques and Methods

A1901 Techniques and Methods of Optical, Ultraviolet and Infrared Astronomy

A1902 Technology and Methods of Radio Astronomy

A1903 Technology and Methods of Space Astronomy and High-Energy Astronomy

A1904 Astronomical Information Technology, Mass Data Processing and Numerical Simulation Methods

A20 Condensed Matter Physics

A2001 Structures, Phase Transitions and Lattice Dynamics of Condensed Matter

A2002 Mechanical, Thermal, Optical and Electronic Properties of Condensed Matter

A2003 Transport Properties of Condensed Matter

A2004 Electronic Structures of Condensed Matter

A2005 Physics of Semiconductors

A2006 Ferroelectric and Multiferroic Systems

A2007 Magnetism and Spintronics

A2008 Superconductivity and Superfluid

A2009 Strongly Correlated Systems

A2010 Topological Systems in Condensed Matter

A2011 Surface, Interface and Low-Dimensional Physics

A2012 Liquid, Quasicrystalline and Amorphous State Physics
A2013 Soft Matter and Biological Physics
A2014 Emerging and Interdisciplinary Fields in Condensed Matter Physics

A21 Atomic and Molecular Physics

A2101 Structure, Collision, and Spectroscopy of Atoms and Molecules
A2102 Interaction of Atoms, Molecules with Photons
A2103 Cold Atom/Molecule Physics and Application
A2104 Cluster Physics
A2105 Atomic and Molecular Physics at Extreme
A2106 Atoms and Molecules in External Fields: Properties and Manipulations
A2107 Atomic and Molecular Physics Intersects with Other Disciplines

A22 Optics

A2201 Light Propagation, Detection and Imaging
A2202 Light-Matter Interaction
A2203 Light Field Manipulation and Nonlinear Optics
A2204 Ultrafast Optics and Strong Field Physics
A2205 Quantum Optics
A2206 Micro-and Nano-Optics and Photonics
A2207 Spectroscopy and Solid State Luminescence
A2208 Optical Materials and Device Physics
A2209 Optics in Emerging Spectral Range and Novel Light Sources
A2210 Interdisciplinary Fields Related to Optics

A23 Acoustics

A2301 Linear and Nonlinear Acoustics
A2302 Underwater Acoustics and Aeroacoustics
A2303 Ultrasonics and Ultrasonic Technique
A2304 Environmental Acoustics
A2305 Bioacoustics and Speech Acoustics
A2306 Acoustic Material, Transducer and Measurement
A2307 Interdisciplinary Fields Related to Acoustics

A24 Quantum Manipulation

A2401 Quantum Materials and Physical Property Manipulations
A2402 Quantum Structures and Quantum Effects
A2403 Precision Measurement Physics
A2404 Quantum Computation and Quantum Communication
A2405 Quantum Simulation

A2406 Quantum Device Physics
A2407 Novel Quantum Technologies and Interdisciplinary Fields

A25 Fundamental Physics

A2501 Mathematical Physics and Computational Methods in Physics
A2502 Quantum Physics and Quantum Information
A2503 Statistical Physics and Complex Systems
A2504 Relativity, Gravitation and Cosmology
A2505 Theoretical Physics for Interdisciplinary Sciences

A26 Particle Physics

A2601 Quantum Field Theory and String Theory
A2602 Strong Interactions and Hadronic Physics
A2603 Heavy Flavor Physics
A2604 Electroweak Interactions and Higgs Physics
A2605 Precision Tests of the Standard Model and New Physics
A2606 Neutrino and Particle Astrophysics

A27 Nuclear Physics

A2701 Nuclear Structure and Decay
A2702 Nuclear Reaction and Heavy Ion Nuclear Physics
A2703 Intermediate and High Energy Nuclear Physics
A2704 Symmetries in Nuclei
A2705 Nuclear Astrophysics
A2706 Nuclear Parameter Measurements and Evaluations

A28 Particle Accelerator, Nuclear Reactor and Particle Detector

A2801 Accelerator Physics
A2802 Accelerator Technology and Application
A2803 Physics and Technology of Nuclear Reactor
A2804 Particle Detection Technology
A2805 Nuclear Electronics Technology
A2806 Online and Offline Data Processing

A29 Plasma Physics

A2901 Basic Processes and Characteristics in Plasmas
A2902 Plasma Matter Interactions
A2903 Plasma Diagnostic Technology
A2904 Magnetic Confinement Fusion Plasmas
A2905 Inertial Confinement Fusion Plasmas

A2906 High Energy Density Physics
A2907 Low Temperature Plasmas
A2908 Space and Astrophysical Plasmas

A30 Nuclear Technology and Application

A3001 Interaction of Particle Beam with Matter
A3002 Radiation Damage in Materials and Devices
A3003 Ion Implantation and Ion Beam Modification of Materials
A3004 Nuclear Analysis Techniques and Applications
A3005 Neutron Techniques and Applications
A3006 Radiation Detection and Imaging
A3007 Radiation Dosimetry and Radiation Protection
A3008 Principles and Techniques of Synchrotron Radiation and Free-Electron Laser
A3009 Beamline Techniques and Experimental Methods
A3010 Application of Nuclear Technology in Other Fields

B. Department of Chemical Sciences

B01 Synthetic Chemistry

B0101 Elemental chemistry
B0102 Coordination chemistry
B0103 Clusters and nanochemistry
B0104 Inorganic synthesis
B0105 Catalytic synthesis reaction
B0106 Asymmetric synthesis
B0107 Total synthesis of natural products
B0108 New reactions and reagents
B0109 Polymer synthesis
B0110 Supramolecular chemistry
B0111 Biomimetic and green synthesis
B0112 Synthesis of functional molecules/materials
B0113 Structure and reaction mechanism

B02 Catalysis and surface/Interface Chemistry

B0201 Fundamental theory and characterization methods
B0202 Catalytic chemistry

B0203 Surface chemistry
B0204 Colloid and interface chemistry
B0205 Electrochemistry

B03 Chemical Theory and Mechanism

B0301 Chemical theory and methodology
B0302 Chemical simulation and application
B0303 Chemical thermodynamics
B0304 Chemical kinetics
B0305 Structural chemistry
B0306 Photochemistry and spectroscopy
B0307 Chemical reaction mechanisms
B0308 Moletronics and molecular magnetism
B0309 Polymer physics and polymer physical chemistry
B0310 Chemical informatics and artificial intelligence
B0311 Chemical programs and software

B04 Chemical Measurement Science

B0401 Separation and analysis
B0402 Electrochemical analysis
B0403 Spectroscopic theory and methods
B0404 Chem/Biosensing
B0405 Chemical imaging
B0406 Life and public safety analysis
B0407 Instrument creation and application of large research infrastructures

B05 Materials Chemistry

B0501 Advanced characterization/theory/mechanism
B0502 Functional inorganic materials chemistry
B0503 Functional organic materials chemistry
B0504 Functional polymer materials chemistry
B0505 Composite/hybrid materials chemistry
B0506 Smart and biomimetic materials chemistry
B0507 Medical materials chemistry
B0508 Information technology materials chemistry
B0509 Ecomaterials chemistry
B0510 Energetic materials chemistry
B0511 Functional specialty materials chemistry

B06 Environmental Chemistry

B0601 Environmental theoretical chemistry
B0602 Environmental analytical chemistry
B0603 Chemistry in air pollution and its control
B0604 Chemistry in water pollution and its control
B0605 Chemistry in soil pollution and remediation
B0606 Chemistry in solid waste pollution and disposal
B0607 Environmental toxicology and health
B0608 Radiochemistry and radiation chemistry
B0609 Biosafety and chemical protection
B0610 Interface chemistry and behavior of pollutants

B07 Chemical Biology

B0701 Molecular probes for biological systems
B0702 Chemical biology of biomolecules
B0703 Chemical biology of natural products
B0704 Chemical genetics
B0705 Biosynthetic chemistry
B0706 Medicinal chemical biology
B0707 Theory, methodology and technology of chemical biology

B08 Chemical Engineering and Industrial Chemistry

B0801 Chemical engineering thermodynamics
B0802 Transport process
B0803 Reaction engineering
B0804 Separation engineering
B0805 Process intensification and chemical engineering equipment
B0806 Mesoscience and artificial intelligence chemical engineering
B0807 Green chemical process and process safety
B0808 Medicinal and pharmaceutical chemical engineering
B0809 Photochemical and electrochemical engineering
B0810 Agriculture and food chemical engineering
B0811 Biomass conversion and light chemical engineering
B0812 Biochemical engineering and synthetic bioengineering
B0813 Fine chemical engineering and specialty chemicals
B0814 Chemical product engineering and materials chemical engineering
B0815 Energy chemical engineering
B0816 Chemical engineering of resources, environment and ecology

B09 Energy Chemistry

B0901 Hydrogen energy chemistry
B0902 Carbon-based energy chemistry
B0903 Thermal energy chemistry
B0904 Mechanical energy chemistry
B0905 Electro-energy chemistry
B0906 Photo-energy chemistry
B0907 Energy chemistry in extreme conditions
B0908 Energy materials chemistry

C. Department of Life Sciences

C01 Microbiology

C0101 Microbial Diversity, Classification, and Phylogeny
C0102 Microbial Physiology and Biochemistry
C0103 Microbiomics and Metabolism
C0104 Microbial Genetics and Biosynthesis
C0105 New Microbiological Techniques and Methods
C0106 Microbial Environmental Interaction
C0107 Virology
C0108 Pathogenic Bacteriology
C0109 Pathogenic Mycology and Other Microorganisms

C02 Botany

C0201 Plant Taxonomy
C0202 Phylogenesis and Evolution of Plants
C0203 Plant Photosynthesis and Nitrogen Fixation
C0204 Transport and metabolism of water and nutrients
C0205 Plant Environment Interaction
C0206 Plant Hormones and Growth Regulators
C0207 Plant Reproduction and Development
C0208 Plant Resource Protection and Utilization
C0209 Phytochemistry
C0210 New Technologies and Methods in Botany Research

C03 Ecology

C0301 Ecological Theory and Methods

C0302 Behavioral Ecology
C0303 Physiological Ecology
C0304 Population Ecology
C0305 Community Ecology
C0306 Ecosystem Ecology
C0307 Landscape and Regional Ecology
C0308 Global Change Ecology
C0309 Environment and Biological Evolution
C0310 Pollution Ecology and Restoration Ecology
C0311 Soil Ecology
C0312 Protective Biology
C0313 Sustainable Ecology

C04 Zoology

C0401 Animal Evolution and Development
C0402 Animal System and Classification
C0403 Animal Physiology and Behavior
C0404 Animal Breeding and Population Dynamics
C0405 Animal Resources and Protection
C0406 Marine Zoology
C0407 Wildlife Epidemics and Transmission
C0408 Experimental Zoology

C05 Biophysics and Biochemistry

C0501 Structural Biology
C0502 Molecular Biophysics
C0503 Cell Sensing and Environmental Biophysics
C0504 Physical Biology
C0505 Protein, Peptide, and Enzyme Biochemistry
C0506 Biochemistry of sugars and lipids
C0507 Nucleic Acid Biochemistry
C0508 Inorganic Biochemistry and Environmental Measurement and Control
C0509 Biological Processes and Metabolism

C06 Genetics and Bioinformatics

C0601 Structure and function of genetic material
C0602 Gene expression and non coding sequence regulation
C0603 Epigenetic regulation
C0604 Phenotype, Behavior, and Genetic Basis of Diseases
C0605 Genetics and Evolution

C0606 Population genetics and quantitative genetics
C0607 Genomics
C0608 Biological Data Resources and Analysis Methods
C0609 Biological Big Data Analysis

C07 Cell Biology

C0701 The structure, interaction, and function of organelles and subcellular cells
C0702 Cell Signal Transduction
C0703 Cell Proliferation and Cell Cycle
C0704 Cell fate and reprogramming
C0705 Cell Aging, Death and Autophagy
C0706 Cell Polarity and Cell Movement
C0707 Cell Variation and Functional Abnormality
C0708 Cell Metabolism and Steady State Regulation
C0709 Extracellular microenvironment and intercellular communication

C08 Immunology

C0801 innate immunity
C0802 Adaptive immunity
C0803 Mucosal and regional immunity
C0804 Autoimmunity and immune tolerance
C0805 Tumor Immune Microenvironment
C0806 Infection and Non Infectious Inflammation
C0807 Reproductive Immunity and Transplantation Immunity
C0808 Vaccine, Antibody, and Immune Intervention

C09 Neuroscience and Psychology

C0901 Molecular and Cellular Neurobiology
C0902 Developmental and Aging Neurobiology
C0903 Structure and function of nervous system and abnormalities
C0904 Neurobiology of the sensory and motor systems
C0905 Behavioral and Emotional Neuroscience
C0906 Cognitive Neurobiology
C0907 Cognitive Psychology
C0908 Developmental and Educational Psychology
C0909 Behavior, Decision Making, and Social Psychology
C0910 Applied Psychology and Others
C0911 Physiology and Medical Psychology
C0912 Psychological Disorders and Cognitive Disorders and Interventions
C0913 New Technologies and Paradigms in Neuroscience and Psychology

Research
C0914 Cognitive Simulation, Computing, and Artificial Intelligence

C10 Biomaterials, Imaging, and Tissue Engineering

C1001 Biomechanics and Biorheology
C1002 Biomaterials and Biological Effects
C1003 Tissue Engineering
C1004 Tissue Regeneration and Artificial Organs
C1005 Bioimaging, Electronics, and Probes
C1006 Biomimetics and Artificial Intelligence
C1007 Nanobiology
C1008 New Technologies and Methods for Biological and Medical Engineering

C11 Physiology and Integrative Biology

C1101 Circulation and Blood Physiology
C1102 Endocrine, urinary, and reproductive physiology
C1103 Respiratory and Digestive Physiology
C1104 Sensory Organs and Exercise Physiology
C1105 Integrative Physiology and Integrative Biology
C1106 Aging and Biological Rhythm
C1107 Nutrition and Metabolic Physiology
C1108 Special Environmental Physiology and Comparative Physiology
C1109 Pathophysiology

C12 Developmental Biology and Reproductive Biology

C1201 Basic Research on stem cells
C1202 Applied research on stem cell
C1203 Early embryonic development and cell lineage establishment
C1204 Tissue and organ development and in vitro construction
C1205 Tissue and Organ Steady State Maintenance and Regeneration Repair
C1206 Germ Cells and Sex Determination
C1207 Fertilization, implantation, and maternal fetal interaction
C1208 Reproductive abnormalities and assisted reproduction

C13 Agriculture and Crop Science

C1301 Agricultural Informatics
C1302 Agronomy and Agromechanics
C1303 Agricultural Biological Systems Engineering
C1304 Crop Physiology
C1305 Crop Stress Biology

C1306 Crop Germplasm Resources
C1307 Crop Genome and Genetics
C1308 Crop Breeding
C1309 Cultivation of Rice Crops
C1310 Wheat Crops and Maize Cultivation
C1311 Other Crop Cultivation
C1312 Tillage

C14 Plant Protection

C1401 Plant Pathology
C1402 Agricultural Entomology
C1403 Crop Immunity and Resistance
C1404 Grass, mouse, and other harmful organisms in farmland
C1405 Plant Chemical Protection
C1406 Biological Control
C1407 New Plant Protection Technology
C1408 Crop Biological Factor Interaction and Ecological Regulation

C15 Horticulture and Plant Nutrition

C1501 Physiology and Cultivation of Fruit Trees
C1502 Fruit Tree Germplasm Resources and Genetics and Breeding
C1503 Fruit Tree Growth and Development
C1504 Physiology and Cultivation of Vegetables, Melons and Fruits
C1505 Vegetable, melon and fruit germplasm resources and genetics and breeding
C1506 Vegetables and Fruit Growth and Development
C1507 Ornamental Horticulture
C1508 Tea Science
C1509 Postharvest Biology of Horticultural Crops
C1510 Edible Mycology
C1511 Facility Horticulture
C1512 Fundamentals of Plant Nutrition
C1513 Fertilizers and Nutrient Management

C16 Forestry and Grass Science

C1601 Grass Germplasm Resources and Genetic Breeding
C1602 Grass Cultivation, Protection and Utilization
C1603 Wood Physics
C1604 Forest Products Chemistry
C1605 Tree Biology

C1606 Forest Soil Science
C1607 Forest Cultivation
C1608 Forest Informatics and Forest Management
C1609 Forest Conservation
C1610 Tree Genetics and Breeding
C1611 Economic Forestry
C1612 Landscape Architecture
C1613 Desertification and Soil and Water Conservation
C1614 Bamboo Science

C17 Animal Husbandry

C1701 Fundamentals of Animal Husbandry
C1702 Livestock Germplasm Resources and Genetics and Breeding
C1703 Germplasm Resources and Genetics and Breeding of Poultry and Other Economic Animals
C1704 Livestock and Poultry Reproduction
C1705 Animal Nutrition
C1706 Feed Science
C1707 Animal Behavior and Intelligent Breeding
C1708 Beekeeping
C1709 Sericulture

C18 Veterinary Medicine

C1801 Basic Veterinary Medicine
C1802 Veterinary Virology
C1803 Veterinary Bacteriology and Other Microbiology
C1804 Veterinary Immunology
C1805 Veterinary Parasitology
C1806 Veterinary Infectious Diseases
C1807 Chinese Veterinary Medicine
C1808 Veterinary Pharmacology and Toxicology
C1809 Clinical Veterinary Medicine
C1810 Zoonosis
C1811 Veterinary Public Hygiene

C19 Aquatics

C1901 Fundamentals of Aquatics
C1902 Aquatic Biology Genetics and Breeding
C1903 Aquatic Biological Reproduction and Development
C1904 Fisheries Resources and Conservation Biology

C1905 Aquatic Animal Nutrition and Feed Science
C1906 Aquaculture
C1907 Aquatic Biological Immunology
C1908 Aquatic Bioaetiology and Disease Control
C1909 Aquaculture and Fishery Engineering

C20 Food Science

C2001 Food Ingredients
C2002 Food Biochemistry
C2003 Food Microbiology
C2004 Food Composition and Nutrition
C2005 Food and Intestinal Microflora
C2006 Food Processing and Manufacturing
C2007 Food Storage and Preservation
C2008 Food Quality and Safety Testing
C2009 Food Safety Risk Assessment
C2010 Food Safety and Quality Control
C2011 Food Flavor Chemistry and Sensory Evaluation
C2012 New Methods for Food Science Research

C21 Molecular Biology and Biotechnology

C2101 Basic Theory of Frontier Technology
C2102 Synthetic Biology and Biomodification Technology
C2103 Biomics Technology
C2104 Common Biotechnology
C2105 Cross Fusion Biotechnology
C2106 Applied Biotechnology
C2107 Disruptive Biotechnology

D. Department of Earth Sciences

D01 Geography

D0101 Geomorphology
D0102 Hydrology and Climatology
D0103 Biogeography and Soil Geography
D0104 Environmental Geography and Disaster Geography
D0105 Landscape Geography and Integrated Physical Geography
D0106 Cryospheric Science

D0107 Geographical Environmental Change and Civilization Evolution
D0108 Economic Geography
D0109 Urban Geography and Rural Geography
D0110 Human Geography
D0111 Land Science and Natural Resource Management
D0112 Regional Sustainable Development
D0113 Remote Sensing
D0114 Geographical Information Science
D0115 Geodesy and Cartography
D0116 Geographical Big Data and Spatial Intelligence
D0117 Geographic Observation and Simulation Technology

D02 Geolog

D0201 Paleontology, paleoanthropology and palaeoecology
D0202 Stratigraph
D0203 Mineralog（including mineral physics）
D0204 Petrolog
D0205 Mineral deposits
D0206 Sedimentology and basin dynamics
D0207 Petroleum and natural gas geology
D0208 Coa geolog
D0209 Quaternar geolog
D0210 Precambria geolog
D0211 Tectonic and structura geolog
D0212 Planetary geology
D0213 Hydrogeolog
D0214 Engineerin geolog
D0215 Mathematical geology and remote sensing geology
D0216 Volcanolog and geothermic geology
D0217 Biogeology
D0218 Explorationtechnolog and geologicaldrillin

D03 Geochemistry

D0301 Isotope Geochemistry
D0302 Elemental Geochemistry
D0303 Geochronology
D0304 Organic Geochemistry
D0305 Analytical Geochemistry
D0306 Experimental and Computational Geochemistry
D0307 Cosmochemistry

D0308 Petrogeochemistry
D0309 Fossil Fuel Geochemistry
D0310 Surface Geochemistry
D0311 Ore Deposit and Exploration Geochemistry
D0312 Biogeochemistry
D0313 Atmospheric and Marine Geochemistry
D0314 Emerging and Interdisciplinary Geochemistry

D04 Geophysics and Space Physics

D0401 Physical Geodesy
D0402 Satellite Geodesy
D0403 Applied Geodesy
D0404 Seismology
D0405 Geomagnetism and Geo-electromagnetism
D0406 Gravity
D0407 Earth Interior Physics and Geodynamics (including Geothermy)
D0408 Oil and Gas Geophysics
D0409 Mineral Geophysics
D0410 Engineering and Environmental Geophysics
D0411 Space Physics
D0412 Space Weather
D0413 Planetary Physics
D0414 Physics Experiments and Instruments of the Earth and other Planets

D05 Atmospheric Science

D0501 Synoptic Meteorology
D0502 Climate and Climate System
D0503 Paleoclimate Simulation and Dynamics
D0504 Atmospheric Dynamics
D0505 Atmospheric Physics
D0506 Atmospheric Chemistry
D0507 Ecological Meteorology
D0508 Planetary Atmosphere
D0509 Atmospheric Observation Techniques
D0510 Atmospheric Data and Information Techniques
D0511 Atmospheric Numerical Model Development
D0512 Earth System Model Development
D0513 Climate change, impacts and Countermeasures
D0514 Atmospheric Environment and Medical Meteorology
D0515 Applied Meteorology

D06 Marine Science

D0601 Physical Oceanography
D0602 Marine Chemistry
D0603 Marine Geology and Geophysics
D0604 Biological Oceanography and Marine Bioresources
D0605 Marine Ecology and Environmental Science
D0606 Estuarine and Coastal Science
D0607 Ocean Remote Sensing
D0608 Ocean Physics and Marine Observation & Detection Technology
D0609 Marine Data Science and Information System
D0610 Ocean System and Global Change
D0611 Ocean Engineering and the Associated Environmental Effects
D0612 Marine Disasters, Disaster Prevention and Mitigation
D0613 Marine Energy and Resources
D0614 Sea-land Coordination and Sustainable Development
D0615 Polar Science

D07 Environmental Geosciences

D0701 Environmental Soil Science
D0702 Environmental Water Science
D0703 Environmental Atmospheric Science
D0704 Environmental Biology
D0705 Engineering Geological Environment and Disasters
D0706 Environmental Geology
D0707 Environmental Geochemistry
D0708 Ecotoxicology
D0709 Basic Soil Science
D0710 Soil Erosion and Soil Fertility.
D0711 Environmental Behavior and Effects of Pollutants
D0712 Environment and Health Risk
D0713 Quaternary Environment and Environmental Archaeology
D0714 Environmental Information and Environmental Prediction
D0715 New Technologies and New Methods in Environmental Geosciences
D0716 Regional Environmental Quality and Safety
D0717 Environment Protection and Sustainable Development

E. Department of Engineering and Material Sciences

E01 Metallic Materials

E0101 Design, calculation and characterization of metallic materials
E0102 Preparation and processing of metallic materials
E0103 Service behavior and surface engineering of metallic materials
E0104 Metallic structural materials and mechanical behavior
E0105 Metallic matrix composites and structural functional integration
E0106 Low-dimensional and metastable materials
E0107 Functional materials
E0108 Energy and environmental materials
E0109 Information functional materials
E0110 Biomaterials and biomimetic materials

E02 Inorganic non-metallic materials

E0201 Artificial crystals and glass materials
E0202 Inorganic non-metallic basic materials
E0203 Carbon based materials and super-hard materials
E0204 Structural ceramics
E0205 Inorganic non-metallic basic composite materials
E0206 Functional ceramics
E0207 Inorganic non-metallic semiconductors and information functional materials
E0208 Inorganic non-metallic energy conversion and storage materials
E0209 Inorganic non-metallic high-temperature superconducting materials and magnetic materials
E0210 Inorganic non-metallic biological materials
E0211 Other inorganic non-metallic materials

E03 Organic polymer materials

E0301 Preparation of polymeric materials;
E0302 Physics of polymeric materials
E0303 Processing of polymeric materials
E0304 General polymer materials
E0305 Polymer blends and composites
E0306 Polymeric materials related to ecological environment
E0307 Intelligent and biomimetic polymer materials

E0308 Biomedical organic and polymeric materials

E0309 Organic and polymeric materials with optical-, electrical- or magnetic-function

E0310 Other functional organic polymeric materials

E04 Mining and Metallurgical Engineering

E0401 Oil-Gas Well Engineering
E0402 Oil and Gas Production
E0403 Storage and Transportation of Oil and Gas
E0404 Basic Theory of Mining
E0405 Mining Engineering
E0406 Intelligent Mine
E0407 Mine Restoration Engineering
E0408 Safety Science and Engineering
E0409 Mining Engineering and Separation of Substances
E0410 Metallurgical Physical Chemistry and Principles of Metallurgy
E0411 Ferrous Metallurgy
E0412 Nonferrous Metals Metallurgy
E0413 Powder Metallurgy and Powder Engineering
E0414 Materials Processing Engineering and Metallurgy

E05 Mechanical Design and Manufacturing

E0501 Robotics and Mechanism
E0502 Transmission and Drive
E0503 Mechanical Dynamics
E0504 Mechanical Structural Strength
E0505 Mechanical Tribology and Surface Technology
E0506 Mechanical Design
E0507 Mechanical Bionics and Biomanufacturing
E0508 Forming Manufacturing
E0509 Machining Manufacturing
E0510 Manufacturing Systems and Intelligence
E0511 Mechanical Measurement Theory and Technology
E0512 Micro-nanomechanical Systems

E06 Engineering Thermo-physics and Energy Utilization

E0601 Engineering Thermodynamics
E0602 Internal Flow Fluid Mechanics
E0603 Heat and Mass Transfer
E0604 Combustion

E0605 Multiphase Flow Thermo-physics
E0606 Thermal Properties and Thermophysical Testing Techniques
E0607 Engineering Thermo-physics in Renewable Energy and New Energy Utilization

E07 Electrical science and engineering

E0701 Electromagnetic field and circuit
E0702 Superconducting and electrical materials
E0703 Electric machine and its system
E0704 Power system and integrated energy
E0705 High voltage and discharge
E0706 Power electronics
E0707 Electric energy storage and application
E0708 Bio-electromagnetic technology

E08 Architecture and civil engineering

E0801 Architecture
E0802 Urban and Rural Planning
E0803 Architectural Physics
E0804 Structural Engineering
E0805 Engineering Materials
E0806 Engineering Construction and Service
E0807 Geotechnical and Foundation Engineering
E0808 Underground and Tunnel Engineering
E0809 Road and Rail Transit Engineering
E0810 Engineering Disaster Prevention

E09 Hydraulic Engineering

E0901 Engineering Hydrology and Water Resources Utilization
E0902 Agricultural and Rural Water Conservancy
E0903 Hydraulics and River Dynamics
E0904 Hydro-machinery and Systems
E0905 Hydraulic Geotechnical Engineering
E0906 Hydraulic Structures

E10 Environmental engineering

E1001 Drinking water engineering
E1002 Urban wastewater treatment and reclamation
E1003 Industrial wastewater treatment and reuse
E1004 Urban and rural water system and ecological cycle

E1005 Air pollution control
E1006 Solid waste recycling and safe disposal
E1007 Environmental pollution abatement and remediation
E1008 Regional and urban eco-environmental system engineering
E1009 Eco-environmental risk control

E11 Ocean Engineering

E1101 Coastal Engineering and Ocean Engineering
E1102 Ship Engineering
E1103 Ocean Techniques
E1104 Navigation and Maritime technology

E12 Transportation and Vehicle Engineering

E1201 Theory of Transportation System Analysis
E1202 Transportation Planning and Design
E1203 Traffic Information and Control
E1204 Transportation Safety and Environment
E1205 Foundation of Vehicle Design
E1206 Vehicle System Dynamics
E1207 Intelligentization of Vehicle System
E1208 Vehicle Application Engineering

E13 New Conceptual Materials and Common Science of Materials

E1301 New methods of materials design and characterization
E1302 New material preparation technology and digital manufacturing
E1303 Multi-functional integration of materials and devices
E1304 New composite and hybrid materials
E1305 New conceptual materials
E1306 Key materials of advanced manufacturing
E1307 Key engineering materials

F. Department of Information Sciences

F01 Electronics and information system

F0101 Information theory
F0102 Information system and system security
F0103 Communication theory and system
F0104 Communication network

F0105 Mobile communication
F0106 Aerospace communication
F0107 Maritime and underwater communication
F0108 Multimedia communication
F0109 Optical communication
F0110 Quantum communication and its information processing
F0111 Signal theory and signal processing
F0112 Radar principle and technology
F0113 Information acquisition and processing
F0114 Detection and imaging
F0115 Underwater information acquisition and processing
F0116 Image information processing
F0117 Multimedia information processing
F0118 Circuit and system
F0119 Electromagnetic field and wave
F0120 Terahertz theory and technology
F0121 Microwave photonics
F0122 Physical electronics
F0123 Sensitive electronics and sensors
F0124 Bio-electronics and bio-information processing
F0125 Medical information detection and processing
F0126 Interdisciplinary Research in Electronic Information

F02 Computer Science

F0201 Theoretical Foundations of Computer Science
F0202 System Software, Databases, and Enterprise Software
F0203 Software Theory, Software Engineering, and Services
F0204 Computer System Architecture and Hardware Technology
F0205 Network and System Security
F0206 Information Security
F0207 Computer Networks
F0208 Internet of Things and Other Emerging Networks
F0209 Computer Graphics and Virtual Reality
F0210 Computer Image and Video Processing and Multimedia Technology
F0211 Information Retrieval and Social Computing
F0212 Data Science and Big Data Processing
F0213 Bioinformatics and Digital Health
F0214 New Computing Methods and Applications
F0215 Interdisciplinary Research in Computer Science

F03 Automation

F0301 Control Theory &Technologies
F0302 Control Systems &Applications
F0303 System Modeling Theory & Simulation Technologies
F0304 Systems Engineering Theory &Technologies
F0305 Biological & Medical Informatics: Systems & Technologies
F0306 Automatic Measurement Technologies & Devices
F0307 Navigation, Guidance & Control
F0308 Automation for Intelligent Manufacturing
F0309 Robotics & Intelligent Systems
F0310 Artificial Intelligence-Driven Automation
F0311 Automation for Emerging Fields

F04 Semiconductor Science and Information Devices

F0401 Semiconductor Materials
F0402 Integrated Circuit Design
F0403 Semiconductor Optoelectronic Devices and Integration
F0404 Semiconductor Electronic Devices and Integration
F0405 Semiconductor Device Physics
F0406 Integrated Circuit Devices, Manufacturing, and Packaging
F0407 Micro-Nano Electromechanical Devices and Control Systems
F0408 Novel Information Devices
F0409 Interdisciplinary Research in Semiconductors

F05 Optics and Optoelectronics

F0501 Optical Information Acquisition, Display and Processing
F0502 Photonic and Optoelectronic Devices
F0503 Photonic Devices for Transmission and Switching
F0504 Infrared and Terahertz Physics and Technology
F0505 Nonlinear Optics
F0506 Lasers
F0507 Spectral Informatics
F0508 Applied Optics
F0509 Optical And Optoelectronic Materials
F0510 Space, Atmospheric, Oceanic and Environmental Optics
F0511 Biological, Medical Optics and Photonics
F0512 Energy and Illumination Photonics
F0513 Micro-Nano Photonics
F0514 Photonic Integration Technology and Devices
F0515 Quantum Optics

F0516 Optical Problems in Interdisciplinary Research

F06 Artificial Intelligence

F0601 Fundamentals of Artificial Intelligence
F0602 Complexity Science and Artificial Intelligence Theory
F0603 Machine Learning
F0604 Machine Perception and Machine Vision
F0605 Pattern Recognition and Data Mining
F0606 Natural Language Processing
F0607 Knowledge Representation and Processing
F0608 Intelligent Systems and Artificial Intelligence Security
F0609 Cognitive and Neuroscience Inspired Artificial Intelligence
F0610 Artificial Intelligence Issues in Interdisciplinarity

F07 Information Science in Interdisciplinarity

F0701 Information Science and Technology in Education

G. Department of Management Sciences

G01 Management Science and Engineering

G0101 Complex Systems Management
G0102 Operations Research and Management
G0103 Decision-Making Theory and Game Theory
G0104 ForecastingandEvaluationTheory and Method
G0105 Management Statistics Theory and Method
G0106 Management Psychology and Behaviors
G0107 Management System Engineering
G0108 Industrial Engineering and Quality Management
G0109 Logistics and Supply Chain Management
G0110 Service Science and Engineering
G0111 Data Science and Management
G0112 Information System and Management
G0113 Risk Management
G0114 Financial Engineering
G0115 Engineering Management and Project Management
G0116 Transportation Management
G0117 Digital Platform Management Theory
G0118 Intelligent Management and Artificial Intelligence

G0119 New Technology-Driven Management Theory and Method

G02 Business Administration

G0201 Strategic Management
G0202 Theory of Firm
G0203 Enterprise Technology Management and Innovation Management
G0204 Human Resource Management
G0205 Financial Management
G0206 Accounting and Auditing
G0207 Marketing
G0208 Organization Theory and Organization Behaviors
G0209 Business Intelligence and Digital Business
G0210 Corporate Finance
G0211 Enterprise Operation Management
G0212 Corporate Governance
G0213 Entrepreneurship
G0214 International Business Management
G0215 Tourism Management

G03 Economic Sciences

G0301 Econometrics and Economic Statistics
G0302 Behavior Economics and Experimental Economics
G0303 Mathematical Economics and Computational Economics
G0304 Microeconomics
G0305 Macroeconomic Management
G0306 International Economics and Trade
G0307 Financial Economics
G0308 Public Finance and Public Economics
G0309 Industrial Economics
G0310 Economic Development and Economic Institution
G0311 Agricultural and Forestry Economics and Management
G0312 Regional Economics
G0313 Population, Labor and Health Economics
G0314 Resources and Environment Economics

G04 Macro-management and Policy

G0401 Public Administration and Public Policy
G0402 Theories and Methods of Policy Science
G0403 Governance and Policy of Science and Technology
G0404 Governance and Policy of Innovation

G0405 Governance and Policy of Health
G0406 Governance and Policy of Medicine
G0407 Governance and Policy of Education
G0408 Governance and Policy of Culture
G0409 Public Safety and Emergency Management
G0410 Social Governance and Social Security
G0411 Governance of Environment and Ecology
G0412 Governance and Policy of Resource
G0413 Regional Development and Urban Governance
G0414 Digital Governance and Information Resource Management
G0415 Global Governance and Sustainable Development

H. Department of Health Sciences

H01 Respiratory system

H0101 Structural and developmental abnormalities of the respiratory system
H0102 Respiratory infections, inflammation and immunity
H0103 Environmental factors and airway diseases
H0104 Bronchial asthma
H0105 Chronic obstructive pulmonary disease
H0106 Bronchiectasis
H0107 Pulmonary circulation and pulmonary vascular disease
H0108 Interstitial lung disease
H0109 Acute lung injury and acute respiratory distress syndrome
H0110 Sleep-disordered breathing and respiratory regulation
H0111 Respiratory failure and respiratory support
H0112 Pleura, mediastinum, thoracic and diaphragm-related disorders
H0113 Respiratory interventions, tracheal reconstruction and lung transplantation
H0114 New technologies and methods for respiratory disease research

H02 Circulation System

H0201 Abnormalities in cardiac structure, function and development
H0202 Myocardial injury, repair, remodeling and regeneration
H0203 Congenital heart disease
H0204 Abnormal cardiac electrical activity and arrhythmia
H0205 Coronary Artery Disease
H0206 Pulmonary heart disease
H0207 Myocarditis and cardiomyopathy
H0208 Heart valve disease and pericardial disease

H0209 Heart Failure
H0210 Heart/Vascular Transplantation and Assisted Circulation
H0211 Abnormalities in angiogenesis and vascular structure and function
H0212 Vascular injury, repair, remodeling and regeneration
H0213 Abnormal blood pressure regulation and hypertension
H0214 Atherosclerosis and arteriosclerosis
H0215 Aortic disease
H0216 Peripheral vascular disease
H0217 Lymphatic vessels and lymphatic circulation diseases
H0218 Microcirculation and shock
H0219 Infections of circulation system and immune-related diseases
H0220 New technologies and methods for circulatory system diseases

H03 Digestive system

H0301 Digestive system textural abnormality, dysfunction and dysplasia
H0302 Immune-related diseases
H0303 Abnormal gastrointestinal motility
H0304 Abnormal gastrointestinal homeostasis, mucosal barrier disorders and related diseases
H0305 Gastric acid-related diseases and neuroendocrine dysregulation in digestive system
H0306 Gastrointestinal and abdominal infectious diseases
H0307 Liver metabolic disorders and related diseases
H0308 Drug, toxin and alcohol-induced digestive diseases
H0309 Inflammatory and infectious liver diseases
H0310 Liver injury, repair and regeneration
H0311 Liver protection and artificial liver
H0312 Cholelithiasis and biliary inflammation
H0313 Pancreatic exocrine dysfunction and pancreatitis
H0313 Digestive system organ transplantation
H0314 New technologies and methods for digestive diseases

H04 Reproductive System/Perinatal Medicine/Neonatology

H0401 Male reproductive system structure, function and development abnormalities
H0402 Male reproductive system injury and repair
H0403 Male reproductive system inflammation and infection
H0404 Male reproductive endocrine abnormalities and related diseases
H0405 Spermatogenic abnormalities and male infertility
H0406 Sexual dysfunction
H0407 Mammary structure, function and development abnormalities

H0408 Female reproductive system structure, function and development abnormalities

H0409 Female reproductive system injury and repair

H0410 Female reproductive system inflammation and infection

H0411 Female reproductive endocrine abnormalities and related diseases

H0412 Endometriosis and adenomyosis

H0413 Oocyte development, maturation, fertilization and related abnormalities

H0414 Earlyembryo development

H0415 Embryo implantation, maternal-fetal interaction, reproductive immunity and related diseases

H0416 Placental development, structure, function and related abnormalities

H0417 Pregnancy related diseases

H0418 Delivery and puerperal related diseases

H0419 Fetus related diseases and embryo origin diseases

H0420 Assisted reproduction

H0421 Neonatal diseases

H0422 New technologies and methods for reproductive system/perinatal medicine/ neonatology research

H05 Urinary System

H0501 The structural, functional and development disorders of urinary system

H0502 Injuries and repairs of urinary system

H0503 Primary kidney diseases

H0504 Secondary kidney diseases

H0505 Chronic kidney diseases and its related complication

H0506 Hemodialyses and renal replacement therapies

H0507 Kidney transplantations

H0508 Urolithiasis and urinary tract infections

H0509 Benign diseases of prostate and bladder

H0510 Voiding dysfunction

H0511 New technologies and methods for urological diseases

H06 Locomotor System

H0601 Structural, functional and developmental abnormalities in locomotor system

H0602 Immune related diseases in locomotor system

H0603 Biomedical materials for bone, joint and soft tissue

H0604 Injury and repair of bone, joint and soft tissue

H0605 Transplantation and reconstruction of bone, joint and soft tissue

H0606 Infection of bone, joint and soft tissue

H0607 Fatigue and recuperation of bone, joint and soft tissue

H0608 Degenerative disease of bone, joint and soft tissue
H0609 Sports injury of bone, joint and soft tissue
H0610 Deformity and correction in locomotor system
H0611 New technologies and methods for locomotor system diseases

H07 Endocrine System/Metabolic Abnormalities and Nutritional Support

H0701 Endocrine system immune-related diseases
H0702 Pineal gland, hypothalamus, pituitary and related diseases
H0703 Thyroid, parathyroid and related diseases
H0704 Adrenal gland associated diseases
H0705 Gonads and related diseases
H0706 Physiological regulation and dysfunction of islets
H0707 Imbalance of glucose homeostasis and insulin resistance in target organs
H0708 Diabetes mellitus
H0709 Abnormal regulation of energy metabolism and obesity
H0710 Abnormal lipid metabolism
H0711 Physiological regulation and dysfunction of adipose tissue
H0712 Bone turnover, abnormal bone metabolism and abnormal calcium and phosphorus metabolism
H0713 Amino acids and nucleic acid metabolic abnormalities
H0714 Abnormal metabolism of water, electrolyte, trace elements and vitamins, acid-base imbalance
H0715 Malnutrition and nutritional support
H0716 New technologies and methods for endocrine system diseases/metabolic abnormalities and nutritional support

H08 Hematologic System

H0801 Hematopoiesis, hematopoiesis regulation and hematopoietic microenvironment
H0802 Erythrocyte and its related diseases
H0803 Leukocyte and its related diseases
H0804 Megakaryocyte, platelet and their related diseases
H0805 Bleeding, coagulation, fibrinolysis and thrombosis
H0806 Aplastic anemia and bone marrow failure
H0807 Myelodysplastic syndromes
H0808 Myeloproliferative diseases
H0809 Leukemia
H0810 Lymphoma and lymphocytic diseases
H0811 Myeloma and plasma cell diseases
H0812 Infection associated with blood system diseases and its treatment
H0813 Hematopoietic stem cell transplantation and its complications

H0814 Immunotherapy and cell therapy for hematologic disease
H0815 Blood transfusion, blood regeneration and blood products
H0816 New technologies and methods for hematological diseases

H09 Nervous System

H0901 Neurodevelopmental and metabolic abnormalities
H0902 Disorders of consciousness and cognitive dysfunction
H0903 Sensory disorders, pain and analgesia
H0904 Dyskinesia
H0905 Anaesthesia and sedation
H0906 Abnormalities of cerebrovascular structure, function and related disorders
H0907 Neurological immune abnormalities and related disorders
H0908 Diseases associated with neurological barrier and cerebrospinal fluid circulation disorders
H0909 Inflammation, infection and related diseases of the nervous system
H0910 Nerve injury, repair and regeneration
H0911 Neuromuscular junction and muscle diseases, autonomic nerve diseases
H0912 Neurodegeneration and associated disorders
H0913 Abnormal neural electrical activities and paroxysmal diseases
H0914 Protection and regulation of neurological function
H0915 New technologies and methodsfor neurological diseases

H10 Mental Health and Psychological Health

H1001 Biological rhythm disorders and associated diseases
H1002 Sleep and sleep disorders
H1003 Organic mental disorders
H1004 Substance dependence and other addictive disorders
H1005 Schizophrenia or other psychotic disorders
H1006 Anxiety disorders, obsessive-compulsive disorders and stress-related disorders
H1007 Mood disorders
H1008 Psycho-behavioral disorders in children and adolescents
H1009 Other behavioral and psychiatric disorders
H1010 Psychological assessment and intervention of psycho-behavioral disorders
H1011 Newtechnologies and methodsfor mental disorders and psychological health

H11 Medical Immunology

H1101 Immune system development and differentiation abnormalities
H1102 Immune response abnormalities
H1103 Immune regulation abnormalities
H1104 Inflammation, infection and immunity

H1105 Organ transplantation and transplant immunity
H1106 Hypersensitivity reaction diseases
H1107 Autoimmune diseases
H1108 Immunodeficiency diseases
H1109 Neuroendocrine-immune abnormalities
H1110 Regional immune and mucosal immune diseases
H1111 Vaccine and immunoprophylaxis
H1112 Immunotherapy and related mechanisms
H1113 New technologies and methods for medical immunology research

H12 Dermatology

H1201 Abnormalities of skin morphology, structure, and function
H1202 Immune-mediated skin diseases
H1203 Infectious skin diseases
H1204 Non-infectious skin diseases
H1205 Skin appendages and related diseases
H1206 New techniques and approaches for dermatology research

H13 Ophthalmology

H1301 Corneal and ocular surface related diseases
H1302 Lens and cataract innovative technologies and methods in ophthalmic research.
H1303 Sclera, uvea and ocular immunology related diseases
H1304 Glaucoma, optic nerve and visual pathway related diseases
H1305 Retina, choroid and vitreous related diseases
H1306 Vision, optometry and myopia, amblyopia and ocular muscle disorder related diseases
H1307 Ocular manifestations due to systemic disease and orbital diseases
H1308 Ocular tissue transplantation
H1309 New technologies and methods for ophthalmic research

H14 Emergency and Critical Care Medicine

H1401 Olfactory, nasal and anterior skull base diseases
H1402 Throat and neck diseases
H1403 Ear and lateral skull base diseases
H1404 Auditory abnormalities and balance disorders
H1405 Otorhinolaryngology head and neck development related diseases
H1406 New technologies and methods for otorhinolaryngology head and neck research

H15 Oral and Craniofacial Sciences

H1501 Diseases related to the development of oral craniomaxillofacial tissues and organs

H1502 Defect restoration and regeneration of oral craniomaxillofacial tissues and organs

H1503 Dental pulp and periapical tissue diseases

H1504 Periodontal and oral mucosal diseases

H1505 Saliva, salivary glands, oral and maxillofacial, nerves and jaw benign diseases

H1506 Taste, oral and maxillofacial pain, occlusion and temporomandibular joint diseases

H1507 Restoration of tooth defects or missing and correction of dentognathic deformities

H1508 Biomechanics and biomaterials of oral craniomaxillofacial tissues

H1509 New technologies and methods for oral craniomaxillofacial research

H16 Emergency and Critical Care Medicine

H1601 Sepsis

H1602 Organ function failure and support

H1603 Cardiac-pulmonary resuscitation

H1604 Poisoning and heat stroke

H1605 New technologies and methods for emergency and critical care medicine

H17 Trauma/Burns/Plastic Surgery

H1701 Trauma

H1702 Burns and chimatlon

H1703 Wound healing and scar management

H1704 Deformity, injury, repair and regeneration of surface tissues and organs

H1705 Transplantation and reconstruction of surface tissues and organs

H1706 Craniomaxillo-facial deformity and its correction

H1707 New technologies and methods for trauma/burn/plastic surgery research

H18 Oncology

H1801 Tumor etiology

H1802 Tumorigenesis

H1803 Tumor cell-fate

H1804 Tumor genetics and evolution

H1805 Tumor epigenetics

H1806 Tumor immunology

H1807 Tumor metabolism

H1808 Tumor microenvironment

H1809 Tumor recurrence and metastasis

H1810 Tumor stem cells
H1811 Interdisciplinary oncology
H1812 Cancer prevention
H1813 Cancer diagnosis
H1814 Cancer chemotherapy
H1815 Targeted cancer therapy
H1816 Cancer radiotherapy
H1817 Cancer physical therapy
H1818 Cancer immunotherapy
H1819 Cancer biotherapy
H1820 Comprehensive cancer therapy
H1821 Cancer therapy resistance
H1822 Cancer rehabilitation
H1823 Research for cancer with special clinical characteristics
H1824 Big data and artificial intelligence for Oncology
H1825 Clinical Translational research in Oncology
H1826 New technologies and methods for oncology

H19 Gerontology

H1901 Mechanism and regulation of aging
H1902 Aging-related diseases
H1903 New technologies and methods for gerontology

H20 Rehabilitation Medicine

H2001 Rehabilitation treatment and rehabilitation mechanism
H2002 Rehabilitation evaluation
H2003 New technologies and new methods for rehabilitation medicine research

H21 Medical Virology and Viral Infection

H2101 Respiratory viruses and infections
H2102 Digestive tract viruses, picorna viruses and infections
H2103 Hepatitis viruses and infections
H2104 Retroviruses andinfections
H2105 Herpes viruses and infections
H2106 Arboviruses and infections
H2107 Hemorrhagic feverviruses and infections
H2108 Human papilloma virus, rabies virus, parvovirus, prion andother viruses and infections
H2109 New technologies and methods for medicalvirology and viral infection

H22 Medical Pathogens and Infection

H2201 Pathogenic bacteria and infections
H2202 Pathogens fungi andinfections
H2203 Parasites and infections
H2204 Mycoplasma, chlamydia, rickettsia, spirochetes andinfections
H2205 Infectious diseases and vectors
H2206 Mutation and drug resistance of pathogens
H2207 Hospital-acquired infections
H2208 Sexually transmitted diseases
H2209 New technologies and methods for the study of non-viral medical pathogens and their infections

H23 Medical Genetics

H2301 Genetic diseases
H2302 Rare diseases
H2303 New technologies and methods for medical genetics research

H24 Medical Aspects of Specific Environments

H2401 Adaptation changes and injury mechanism of organism in specific environments
H2402 New technologies and methods for evaluation and protection of medical problems in specific environments

H25 Forensic Medicine

H2501 Forensic pathology and forensic clinical medicine
H2502 Forensic material evidence and forensic anthropology
H2503 Forensic toxicology
H2504 New technologies and methods for forensic medicine research

H26 Laboratory Medicine

H2601 Biochemical test
H2602 Microbiologicalanalysis
H2603 Cytological and hematological examination
H2604 Immunological test
H2605 Molecular biology test
H2606 New technologies and methods for laboratory medicine

H27 Medical Imaging/Nuclear Medicine

H2701 Magnetic resonance imaging

H2702 X-rays and CT, electrons and ion beams
H2703 Ultrasonic medicine
H2704 Diagnosis and treatment in nuclear medicine
H2705 Medical optical imaging
H2706 Molecular imaging
H2707 Bio-electromagnetic imaging
H2708 Data processing, analysis and visualization for medical images
H2709 Big data and artificial intelligence for medical images
H2710 Interventional medicine and engineering
H2711 New technologies and methods for medical imaging/nuclear medicine

H28 Biomedical Engineering/Regenerative Medicine

H2801 Brain-computer interaction, neural engineering and rehabilitation engineering
H2802 Medical signal detection, recognition, processing and analysis for human
H2803 Biomedical sensing
H2804 Electromagnetic and physical therapy
H2805 Biomedical system modeling and simulation
H2806 Medical information system and telemedicine
H2807 Treatment planning, navigation and robot assistance
H2808 Nanomedicine
H2809 Biomaterials and biomimetic materials for medical uses
H2810 Mechanism and regulation of tissue/organ regeneration
H2811 Tissue and organ construction
H2812 Organ chip and system
H2813 Medical devices and instruments for detection and treatment
H2814 New technologies and methods for biomedical engineering/regenerative medicine

H29 Radiation medicine

H2901 Radiation injury and prevention
H2902 Medical radiobiology
H2903 New technologies and methods forradiation medicine research

H30 Preventive medicine

H3001 Environmental hygiene
H3002 Occupational health and diseases
H3003 Human nutrition
H3004 Food hygiene
H3005 Maternal and child health care
H3006 Children and adolescent health

H3007 Hygienic toxicology
H3008 Hygienic analytical chemistry
H3009 Infectious disease epidemiology
H3010 Epidemiology of non-communicable diseases
H3011 Epidemiological methods and health statistics
H3012 Behavior/psychological factors and health
H3013 Endemiology
H3014 New technologies and methods forpreventive medicine research

H31 Chinese medicine

H3101 Zang-fu organs, qi, blood and body fluids
H3102 Etiology and pathogenesis
H3103 Basis of syndromes
H3104 Treatment principles and methods
H3105 Chinese medicine prescription
H3106 Chinese medicine diagnosis
H3107 Acupoints and Meridians
H3108 Chinese medicine internal medicine
H3109 Chinese medicine surgery
H3110 Chinese medicine orthopedics
H3111 Chinese medicine gynecology
H3112 Chinese medicine pediatrics
H3113 Chinese medicine ophthalmology
H3114 Chinese medicine otolaryngology and oral science
H3115 Chinese medicine oncology
H3116 Chinese medicine geriatrics
H3117 Chinese medicine health and rehabilitation
H3118 Acupuncture and moxibustion
H3119 Tuina and Massage
H3120 Ethnic medicine
H3121 New technologies and methods for Chinese medicine research

H32 Chinese materia medica

H3201 Chinese materia medica resources
H3202 Chinese medicinal identification
H3203 Chinese medicinal substances
H3204 Substances in pharmacodynamics
H3205 The processing of Chinese materia
H3206 Chinese materia medica preparation
H3207 Theories in the properties of Chinese materia medica

H3208 Neuropsychopharmacology of Chinese medicine
H3209 Cardio-cerebrovascular pharmacology of Chinese medicine
H3210 Anti-tumor pharmacology of Chinese medicine
H3211 Endocrinological and metabolic pharmacology of Chinese medicine
H3212 Anti-inflammatory and immune pharmacology of Chinese medicine
H3213 Antiviral and anti-infective pharmacology of Chinese medicine
H3214 Digestive and respiratory pharmacology of Chinese medicine
H3215 Urologic and reproductive pharmacology of Chinese medicine
H3216 Metabolism and pharmacokinetics of Chinese medicine
H3217 Toxicology of Chinese medicine
H3218 Ethnopharmacy
H3219 New techniques and methods for Chinese materia medica research

H33 Integrative medicine

H3301 Basic theory of integrated Chinese and western medicine
H3302 Clinical basis of integrated Chinese and western medicine;
H3303 New technologies and methods for research on integrated Chinese and western medicine

H34 Materia medica

H3401 Synthetic medicinal chemistry
H3402 Medicinal chemistry of natural products
H3403 Microbial drugs
H3404 Biotechnology drugs
H3405 Marine drugs
H3406 Special drugs and Rare Disease Drugs
H3407 Drug design and drug informatics
H3408 Pharmaceutics
H3409 Pharmaceutical materials
H3410 Pharmaceutical analysis
H3411 Drug resources
H3412 New technologies and methods for pharmaceutical research

H35 Pharmacology

H3501 Neuropsycho-pharmacology
H3502 Cardio-cerebrovascular pharmacology
H3503 Geriatric pharmacology
H3504 Pharmacology of anti-inflammatory-immunity drugs
H3505 Pharmacology of anti-tumor drugs
H3506 Pharmacology of anti-infective drugs

H3507 Pharmacology of anti-metabolic diseases
H3508 Pharmacology of digestive and respiratory system
H3509 Pharmacology of blood, urinary and reproductive system
H3510 Drug metabolism and pharmacokinetics
H3511 Clinical pharmacology
H3512 Drug toxicology
H3513 New technologies and methods for pharmacological research

T. Department of Interdisciplinary Sciences

T01 Physical sciences
T02 Intelligence sciences
T03 Life and health sciences
T04 Convergence sciences

Notes:

These are the acceptance codes of Department of Interdisciplinary Sciences. There is no separate application code for the Department of Interdisciplinary Sciences. When applying for the program of Interdisciplinary Science Department, the applicant shall first select an acceptance code (T01, T02, T03 or T04), and then accurately select 2 to 5 application codes from the application codes of aforementioned eight science departments.

Appendix

Contact information for the National Natural Science Foundation Departments

Department Name			Telephone number
Department of Mathematical and Physical Sciences			
Division of General Affairs			62326910 62326911
Division of Mathematics			62325025
Division of Mechanics			62327178
Division of Astronomy			62325940
Division I of Physics			62325055
Division II of Physics			62325069
Department of Chemical Sciences			
Division of General Affairs			62326906 62329320
I	Synthetic Chemistry		62327170
II	Catalysis and Surface/ Interface Chemistry		62327035
	Chemical Theory and Mechanism		62327167
III	Materials Chemistry		62328253
	Environmental Chemistry		62328181
IV	Chemical Measurement		62327173
	Environmental Chemistry		62327075
	Chemical Biology		62327169
V	Chemical Engineering and Industrial Chemistry		62327111 62328370
Department of Life Sciences			
Division of General Affairs			62326916 62327200 62329341
Division I of Biology	Microbiology		62329221
	Botany		62329135
	Zoology		62326914
Division II of Biology	Genetics and Bioinformatics		62329253
	Cell Biology		62327213
	Developmental Biology and Reproductive Biology		62329170

Department Name			Telephone number
Division of Agriculture and Food Sciences		Basic Agriculture and Crop Science	62327193
		Food Sciences	62326919
Division of Agricultural Environment and Horticulture		Plant Protection	62328882
		Horticulture and Plant Nutrition	62327197
Division of Agriculture Animal		Animal Husbandry	62327196
		Veterinary Science	62329585
		Aquatic Science	62329105
Department of Earth Sciences			
Division of General Affairs			62327157 62326900
I	Science of Geography		62327161
II	Geology		62327652
	Geochemistry		62327675
III	Environmental Geosciences		62327159
	Geophysics and Space Physics		62327619
IV	Marine Science		62328528
V	Atmospheric Science		62327654
Department of Engineering and Materials Sciences			
Division of General Affairs			62326887 62326884
Division I of Materials Sciences		Metallic Materials	62327144
		Inorganic nonmetallic materials	62328234
Division II of Materials Sciences		Organic polymer materials	62328337
		New concept and general science of materials	62327138
Division I of Engineering Sciences		Mining and Metallurgical Engineering	62327136
		Engineering Thermophysics and Energy Utilization	62327131
Division II of Engineering Sciences		Mechanical Design and Manufacturing	62327084
Division III of Engineering Sciences		Environmental Engineering	62327092
		Ocean Engineering	62327137
Division IV of Engineering Sciences		Architecture and Civil Engineering	62327135
		Transportation and Vehicle Engineering	62327142

Division of Biomedicine	Immunology	62329630	Division V of Engineering Sciences	Electrical Science and Engineering	62328301
	Neuroscience and Psychology	62329240		Hydraulic Engineering	62328362
	Physiology and Integrative Biology	62325489	**Department of Information Sciences**		
Division of Interdisciplinary Research	Biophysics and Biochemistry	62329246	Division of General Affairs		62327140
	Biomaterials, Imaging and Tissue Engineering	62327842	I	Electronics and technology	62327143
	Molecular Biology and Biotechnology	62326915	II	Computer Science	62327929
Division of Environment and Ecology	Ecology	62329321	III	Automation	62327149
	Forestry and Grassland Science	62329573	IV	Information Devices and Optics and Photo Electronics	62327351

Department Name		Telephone number	Department Name	Telephone number
Department of Management Sciences			**Bureau of Planning**	
Division of General Affairs		62326898	Division of Planning	62326980 62325277
I	Management science and engineering	62327156	Division of Projects	62327230 62328222 62329336 62327008
II	Business administration	62326972	Division of Talents	62329133 62325932
III	Macro-management and policy	62327152	Division of Joint Funds	62329897 62326872
	Economic Sciences	62326660		
Department of Health Sciences			**Bureau of Finance**	
Division of General Affairs		62328991 62328047 62328952 62328941	Secretary of the Bureau	62328485
I	Respiratory system, circulatory system, hematological system	62327215 62328559	Division of Budget Management	62327229 62327225 62329112 62328383 62326961
			Bureau of International Cooperation	
II	Digestive system, urinary system, endocrine system, metabolism, and nutrition support, ophthalmology, otorhinolaryngology head and neck science, oral and craniomaxillo-facial science	62328790 62328680	Division of Planning	62325454 62325793
III	Nervous system, mental health and psychological health, gerontology	62327199	Division of Asian, African and International Organizations	62327014 62326998
IV	Reproductive system/perinatal medicine/neonatology, medical immunology, medical genetics	62327207	Division of American and Oceanian Affairs	62326877 62327145
V	Special medicine, forensic medicine, medical imaging/nuclear medicine, biomedical engineering/regenerative medicine	62327198	Division of European Affairs	62325377 62327017

VI	Locomotor System, emergency and intensive care medicine, trauma/burns/plastic surgery, rehabilitation medicine, medical virology and virus infection, Human Pathogens and Infections, laboratory medicine	62328775 62327465	Office for Hong Kong, Macao and Taiwan Affairs	62327179 62326943
VII	Oncology (hematological system not included)	62329157 62328944	**Service Center for Administrative Affairs**	
			General Office	62326967
			Department I	62326046
VIII	Dermatology, radiation medicine, preventive medicine	62328962	**Center for Science Communication and Achievement Transformation**	
IX	Materia medica, pharmacology	62327212	General Office	62326876
X	Traditional Chinese medicine, Chinese materia medica, integrated Chinese and western medicine	62328634 62328552	**Sino-German Centre for Research Promotion**	
			Telephone Number	82361200
Department of Interdisciplinary Sciences				
Division of General Affairs		62328382		
I	Material Science	62328382		
II	Intelligent Science and Intelligent Manufacturing	62327140		
III	Life Science and Heath	62327096		
IV	interdisciplinary Science	62328382		

Programs of Joint Funds

The joint funds set up by NSFC and relevant government departments, provincial governments and industrial sectors are committed to supporting basic research in agreed scientific areas.

The joint funds are designed to give full play to the leading role of the National Natural Science Fund, integrate social resources for basic research, promote the synergy of relevant departments, industries and regions with universities and research institutions, foster scientific and technological talents, and enhance China's indigenous innovation capabilities in related research areas, industries and regions.

In 2018, the Joint Fund for Regional Innovation and Development and the Joint Fund for Industrial Innovation and Development were set up by NSFC and relevant provincial departments or enterprises. These Funds are designed in a way that ensures integrated management regarding grant expenses, program solicitation, review process, etc.. In the meantime, by focusing on key scientific issues in relevant industrial sectors with joint support from NSFC and major administrative departments, the Joint Funds will contribute to the establishment of an upgraded system characterized by higher funding efficiency in the new era.

The joint funds are part of the Natural Science Funds. The application, evaluation and management of the joint funds will comply with management methods such as the *Regulations*, *Measures for Fund Management of NSFC-funded Projects* and *Measures for Programs of Joint Funds Management*.

In 2023, the Joint Funds in this*Guide* include the Joint Fund for Regional Innovation and Development, Joint Fund for Industrial Innovation and Development, NSAF Joint Fund, "Ye Qisun" Science Fund，Joint Fund for Civil Aviation Research, Joint Fund for Meteorology, NSFC-CR Joint Fund for Basic Research, NSFC-GenerTec Joint Fund for Basic Research, Joint Fund for Geology. Call for Proposals for other Joint Funds will be published on NSFC website.

Applicants for the Joint Funds should:

(1) Have the experience of conducting basic research;

(2) Hold senior professional position (title) or PhD degree;

(3) Meet other requirements in this *Guide*.

For any research achievements funded by the Joint Fund, NSFC's contribution and support to the project should be acknowledged in a prominent place and in an appropriate form according to the *Guide* with the title of the joint fund and the project ID number.

Applications for the joint funds should be prepared according to the requirements and outlines specified for each Joint Fund. Please select “Joint Fund” for funding category, “Fostering Project” or “Key Project” or “Integrated Project” for subcategories, and select the name of the joint fund in the "Annotations” section.

The number of collaborative research institutions for “Fostering Project” and “Key Project” shall not exceed two. The number of collaborative research institutions for Integrated Project shall not exceed four.

The funding duration for “Fostering Project” will be three years and the funding period shall be “from January 1, 2024 to December 31, 2026” in the application form. The funding duration for “Key Project” and “Integrated Project” will be four years and the funding period shall be “from January 1, 2024 to December 31, 2027” in the application form.

Joint Fund for Regional Innovation Development

The Joint Fund for Regional Innovation and Development co-established by NSFC and provincial governments aims to give play to the guiding role of the National Natural Science Fund, and attract and gather excellent scientific research teams across the country. Focusing on the major needs in regional economic and social development, it supports basic research and applied basic research on key scientific issues, promote cross-regional and cross-sector collaborative innovation, and enhance the country's regional independent innovation capabilities.

In 2023, the Joint Fund for Regional Innovation and Development calls for proposals of “Key Project” and “Integrated Project” with a funding duration of four years. The average funding amount (direct cost) for Key Project will be 2.6 million yuan per project. The average funding amount (direct cost) for Integrated Project is specified in this *Guide*.

Joint Fund for Corporate Innovation and Development

The Joint Fund for Corporate Innovation and Development is jointly funded by the NSFC and the industries. It aims to, by taking into consideration of the urgent needs in the industrial development, give play to the guiding role of the National Science Fund, attract and gather the nation's scientific research forces and support the basic research focusing on core scientific issues in key technology areas. It intends to integrate the knowledge innovation system and technology innovation system, so as to advance the independent innovation capabilities of Chinese enterprises.

In 2023, the Joint Fund for Corporate Innovation and Development calls for proposals of “Key Project” and “Integrated Project” with a funding duration of four years. The average funding amount (direct cost) for Key Project will be 2.6 million yuan per project. The average funding amount (direct cost) for Integrated Project is specified in this *Guide*.

NSAF Joint Fund

Jointly set up by NSFC and the China Academy of Engineering Physics (CAEP), the NSAF Joint Fund is aimed to encourage and mobilize scientists and teams from universities and research institutes nationwide to focus on core fundamental issues of relevant areas addressing the national strategic demands, carry out forward-looking research on multidisciplinary topics, promote openness and exchanges, cultivate excellent talent of scientific research, and upgrade the ability of scientific and technological innovation.

In 2023, the NSAF Joint Fund plans to fund three types of projects, namely "Fostering Project", "Key Project" and "Center Project". The Fostering Project aims to expand the open sharing of the National Science Facility built by the CAEP and promote exchanges and cooperation. The Key Project focuses on key bottlenecks in the field addressing national strategic demand, interdisciplinary innovations that may be applied in the future, and prospective and disruptive basic research. The Center Project mainly provides sustainable funding for some important basic research areas. The Fostering Project offers an average funding amount (direct cost) of 500,000 yuan per project for a period of 3 years; the Key Project offers an average funding amount (direct cost) of 3 million yuan per project for a period of 4 years; the Center Project offers an average funding amount (direct cost) of 6 million yuan per project for a period of 2 years.

Ye Qisun Science Fund

Aiming at the implementation of the strategy of innovation-driven development and making full use of the guiding role of the National Science Fund, the Ye Qisun Science Fund is set up to attract and mobilize scientific and technological resources in society to conduct fundamental, frontier and exploratory research to meet the demands of the industry. It also aims to promote the integration and development of modern engineering technology and basic science for groundbreaking progress in solving basic science problems, and improving independent innovation capacity.

In 2023, the Ye Qisun Science Fund calls for proposals of Key Projects, with an average funding amount (direct cost) of 2.6 million yuan per project for 4 years.

Joint Fund for Civil Aviation Research

The Joint Fund for Civil Aviation Research is jointly set up by NSFC and the Civil Aviation Administration of China (CAAC). The Fund is aimed to attract researchers across China to participate in basic research for the sustainable development of aviation science and technology, so as to foster high level scientific talents, enhance the ability of indigenous innovation in the aviation industry, promote the integration of knowledge and technological innovation, and contribute to the building of China into a nation with strong aviation industry.

In 2023, the Joint Fund for Civil Aviation Research calls for proposals of Key Projects, with an average funding amount (direct cost) of 2.1 million yuan per project for 4 years.

Joint Fund for Meteorology

The Joint Fund for Meteorology is jointly established by the NSFC and the China Meteorological Administration (CMA) to implement the important instructions of President Xi Jinping on meteorological work, accelerate the STI in meteorological field, and strengthen basic research. It intends to solving and breaking through important scientific bottlenecks closely related to the core technology of meteorological industry, cultivate outstanding talents, enhance independent innovation capability, and promote high-quality development of China's

meteorological services.

In 2023, the Joint Foundation for Meteorology will, in accordance with the urgent needs of quality development of meteorology, focus on the earth-system numerical forecast model development, catastrophic weather monitoring and forecasting theory and methods, AI-based meteorological applications, atmospheric sounding technology and application, short-term climate prediction, climate change theory and method and other core fields. The Joint Fund will call for proposals of Key Projects, with an average funding amount (direct cost) of 2.6 million yuan per project for 4 years.

NSFC-CR Joint Fund for Basic Research

Jointly set up by the NSFC and China Railway (CR), the NSFC-CR Joint Fund for Basic Research will, by giving full play to the guiding role of the National Science Fund, attract and mobilize scientific research resources of the whole society to contribute to the development and operation management of the high-speed railway, plateau and alpine railway and heavy haul railway in China. The focus will be placed on the fundamental research of major scientific issues, key technical problems and common problems, so as to enhance the self-reliance in the capabilities of China's railway technology.

In 2023, the NSFC-CR Joint Fund for Basic Research will call for proposals of “Key Projects”, with an average funding amount (direct cost) of 2.6 million yuan per project for 4 years.

NSFC-Gener Tec Joint Fund for Basic Research

The NSFC-Gener Tec Joint Fund for Basic Research is jointly established by the NSFC and the China Academy of General Technology. Aimed at addressing the major needs of national strategic development and scientific and technological innovation, the Joint Fund intends to attract and gather outstanding talents in relevant research fields across the country, to improve the role of the China Academy of General Technology to solving major scientific and key technical problems in fundamental, forward-looking and innovative research, and promote the sustainable development of related fields and independent innovative capabilities.

In 2023, the NSFC-GenerTec Joint Fund for Basic Research calls for proposals of “Key Projects” and “Fostering Projects”. The average funding amount (direct cost) will be 2.6 million per project for 3 years for “Key Project” and 0.6 million per project for 3 years for Fostering Projects.

Joint Fund for Geology

The Joint Fund for Geology set up by the NSFC and the China Geological Survey is aimed at contributing to the quality development of China's geological cause in accordance with the national strategic demands and guiding excellent talents in related fields of the country's geological industry. It also intends to support basic, forward-looking and innovative research on basic geological problems and key technological approaches that may affect and restrict the major resource and environment security.

In 2023, the Joint Fund for Geology calls for proposals of "Key Projects" with an average funding amount (direct cost) of 2.6 million per project for 4 years.