National Natural Science Fund

Guide to Programs

Fiscal Year 2016

National Natural Science

Foundation of China

Brief Introduction on this Book

The Guide to Programs of the National Natural Science Fund 2016, in accordance with the Regulations of the National Natural Science Fund and relevant documents on program management, gives instructions on how to apply for funding from National Natural Science Foundation of China (NSFC), and explains the definition of application quota and introduces the funding policies for various types of programs in 2016. It provides applicants with useful guidance on making independent selections of topics to seek support from the National Natural Science Fund. The Guide introduces the research, talent, and research environment program categories in separate sections. It is an important basis for the distribution 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 year of 2015 is the last year for implementation of the 12th Five-Year Plan. In view of the new requirement on basic research for building China into an innovative country and S & T power, the National Natural Science Foundation of China (NSFC) fully implemented the National Program for Medium and Long-Term Scientific and Technological Development (2006-2020), the12th Five-Year Plan, and its strategy of "supporting basic research and scientific frontier exploration, supporting talent and team building, strengthening China's original innovative capability", and adhered to its evaluation principle of "relying on experts, promoting democracy, funding excellent research, and advocating fairness and justness" to nurture creative ideas and foster talents, further strengthen support to the development of research tools, and has made great contributions to the construction of an innovation-oriented country.

NSFC's funding portfolio consists of 3 categories of programs with respective preferential focuses, i.e., Research Program, Talent-Training Program, and Research Environment Program, which constitute an integrated funding system of the National Natural Science Fund. The Research Program is aimed at achieving innovative results in basic research, fostering a balanced and coordinated development of disciplines with special emphasis on certain key areas, facilitating interdisciplinary research, and stimulating original innovation. Through funding young researchers to conduct independent research and assisting researchers in regions weak in basic research, Talent-Training Program is targeted at nurturing outstanding academic backbones, top talents and innovative research teams and enhancing China's S & T competitiveness in the future. Research Environment Program is mainly intended to improve research facilities, especially to increase support for the development of indigenous scientific instruments, to boost the sharing of resources, to allocate social resources in basic research, and to optimize the environments for basic research.

As of December 9, 2015, a total of 172,952 research proposals were received by NSFC for the year 2015, among which 165,598 research proposals from 15 types of programs were submitted during the batch application period (from March 2 to 20 16:00 PM, 2015), up by of 9.35% (14,153 applications) year-on-year. The applications for the General Program increased by 23.42% (13,855 applications) year on year. The applications for the Key Program decreased by 7.27% (220 applications). The applications for the Excellent Young Scientists Fund increased by 6.22% (206 applications). The applications for National Science Fund for Distinguished Young Scholar increased by 5.71% (116 applications). For Science Fund for Creative Research Groups, the

applications decreased by 4.96% (13 applications) and for Key International (Regional) Joint Research Program, the applications decreased by 10.30% (71 applications). The applications for Special Fund for Research on National Major Research Instruments (free application) decreased by 11.66% (80 applications). In addition, the applications for the Young Scientists Fund and the Fund for Less Developed Regions have remained stable.

After compulsory review procedures and as of December 9, 2015, 16,709 projects in the General Program were approved, 625 projects in the Key Program, 20 projects in the Major Program, 402 projects in the Major Research Plan Program, 105 projects in the Major International (Regional) Joint Research Program. Furthermore, 16,155 projects were approved in the Young Scientists Fund, 2,829 projects in the Fund for Less Developed Regions, 400 projects in the Excellent Young Scientists Fund, 198 projects in the National Science Fund for Distinguished Young Scholars, 38 new projects, 30 extended projects after 3 years and 11 extended projects after 6 years in the Science Fund for Creative Research Groups, 136 projects in the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao, 81 projects in the Environment Category of the Special Fund for Research on National Major Research Instruments (free application), 5 projects in the Special Fund for Research on National Major Research Instruments (department recommendation), 580 projects for Joint Funds, 107 projects in the Research Fund for International Young Scientists and 384 projects in International (Regional) Exchange Programs. For more information about the statistics and analysis of the applications and final approvals, please refer to the respective relevant sections of this Guide to Programs.

In order to give expression to the principle of openness, fairness and justness and help scientists better understand NSFC's funding policies, the Guide to Programs of the National Natural Science Fund: 2016 (here in after abbreviated as the Guide to Programs) is published to all applicants for these sections of the proper categories of programs, research areas and orientations of investigation in applying for the National Natural Science Fund with research topics proposed on their own initiative.

This Guide to Programs introduces various types of programs, of which applications will be accepted during the batch application period in 2016. Notes on application and regulations on the limits of the total number of applications for one applicant are introduced in detail. The overall funding facts and priority areas of the General Program, Key Program, the Young Scientists Fund, and the Fund for Less Developed Regions are introduced in the section of each scientific department. For the General Program, the overall funding principles and specified requirements as well as notes on applications are provided in addition to the introduction of the overall funding statistics of each scientific department. Apart from that, the trend of development, funding scopes and requirements in diverse disciplines are described by respective divisions of the scientific

departments. Other types of programs are introduced in general terms. Special requirements for each of them are introduced in the main text of this Guide to Programs.

Applications for programs which are not listed in the Guide to Programs will not be accepted during the batch application period, and the call for proposals of these programs and related guiding information will be announced at NSFC's website (http://www.nsfc.gov.cn). Applicants are advised to pay due attention to the updating of related information.

In the consecutive procedures of application acceptance, evaluation and program management, NSFC will, in light of the Regulations on the National Natural Science Fund and relevant guidelines for program management, strive to standardize management procedures, optimize the peer review mechanism, encourage indigenous innovation, emphasize on research merits, nurture a favorable environment for research, support disciplinary intercrossing and tolerance of different academic ideas, strictly observe pertinent regulations on conflict of interest and confidentiality, and sincerely cherish the supervision from the scientific community and the general public. All scientists are welcome to submit high-quality applications for the National Natural Science Fund.

Editorial Board of *the Guide to Programs of the National Natural Science Fund: 2016*

December 10, 2015

Information for Applicants

In applying for the NSFC funds in 2016, applicants and their host institutions should comply with the following provisions.

I. Eligibility for applicants

1. As the principle investigator, the applicant should comply with Article 10 Item 1 of the National Natural Science Foundation Regulations (here in after referred to as Regulations), the applicant has (1) the experience of undertaking basic research program(s) or other basic research activity; (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 categories of programs shall satisfy other specific requirements (for more information, please refer to the text of this Guide).

When domestic and overseas applicant who is not employed full-time at the host institution submit the application, he or she should provide the copy of the employment contract from the host institution and the statement (with seal from the personnel department of the host institution) for his or her position, employment period and working hours per year together with the hard copy of application form.

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 section on Fund for Less Developed Regions in this Guide), or the technical personnel following national policy and sent by the Central Organization Department a the 3-year aiding mission or longer in Xinjiang and Tibet, who should provide the supporting materials of the aiding mission issued by the organization department or the personnel department of the aided institutions. Part-time employees in the specified host institutions, technical personnel from the specified host institutions affiliated under Chinese People's Liberation Army or the excluded host institutions are not eligible to apply for the Fund for Less Developed Regions.

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

Under this circumstance, the applicant shall fill in the authentic personal information in the basic information section of the proposal and research experiences in CV, together with the agreement signed with the supporting institution (for more information please refer to the Management Methods) in

the hard copy of the application form.

3. Students pursuing the postgraduate degree (degree not obtained by the deadline of NSFC program submission) cannot apply for any funds as the Principle Investigator. However, with the supervisor's consent, in-service personnel can apply for certain categories of programs through the employment institution. The applicant should submit the hard copy of application with the following attachments: signed certification of the supervisor's consent which explains the connection between the dissertation and the proposal, and the guarantee of working hours and conditions after the project starts, etc.

In-service personnel pursuing postgraduate degrees can apply for the following program types: General Program, Young Scientists Fund, Fund for Less Developed Regions and parts of the Programs of the Joint Funds (unless otherwise stated). But in-service personnel pursuing the master degree can not apply for Young Scientists Funds.

4. Researchers outside mainland China and not employed at the supporting institutions in the mainland cannot apply for NSFC programs. Those who are employed at the supporting institutions cannot apply for or participate in NSFC programs both as the international or regional collaborator and domestic researcher at the same time. If the researcher has the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao projects, or the International (Regional) Joint Research project (including Key International (Regional) Joint Research Program and International (Regional) Joint Research Program under Agreements/MOUs) as the foreign Principle Investigator, he or she cannot apply for other types of program as the Principle Investigator before these projects are completed. Vice versa, if the applicant has on-going projects other than these two types, he or she cannot apply for the Overseas Chinese Scholars and Scholars in Hong Kong and Macao Program or participate in the International (Regional) Joint Research project (including Key International (Regional) Joint Research Program and International (Regional) Joint Research Program under Agreements/MOUs) as the foreign principle investigator.

5. Researchers employed at postdoctoral research centers can apply for the following programs only: General Programs, Young Scientists Fund and Programs of Joint Funds. In the process of applying for these funds, the applicant should present the supporting institution's written guarantee that within the funding period the applicant will continue the research before or after he or she leaves the postdoctoral research centers. The guarantee shall be attached to the paper proposal form.

6. Researchers with on-going National Social Science Funds as the principle investigator cannot apply for any NSFC funds other than the National Science Fund for Distinguished Young Scholars. Within the same year, applicant for the National Social Science Funds cannot apply for any NSFC funds.

II. About the proposal

1. Prior to the writing of the proposal, the applicant shall carefully read the Regulations, Guide to Programs, National Natural Science Funds' Management Methods, Management regulations on various programs, and relevant notice and announcements. In case of a conflict between the existing Management regulations and the Regulations or this Guide, the later shall prevail.

2. 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. Caution should be taken against revealing any content contrary to law or confidentiality. The applicant shall be responsible for the authenticity and legitimacy of the proposal submitted.

3. In accordance with program types, the applicant shall make correct choice of the "funding category", "subclass introduction" and "annotation". Content that requires "choosing" can only be chosen in the pull-down menu; content that requires "filling out" can be written in words; some program's annotation attachments should be written strictly in accordance with this Guide.

4. Code should be chosen in accordance with the research direction or research field and the "National Natural Science Foundation Application Code" in this Guide's appendix and extra attention shall be paid to:

(1) When choosing the code, try to select the full code including the last digit (six or four digits);

(2) The first application code is reference for deciding NSFC's accepting department and selecting the panel experts. The second application code is supplementary. For some programs, the first or the second application code is designated;

(3) In 2016, NSFC furthermore carries forward the standardization of "application code", "research direction" and "key word". Applicants should accurately select "application code 1" and the corresponding "research direction" and "key word" when filling out the proposal form;

(4) For any questions, please contact departments concerned.

5. The hard copy of application should be signed by the applicant and major participants. For participants outside the supporting institution (including post-graduates), their work places are seen as cooperative research institutions whose information shall be included in the proposal's basic information form and whose official seal should be included on the sign and seal page. The name of the institution and that on the seal shall be identical. The registered seal should be used, if the institution is registered at NSFC, and the corporate seal should be used if otherwise.

The foreign researchers as the major participants shall be seen as individual participants and their foreign work places should not be seen as collaborative research institution. If the researcher is unable to sign in person, a paper

document with the signature and stating his or her consent to participate and perform the related responsibilities shall be sent via mail or fax and submitted with the paper form proposal as attachments.

The number of one proposal's cooperative institutions shall not succeed two.

6. In the proposal, the applicants and the major participants with a senior academic rank (title) shall indicate in the CV if:

(1) They have more than one supporting institution when applying or participating in NSFC projects in one year;

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

7. If the research has received funding through other sources, the applicant should 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 the 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 to the current application.

8. The start time shall be January 1, 2017, the finish time shall be December 31, 201*x*, depending on the funding periods (unless otherwise specified in this Guide). Researchers at postdoctoral research centers as the applicant should fill out the closing date as the December 31 of the year the project is completed with written guarantee from the supporting institution.

9. The applicant and the major participants should use the same and only identification for application.

Applicants and major participants should use the same identification for application. If they have received funds using other identification as the applicants or major participants, they should explain in the proposal. If not, they will be treated as misconduct and their supporting institutions are responsible for verification.

10. All program costs consist of direct cost and indirect cost. The applicant only fills in the direct cost while the indirect cost and the total will be automatically calculated. For more information on budget making, please refer to the Funding Management Methods. The funding intensities for 2015 and 2016 in this Guide both refer to direct cost.

III. About the supporting institutions' responsibilities

1. The supporting institutions should strictly abide by the Regulations, the Guide to Program, the Working Management Methods for Host Institutions, other relevant notices and management methods about application reception and relevant program management and Funding Management Method.

2. The supporting institution is responsible for the proposal's authenticity and integrity, and the qualification of the applicant. No confidential content should be included in the proposal.

3. If the supporting institution allows the applicants without work or whose work place is not registered to apply for funds as listed under Regulation Article 10 Item 2, it shall bear the Regulation's relevant responsibilities as listed in Article 13, sign the written contract and attach it to the paper form proposal.

4. The supporting institution should provide written guarantee for researchers in postdoctoral research centers that the applicants will continue the research before and after he or she leaves the research center. Each written guarantee should have the institution's seal and be attached to the proposal.

IV. Limit on the principle investigator's accumulated number of Fund for Less Developed Regions projects

In order to support the technical personnel in the Fund for Less Developed Region Program, lead and encourage the above mentioned personnel to participate in the competition in General Program, etc., and increase the region's basic research level, beginning from the year 2016, the applicant's accumulated number of Fund for Less Developed Region projects can't exceed 3. Projects approved before (including) 2015 are not counted.

V. About application reception conditions

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

1. The applicant does not comply with the Regulation and Guide's conditions;
2. The application materials do not comply with the Guide's conditions;
3. The number of proposals does not comply with the Application Limit's conditions.

VI. Special notice

To prevent academic misconduct and repeated funding, it is important that applicants shall not:

1. Use the identical or similar proposal and apply for different programs from the same or different science departments;

2. Use the identical or similar proposal and apply from different supporting institutions if the applicant is employed at more than one supporting institutions;

3. Use the identical or similar proposal and apply by different applicants;

4. Use the granted project content and apply for repeated funding from the same or different science departments.

NSFC will use computers for proposal comparison. If the above condition is verified, treatments shall be in accordance with the circumstances. Those with academic misconduct shall be made handled by the Supervisory Committee.

Application Limit

1. Application limit in general

(1) Applicants shall only apply for one type of program once in a year (excluding the Fostering Program and Director Panel Research Program in the major research plan, and the International (Regional) Exchange Program; for Joint Funds, the same type refers to the same program title).

(2) An applicant cannot apply for the same type of program if in the previous year he or she received funding for the General Program (including one-year program), Key Program, Major Program, Major Research Plan Program (excluding the Fostering Program and Director Panel Research Program), Program of Joint Funds (referring to the Joint Fund with the same name), Fund for Less Developed Regions (including one-year program), International (Regional) Cooperation and Exchange Programs (unless otherwise notified) and National R & D Program for Major Research Instruments.

2. One-year suspension from application after unsuccessful application for the General Program for two years in a row

Applicants with unsuccessful application for the General Program both in 2014 and 2015 (including eligibility rejection) can't apply for the General Program as the principle investigator in 2016.

3. Restriction on the total number of projects for researchers with a senior academic rank (title) applies for and undertakes

The total number of the following programs a researcher with a senior academic rank (title) applies for (including the applicant and the major participant) and undertakes (including the applicant and the major participant) shall not exceed three: General Program, Key Program, Major Program, Major Research Plan (excluding the Fostering Program and Director Panel Research Program), Program of Joint Funds, Young Scientists Fund, Fund for Less Developed Regions, Excellent Young Scientists Fund (no limit during application), National Science Fund for Distinguished Young Scholars (no limit during application), Key International (Regional) Joint Research Program, International (Regional) Joint Research Program under Agreements/MOUs with direct cost more than 2 million yuan/project (only the principle investigator are counted, the major 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), Excellent State Lab Research Program and Emergency Program over one year.

Limit on the number of Instrument Program: The number of National R & D

Program for Major Research Instruments (including Special Fund for Major Research Instruments and Special Program of National Major Research Instruments) a researcher applies for (including applicants and major participants) and undertakes (including principle investigator and major participants), and the National Major Instrument Equipment R & D Program by Ministry of Science and Technology shall not exceed 1; after the National R & D Program for Major Research Instruments (recommended by the department) is funded, the principle investigator cannot apply for any other NSFC funds other than the National Science Fund for Distinguished Young Scholars before the program terminates.

4. The limit on the principle investigator for accumulated number of funding

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

(2) Beginning from 2016, for Fund for Less Developed Region Program, the applicant's accumulated number of funding can't exceed 3. Projects approved before (including) 2015 are not counted.

5. Limit for researcher without a senior academic rank (title)

(1) The total number of project the researcher applies for or undertakes as the principle investigator should not exceed one. The principle investigator of the Young Scientists Fund can apply for the General Program in the last year of the Fund.

(2) Under the premise of adequate time and energy, the total number of projects the researcher applies for or undertakes as the major participant is not limited.

6. Programs not limited by the total number limit

Programs not limited by the total number limit include: 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 or less than 2 million yuan/project, International (Regional) Exchange Program, Research Fund for International Young Scientist, assigned and soft projects by bureaus and divisions in the Emergency Program, projects which lasts for 1 year or less, and other programs specified in the individual Program Guide.

Special Notice

(1) During the evaluation period (prior to NSFC's final decision), the proposal shall be counted in the total number limit.

(2) In the case that applicants engaged in multiple supporting institutions apply for or undertake through different supporting institutions, the limit is still applicable.

(3) In case the researcher receives the senior academic rank (title), the projects he or she undertakes as the principle investigator shall be counted into the total number whereas those the researcher undertakes as the major participant shall not.
(4) In case of an inconsistency between other management methods and this limit in terms of total project numbers, the latter shall prevail.

Contents

General Program

General Program is the main part of the research program category in the National Natural Science Fund. It supports scientists doing basic research on bottom-up based topics within the funding scope of NSFC to conduct innovative research and promote a balanced, coordinated and sustained development of all disciplines.

Applicants should meet the following qualifications:

(1) With the experience of undertaking basic research projects or doing basic research;

(2) Have senior professional title or PhD degree, or are recommended by two professionals with senior academic positions (titles).

Post graduate students are not eligible to apply for the General Program, but part time graduate students may apply through their employers if agreed upon by their supervisors.

Applicants should be familiar with the current situation of relevant research in China and the world, capable of leading a research group to conduct research. Home institutions should have necessary experimental research infrastructure for those proposals which need experimental facilities. Applicants should follow the guideline to prepare proposals. The proposed research should be of significance and have research merits, sound theoretical basis, new academic ideas, clear research objectives, detailed research contents and feasible research schemes. The number of collaborative institutions for General Program projects should not exceed 2, and the duration of General Program projects is 4 years.

In 2015, NSFC funded 16,709 General Program projects, an increase by 11.39% (or 1,709 projects) compared with that of 2014, with total funding of 10.24 billion yuan and average funding of 612,900 yuan per project for direct costs. The average funding rate was 22.88%, 2.47% lower than the previous year. Applicants are advised to prepare their research proposals in line with the instructions by respective science departments on funding scale.

Please refer to the sections of each department for detailed funding information about General Program projects.

Funding of the General Program Projects in 2015

Unit: 10,000 yuan

Department	No. of applica-tions	Awards				Funding 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	5,001	1,533	97,330	63.49	9.50	30.65
Chemical sciences	6,154	1,568	101,980	65.04	9.96	25.48
Life sciences	10,777	2,665	164,640	61.78	16.08	24.73
Earth sciences	5,792	1,554	109,230	70.29	10.67	26.83
Engineering and materials sciences	13,911	2,794	177,270	63.45	17.31	20.08
Information sciences	8,240	1,793	109,000	60.79	10.64	21.76
Management sciences	3,563	700	33,660	48.09	3.29	19.65
Health sciences	19,587	4,102	230,940	56.30	22.55	20.94
Total	73,025	16,709	1,024,050	61.29	100.00	22.88

Department of Mathematical and Physical Sciences

Mathematical and physical sciences studying deep level structures of matter and the laws of its motion 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. The 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 in mathematical and physical sciences are also expanding.

The Department will continue to increase its support to basic research that takes as its primary goals of 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.

According to the strategic needs of the development of mathematical and physical sciences and the overall plan of project funding, the Department has taken some measures in project funding performance and has strengthened macro guidance. In 2016, the Department will continue to pay attention to the following aspects:

(1) Emphasize on fostering outstanding young talents. In 2015, the principal investigators under the age of 40 in General Program projects reached 48.21%. In 2016, the Department will further increase funding for young researchers and expand funding scale for applicants under age 40, so as to have more young scientists funded and improve their research capability.

(2) Give more emphasis on creative research and disciplinary development. Multi-level funding to suit the needs of research will be adopted. More funding will be given to studies on developing experimental methods and techniques with innovative ideas aiming to the actual needs, which can be up to 1 to 1.5 million yuan per project. Applicants are advised to pay attention to this policy.

(3) Strengthen macro planning, and give preferential support to special areas so as to promote sustainable development in these areas. In 2016, preferential support will be given to the following areas:

(i) New concepts and new methods in soft matter studies;

(ii) Interdisciplinary issues related to mathematics and information science;

(iii) Research and development of experimental methods and techniques with novel research idea;

(iv) Pre-research on scientific goals of large-scale national projects;

(v) Problems driven research in applied mathematics;

(vi) Radiation protection and radiation physics;

(vii) Integration and standardization of computational mechanic software;
(viii) New principle and methods of X ray, inferred, tetra-hertz generation and imaging;
(ix) Advanced method and key technologies of nuclear detection and nuclear electronics.

Please indicate the research directions in the note section of the application form when applying for these projects, and choose the proper application code.

(4) As the governmental investment in the National Natural Science Fund is changing, the average funding for mathematical and physical research projects will also be changed accordingly. Please see the following table for average funding intensity for General Program projects for reference. The funding intensity for experimental research projects will be higher than that of theoretical research projects.

Funding for General Program Projects
in Department of Mathematical and Physical Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Average funding for direct costs	Funding rate (%)
Mathematic	Mathematics I	193	9,327	32.55
	Mathematics II	198	9,711	29.69
Mechanics	Basic problems and methods in mechanics	6	392	25.00
	Dynamics and control	61	4,084	29.61
	Solid mechanics	152	10,658	29.63
	Fluid mechanics	82	5,502	29.82
	Biomechanics	25	1,666	30.86
	Explosive and impact dynamics	33	2,230	29.73
Astronomy	Astrophysics	41	2,953	33.61
	Astrometry and celestial mechanics	36	2,517	30.77
Physics I	Condensed matter physics	215	14,751	30.76
	Atomic and molecular physics	34	2,280	32.69
	Optics	125	8,537	30.79
	Acoustics	34	2,344	30.63
Physics II	Fundamental physics and particle physics	70	4,295	30.70
	Nuclear physics, nuclear technology and its applications	105	7,406	32.41
	Particle physics and nuclear physics experimental facilities	65	4,684	26.64
	Plasma physics	58	3,993	32.95
Total		1,533	97,330	30.65
Direct cost funding per project		63.49		

Division of Mathematics

The Division of Mathematics 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, intercrossing 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. **In 2016, the average funding for direct cost will be 550,000 yuan per project.**

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 algebraic number theory, algebraic geometry, low dimensional topology, complex geometry, non-communicative geometry, and mathematical problems in quantum field theory.

The funding for applied mathematics and computational mathematics 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 complex data and mass data, and support 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, information processing and control, coding theory and information security, mathematical modeling and analysis in environmental and energy sciences, bioinformation and life system, pathogenesis and control of infectious disease, statistical methods in industry and medical science, data mining and computational statistics, and mathematical methods for economic prediction and financial security.

When applying for interdisciplinary projects, applicants should choose the corresponding mathematical disciplines under Application Code I and the interdisciplinary disciplines under Application Code II.

In order to strengthen funding for problem driven research in applied mathematics, the Division will give preferential support so as to provide a platform for mathematicians and encourage their close collaboration with applied researchers to conduct research closely related to other areas and bring the role of mathematics into full play in advancing the development of science and technology, economy and society. **Please indicate "Problem Driven Research in Applied Mathematics" in the note section of the application form.**

Interdisciplinary Research between Information and Mathematics

In order to promote interdisciplinary research between mathematics and information sciences, in 2016, the Department of Information Sciences and the Department of Mathematical and Physical Sciences will continue to fund interdisciplinary research that requires joint efforts from information science and mathematics. The direct cost funding intensity will be the same as that of General Program projects. The interdisciplinary areas for funding include: mathematical theories in information sciences, mathematical methods

in information security, information system and advanced control theory. Key interdisciplinary research orientations to be funded are listed as the following:

1. Theory and algorithm of integer representation of real numbers

Design the theories and algorithms for the integer representation of real numbers, and the realization of the algorithms by computers and complexity analysis of the algorithm.

2. Theory and methods of formalized representation of software systems

Describe and represent, by using the formalization theory and methods, practical software system not only applicable to real time application software systems, but also to interactive, and discrete event software systems.

3. Theory and methods of security software systems designing

In connection with the analysis and design of typical software systems (system software or application software), study the theory, algorithm and system architectures to improve safety of software system, and verify both theoretically and practically the advantages of such theory, algorithm and system architectures.

4. Theoretical studies on new types of software system architecture

Study, by addressing the contemporary features and needs of software application, the structure, theory and methods of new software system and define appropriate scientific characteristics in combination with practical software system.

5. Theoretical studies on the validation of software systems

Study the theory and methods for the validation of software system development so as to ensure the validity of the developed software.

6. Theory and methods of formalized representation of practical engineering projects

When applying for interdisciplinary projects, applicants should choose the corresponding department (The Department of Mathematical and Physical Sciences or the Department of Information Sciences) under Application Code I and the other department under Code II. "General Program" should be chosen under the "Funding Category" and "Interdisciplinary Projects between Information Sciences and Mathematics" be chosen under Annotations.

Division of Mechanics

The Division of Mechanics mainly supports research on basic problems and methods in mechanics, studies in areas of branches of mechanics such as dynamics and control, solid mechanics, fluid mechanics, biomechanics, explosion and impact dynamics. 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 encourages experimental research using the available experimental facilities and key labs in China and advocates interdisciplinary research conducted by scientists from different disciplines. **In 2016, the average funding of direct cost will reach 750,000 yuan per project.**

Research on basic issues and methods in mechanics should focus on theoretical studies on mathematical methods, rational mechanics and physical mechanics, and strengthen the intercrossing with mathematics and physics.

Applications for research in areas of dynamics and control should pay attention to the theory and methods of nonlinear dynamics, strengthen research on vibration and control of complex systems, dynamic modeling and analysis of problems involving the coupling of solid, flexible bodies, fluid, and magnetic bodies, and promote development of non-smooth

and multi-body system dynamics. The Division encourages studies on 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 give more consideration to intercrossing with physics, materials science, chemistry, information and biological sciences, and strengthen on proposing and studying topics in major engineering application, expand basic theory of continuum mechanics, and promote the development of multi-scale mechanics and multi-field coupled mechanics. Proposals in such areas will be encouraged as follows: the constitutive theory of materials at macro, meso and micro scales; the theory of strength, damage, fatigue and failure mechanism; the mechanical behavior of new materials and structures; experimental measurement techniques and representation methods, high performance computational methods; structural optimization, completeness and safety evaluations, and the deformation, damage mechanism of rock and soil media and stability of rock mechanical engineering, etc.

Applications in fluid mechanics should pay attention to studies on the laws and mechanisms governing complex flows. The Division encourages researches on new concepts, new methods and new technologies in fluid mechanics, especially new experimental methods and advanced measurement technologies, and continues to support studies on fluid mechanical issues in aerospace and aviation, ship and marine engineering, civil and hydrological engineering, and strengthens studies on fluid mechanical issues in energy, transportation, environment and other high-tech and advanced technological areas.

Applications in biomechanics should pay attention to biomechanical and mechanical biology problems related to human health and disease, explorations on mechanical laws in life sciences and clinical medical sciences, and studies on new theory, methods and technologies in biomechanics.

Applications for explosive and impact dynamics should pay attention to frontier areas and major national needs, closely focus on the safety issues of relevant engineering projects, and strengthen theoretical and experimental studies on the dynamic mechanical behaviors of materials, structural response to explosive impacts and detonation mechanisms.

The Department of Mathematical and Physical Sciences continues to support studies on instruments, new experimental methods and techniques with innovative ideas. Applicants for this type of application should mark "Experimental Techniques and Instruments" in the application form. The Department 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. Applicants for this type are requested to mark "Computational Mechanics Software" in the application form. Applicants of above two types of projects should have relevant research background.

Division of Astronomy

The Division of Astronomy 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, particularly those using large and advanced facilities abroad for observation and research, will be given much attention.

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

In 2016, in addition to strengthening continuous support for projects integrating theory and observation and projects conducted by young scientists, emphasis will be given to interdisciplinary research with physics, space science, etc. Compared with the development in the world, research on planetary physics is rather weak in China, and should therefore be enhanced immediately. On the basic policy of funding the best ones, the Division encourages research on interdisciplinary studies with particle cosmology, celestial bodies in the solar system, and planetary systems in other galaxies, structure and dynamics of galaxies, 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 2016, the average funding for direct cost will be 750,000 yuan per project.**

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

The funding scope of the Division I of Physics 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, and encourages researches in new computational methods and simulation software closely related to experimental physics and explorative types, key basic physical issues serving national needs, and new physical concepts and methods in interdisciplinary areas. The Division encourages especially in-depth studies on important physical problems that have not become hot topics, and researches in new areas and directions. **In 2016, the average funding for direct cost will be 750,000 yuan per project.**

For the funding in condensed matter physics, the Division will pay attention to singular quantum phenomenon in electron related systems, quantum phenomena and quantum effects in various low dimensional and small-scale systems or devices, device physics and advanced technologies and methods of characterization, structural and physical properties of surface, interface and membrane, and physical issues in the structure, performance, preparation and application of advanced functional materials. Encouraged areas include basic physical issues and experimental methods related to soft matters, life science. The

division pays special attention to studies on material, device and physics having important application prospects.

For areas of atomic and molecular physics and optics, the Division encourages researchers to pay attention to atomic, molecular and cluster structures and dynamical process, cold atomic and molecular physics and its interactions with optical field, complex interactions of atomic and molecular systems, interactions between laser and atoms or molecular, physical issues in ultra-fast and extremely strong light conditions, propagation process of light in new media and its characteristics, quantum frequency markers, quantum metrology, quantum information, physics and methods of precision atomic and molecular spectra and precision measurement, high resolution, high sensitivity and high precision laser spectrum and its applications, and research on basic physical issues in micro-nano photonics, optical mechanics, and surface plasma exciter, optical field regulation and its applications. The basic research on the generation, transmission, display and application of 3D optical images will be encouraged. In addition, optical electronics as well as frontier physical issues in optical electronics are also important research areas for funding.

In the area of acoustics, according to the major needs of social development, studies on key fundamental acoustic problems will be encouraged. Physical acoustics and basic research in marine acoustics, ultrasonic and acoustic effect, noise and control, new acoustic materials and devices, acoustic energy exchanger, and issues in information technology, etc., will be in priority.

Division II of Physics

The Division II of Physics mainly supports research on fundamental physics, particle physics, nuclear physics, nuclear technology and its applications, accelerator physics and detectors, plasma physics, and synchronized radiation methods. **In 2016, the average funding of direct cost will be 750,000 yuan per project.**

For fundamental physics, funding will be focused on original studies and interdisciplinary research with other disciplines. Stress will be given to current research frontiers, especially to important theoretical physical issues closely related to experimental studies, and raised from scientific experiments as well as from interdisciplinary considerations.

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 and detector, low-temperature plasma and synchronized radiation, 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, nanometer 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. NSFC 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 across the conntry to make full use of large national facilities, small and medium equipment to conduct research, so as to achieve sustainable development in the research. NSFC encourages experimental studies with innovative methods of high resolution diagnosis and detection, as well as the development of experimental facilities, detection and diagnosis devices which are important for the development of accelerators and detectors. 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.

In 2016, the Department of Mathematical and Physical Sciences will arrange special funding in certain areas, and continue to support innovative development and improvement of instruments, advanced experimental techniques and methods, advanced method and key technologies in nuclear detection and nuclear electronics, and radioactive physics, radioactive protection and environmental protection.

Department of Chemical Sciences

Chemical science is to study the composition, structure, property and reactions of matters, and it is the central science which is closely intercrossed and permeated with and into other disciplines, such as materials science, life science, information science, environmental science, energy science, earth science, space science and nuclear science. Chemical engineering is aimed to accomplish the transfer and conversion of matters and energy by making use of the principles of the basic discipline of Chemistry, and to solve scientific issues raised in the large-scaled production of chemical materials and products.

The mission of the Department is to improve the overall quality and international status of China’s basic research in chemical science, and foster creative talents and groups in chemical research with international influence. The Department supports the multi-level and multi-scale research on the reaction, process and function at different levels of atoms, molecules, molecular aggregation and condensed state, as well as studies on the complex chemical system. In accordance with major scientific problems raised from the national economy, social development, national security and sustainable development, researches on chemical science and chemical engineering are encouraged for exploring their role in fields of life, materials, energy, information, resources, environmental science and human health. The Department promotes the combination of microscopic and macroscopic research, static and dynamic states, and theoretical research and empirical development of novel experimental methods and analytical precise technologies. It is also encouraged that the introduction of latest theories, technologies and achievements from other disciplines into the

research for facilitating the sustainable development of research in chemical science and chemical engineering, fostering innovation and interdisciplinary studies, and supporting the emerging frontiers in research.

Funding for General Program Projects in Department of Chemical Sciences in 2015

Unit: 10,000 yuan

Division		Projects	Average funding for direct costs	Funding rate (%)
Division I	Inorganic chemistry	196	12,737	26.17
	Analytical chemistry	168	10,917	26.29
Division II	Organic chemistry	282	18,367	26.58
Division III	Physical chemistry	292	18,977	26.19
Division IV	Polymers	148	9,618	26.38
	Environmental chemistry	179	11,672	26.72
Division V	Chemical engineering	303	19,692	22.30
Total		1,568	101,980	25.48
Average funding per project		65.04		

In 2015, 6,154 proposals for free application from 608 research institutions were received by the Department (23.18% higher than that of 2014). 1,568 proposals were funded with the success rate of 25.48% and the average funding intensity of 650,400 yuan per project.

In 2016, the Department will continue to promote high quality research in the cutting edge fields, lay stress on in-depth and systematic research work, give priority to interdisciplinary research projects, and take effective measures to support original creative and high risk research. In the process of assessment, scientific merit will always be the core concept, and the balancing, coordinating and sustainable development of all related disciplines will be thoroughly considered for the promotion of the fundamental research of chemical sciences in China at international frontier. In 2016, the average funding intensity per project will be at the same level as that of 2015.

Division I of Chemistry

The Division supports research in fields of inorganic chemistry and analytical chemistry.

Inorganic Chemistry

The Division will give its funding priority for researches on fundamental scientific issues of inorganic chemistry related to materials, life sciences, energy, information, environment and resource, etc.

Inorganic chemistry is aimed to develop new synthetic methods and approaches, reveal reaction mechanisms and rules, carry out function-oriented research on the controllable synthesis, structure and property of new compounds, strengthen studies on the functional assembly and composition of inorganic materials, intensively study the relations between structure and property of inorganic matters as well as the theoretical principles, and enhance studies on devices and properties of inorganic materials by making full use of the modern characterization techniques. The chemical bases of biological effects of inorganic elements,

especially research on bioinorganic chemistry beyond molecular level, inorganic bionic processes and bio-macromolecules combined with metal are emphasized.

In recent years, the research quality of inorganic chemistry in China has been greatly improved. Inorganic chemists have paid more attention to the creativity of research theme and made outstanding achievements in some areas. In the studies on the synthesis and assembly methods of inorganic materials, more applicants have emphasized on the mutual relations between structure and property as well as creative academic ideas. However, there are still some problems as follows: a great number of proposals for coordinated chemistry, molecule-based material chemistry and inorganic nano-material chemistry have been funded by the Division. The research contents were mainly focused on synthetic methods and structural characterization, and the study on the reaction process mechanism, relation and rule between the structure and property is going to be enhanced. More proposals are expected in regard to solid inorganic chemistry, especially those on function oriented synthesis and its application research. As for the proposals of bioinorganic chemistry, more attention should be paid in mechanism study on biochemical process of metal ion or inorganic small molecule. The proposal for basic research and fruitful achievements in the area of radiochemistry should be further improved. Inorganic chemistry research should carry out more distinctive, systematic and thorough work with an emphasis on the research characteristics.

In 2016, applicants should focus their proposals on the development of inorganic synthetic chemistry and assembly methods, pay more attention to the combination of theory with experiment, and emphasize research on correlated regulations of structure and property of inorganic matters. Finally, proposals with creative ideas in the areas of solid chemistry, bioinorganic chemistry and radiochemistry will be encouraged. Those function-oriented design ideas, creative and leading research are more than welcome.

Analytical Chemistry

Analytical chemistry is to study the component and structure of matters and to determine their chemical composite, content and distribution in different time and space. It covers wide fields including spectrographic analysis, electrochemical analysis, chromatographic analysis, mass spectra analysis, NMR analysis, stoichiometry, surface and interface analysis; and inorganic analysis, organic analysis, biological analysis, environmental analysis, pharmaceutical analysis, food analysis, clinical analysis and legal medical test, characterization and analysis of materials, quality control and process analysis, instrument development and its combining-use technique, etc., as well as newly emerged omics-analysis, imaging analysis, in vivo analysis, single molecule and single cell analysis, microfluidic and chip analysis chemo-informatics and bioinformatics, etc. The creative research related to the above areas will also be supported such as new principles, new methods, new techniques, new instruments, new installation, key devices and so on. Those extended studies focused on certain important scientific issues will be especially encouraged.

The funding scope of analytical chemistry ranges from macro complex structure to the precise analysis and detection of a single molecule, aiming at building innovative and general technologies and methods. For example, new methods of detection and imaging for rapid chemical processes and electron transfer process, new methods of chemical metrology for big data analysis and interpretation, new theory and new methods for sensor related research, and the widening of the application range of the existing technology in the field of important science are encouraged.

The current development in the area of analytical chemistry is very fast with obvious features. The features are incarnated from the applications as follows: (i) The research

system has become complex system from simple one, focusing on "-omics" sample and living object, etc.; (ii) More profound studies were stressed on unicellular and mono-molecular level; (iii) Prospective, fundamental and innovation have been taken seriously in the research contents; (iv) Research targets have been extended from components of substances to structure, morphology, stereo-conformation and function, meanwhile data mining and processing are more emphasized; (v) Research is not limited to the instrument analysis based on the tradition and simple principle, and new principles and knowledge from nano-science and microfluidic controlling techniques, bionics and physics, etc., have been more and more brought into the creation of new methodologies and new technologies of analytical chemistry.

Based on proposals received and projects funded in recent years, the tendencies of disciplinary development are shown as follows: (i) To emphasize the research on methodology creativity, integration and intercross-discipline, integration of methods and information processing; (ii) To stress the studies on mutual action, signal transformation and action mechanism of related materials; (iii) To pay attention to the development of pre-treatment, separation and identification technologies of complex samples; (iv) To stress the development of instruments, including not only the development of whole set instruments, but also the improvement of key instruments, and upgrade of performance; (v) To strengthen the research on new techniques and methods of detection and diagnosis related to life sciences; (vi) To combine analytical chemistry closely with the frontier areas such as functional materials, resource and environment, new-type of energy, exploration of aviation/space and so on.

Division II of Chemistry

The Division supports research projects in areas of organic chemistry and chemical biology.

Organic Chemistry

Organic chemistry is to study the sources and components, the synthesis and characteristics, the structures and properties, the reaction and conversion, and the functions and reactive mechanism of organic compounds, which is one of the key disciplines for preparing new substances.

From the vertical point of view, the organic chemistry research continuously deepens the disciplinary connotation and extends the discipline from micro to macro level. The purpose is to fully reveal molecular structure-property relationship of time and space, chemical bond formation and fracture and the regularity of intermolecular interactions, and in turn to search for the optimal condition for material conversions, and gradually realize the creation and application precision of organic materials. From the horizontal perspective, organic chemistry proactively promotes the interdisciplinary integration with other disciplines and catalyzes new growing points, which promote the solution of important scientific problems in the fields of energy, health, and environment and so on, and facilitated the national economic and social development.

The main features of current research in organic chemistry are incarnated as follows: The systematic knowledge of structure, transformation and interaction of organic matter is constantly deepening, which promotes the discoveries of new reactions and new reagents. Organic chemical reactions and synthesis pay more attention to selective precise control and atomic/steps economy. The activation and conversion of inert chemical bonds and small molecules, cheap metal catalysis, green synthesis, bio-mass conversion have become the

frontiers for sustainable development. New structure/reactive molecules and biological compatibility reaction have provided key materials and research methods to solve the problem of life science at a molecular level. The original innovation of materials science has been promoted by creating new functional materials and intelligent assembly system.

In recent years, remarkable progress has been made in basic research on organic chemistry in China, not only in scope but also in depth. Areas such as organic synthesis methodology have been among the most advanced ones internationally and formed a number of characteristic systems. However, based on the proposals received in recent years, there are still some problems for the development of organic chemistry in China such as insufficient originality and systematization, obvious homogenization research, weak ability to develop and lead a new area and new direction, unbalanced development of sub-discipline and the serious tendency of publication oriented utilitarianism. The Division will continually support the development of sub-disciplines, encourage those projects with original innovation and systematization guided by scientific problems, emphasize the research ideas, research direction, research content and the diversification of evaluation methods, focus on original breakthroughs in basic research and contribution to industry based on the organic synthesis with the core target of material conversion, and further strengthen the intercrossing with physics, material science, life science and other fields.

Chemical biology

Chemical biology is the science to accurately modify, manipulate and explain biological systems at the molecular level by means of exogenous chemical substance, method and route. It not only develops new reactive technologies and molecular tools, but also provides new knowledge and concept for research in the area of life sciences. It is playing an in creasingly crucial in the research of visual, controllable and creatable life processes. It is to reveal living innate characters used for means and idea of chemical science, meanwhile it is also to promote development and innovation of the discipline based on understanding and exploring to living system.

Chemical biology focuses on the processes and rules of important molecular event in life science, and gives full play to the characteristics and creativity of chemical science. Study focuses are: (i) to achieve, explore and regulate the living action with real-time, in-situ and quantity by using design and synthesis of molecular probe; (ii) to develop diversified catalytic and non-catalytic reaction with bio-compatibility, as well as its reactive mechanism, rule and application in living system; (iii) to exploit new method and technology for synthesis of biological macromolecules, such as protein, nucleic acid, polysaccharide, etc., and bio-micromolecules, such as lipid compounds, coenzyme factor, living nature products, etc.; (iv) to establish, optimize and utilize small molecule compounds library and high-throughput screening technology to detect the biological process in cell by interference of small organic molecules, thereby to reveal unknown pathways and new life activities of interaction of biological molecules, promote the study of signal transduction and gene transcription activity based on small molecules, and realize the identification of drug targets and the discovery and development of leading compounds; (v) to synthesize target molecule or completely special chemical reaction by using biosystem (e.g. microbe) and/or bionic work unit (e.g. enzyme); (vi) on the basis of above works, to develop new theory and technology used for life science or living system, carry out chemical assembly and simulation of complex living system, exploit new technique for disease diagnosis, solve chemical biological issues in medicine and carry out research into the frontier issues related to life.

The Division will encourage those intercrossing projects with core content as chemical material, reaction and technology, and preferentially support the themes on: (i) synthesis of

chemical molecular probe and utilization in living process, and study on the molecular mechanism of important biological events; (ii) new method and new technique of analytical detection for important substance and process in living system; and (iii) study of molecular mechanism in key biological events, in order to strengthen basic research of solving biological events by use of chemical means for promoting intercross and cooperation between chemistry, and biology and medicine. The discipline intercrossing has been well implemented in most of the applications in the past two years, and it is expected to be further strengthened.

Division III of Chemistry

The Division supports research projects in areas of physical chemistry and theoretical chemistry.

Physical chemistry and theoretical chemistry provide the theoretical basis of chemical sciences. The research contents of physical chemistry and theoretical chemistry have been enriched gradually and the research objects have been extended from mono-molecules, molecular aggregates to condensed states, and from weak interaction between molecules to the formation of chemical bond. By using of experimental means and theoretic methods of physical chemistry, the information could be acquired in terms of molecular structure and dynamic changes from ground states to excited states and from steady states to transient states. Research on physical chemistry and theoretical chemistry has the following trends: the combination of macroscopic and microscopic studies, the combination of bulk phase and surface/interface, the combination of static and dynamic states, and the combination of theory and experiment. These trends have been furthered into the study on the regulation of chemical reaction and structure/function of substance. As the intercrossing of physical chemistry and theoretical chemistry with energy science, environmental science, life science, materials science and information science, many new sub-disciplines have been generated. Physical chemistry has been playing a more and more important role in the development of chemistry and related sciences.

Among the proposals received and funded by the Division, catalysis chemistry has been one of the most active research areas in physical chemistry, and more and more attention is paid to the essence of catalytic action in studies. More and more studies on electrochemistry and colloid and interface chemistry focus on the basic physicochemical issues in materials and life sciences, so the number of proposals and funding concerned has been steadily increased. Research areas of chemical thermodynamics and kinetics have been broadened, and development and application of microcosmic research means in these areas have become a new trend. The development of theoretic chemical method has been emphasized. It has become a new growth point that theories and experimental methods of physical chemistry could be used for solving major issues in life science. However, researches on experiment methods of physic-chemistry and the development of novel instruments, particularly for the research and application of spectroscopic methods, should be further strengthened.

The Division encourages applicants to give play to the discipline's strengths, focus on scientific frontiers, meet the national needs, and emphasize creative, systematic and prospective studies for developing new concepts, new theories and methods. The intercrossing research with other disciplines and the basic research with important theoretical significance and potential for application in the areas of energy, information, environment, materials and biomedicine will be advocated. Meanwhile, the Division invites researchers of other disciplines to apply for interdisciplinary projects, and applications

should stress the scientific problems correlated with physical chemistry in their proposals.

Division IV of Chemistry

The Division funds research projects in areas of polymer science and environmental chemistry.

Polymer Science

Polymer science deals with the synthesis, molecular structure, chain structure, condensed state structure, properties and functions of polymers as well as their processing and application. The scope of polymer science covers the research on soft matter, including synthetic polymers, bio-macromolecules and superamolecular polymers.

In the field of polymer chemistry, it needs to develop the synthesizing methodologies of polymers, explore the novel catalysts or initiators for polymerizations expired by new ideas from other disciplines, and develop the reaction with mild, high efficiency and high selectivity. It also needs to stress polymerizing reaction with controllable structure and molecular weight as well as its distribution, pay attention to biosynthesizing methodologies and the chemical reaction involving polymers, and emphasize the polymers synthesized by non-oil resource, and polymers with new structure, such as superamolecular polymers, hyper-branched polymers, dendrimer and chiral polymer. Meanwhile the Division will attach importance to the mass production methods of the photoelectric functional polymers.

In the field of polymer physics, it needs to deepen the understanding of the basic laws of condensed state physics of soft matter. Main tasks including: to pay attention to polymer crystal, liquid crystals and glassy states and their phase transitions, and the structure of condensed state with multi-stage and its dynamics; to pay attention to research on surface and interface of polymers, size effect of micro or nanostructure on properties of polymer; to enhance studies on the polymer solution and rheology, and to stress the research on theory of polymer, as well as methods for the bridge up gaps in multi-scale simulation; to stress the research on polymer physics related to biological systems; to stress on the condensed state physics of the semi rigid chains of photoelectric conjugated polymers.

In the field of functional polymers, it should be addressed to develop and add knowledge in new functional materials and functional system of polymers, e.g. polymers with electric, optic and magnetic functionalities, polymers correlated with biology, medicine and pharmacy, as well as polymers with the function of adsorption, separation, reaction agents, catalysis, biosensing and molecular recognition; to promote the functional polymer as advanced soft matter used in those technologies related to the fields of energy, information, biomedicine or environment, especially emphasize the polymers related to energy technology; to find novel issues from studies of natural polymers and bio-macromolecules, so as to develop the crossover research between synthesized polymers and bio-macromolecules; to stress the studies on responsive polymers, environmental friendly polymers, self-healing polymers and bioinspired and biomimic polymers. A new growth point is the synthesis of the two-dimensional function polymer and the porous covalent polymer frameworks.

As for the polymer assembly, the research focuses on the supramolecular polymers and polymer supramolecular assemblies. It needs to study the assembly processes between polymer and polymer, polymer and small molecule, and polymer and the molecular aggregates, the multiple weak interactions effects and their essence between supramolecular building blocks and interface, the ordered assembly with different size and shape by regulating the non-covalent interactions, and in turn to implement the function.

For applied science of polymers, it needs to further creatively develop the method for optimizing polymerization processing of major category of polymers. It should be stressed to explore new technology in polymer fabrication and processing. It is encouraged to extract important fundamental issues from polymer industries, and pay attention to the research on high performance polymer, polymer composites, chemical fibers, polymeric elastomers, flame retardant polymer, natural polymer, hybrid polymer and reactive oligomer as precursor of thin films, composites and coatings.

It is necessary to strengthen the research on the basic scientific issues and classical issues of polymer science, which particularly needs the intercrossing and thorough research of the above-mentioned fields.

It should be noted that in recent years, few proposals have been received in methodologies of polymerization and structural characterization.

Environmental Chemistry

Environmental chemistry contains the following branches: environmental analytical chemistry, environmental pollution chemistry, pollution-controlled chemistry, pollution ecological chemistry, environmental theoretical chemistry and the relation of chemical pollutants with human health. Research on environmental chemistry has been developed rapidly along with the comprehensiveness and intercrossing with other disciplines. Now, environmental chemistry is playing an increasingly important role in moving forward the frontiers of basic research, solving national major environmental problems and so on.

Environmental chemistry is mainly to study the principles and methods of occurrence, transportation and transformation, effects and control of chemical substances, especially pollutants, in various environmental matrixes. Research contents of proposal are gradually opened up from microcosmic mechanism to macrocosmic rule, combined with in-situ work and theoretic computation and simulation, and enhance the creativity and systematization. But there are certain problems in some proposals, e.g. lack of new ideas when selecting theme; less focusing on fundamental scientific issues; giving no prominence to the key points; simple repetition and no clear technical scheme.

Based on the proposals accepted in recent years, major research orientations include: (i) identification, new analytic principles, methods and technologies of pollutants; (ii) environmental chemical behavior and microscopic mechanism of pollutants in multi-matrix system, and evolutional process and mechanism of regional environmental qualities; (iii) forming mechanism and controlling principles of air pollution, polluting chemistry and control of water body environment, polluting process and renovating technology of soils, and technologies and reusable principles of treating solid waste substances; (iv) green chemical process and environmental efficacy in the utilization of new energy; (v) application and safety of nano-materials in pollution controlled process; (vi) effects of chemical pollutants on ecological environment and human health, and (vii) relations of structure/effects and dose/effects of pollutants and forecast model of environmental pollution.

The Division encourages applicants to carry out the research on key scientific issues of environment chemistry in areas of environmental characteristics, molecular transformation, ecological and health effects, and risk and control of pollutants, in consideration of real environment condition and by means of modern scientific means and methods.

Division V of Chemistry

Funding areas by the Division cover two disciplines, the chemical engineering and

industrial chemistry.

Chemical engineering and industrial chemistry are to study the motion, transfer, reaction and interrelation in the conversion processes of matter. It is aimed to recognize the phenomena and rules of transfer of matter in the conversion processes and its effect on the reaction and properties of products, develop technologies, flow chart and equipment for the clean and high effective conversion of substances, and establish theories and methods of design, scale-up and regulation and control for use in industrial production. New ideas, concepts and methods as well as their application in chemical engineering and technology will be especially emphasized.

In recent years, basic research of chemical engineering in China has made great progress, research quality has been constantly enhanced, and research ideas have also become more and more innovative and unceasingly opened up. Extracting key scientific issues from complex industrial systems and forming step by step systematic theories and key techniques have become a major trend in areas of chemical engineering and industrial chemistry. A lot of new research contents are raised as follows: (i) the observation, measurement and simulation of micro-/meso-structure, interface and multi-scales, beside the measurement and correlation of macro-properties, and more attention on the optimization and regulation of structures, reinforcement of processes and scale-up rules; (ii) the uncommon and extreme processes, beside common systems; and (iii) the chemical product engineering, beside chemical processing engineering. Nevertheless, there are still some problems that proposals with original creative idea and works with breakthrough are not enough, and especially those proposals combined with key scientific issues based on national needs are even rare. The Division encourages that researchers in basic areas, especially in traditional chemical engineering areas, should keep up their defined study direction instead of blindly following hot subjects, and carry out their research intercrossing and integrating with other disciplines.

Under the guidance of the national goals and social needs, the Division will give preferential support to studies on basic theories, key applied technologies and sustainable development in chemical engineering and industrial chemistry to enhance the overall national comprehensive strength and creative ability. Particular focuses will be given on the following studies: (i) research of frontier subjects in new and high technologies of chemical engineering and newly emerged disciplines, which should be good at extracting the chemical engineering issues from the intercrossing study of multi-disciplines and emphasizing the development and innovation of scientific theory and technological mean; (ii) key technologies in chemical engineering related to the national economy and people's welfare, which should strengthen systematic basic research and accumulation to understand the laws, improve existing theories of the discipline and bring the guiding role of basic research into full play.

The following research areas will be encouraged: thermodynamics and basic chemical engineering data, inorganic chemical engineering, chemical pharmaceutical engineering, chemical process equipment and safety, chemical engineering related to metallurgy, chemical engineering related to environment and resources, as well as transfer processes in uncommon condition with creative ideas.

Department of Life Sciences

The funding of the Department of Life Sciences covers a broad spectrum including biology, agricultural sciences and basic medicine, which extends to various fields of resources, environment, ecology, population and health, etc. In recent years, with the support from NSFC and other funding sources, together with unremitting efforts made by

Chinese scientists, research in life sciences has achieved extraordinary progress in China. Not only the number of authentic research articles published by Chinese scientists in international authoritative journals is climbing, but the quality of research is improved rapidly.

Funding for General Program Projects

in Department of Life Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Average funding for direct costs	Funding rate ++ (%)
Division I	Microbiology	167+7*	10,599+175*	25.66
	Botany	187+7*	11,881+175*	25.80
Division II	Ecology	163+7*	10,381+175*	25.07
	Forestry	167+7*	10,616+175*	23.45
Division III	Biophysics/biochemistry/molecular biology	144+3*	9,138+75*	31.89
	Immunology	71+4*	4,526+100*	30.49
	Biomechanics and tissue engineering	86+8*	5,467+200*	26.18
Division IV	Neurosciences	77+4*	4,906+100*	29.35
	Psychology	46+4*	2,940+100*	24.04
	Physiology and integrative biology	79+4*	4,988+100*	32.68
Division V	Genetics and bioinformatics	125+6*	7,925+150*	25.74
	Cell biology	101+5*	6,419+125*	34.98
	Developmental biology and reproductive biology	72+4*	4,596+100*	29.80
Division VI	Agriculture and crop sciences	197+8*	12,478+200*	21.44
	Food science	174+8*	11,025+200*	17.98
Division VII	Plant protection	126+6*	8,021+150*	21.75
	Horticulture and plant nutrition	135+6*	8,589+150*	21.83
Division VIII	Zoology	133+5*	8,446+125*	31.80
	Animal husbandry and grassland science	112+6*	7,115+150*	23.74
	Veterinary medicine	114+6*	7,222+150*	21.66
	Aquaculture	69+5*	4,362+125*	21.14
Total		2,545+120*	161,640+3,000*	24.73
Average direct cost per project		61.78 (63.51**)		

Note: * Pilot Projects of Small fund for Exploratory Studies; ** Average funding for general program project excluding of Small Fund for Exploratory Studies; ++ Funding rate including Projects of Small Fund for Exploratory Studies

In 2015 the Department of Life Sciences received 10,777 proposals, of which, 10,562 were accepted for General Program and 2,665 projects were funded, including projects of Small Fund for Exploratory Studies, with a funding rate of 24.73% (accounted by the accepted proposals, and all the data bellows are also calculated by the number of accepted

proposals). The average direct cost is 617,800 yuan per project, among which, there are 2,545 projects funded as 4-year General Program projects. The funding rate for 4-year General Program progects is 23.62% and the average funding intensity is 635,100 yuan per project. In the future, the Department will continue to emphasize on funding decision according to the research quality and actual need rather than funding in equal intensity. The Department also expects that the home institutions of applicants should pay close attention to academic standard of research and improve the quality of proposals.

In 2016 the funding of General Program projects is expected to keep constant as the previous year. The applicants should apply for funding according to the actual need of the research. When writing proposals, in addition to filling in the budget form, applicants should attach the detailed description of the budget to the proposal, so as to allow peer reviewer and panel expert to evaluate. For proposed research having more exploratory nature but with weak research basis, we suggest applicants apply for lower funding. For those with solid research basis and recent important progresses in previous work and requiring more funding to carry out further investigation, applicants may apply for higher intensity of funding according to the actual need. It should be noted in particular that the budget in proposals will be evaluated by peer reviewer and the panel.

The Department has been encouraging researchers to carry out original study with innovative academic ideas, as well as novel technology and approaches, particularly for those playing a pivotal role of prompting the development of related disciplines with authentic ideas. Emphasis will be put on proposals with novel theories, firm hypotheses and the interdisciplinary importance based on previous research over a long period of time. The Department will pay attention to important frontiers and new emerging fields in life sciences in the future, while keeping a balanced and harmonious development among various disciplines. The Department continues to encourage studies concerning basic research on morphology, structure and function of cells, tissues, organs and systems, and actively support researches related to human physiology, biochemistry, immunology, reproduction, development, aging, stem cell and tissue engineering, etc. Studies will be encouraged on aiming at fundamental level scientific questions of life sciences using various disease models. Pivotal investigations to agriculture sciences and environmental ecology are encouraged.

The Department encourages researchers to carry out systematic and innovative work focusing on key issues over a long-term period, therefore, great importance to project management at later stage. The Department implements the funding policy depending on the performance of previous funded project, and gives preferential consideration to applicants with good performance in their previous projects under equivalent conditions. Moreover, considering the problems commonly occurred during the application and peer review processes in recent years, the Department reminds applicants to pay special attention to the following points when writing proposals:

(1) In the explanation part of the Guide to Programs of the Department of Life Sciences, as well as of the eight scientific divisions, the funding scope of the Division is emphasized and the categories that are not to be accepted have been clearly noted. Therefore applicants should read carefully according to their subject of application. It should be stressed, that the categories not to be funded by the Division in the General Program Guide may apply to other types of programs in the same Division.

(2) Concerning applications related to medical ethics, applicants should give the certification of ethic committee from their host institutions or the superior administrative agencies. For research using genetically modified organisms, the source should be indicated, and if donation is needed from other laboratories, the

agreement from the donors should be attached.

(3) Concerning applications related to operation with highly pathogenic microbe, applicants should abide by national regulations concerned, and perform under bio-safety qualified conditions.

(4) For applications involving international cooperation or with team members living abroad, applicants should provide confirmation from the overseas members. The signature of both the applicant and all participants should be in regular script, and the signature should be the same as the one in printed form in the application. Any kind of "personal signature" which is not inconsistent with the printed form is not acceptable. Please note specially that the signature and the name in printed form may not be in different languages, for instance Chinese and English; otherwise, the proposal may be declined due to determination difficulty.

(5) Please fill in the research period according to the notes requirement for application in this guide. If the start time is earlier than the deadline of the applications, they will be declined.

(6) The applicants should note that the fund is filled in the unit of ten 10,000 yuan. Misfiling will cause errors in the budget, leading to a decline.

Applicants should follow the requirement of the Guide to Programs and the application syllabus when writing their proposals. Otherwise, the proposals will be rejected or not funded.

Division I of Life Sciences

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

Microbiology

The Microbiology discipline supports basic research in the area of microbes, including fungus, bacteria, achaea, virus, prion and other microbes. Major funding fields in this discipline include resources and taxonomy of microbe, microbe ecology, microbe group behavior, metabolism, physiology and biochemistry of microbes, microbe genetics and evolution, microbe epigenetics, microbe morphological differentiation, structure and function of microbes, synthetic biology of microbe, the interaction between microbes and their hosts, the relationship of microbes and environment, the pathogenesis and drug-resistance of pathogenic microbes, etc.

There is an obvious lack of balanced development of different branches in microbiology, observed based on previous years of grant application and funding situation. The number of proposals aiming at study on mycoplasma, rickettsia, chlamydia, spiroplasma, phage, prion, etc., is relatively small, indicating that the related research team needs to be augmented and intensified. The discipline of Microbiology encourages researches carry out fundamental and authentic studies in the fields listed above. Preferential support policy will be given to these fields in the year of 2016.

In 2016, the discipline will continue to give preference funding to areas in the taxonomy of microbes, and taxonomy research combining novel technology such as whole genome and big data with traditional methodology is especially encouraged.

The discipline encourages the exploration of novel techniques and methodologies applied to basic research of microbiology, and especially welcomes scientists in physics, chemistry, and information sciences to carry out interdisciplinary studies related to microbiology; encourages research based on single microbe cell, structural compositional

research of microbe, basic research in pathogenic microbe and marine microorganism, and functional research on microbe in complex system; systematic research to mechanisms of frontiers in life sciences applying microbe as model system is preferentially encouraged.

Botany

The discipline of Botany supports basic and part of applied basic researches on plants. It mainly covers studies in areas of structure of plants, taxonomy (including flora geography), plant evolution biology, paleobotany, plant physiology, plant biochemistry, plant morphology, plant development, plant reproductive biology, plant chemistry and natural product chemistry, endangered species protection, resource plant (including economic botany), marine/ocean botany, ethno botany, interaction between plant and environment, plant secondary metabolism, plant nutrition and substance metabolism, plant germplasm (including conservation and innovation of germplasm), as well as the exploration of new techniques and methodologies related to botany.

It can be seen from the applications accepted and funded in recent years that the development of each branching field within the Botany discipline has been unbalanced. There are relatively more applications in areas such as plant phylogeny, plant hormone, growth and development, and resistance physiology, and therefore the research quality is relatively high. Systematic and creative research should be further strengthened henceforth. Besides, emphasis on interdisciplinary study is put to the application of novel technologies on those relatively developed fields listed above. On the other hand, there are fewer applications in the fields such as paleobotany, biological nitrogen fixation, photosynthesis, respiration, water physiology, mineral elements and the metabolism, organic synthesize and transportation, physiology of seed, plant introduction and acclimatization, plant germplasm, hydrophytes and ocean plant and resources, etc. Applications that have research basis in the above-mentioned subjects will be encouraged. Applicants are also encouraged to carry out their studies in the fields of plant systems biology, plant tropism biology, invasive plant biology, the totipotency of plant cell, molecular basis of major plant property, and plant response to environmental change, etc.

The discipline of Botany will continue to give preferential support to plant taxonomy in 2016, especially to strengthen the support to young taxonomists. The discipline encourage applicants to carry out research on species revision of certain families and genus on the world wide range and plant resources research in key areas and special environment. Meanwhile, since the research on plant resources is relatively weak in China, multidisciplinary and integrated research is specially encouraged to pay attention to key scientific issues during the process of introduction and plant germplasm protection for promoting effective protection and utilization of domestic plant resources of China.

The interdisciplinary studies of botany with other related fields will be strongly encouraged, especially with mathematics, physics, chemistry, geosciences, and ecology, genetics, genomics, proteomics, metabonomics, bioinformatics and computer science, etc. Studies are also encouraged on the discovery and development of novel instruments, technologies and methodologies applying to further research in botany, such as new detection techniques, high-throughput screening techniques, advanced imaging techniques, analysis techniques of high efficiency, etc. To encourage applicants to put forward unique or typical scientific issues based on their strength and research basis, the discipline will intensify its support to projects with high degree of creativity. In order to achieve better use of local advantages, resources advantages, and talent training, the discipline will encourage collaborations among applicants with institutions or groups having unique special advantages.

Division II of Life Sciences

The Division supports researches in areas of ecology and forestry.

Ecology

Ecology studies the interaction between organisms or between organisms and the environment. It plays a pivotal role in solving the national ecological problems that are getting increasingly important. The Ecology discipline covers molecular and evolutionary ecology, behavior ecology, physiological ecology, population ecology, community ecology, ecosystem ecology, landscape and regional ecology, global change ecology, microbe ecology, pollution ecology, soil ecology, conservation biology and restoration ecology, and evaluation of ecological safety, etc.

In recent years, significant progress has been achieved in ecological study in China. However, the overall quality of fundamental ecology needs to be improved. The discipline will strengthen its support to applications with strong innovative ideas, multidisciplinary research and cutting-edge growing subjects, give priority support to proposals focusing on the basic research frontier of international ecology, closely connected with the national ecological and environmental issues, give preference to researches with possibility of making breakthrough in new theory and novel method, and strengthen basic research with long-term observation and experiment of field work, and encourage researches perform study on landscape and regional scale.

In 2015, a large number of applications were accepted in fields of ecosystem ecology, conservation biology and restoration ecology, physiological ecology, pollution ecology, community ecology, globe change ecology, population ecology, and molecular ecology, etc., but relatively fewer applications were received in the areas of evolution ecology, behavior ecology, landscape and regional ecology and civil ecology. In the future, the discipline will strengthen its support to biological ecology, including micro evolution ecology, species differentiation, and pedigree ecology. The discipline encourages studies on behavior ecology, civil ecology, landscape and regional ecology, and soil ecology. Continuous encouragement is put on special-regional ecology studies in the Fund for Less Development Regions.

The discipline reminds applicants to pay attention to the following points in 2016: The content of research proposal should focus on key points with clear definition of scientific issues, and special attention should be paid to scientific aspect and feasibility of the research route and methods. Proposals regarding to the multidisciplinary and macro research should put enough emphasis on the combination of the theoretical study with the national need.

Forestry

Forestry is to reveal the essence and mechanisms of the biological phenomena by taking forest and xylophyta as its research objects, in order to carry out the cultivation, protection, management, and utilization of forest resources. The Forestry discipline covers studies in fields of forest resources, forest resources information, wood physics, chemistry of forest products, forest biology, forest soil science, silviculture, forest management, forest health, tree genetic breeding, nonwood product forest science, landscape architecture, desertification, and water and soil preservation, as well as related new technology and methodologies in forest related studies.

In recent years, there is a tendency of rapid growth of basic research on forest, but the unbalanced development among sub-disciplines remains the key issue. It is shown from applications in recent years that the number of proposals submitted to branches such as wood physics and the chemistry of forest products is large, while there are much fewer

applications to the more classical sub-disciplines like silviculture, forest soil science and forest management, indicating a trend to shrinking. The proposals failed to focus on important basic scientific issues in some important fields, such as silviculture and nonwood product forestry.

There are two major features in basic research of forest. The first one is to meet the national needs for forestry development. Therefore applicants should pay close attention to formulating the important and key scientific questions from the forestry industry. The second is to carry out continuous and in-depth studies regarding to perennial woody plants for a relatively long period of time. In the future, the discipline will continue to prioritize to support basic research in such core fields like silviculture, the health care, the efficient utilization of forest resources, etc. The discipline will encourage researchers to carry out investigation in fields of advanced generation tree breeding theory and methods, multi-service function of forest and management, forming mechanism of wood superior traits, the analysis of the specific growth, silviculture, forest soil science, forest management, garden planning and landscape architecture and development mechanisms of trees, which meet the national strategic needs at the international frontier research fields.

In 2016, applicants should pay close attention to the following: proposals should focus on targeted scientific questions with a precise title; according to objects and contents of research, the application code should be specific; applicants should provide detailed and specific research plan to demonstrate the feasibility of the project; the discipline of Forestry will not accept proposals on pharmaceutical functional verification of effective components targeting at animals.

Division III of Life Sciences

The Division covers disciplines as follows: biophysics, biochemistry and molecular biology; immunology; and biomechanics and tissue engineering.

Biophysics, Biochemistry and Molecular Biology

Biophysics is a cross discipline to investigate mechanisms of biological problems and phenomena, applying the theory and method of physics; Biochemistry and Molecular Biology is a discipline to study chemical composition of living organisms as well as chemical changes during the process of life, and to research the life phenomena and activities of life process at the level of biological molecules. The Division mainly supports studies on the following issues: (i) structure and function prediction of biological macromolecules, protein crystallography, NMR, biological mass spectrometry, electron microscopy, small angle scattering and its composites; structure of protein complex and membrane-proteins; novel structural biology methodology for functional study and predictions of macromolecule; (ii) the interaction between macromolecules (including small molecules); (iii) the role of post-translational modifications on stability and function of proteins; (iv) classical biochemistry of protein and peptide, nucleic acid and enzymology; (v) molecular mechanisms of sugar/lipid/nucleic acid metabolism; (vi) computational biology, bioinformatics, systematic biology and synthetic biology; (vii) interaction and regulation between bioplasma membrane and membrane proteins; (viii) studies on polysaccharides and glycoconjugates; (ix) the effect and role of the physical environment to organisms, including microgravity and space radiation; (x) novel technology and methodology in biophysics, biochemistry and molecular biology.

Considering the contents of applications received in recent years, fields with more applications as well as more funding are the following: structure and function of protein

complexes, which have in-depth researches with sound background and accumulation. Among studies on protein structure, the number of applications aiming at function of protein complex as well as membrane proteins is climbing; researchers and application numbers of cryo electron microscopy are developing fast; NMR study on macromolecules remains the same with previous years. The proposals accepted on the interaction of biological macromolecules can carry out their research closely connected with important vital movement of cells. There are comparatively high-quality applications in areas of nuclear biochemistry, including non-coding RNA metabolism, post-transcription modification and their interactions with proteins for various function and regulation. As for studies on the structure and function of biomembrane, the quality of applications is relatively high in transmembrane signal transduction and transportations across membrane. Proposals in areas of structure computing and theoretical forecasting of large biological molecules and bioinformatics have well reflected the character of the intercrossing of disciplines. Researches on bio-effect and functional mechanisms of ionization and the electromagnetic radiation to organisms, and proteomics are inadequate in the quality of proposals. Applications for structure and function research on glycoconjugates and environmental biophysics showed significant improvement in recent years. Applications on acoustic biophysics, photo-biophysics and space biology are few. There is a wide range of research directions covered by new techniques and methods in the area of biophysics and molecular biology, and some applications have creative ideas in terms of the development of disciplinary intercross methodology and new technology in recent years. Interdisciplinary studies for novel technology and methodology are encouraged.

As a discipline with bio-molecules as the object of study, focusing on methodology, the discipline will continue to encourage studies on investigation of life phenomena on the level of molecules. Funding priorities is given to the following fields: (i) researches on the methods of structure computing and forecasting of large biological molecules and complexes, protein crystallography, nuclear magnetic resonance spectrum, bio-mass spectrometry, electronic microscope, small angle scattering, etc., for studying the structure and function of protein and complexes; biological studies on the protein complexes and membrane protein structure, and the development of new structural biology methods for the structure determination and function study of proteins and other large bio-molecules; (ii) applications with new methods and ideas from mathematics, information sciences, and interdisciplinary subjects, to carry out researches on bioinformatics, systems biology or integrative biology; (iii) molecular mechanism studies of the regulation of glucose, polysaccharide glycol-conjugates and lipid biochemistry will be moderately encouraged; (iv) applications on the mechanisms of environmental physical factors to organisms, and research on the effect of space factors to organisms in micro gravity, space radiation conditions will be moderately encouraged.

Immunology

Immunology is a frontier and leading discipline in life sciences and basic medicine. The funding areas of the discipline include molecular immunology, cell immunology, immune response, immune tolerance, immune regulation, immunogenetics, reproductive immunology, mucosal immunology, vaccine, antibody engineering, and novel technologies and methodologies of immunology, etc.

The discipline mainly supports basic research aiming at the structure, development, function and abnormal mechanisms of immune molecules, cells, tissues, organs, and immune systems. The core funding areas include:

(l) Gene expression and regulation, structure and function of immune molecules; structure basis of immune recognition; recognition, activation and effects of innate

immunology; molecular mechanisms of antigen presentation; structure, function and immune-pathogenic of cytokines and chemokines;

(2) The differentiation, development, migration, tissue distribution of immune cells and sub-cells and their functional modulation, evolution and comparative immunity;

(3) Identification, response and regulation of innate and adaptive immune; infectious immunity; tumor immunity; self-immunity; hypersensitivity; initiation, progression and elimination of inflammation; mechanisms and intervention of non-infectious diseases;

(4) Cell and molecular mechanisms of immune tolerance; malfunction of immune tolerance; mechanisms of transplant immune tolerance; abnormal immune response and immunodeficiency;

(5) Molecular and cellular mechanisms of immune regulation; abnormal of immune regulation; nerve-endocrine-immune network; immune metabolism;

(6) Immune heredity; genetic basis of immune-related diseases; epi-genetic regulation of immune response;

(7) Immunological mechanisms of reproduction and pregnancy; cross-interaction between reproductive endocrine and immune system;

(8) The function and mechanisms of mucosal immunity and local immunity;

(9) Basic immunology problems during the manufacture of vaccine;

(10) Studies of antibody engineering, including:scientific problems on the establishment of new techniques and methods and new research system of immunity.

It is clearly demonstrated from the applications in 2015 that there is a rapid progress of immunological research in China, with the proposals covering a wide range of subjects, and the quality of research contents improved obviously. Most of the proposals were based on solid background and pre-studies; some applications analyzed the possibilities of technical failures and were able to provide alternative resolutions as backup plans; a few proposals were carrying out systematic cutting-edge studies based on novel hypothesis. However, there are problems such as lack of substantial subject intercrossing, etc.

In 2016, the discipline will continue to support applications with creative academic thoughts, stable research directions, solid academic basis; encourage applicants to concentrate scientific problems from their former research and practice to carry out in-depth exploration of mechanisms targeting at specific scientific target; encourage the establishment of typical research system and techniques platform, and highlight the setting-up and application of various novel methods and techniques in immunological studies; encourage study in areas of systems immunology, immunomics and computational immunology; encourage basic research relating to the structure of immune system and abnormal function, and the close cooperation of scientists working in basic and clinic studies.

Biomechanics and Tissue Engineering

This discipline is a branch intercrossing of life science with other research area. The funding scope covers biomechanics and biorheology, biomaterials, tissue engineering, biomedical electronics, bionics and nano-biology.

The funding of biomechanics and biorheology fields includes: the coupling of molecules-cellular mechanics-chemistry on cellular-subcellular-molecular level, the mechanical property and its mechanisms on system-organ-tissues aspects, mechanical simulation and modeling, and mechanics of biomaterials.

The funding of biomaterials mainly covers studies on the regenerative medicine; biomaterials for tissue engineering; implants, interventional biomaterials, and biomaterials of artificial organs; drug or gene carrier biomaterials; surface and interface of biomaterials

and its biological effects, compatibility and safety of biomaterials.

The funding of tissue engineering fields includes: regeneration and construction of skin, bone and cartilage, blood vessel and heart, mouth, nerve, blood and myocardium, muscle and tendon, liver and cholecyst, pancreas, kidney, urocyst, etc. Studies on in vitro three-dimensional constructions of malfunction tissues such as tumor are also covered in this branch.

Bioelectronics and bioimaging mainly cover biomedical-signal detection and recognition, biosensor, biomedical imaging and image processing, appropriators and systems of biosystem detection.

Subjects mainly involved in the field of bionics include: molecular bionic, bionic function and mechanism, bionic materials, bionic surface interface, bionic device and system.

Nanobiology mainly covers studies in areas of nano-biodetection, nanocarriers and delivery, nano-biological effect and its safety.

According to applications in recent years, there is an imbalanced development among the above five sub-disciplines. In the sub-discipline of biomechanics, projects were mostly in the such fields as biomechanics of cellular and molecular biomechanics, bone and other tissues and organs of the movement, while biomechanics studies on other organs were rare; in tissue engineering, most projects focused on bone and cartilage tissue engineering, oral tissue engineering, stem cell transplantation and tissue regeneration, but were lack of proposals on other important organ tissue engineering, as well as novel methodology; in the biological image and bioelectronics devices sub-discipline, there was a lack of study on biomedical signal detection and analysis, biomedical sensing, biomedical detection and system applications; in the field of nano biology, few studies were proposed on nano-bio safety evaluation. Most of the proposals funded in 2015 showed solid research basis and provided clear scientific questions with novelty. The main weakness of applications was lack of original ideas, or lack of substantial interdisciplinary collaboration.

In 2016, the discipline will continue to encourage applications to carry out systematic multidisciplinary research in fields of biomechanics and biorheology, biomaterials, tissue engineering, biomedical electronics, bionics and nano-biology. Researches should aim at key scientific issues in the rocess of important tissue/organ reconstruct engineering, as well as interdisciplinary studies, especially long-term, systematic and in-depth study in tissue/organ replacement and repair, engineering reconstruct and transformation of regeneration.

In particular, the discipline encourages and supports the basic research in tissue biomechanics basis and the practical application, other than bone/joint motion system, and cardiovascular system; study on interaction mechanisms and new effect features between biological materials and the body; the novel methods and new technology of tissue engineering (such as 3D printing, biological manufacturing); studies on bioelectronics and biological systems related to the study of bionics, and nano biodetection, nanometer biological safety evaluation and application of ethics.

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

Division IV of Life Sciences

The Division's funding areas cover three disciplines: neuroscience; physiology and integrative biology; and psychology.

Neuroscience

This discipline is to study the structure and functions of nerve system, and investigate the essence and mechanisms of human/animal behaviors and cognition activities. The goal of this discipline is to explain the structure and function of neuronal system as well as the brain at various levels.

The funding areas of neuroscience cover molecular neurobiology, cellular neurobiology, developmental neurobiology, sensory neurobiology, system neurobiology, behavioral neurobiology, computational neurobiology, and other related studies concerning techniques and approaches of neuroscience.

About 40% of the proposals submitted and projects funded in 2015 are focused on molecular neurobiology and cellular neurobiology. The third largest group of applications was abnormality of neuronal structure and function (for instance, development of neurodegenerative diseases), taking up about 12% of total number of applications, whereas there are fewer applications under the applying code of novel technology, computational neurobiology and neuronal informatics. The funded proposals normally demonstrate high degree of novelty, with precise description of scientific questions and proper research plans. Areas with the most funding include generation, maintenance and differentiation of neuronal stem cells; neuronal mechanisms of learning, memory and behavior; neuro-degeneration diseases; damage and repairing of neuronal system; function and plasticity of synapses; neuronal basis of mental disorders.

In 2016, the discipline will continue to encourage basic research in the following areas: analysis of molecular, cellular and circuit mechanism of brain activity; interdisciplinary study of neuroscience with chemistry, physics, and materials, etc.; studies related to malfunction of neuronal system to reveal mechanisms of diseases at various levels such as molecules, cells, circuit and body; the development, improvement and application of new techniques relating to optogenetics, nerve transsynaptic tracing, bio-molecular imaging, etc.

Special notes for applications: cognitive studies with human being should apply to the discipline of Psychology.

Physiology and Integrative Biology

This discipline has two sub-disciplines: Physiology and Integrative Biology. Physiology is a subject to study the phenomena of life activities, principles and regulation. The funding scope covers the physiological function and its mechanisms of homeostasis control under normal conditions, as well as the change of structure and function of human cells, tissues organs and the sustainable homeostasis control and the related research. Integrative Biology is an emerging discipline of science to depict quantities and predict biological function, phenotype and behavior, and to investigate the operating law of information flow. The discipline emphasizes on innovative studies in the area of integrative biology from molecules to the body level, revealing the mechanisms of body homeostasis control.

In 2015, funding for circulation physiology is mainly for researches on blood pressune regulation, blood ressel malfunction and system, arrhythmia, and myocardial remodeling and function renovation: proposals funded in the area of respiratory physiology focus on respiratory dynamics; structure, function, regulation and abnormal in respiratory system; lung injury and repair; respiratory centers and respiratory regulation; pulmonary vascular smooth muscle and pulmonary arterial hypertension. The area of digestive physiology covers investigation on the function of stomach, intestinal, liver, gallbladder, pancreas and body's protection mechanisms upon damage. Proposals funded in the area of urinary physiology cover regulation and control mechanisms of water-salt metabolize of kidney, renal fibrosis, and functional regulation of ladder. Most of the applications supported in the

area of reproductive physiology cover researches on the occurrence and fertilizing of germ cells, implantation of embryo, and the regulation and control mechanism of the placenta function. Most of the applications in neurosystem concentrate their researches on the hypoxic-ischemic encephalopathy, neurodegeneration, injured nerve repair, brain and cognitive behavioral, etc. Most of the applications in the area of exercise physiology mainly focus their researches on the physiology mechanisms of the health by exercise, and the prevention and treatment of diseases. Most of the applications in the area of human anatomy concern about basic research of applied anatomy. The embryology, which covers regulation mechanisms of embryo development, tissue damaging and regeneration, is the major funding area as well. Moreover, endocrine, and glucose metabolism, lipid metabolism, insulin resistance, trace elements (include calcium and phosphorus metabolism) nutrition, senescence, and biological rhythm as well as hemopathology are the key funding areas as well. The discipline will continue to encourage innovative researches on aging and biorhythms, as well as studies on the functional integrative and regulative mechanisms between different systems. In 2016, basic scientific problems based on disease model will continue to be emcourased.

Please note in particular that applications concerning researches about plants, microbes, traditional Chinese medicine, wild animals (except comparative physiology) and livestock are not accepted in this discipline.

Psychology

Psychology studies human mind and behavior, aiming at ultimately understanding initiation, development, performance and regulation mechanisms of cognition, emotion, motivation, intelligence, consciousness, and personality, via various levels of investigations from molecule, gene, physiology, brain, to behavior, population and computational modeling.

Scientific experiments and quantitative analysis are introduced to allow psychology growing into an independent discipline from philosophy. Due to the complexity of study object, psychology research is becoming a combination of multi-level and multi-angle one, with more and more specialized branches and series of interdisciplinary layers. Armed with novel technologies and methodologies of neural science, information science, medical science and engineering science, multiple branches of psychology study are providing interpretations and analysis to the material basis of psychological activities: brain and its structure and function.

The main subjects supported in psychology discipline include cognitive psychology, experimental psychology, developmental and educational psychology, physiological and medical psychology, social and personality psychology, genetic psychology, health psychology, clinical psychology, consulting psychology and applied psychology (including engineering psychology, exercise and sports psychology, management psychology), as well as the brain structure and neural basis of cognition, learning and memory, attention and consciousness, language and thinking, and techniques and methods of cognitive science, etc.

Many researchers are focusing on fields of cognition psychology, biology psychology, medical psychology, development psychology and social psychology, whereas fields in education psychology, applied psychology and sports psychology are relatively lack of research. In the near future, it is speculated that studies in the following fields will achieve breakthrough: psychology process and mechanisms of learning and memory, sensory perception and multi-channel integration, psychology mechanisms of emotion and behavior control, psychology stress and intervention, human cognition and development of social behavior, as well as mechanisms of mental disorders and early recognition.

In 2015, most grants applied to cognition psychology, making 25% of total applications. Development psychology, social psychology and medical psychology covered 10% each, while there were fewer grants on genetics psychology, stress psychology, individual psychology and cognition simulation. Statistics from funded grants showed that topic on perceptional information processing, memory and thinking mechanism in cognition and neural mechanism of decision making and problem were mostly funded in cognition psychology; social development and cognition development were the most funded areas in development psychology; social behavior and mental disorder in medical psychology were top sub-fields in social psychology.

In 2016, the discipline will pay more attention to engineer psychology, personality psychology, psychological genetics, medical psychology, etc. The discipline will continue to encourage multi-discipline study, applying novel neuronal imaging, gene analysis, brain stimulation, big data analysis, system tracking, etc., so that to prompt the increase of the scientific significance and research level of psychology study. The discipline encourages interdisciplinary studies so that to concrete national requirement of development, especially to stress researches on social hotspot with Chinese characteristics, and to encourage applied research to play fully the prompting role of psychology to the national social development.

Cognitive sciences studies on human being are encouraged.

Division V of Life Sciences

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

Genetics and Bioinformatics

Genetics is to study the inheritance and variation of organisms on various levels of molecules, cells, individuals and populations. Bioinformatics is an interdisciplinary field of biology and computing science, aiming at the exploration and improvement of methods and means to obtain, store, manage and analyzes biological data.

The funding scope of the discipline mainly covers human genetics, plant genetics, animal genetics, microbe genetics, genomics, molecular genetics, epigenetics, cell genetics, population and evolution genetics, bioinformatics, behavioral genetics, biostatistics, synthetic genetics and systems biology, etc.

The genetics discipline will give priority support on the following fields: the study of genomic variation and evolution law of complex biological characteristics, including the identification, analysis of key genetic function and its regulating rules; genetic diversity; the correlation between phenotype and genotype; the genotype in analysis and the express prediction of complex traits and complex diseases; the evolution model and mechanisms of genetic variation for important populations; study on the genetic and molecular basis of genetic disease of single gene and complex diseases of multi-genes, including identification of genomic function variation, recognition and prediction of disease genes, and molecular signal route concerned; studies on basic genetic laws and the molecular mechanisms of gene expression and regulation by using model organisms; the establishment of genetic operating system, new methods and technologies of phenomics and genetic breeding; basic researches on the genetic law of typical resources, major agriculture crops, microbe, etc.; and the molecular basis of genetics and variation of organisms under extreme or special environment; novel genetic fields such as chemical genetics, photo-genetics, phenotype-nomics, 3D genomics, etc.

In 2015, the numbers of applications received in areas of animal genetics, microbe

genetics, plant genetics and animal cell genetics were relatively small, whereas those fields are pivotal concepts in classical genetics research. The discipline will prioritize proposals with solid previous studies and novel scientific questions in the above branches. New application code has been established for heredity and rariation to support relevant research in the field. In 2016, the discipline continues to encourage original studies on genetic mechanisms and basis.

As for bioinformatics, the discipline mainly supports the development of new algorithm and analysis techniques, which are used to study genomic structure, function and evolution; mass data integration and systems biology analysis; integration, standardization and visualization of bio big data; design and synthesize of molecular module and network. It is encouraged to carry out combination study between bioinformatics analysis and experiment verification of organisms.

The discipline will continue to encourage and support research on new theory and methodology, as well as interdisciplinary study of genetics.

Cell Biology

Cell biology is to study the principles and mechanisms of life activity. Cell biology is mainly aimed at revealing the structure, function, phenotypes and regulation mechanism at molecular, cellular and individual levels within organisms, as well as studies on cytological mechanisms of phenotype and functional abnormal occurrence of organisms.

The funding scope of the discipline mainly includes: cellular and organelles structure, components and their assemblage mechanisms; regulation mechanisms of cell growth, division, and cell cycle; stem cell biology; cell differentiation; cell polarization; maintenance of cell homeostasis; cell senescence; cell death; autophagy; movement of cells; cell signal transduction; extra cellular matrix; vesicle transportation (including endocytosis and exocytosis); material and energy metabolize of cell; intercellular interaction; cell and environment; cell and microbes; host cell interaction with virus; new materials, new technology and methodology used in cell biology study.

Studies on the structure and function of cells have been the major aspects supported by the discipline. Applicants are encouraged to carry out integrated studies on the mechanisms of synthesis, modification, degradation, localization, and translocation of protein with the aggregation, dissociation, location of its components, and the activity diversification with time and space of protein complex during the process of cell signal transduction with dynamic change mechanisms of life activities of cells. Highlight will be given to endeavors on solving important problems in basic cell biology upon using cell models or model systems, in combination with techniques and methods of genetics, developmental biology, chemical biology, and cell imaging technologies, etc.

Among the applications accepted in 2015, there were fewer applications in areas of cell growth and multiplication, extra cellular matrix, establishment of cell polarity, cell substance transportation, cell metabolism, plant cell biology and research of new methods, whereas the above areas are pivotal in cell biology and have foundations in related researches in China. The discipline will prioritize funding to applicants who present their proposals with scientific issues from their solid research background on these aspects. In 2016, the discipline will continue to emphasize on functional and mechanism issues, highlighting the utilization of various novel research technologies and methodologies in cell biology. The discipline will actively promote the development of techniques in cell in situ and real time, dynamic and high resolution analysis, and highly value integrated researches from molecular to cellular and individual levels, so as to reveal different molecular mechanisms closely linked with cell function and biological effect and regulation network.

Developmental Biology and Reproductive Biology

The funding scope of this discipline covers three research fields including developmental biology, reproductive biology and stem-cell biology. The ultimate goal is to explore the basic rules of gametogenesis, fertilization, embryo development, the occurrence and growth, homeostasis, damage recovery and regeneration, aging of various organism tissues and organs.

The key biological issues in Developmental Biology (animals, including human) include: proliferation and migration of embryo cells; the determination of embryo polarity; the inducement and differentiation of germ layers; cell lineage and cells fate determination; morphogenesis of tissues and organs; growth and shape control of tissues and organs; organ homeostasis maintain and regeneration; tissue and organ senescence; abnormal development and related diseases; evolution of development mechanisms and influence of environment to development, etc. The key biological issues in the area of plant developmental biology concern mechanisms of organogenesis and cell differentiation, especially the molecular regulating mechanisms study of fertilization, zygotic activation, the development of embryo and endosperm, nutrition, and the occurrence and development of breeding organs; organ aging; resolution of signal transduction of flower induction and gamete development; the study of the maintain of stem-cells and its function of growing point; and the exploration of the relationship between development and evolution.

The key biological issues in Reproductive Biology include: sex determination; gonad differentiation, development and aging of reproductive organs; the fate determination, migration, multiplication of primordial germ cells; the occurrence and maturation of gamete; development of plant anther and ovary; occurrence of follicular and ovulation; interaction of germ cells and somatic cells; the sperm-egg reorganization and fertilization; early embryo development and implantation; and apomixes; influences of genetics, epigenetics and environment factors on reproductive health; the mechanisms of reproductive system diseases; the security of assisted reproductive techniques; and the regulating role of reproduction, and the regulation function of reproductive endocrinology.

Key scientific issues in the area of stem cell biology include: embryonic stem cells; reproductive stem cells; tissue stem cells; disease related stem cells; plant stem cells; stem tip and root tip; plant cambium; cell reprogramming and induced pluripotent stem cells; nuclear transfer of somatic cells; embryogenesis of plant somatic cells; resting and activation of stem cells; the proliferation of stem cells and maintaining of pluripotence; self-renewal of stem cells; cell cycle regulation of stem cells; the directional differentiation of stem cells; senescence of stem cells; malignant transformation of stem cells; stem cells and microenvironment; immunogenicity of stem cell; cell trans-differentiation; stem cell and tissue and organ engineering, etc.

In 2015 the number of applications on developmental biology and stem cell was relatively big, some of which were able to aim at the international frontier. In reproductive biology branching, research was closely related to human reproductive clinical practice, taking into account the basic and applied studies, reflecting the research trend of transformation from basic research to clinical medicine.

Modern developmental biology and reproductive biology emphasize on the continuity of development and dynamic process of change, emphasize the collaborative function of multi-cells and multi-genes, value the relationship of development and diseases, and encourage the exploration of molecular regulating mechanisms of development and reproduction by using model organisms. Applications will be encouraged on the creative development of research methods and systems, as well as the establishment of model diseases concerning development and reproduction, so as to provide basis for clinical

transformation. In the field of plant development and reproduction, applications of basic research which may provide theoretical guidance for modern molecular breeding will be encouraged.

Division VI of Life Sciences

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

Basic Agriculture and Crops

The discipline mainly supports basic researches targeted at crops and the systems of their environment. The studies emphasize on the laws of crop growth and development; the interaction between crops and environment; the genetic improvement of crops; and the production of crops as well as related issues covering branches of basic agriculture, crop cultivation and farming system, physiological ecology of crop, germplasm resources, genetic breeding of crops and crop seed science, etc.

The main aspects of crop science are as follows: the germplasm and gene resources of crops; genetic and molecular mechanisms of important crop property formation; the interaction between crop and environment; the high-yield theory of crop, rules of resource utilization with high efficiency; and the quality control of crop seed and yields. The discipline encourages scientists to carry out researches driven by scientific issues based on crop production and sustainable development of agriculture, focusing on basic study around the above fields. The discipline will encourage basic research with the combination of modern genomics, biotechniques, bioinformatics and traditional crop science for targeting on scientific frontiers of crops and the national future demands of agriculture industry. Studies on crop information science, which combine information techniques, computing biology, systems biology with crop science, will be promoted. Researches on crop physiological ecology and cultivation regulation carried out around the high-yield, fine quality, high efficiency, the resilience production of crop, and as well as the high efficient utilization of resources will be encouraged. Endeavors on studies of cultivation, physiological and genetic system by using crop varieties and their parental materials which are broadly used in production, and studies on germplasm resources innovation by using new techniques and methods (like atomic energy, etc.) and related theory will also be encouraged.

It is reflected from the applications in recent years 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, and a diversified distribution of host institutions of applications. However, major problems remain as the following: (i) researches on crop genome are generally concerned, but more attention is yet to pay on further exploration of mechanisms of physiology and genetics; (ii) following-up work with the international frontier is increasing, but it should be performed in close combination with practical issues of national agricultural production, so that to provide potent support of basic research to applied research; (iii) most of the applications are lack of systematic and sustainable studies; (iv) there are more applications in agricultural information, utilizing physical methods (such as spectrum, infrared, remote sensing, 3D photography, etc.) to acquire agricultural information, but there is a lack of in-depth theoretical study, and difficulty exists on actual utilization; (v) some of the proposals are not standardized with inaccurate information, such as untrue or incorrect contents in the resume part, especially in the order of authors for publications, or the list failed to present the real contribution of the applicant and others.

Applications to this discipline should take crops and crop products as their research objects, and the interdisciplinary studies with other subjects should not depart from the principal object; otherwise proposals will be rejected. The discipline will encourage the organic combination of new theory, techniques with traditional methods, laboratory work with field experiments, and support will be preferentially given to continuous and systematic work.

The discipline does not accept applications with research objects of agricultural animals, animal products, microbe, forest, vegetable, traditional Chinese medicine, algae, woods, and model plants of Arabidopsis thaliana. Please fill in the application code to the final level (four digits or six digits, such as C1302, C1305, C1306, C1307 or C13XXXX). Applications fail to provide the detailed code will not be accepted for further review.

Food Science

Food science studies the physical, chemical, biological, nutritional and safety properties of food and food materials, as well as principles of food storage processing, the theory and methods enhancing the nutrition value of food and security. Integrating theory and methodology of various subjects in biology, chemistry, physics, nutrition, microbiology, and agriculture, food science covers a broad spectrum of food material science, food biochemistry, food fermentation and brewing, food nutrition, food processing, food storage, transport, and preservation and, food safety, etc.

The discipline mainly supports basic researches based on food and raw food material as research objects, covering basic food materials science, food biochemistry, food fermentation and brewing, food nutrition and health, biological basis of food processing, food storage and fresh keeping, food safety and quality control. Research on health care products is not in the supporting scope of this discipline. In 2016, the discipline will give its priority to important scientific issues concerning the national development of nutrition and health, and factors restricting the growth of Chinese food production industry. The proposal with higher creativeness, continuous and systematic work, and substantive multidisciplinary study will be especially encouraged. In food nutrition and health, the discipline will support with priority the basic study of interaction among food components, changes in nutritional quality during the storage, transport and processing of food, molecular nutrition, dietary patterns and human health, etc. In food safety and quality control, the discipline will give its priority to support theoretical research on the establishment of new techniques and methods for food inspection, and the formation and control of hazardous substance during the processing and storage.

Problems existing in proposals accepted in 2015 include: (i) some proposals excessively emphasized on the technology and product development; (ii) research contents of some proposals departed from the funding scope of food science, such as some applications emphasized studies related to clinical treatment in food nutrition and food health; (iii) some of the applications did not provide authentic resume; (iv) lack of continuity for some of the applicants; (v) loose research contents, failing to concisely demonstrate their key scientific issues, etc.; (vi) some proposals were tracking up study, lack of novelty or in-depth research, for example, many applications in food nutrition and health emphasized much on active ingredients extraction, separation and primary functional evaluation of food; and (vii) some of the proposals in food inspection studied the same method applied in various fields.

The discipline will not accept proposals in the following areas: (i) health products; (ii) food technology, processing technology, food development, chemical modification and studies related to the prevention and treatment of diseases; (iii) disease prevention and treatment research with food and food ingredients; (iv) drug development; (v)

growth, development and metabolic physiological studies of plant and animals; and (vi) preclinical experimental research directly using human body.

Division VII of Life Sciences

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

Plant Protection

The discipline covers plant pathology, agricultural entomology, agricultural weeds, agricultural rats and other pest, plant chemical protection, biological prevention and cure, quarantine of agricultural pests, invasion biology, and biological techniques of plant protection, etc. Recently, the theory and technologies of genomics, proteomics, metabolic and molecular genetics are widely applied in the innovation of theory and techniques of pest control. However, basic research of plant protection in China is relatively weak, and especially there is a large gap between China and developed countries in the basic research on functional genomics of the interaction of important pests and crops, mechanisms of pest's virulence and crop resistance (sensibility), law of pest disaster, production and safe utilization of new pesticides with high efficiency, low poison, and environment-friendly property, etc.

The following problems exist in the 2015 applications: (i) for some of the researches, emphasis was put on the simulation studies in the laboratory at the molecular levels, whereas more attention should have been paid to the field study and verification; (ii) quite a number of applications simply traced or imitated researches related at home and abroad, or grafted one research method (or material) to another material (or method), with a lack of original ideas; (iii) in some of the applications, the research topics were over broadly laid out, with a lack of concrete of scientific problems, and the research contents were not precise, lack of in-depth studies and substantive subject intercrossing; (iv) some of the proposals aiming at too large target with too many goals that were not achievable, as well as the lack of a deep mechanism research plan.

In 2016, the discipline will continue to encourage researches focusing on the national security of agricultural production, quality safety of agricultural products, and eco-environmental safety. Researches should focus on scientific issues concreted from practice of agricultural production, and put more emphasis on the innovation of new theory and methodology in plant conservation, and on the original creativeness of research. 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; principles of disaster of hazardous organisms; monitoring, forecast, prevention and control of pests; and the basic and applied basic research of pesticide toxicology and its safe utilization. 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. On the research approaches, emphasis should be put 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. Preferential support will be given to continuous and systematic research. Excellent proposals will be prioritized funded in the field of agriculture weed, farm rats and diseases and pest forecasting of agricultural crops, etc., in order to promote the balanced

development of different branches in plant conservation.

Applications taking woods or model organisms such as Arabidopsis and Drosophila as main research objects will not be accepted. Please fill in the application code to the final level.

Horticulture and Plant Nutrition

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

The funding scope of horticulture covers pomology, olericulture and fruit science, ornamental horticulture, horticultural facilities, post-harvest biology of garden crops and food mycology. In recent years, there has been a rapid development of basic research in horticulture in China. The quality and activity of research work have been much improved in the field of horticulture: the research objects have broadened and diversified, and research approach have been gradually transferred from traditional organism level and cell level to molecular level; studies based on -omics have been actively carried out in horticulture. Great achievement has been made in the study on 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 rootstock-scion interaction, the formation and regulation of unfavorable components of horticultural products.

The funding scope of plant nutrition covers the heredity of plant nutrition, physiology of plant nutrition, manure and fertilizer science, nutrient resources and recycling, crop-soil interaction and regulation, etc. Based on the frontier of the discipline and the national demands on agricultural resource environment, plant nutrition has been focusing its basic research on the interdisciplinary study of the plant-soil-microbe interactions, especially on root microbe-omics and regulation so as to reveal the coupling mechanism of high efficiency use of plant nutrition elements and water resources; studies on the functional genomics, genetics and physiology of plant nutrition, which are formed by the combination of plant nutrition with modern biotechnology; quantitative study in the process of soil-crop system in the combination of plant nutrition with information techniques, etc.; researches on the new theory and methodology in manure and fertilizer science; and the exploration and sublimation of modern plant nutrition theory from practice of traditional agricultural production.

In 2015, major problems in the application for horticulture were the following: (i) the research content in some of the applications was too broad and lack of the precise layout of basic technique requirement for research approach and method, indicating low level of feasibility to achieve proposed research goals; (ii) there were a large number of proposals pertaining to copying and tracing research, but only a few demonstrated original creativeness and systematic study; some applications concentrated their researches on practical problems of horticulture, but lack of sufficient scientific issues; (iii) some of the applications in the field of facility horticulture neglected the combination of facility gardening environment and its regulation with biological problems of garden crops. Main problems in the applications for plant nutrition were as follows: (i) many applications put their study emphasis on molecular biology of plant nutrition, without in-depth study on mechanisms on the physiology and genetics aspects of plant nutrition; (ii) there was a lack of substantial interdisciplinary studies among crop-soil-microbe, and in-depth study on the efficient nutrient utilization under intensification conditions; (iii) lack of basic researches on nutrient resources and fertilizing science.

In 2016, the discipline will continue to encourage endeavors on scientific issues based on national agricultural practice and agricultural industry development, with a close

combination of new approaches with traditional methods. Priority funding will be given to original, continuous and systematic and distinctive research. The discipline of horticulture will support proposals which take horticultural crops as their research objects, and address scientific problems on the features of horticulture crops, and production yield, quality, fastness, and constancy. Proposals originated from the assessment, extravagant and utilize of germplasm resources of the nation or wild garden crops will be strongly encouraged. Research on specific biological problems, such as winter dormancy of horticulture crops, flowering phase, scion interaction and organ formation and development, is especially encouraged. As for applications in facility horticultural studies, proposals should emphasize on the substantial combination of facility gardening environment and its regulation with biological problems of garden crops. Studies on the genetic, physiologic and molecular mechanisms of nutrient utilization of high efficiency, interaction between crop, soil and microbe and its control, and the coupling mechanisms of soil water and fertilizer, and its effectiveness to crops will be prioritized in funding. It is especially encouraged to apply for the experimental testification of laboratory research in the field and excellent proposals in "manure and fertilizer science". Researches on the nutrient mechanisms of middle and trace elements will also be encouraged for an active promotion of healthy development of all branches in plant nutrition.

Applications using forest or model plant like Arabidopsis as its research objects will be not accepted by this Division. Please fill in the application code to the final level.

Division VIII of Life Sciences

The funding scope of the Division covers four disciplines: zoology; animal husbandry and grassland science; veterinary science; and aquatic science.

Zoology

Zoology studies the life phenomena and principles in animal morphology, taxonomy, physiology, behavior, ecology, evolution and genetics. The effective application of theory and techniques in molecular biology, bioinformatics, computing biology, and related subjects has greatly enriched the research contents of zoology. Studies on animal diversity, ontogeny and phylogeny, co-evolution and phenotypic evolution, animal behavior and adaptability have become cutting-edge research areas; whereas research on animal taxonomy, zoogeography and animal resource utilization, and conservation biology has been deepened and integrated continuously. Laboratory animal science has acquired more and more recognition.

Applications accepted by the discipline in recent years have demonstrated that researches in some subjects have already formed their own features and acquired significant international impact. It can be also observed that not only the formulation of scientific problems as well as rationality of designs, but also the creativeness of academic thoughts of the proposals are both greatly improved. However some problems still exist, for example, the excessive pursuit of hotspots without solid research basis, and the lack of justification for proposed research and feasibility of technical routes; insufficient experimental accumulation was provided by some of applications, or the description of detailed research progress and contents; some proposals were lack of scientific problem or hypothesis with explicit definition, or overstating research objectives; the budget for research is impractical in some proposals.

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

revised study of known species of animals will remain the key funding areas by the branching field of taxonomy. Taxonomy of ocean animals should also be highly valued. 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 animal physiology, animal behavior, and the establishment of model animals, etc. 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. **Special note to applicants: research with livestock and poultry as study objects is excluded from the funding scope of this discipline.**

Basic research of zoology for specific species in China and fragility of western and remote areas will be continually encouraged. 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 and the application of new theory and technologies. Interdisciplinary studies will be encouraged.

Animal Husbandry and Grassland Science

The major funding scope for animal husbandry and grassland science is to study the growth, development, feeding and breeding of domestic animals; the utilization of animal products, and grassland plant resources; quality and higher yield forage grass and the synthesized utilization of resources for maintaining pasture conditions and increasing productivity of grass and livestock.

In areas of animal husbandry and grassland science, the Division supports basic researches on resources, genetic breeding, reproduction of livestock and poultry, nutrition of monogastric animals, poultry nutrition, ruminant nutrition, feedstuff, behavior of livestock, environment and animal husbandry engineering, grassland and grazing, grass germplasm and breeding, grassland environment and disaster, forage production and processing, grassland physiology and functional genomics, sericulture and apiculture, etc.

Applications accepted and funded in 2015 covered all branches of this discipline, among which, the majority of applications focused their studies on mining excellent genes of typical excellent domestic animals of the country and their functional genome, molecular genetically breeding, reproduction and development model, molecular mechanisms of regulation, new theory and methods related to molecular nutrition, and the development of fine grass germplasm resources and fine variety cultivation, the livestock of low emission, and the interaction of animal husbandry development and its environment. Quite a few studies in the above fields have formed their features in many aspects. Moreover, researchers started to pay close attention to international and domestic cooperation and exchange, and endeavors have been put to the research which may acquire independent intellectual property rights.

In 2016, the discipline will give more priority to studies on excellent gene mining of typical livestock, poultry, grass, silkworm and bees of China, and cultivation of fine species; encourage basic research on nutrition of domestic animals, prolificacy of live stocks, and the genetic breeding of grazing; and the high efficiency utilization of feedstuff and forage resources. The discipline will also give moderate preference to researches on the environment of domestic animals and pollution, behavior and welfare, mechanisms of the physiological adaptation of productivity, and grassland pasture, sericulture and apiculture, etc.

Special notes for applicants are the following: (i) study object of the research should be livestock, poultry, grass, silkworm, or bee; interdisciplinary studies with other subjects are not allowed to depart from the main research aspect above; otherwise the proposal will be not funded; (ii) for research topic selection, please grasp

the essence of key scientific issues in related fields, instead of simply following up the new research progress at home and abroad; (iii) please fill in the application code to the final level.

Veterinary Science

Veterinary science is to study the occurrence, development, diagnosis, prevention and cure of animal diseases. The discipline covers the following branching: animal diseases, zoonoses, public hygiene, laboratory animals, veterinary medicinal industry, etc., as well as 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. The funding scope covers: basic veterinary science, animal (veterinary) pathology, veterinary immunology, veterinary parasitology, veterinary epidemiology, traditional Chinese veterinary, veterinary pharmacology and toxicology, and clinical veterinary science.

Proposals accepted and funded in 2015 covered all subjects of this discipline. Among them, the majority of applications were focused on veterinary epidemiology, basic veterinary, clinical veterinary and veterinary immunology. Some of them were able to aim at the international frontiers, highlight the creativeness in the selection of their research themes, and actively prompt to the international standard of research work. However, problems still existed as demonstrated here: some of the applications paid much attention on the international hotspot, but were lacking of enough concentration of scientific issues; basic research on topics such as traditional Chinese veterinary, animal (veterinary) pathology, etc., were yet to be concerned.

The discipline will continue to encourage studies on the epidemiology, pathogenic biology, mechanisms of pathogenic infection and immunity about important animal epidemic diseases and zoonoses, meanwhile, strengthen researches on the basic veterinary immunology, the non-infectious disease of animal mass populations, food safety of animal source, and related research, and give moderate preferential support to studies on traditional Chinese veterinary, and animal (veterinary) pathology, etc.

In 2016, the discipline requests applicants to take animal diseases as their main research objects and interdisciplinary studies should not deviate from the research objects. Otherwise the applications will be not funded in the discipline of veterinary science. Studies with mouse, rat as model system should serve to solve veterinary scientific questions.

Aquatic Science

Aquatic science is to study basic rules of the development, growth, breeding, genetics, 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.

The main funding scope in this discipline covers basic aquatic biology, the genetic breeding of aquatic organisms, aquatic resources and conservation, the nutrition and feed science of aquatic organisms, aquatic breeding, the immunology and control of diseases and pests, breeding and fishery engineering, and new techniques and methods of aquatic biological research.

In 2015, most of proposals accepted and funded were in areas of immunity and control of diseases and pests of aquatic organisms, aquatic basic biology, genetic breeding of aquatic organisms, as well as aquatic resources and conservation, etc. Relatively in-depth

studies were conducted on important economic traits of aquatic animals, molecular characters of important pathogens and their pathogenesis, etc., and some of studies have formed their own research features and superiority in some aspects. It can be seen from peer review and panel meetings that the creativeness of academic thoughts of proposals were obviously improved. 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 issues was yet to be improved.

In 2016, the discipline will request applicants to focus their studies on research fields of aquatic science, and aim at the frontier and important demands of production. The interdisciplinary study 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, aim at scientific problems, focus on original innovation, and avoid over emphasizing on R&D for technology while lacking of key scientific issues. Research on model organisms should be based on aquaculture science. 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 Division 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 of aquatic breeding and interaction with eco-environment, conservation of aquatic resource, new model and new techniques of breeding, etc.

Department of Earth Sciences

Earth sciences study the origin and evolution of the planet earth system. The earth sciences include geography, geology, geochemistry, geophysics and space physics, atmospheric and oceanic sciences, as well as the interdisciplinary research among these disciplines and other fields.

The above sub-disciplines of earth science are the core and basic factor for the progress of earth science. The General Program is aiming to promote the balanced and harmonized development for all disciplines of earth science, facilitate original innovation and expend the frontier of research, and hence to build up a robust basis for the development of the earth science.

In 2015, the Department received 5,792 proposals for the General Program submitted from 688 institutions. Among them, 1,554 were funded with a total budget of 1.0923 billion yuan (direct expenses, and hereinafter), with a success rate of 26.83% and an average budget of 702,900 yuan for individual project. Among the funded projects from the General Program in 2015, 877 (56.4%) were from universities and 648 (41.7%) from research institutes. The PIs of 1,023 projects (65.8%) were younger than 45 years old. There were 134 interdepartmental and interdisciplinary projects, and the proportion of interdisciplinary projects supported by different divisions inside the Department of Earth Sciences is even higher. Small Fund for Exploratory Studies with 1-year research is set up for highly exploratory, innovative and high risk projects or projects with uncertainty. Altogether, 9 proposals were approved as the Small Fund for Exploratory Studies projects in 2015 and 1.78 million yuan were allocated.

The criteria for the selection of General Program projects in 2016 are still as follows:

(1) Innovation and academic value of the overall research approach;
(2) Research capability of the applicants;
(3) Clear stated scientific issues and well defined ideas;
(4) Availability of necessary research basis and conditions.

During the selection of the proposals, the Department pay close attention to the importance of the basic or traditional disciplines, maintain the international status of the privileged discipline or fields in China, promote the disciplines which are still weak or even "endangered" in China yet predominant in the world, encourage the intercrossing, integration, infiltration and synthesis among disciplines, improve the development of the frontier and basic sub-disciplines, foster the development of the sub-disciplines closely related to experiment, observation, data integration and simulation, and recognize the importance of the intercrossing of the earth science and other disciplines.

While advocating innovations, the accumulation of research work should be emphasized. Under the same condition, preferential support will be given to those applicants who have a good accumulation of previous studies and high-quality results obtained from their recent completed projects, as well as who apply to continue their studies. Applicants are required to address the relation between the proposed research work and their accomplished projects. In regard to the exploratory, unforeseeable and long-term running for basic research, special attention will be paid to the high risk, interdisciplinary and frontier research. Scientists will be encouraged to face the great challenging scientific issues and to carry out risky and exploratory research. The intensity of individual grants will be constant to the previous years in 2015. Average budget for individual project will be 600,000 yuan to 1,500,000 yuan for 4 years.

Funding for General Program Projects
in Department of Earth Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Average funding for direct costs	Funding rate++ (%)
Division I	Geography (including soil science and remote sensing)	524+3*	35,000	24.10
Division II	Geology	360+2*	26,844	29.03
	Geochemistry	137+1*	10,048	28.11
Division III	Geophysics and space physics	180+1*	12,980	29.34
Division IV	Marine science	189+1*	13,365	25.78
Division V	Atmospheric science	155+1*	10,993	30.41
Total		15495+9*	109,230	26.83
Average funding per project		70.29 (70.58**)		

Notes: *The number of projects of Small Fund for Exploratory Studies for 1 year
**Average amount for individual projects with a full term (not including Small Fund for Exploratory Studies projects);
++ Funding rates include the projects of Small Funds for Exploratory Studies.

Division I of Earth Sciences

The funding scopes of the Division I include Physical Geography, Human Geography, Soil Science, Remote Sensing and Geographic Information System, and Environmental Geography.

The main research areas funded by the Division I are aiming at the understanding of evolution processes, spatial heterogeneity and interaction mechanisms of natural and human

elements in the terrestrial surface system. Physical Geography focuses mainly on interactions, spatial heterogeneity and evolution processes of modern natural environmental elements at multiple tempo-spatial scales, and concerns the human-land relationship since the Quaternary Period, especially Holecene. Human Geography concentrates mainly on the different types of modern human elements, spatial structure and evolution processes of their information carrier, and concerns natural background, historical development and human mechanism of regional human elements' spatial structure formation. Soil Science is an independent discipline for the understanding of pedogenic processes and spatial distribution, soil physical compositions and characteristics, and spatiotemporal evolution processes of soil functions. It emphasizes on the physical, chemical and biological mechanisms about the changes of soil quality and soil function caused by excessive human utilization. Geographic Information Science (Remote Sensing and Geographic Information System) is a discipline of acquiring, processing, analyzing, presenting, transmitting, memorizing and managing geographic tempo-spatial information of terrestrial surface assisted by the modern technologies of remote sensing (RS), geographic information system (GIS) and global position system (GPS), especially concerns the study on geographic information interpreting. Environmental Geography focuses mainly on environmental pollution, ecosystem conservation and restoration, natural hazards and risk, and resource utilization and management, which concerns about the negative effects on human living and development space by human activities, and analyzes the interactions of human and environment, mechanisms and strategies of the sustainable development. It should be reminded that technology research and development, production technique, product development related to solar energy, wind energy, biological energy and water treatment, etc., are out of the funding system of the Division I.

In 2015, the Division I received 2,187 applications for General Program, among which 527 projects including 3 projects of the Small Funds for Exploratory Studies were aided financially with a direct fund of 666,800 yuan averagely per application (not including the Small Funds for Exploratory Studies). The research fields of these funded projects were categorized into Physical Geography (including D0101, D0103 and D0104) with 144 projects, Human Geography (D0102) with 60 projects, Soil Science (D0105) with 118 projects, Geographic Information Science (D0106, D0107, D0108) with 121 projects, and Environmental Geography (D0109, D0110, D0111, D0112) with 84 projects.

In 2016, a standardized selection of "application code", "research field" and "key words" will be tried out continuously in Division I. When filling out the application forms, applicants should visit the "special focus" under the item of "application acceptance" on the official home page of the NSFC (http://www.nsfc.gov.cn/), and read carefully the "list of application code, research field and key words (D01 and subordinate codes)" and make sure their applications in accordance with the funding areas of Division I.

Division II of Earth Sciences

The funding areas of the Division II include geology, geochemistry and environmental geology.

Geology (Including Environmental Geology)

Geology (including environmental geology) is the knowledge system about the composition, structure and evolution of the solid Earth. The aim of modern geology is not only to elucidate the structure, the material composition and the mechanism controlling the transition of materials of the solid Earth, as well as the history of the environment and life

evolution recorded by these materials, but also to reveal the agents and processes which modify the surface of the Earth. The knowledge of geology can also be applied to explore the utilizable energy, water and mineral resources, to disclose the relationship between geological processes, life evolution and human activities, and to protect the earth environment and mitigate geo-hazard.

The development of geology is based on the progress of the fundamental theory and cutting-edge technology. The introduction of plate tectonic theory has brought about revolutionary changes to the understanding of the Earth. The complexity of the continental dynamics, especially the periodical convergence and dispersion of the continents and supercontinents, is further raising new themes for the advancement of plate tectonic theory. The development of mantle plume theory and geo-fluid in recent years has closely linked the deep activities together with surface phenomena of the solid Earth. The enhancement of abilities to obtain and analyze data has become a major driving force to promote the development of geological science. The improvement of instrumentation, such as high precision, in-situ and real-time analysis of the terrestrial materials has enhanced the ability to determine the composition and evolution for the earth's specimen. The utilization of seismological technology, remote sensing technology and satellite observation of the Earth has deepened the understanding of the structure of the Earth. GIS, GPS and RS technologies have improved the quality of geological mapping and are realizing the real time monitoring of plate motion, earthquake and volcanic activities. Computer simulation has made possible for the analysis, simulation and predication of important geological processes. Crusts drilling techniques, deep-earth detection and high-temperature-pressure experimental technologies have also greatly promoted the development of geology.

Profound changes have taken place in the research subjects, models and methodologies of geological science owing to the emerging new framework of earth system science and the strong demand for the sustainable social and economic development. The concept and rationale of multi-sphere interactions and interface processes have been strengthened in the geological science. The role of geology has evolved from its traditional function of disclosing the records of the Earth's history to the prediction of the Earth's future environment, due to the accumulation of improving capability to obtain critical data. The theory on the formation and exploration of the mineral resources and fossil energy, the environmental changes under the intervention of human activities, as well as the mitigation of geological hazards have been major challenges to geologists. New interdisciplinary fields, such as geo-biology, are developing fast due to the close correlations between geological science and life science established by the discovery of the critical role of life activities in the geological processes. With the development of the deep space exploration in China, more attention will be paid to the research of composition, physical property, structure, origin and evolution of the near-Earth planet and its correlation with the Earth.

The geological program encourages characterized proposals of basic research on fundamental theory based on field and site observations by using of the abundant materials and data recently acquired and accumulated by the geology-related agencies and institutions. Multidisciplinary approaches, such as the application of the concept, theory, technology and methodology of mathematics, physics, chemistry as well as biosciences, are encouraged to study geological issues. International collaboration, which may combine the privileged local geological features, is encouraged to promote the progress of geological theories with global scientific views. Young scientists are encouraged to submit proposals to benefit their research career.

In 2015, 1,247 proposals for General Program projects were received and 362 were funded with a success rate of 29.03% and an average direct expense of 741,500 yuan per project. The distribution pattern of the funded projects among main research fields is as

follows: projects in areas of paleontology, stratigraphy and sedimentology account for 14.7% of the total funds, projects in areas of mineralogy, petrology, volcanology, economic geology and geo-mathematics for 17.9%, projects in areas of petroleum geology and coal geology for 12.5%, projects in areas of structural geology, Precambrian geology and regional geology for 12.0%, projects in areas of Quaternary geology and environmental geology for 13.1%, and projects in areas of hydrogeology and geo-engineering for about 29.8%.

The predominant defects in the applications in 2015 are as follows: The proposed topic is too broad to be supported by the General Program, the raised arguments fail to focus on the scientific frontier or are poorly addressed, the research activities fail to state the scientific significance clearly and thus could not demonstrate the necessity to be carried out, as well as key issues to be attacked are vague due to defectively designed scientific and technological approaches. In some proposals, the description of research methods and technological outlines is very general and there is a lack of essential feasibility on key approaches.

Geochemistry

Geochemistry is the discipline that investigates the chemical composition, chemical process and chemical evolution of the epigeosphere and earth interior. Also, it involves cosmochemistry and comparative planetology. It applies primarily to analysis of elements and isotopes, observation of macroscopic and microscopic structure, isotope and chemical dating, molecular organic geochemical tracer method, biological geochemical process analysis, etc. Geochemistry focuses mainly on substances evolution and interaction of different geosphere in the Earth's history. Also, it emphasizes the source, distribution, migration, transformation, cycle and fate of chemical elements and substances of the earth surface system under human activities stress, and these impact mechanisms on ecosystem.

The characteristics of modern geochemical studies include as follows:

(1) In the solid geochemistry field, the research hotspots have shifted from the material composition and chemical reactions of the interior Earth to the interactions of different geospheres and their boundaries. It gives full play to advantages of geochemical microprobe in situ analysis with high-resolution, high-precision and high-sensitivity. It pays more attention to geochemical processes and composition structure of Earth's layers. It emphasizes the integration of plate tectonics evolution and global change research.

(2) In the research of earth environment changes, supergenesis and environment pollution process, it attaches importance to the superimposed effect of natural processes and human activities, and to the coupling mechanism of chemical and biological effect. It pays close attention to source apportionment and process tracing and their influence on ecosystem and climate change. The environmental geochemical and biogeochemical processes of the Earth's surface system have become an important geochemical research field.

(3) Research methods and techniques have shifted from statically semi-quantitative description to dynamically quantitative simulation, focusing more on the research of four-dimensional space-time evolution.

(4) It pays attention not only to the reconstruction of ancient geologic events on long time scales, but also to the description of physical, chemical and biological processes on short time scales, and the prediction and simulation of environment changes in the future.

The funding policy of this field is listed as follows: (i) to promote coordinated development of different branches of geochemistry; (ii) to encourage the studies on the

fundamental theory, the development of experimental analysis technology, and the establishment and improvement of geochemical model; (iii) to broadly support the frontier fields of geosciences such as the evolution of the Earth and other planets, the environmental evolution and vital processes on earth, the changes and protection of ecological environment; (iv) to concentrate on the basic research about the formation mechanism and detection methods for mineral resources and fossil energy, the evolution and regulation of water-soil resources, and the prevention and treatment of as well as natural disasters energy, water, and mineral resources; and (v) to encourage interdisciplinary research of environmental sciences, life sciences and other disciplines of geosciences with geochemical theory and method.

In 2015, 491 and 487 proposals for General Program projects were received and accepted, respectively. The average annual funding rate (including the Small Fund for Exploratory Study) is 28.11%. The average monetary funding level (excluding the Small Fund for Exploratory Study projects) is 732,000 yuan per project. The percentages of proposals and funded projects of different research fields are as follows: 7.9% and 9.4% for isotope geochemistry, 2.0% and 2.2% for trace element geochemistry, 7.9% and 11.6% for petro geochemistry, 7.9% and 8.7% for ore deposit geochemistry and organic geochemistry, 4.0% and 5.1% for isotopic and chemical geochronology, 3.3% and 2.2% for experimental geochemistry and computational geochemistry, 2.0% and 4.3% for cosmochemistry and comparative planetology, 20.0% and 16.7% for biogeochemistry, 44.9% and 39.9% for environmental geochemistry. In recent years, the quantities of the accepted proposals in environmental geochemistry and biogeochemistry fields have become the largest. The percentages of proposals and funded projects in these research fields are 64.9% and 24.5%. The percentage of funded projects in other seven research fields is 34.7%.

The main insufficiencies of accepted proposals in the past are as follows: (i) it is emphasized only on the importance of research field, but fails to clarify the creative scientific issues; (ii) it is unable to indicate literature view comprehensively and fully, only to elaborate literature supporting its own academic viewpoints; (iii) the research approach, perspective and methodology are uncreative and indistinctive; innovation of the research is exaggerated excessively; (iv) the research aims and contents are too large and too many to realize during the supporting period and by the financial support. These problems are very apparent in proposals for Young Scientists Fund of the National Natural Science Foundation of China. The key methods and technology related to the success or failure of the project are lack of specific and detailed feasibility discussions.

Division III of Earth Sciences

The funding areas of the Division III include geophysics, space physics and geodesy.

Geophysics

Geophysics, which includes direct observation and theoretical studies on the basic physical fields of the earth and planets, for instance, seismic, gravity, magnetic field, electric field, stress field, heat flow, etc., is not only essential for effectively understanding of internal structures of the earth and planets and their components and dynamic processes, but also the foundation of new methods and technology development of resource exploration. Moreover, explorative study on mechanism of earthquake and other natural disasters has important significance for protecting the earth and disaster alleviation.

Space Physics

Rapid progress in space physics has been made in recent years, especially in multi-level energy transferring and coupling, and the comprehensive theory framework of the disturbance of solar-terrestrial system. In addition, studies on the interaction between the solar wind and the atmosphere of the moon and planets are also initialized. This progress provides a foundation for rapid development of space weather. Proposals dealing with scientific issues in these fields are encouraged.

Geodesy

In recent years, aeronautics, astronautics and geodesy have witnessed rapid development due to significant improvement of the precision and spatial resolution of observation and relevant theories of data-processing, and thus have become one of the most important branches of geophysics. Researches based on such development, including the development of the ground- and space-based observation system and theories, are encouraged to understand the shape and gravity of the earth, the crustal deformation field and its changes which provide space, time and gravity datum for the national defense.

Geophysics, including solid-earth geophysics, space physics and geodesy, utilizes the theories and methodologies of physics and mathematics to understand the earth and the solar-terra space as well as the corresponding physical processes. These studies play an important role in solving the emergent problems of resources, environment and natural hazards for the sustainable development of the society.

In 2015, 617 proposals for General Program in geophysics and space physics were received and 181 of them were funded with a success rate of 29.34% and an average funding of 717,100 yuan per project. In addition, 1 project of Small Fund for Exploratory Studies was funded with funding of 200,000 yuan. The funding is distributed in the following major research areas: geodesy (20.99%), solid-earth geophysics (31.49%), exploration geophysics (23.21%), space physics (22.10%) and experiment and facilities (2.21%).

In recent years, the Division awarded more innovative projects, which results in fruitful achievements. In the near future, encouragement for innovative ideas and cultivating team leaders will be continued as the major task of the Division. Besides continuous support to fundamental research, more efforts will also be given to new growth and pioneering studies, specifically those regarding to breakthroughs of well-defined scientific issues. Support will be focused on frontiers of space weather, satellite gravity, environmental geophysics, experimental geophysics, geophysics of the earth's deep interior, and comparative studies of the earth and other planets, as well as the theory of seismic wave propagation. Special attention will be given to the application of new technology, innovative tools and especially new observational data to the study of geophysical and space systems.

Division IV of Earth Sciences

The primary funding areas of the Division IV include marine science and polar science.

Marine Science

Marine science is a discipline studying sea water and seabed, and various processes at interfaces between ocean and atmosphere, and between sea water and coastal estuaries, including physical oceanography, marine geology and geophysics, marine chemistry, biological oceanography, marine environmental science, coastal estuaries, marine

engineering, marine monitoring and survey techniques, marine remote sensing, integrated coastal zone management and other branches. Basic sciences, such as mathematics, mechanics, physics, chemistry and biology have been continuously applied to marine science. Meanwhile, new and high technologies, such as space technology, information technology, biotechnology and deep-diving technology, have been continuously applied to marine science. These have opened a new frontier in marine science. Research within this new frontier is also encouraged by the Division.

Marine science is a comprehensive research, characterized by the accumulation of observational and experimental data, the application of new and high technologies, the development of simulation models, and the tendency towards globalization and internationalization. The advance of marine science can make social and economic development achieve sustained benefits from ocean resources, which is an important measure of national scientific and technological strength. The current strategic position of marine science has been leveled up greatly with a tendency toward “global change” and “deep-sea research”, forming a new pattern extending from the shore to the interior ocean and from the shallow water to the deep ocean.

Marine science is a science essentially based on observation. The promotion of its academic thoughts and research abilities depends on long-term observation and data accumulation. To meet the demands of research projects in ocean observation, NSFC initiated the pilot Ship-time Sharing Project. Scientists are encouraged to participate in the NSFC Open Research Cruise (NORC) to obtain more continuous, systematic and comprehensive data. The program aims at encouraging scientists to conduct in-situ observation and laboratory analysis using new technologies and methods focused on the scientific issues to be investigated, and provide technical support for exploiting new research fields and new results. In order to promote a balanced development of marine science in China, it is also encouraged that scientists may join in existing cruise plans carried out by other agencies to do research on the deep ocean.

For those who want to participate in the NORC, it is required to describe the necessity, contents and expected data outputs of the proposed observations in the proposal. Applicants are suggested to pay close attention to the related bulletin and announcements for cruise timing.

In 2015, 737 proposals for marine science were received and 190 proposals were funded. The total funding amounts to 133.65 million yuan. The success rate is 25.78% and the average support is 703,400 yuan per project. Similar to the past few years, most proposals are focused on biological oceanography, environmental oceanography, marine geology and physical oceanography, which together account for approximately two-thirds of the total submitted and funded proposals. The number of funded proposals has little change in the fields of marine chemistry, estuarine and coastal research, ocean engineering, marine monitoring and investigation, and marine remote sensing. However, the number of proposal in marine physics, which is an important funding direction in marine science including acoustics, optics and electromagnetic, were relatively small and hence the least share of funding was awarded.

There are some basic elements to support a successful proposal, including scientific innovation, appropriate scientific objectives and research scope and feasible scheme. One or more absences of the above elements may lead to a failure. Among them, the scientific innovation is the most decisive. For the Young Scientists Fund applications, some frequent defects come from too broad scope and lack of research focus.

Polar Science

Polar science is a discipline studying various natural phenomena, including the

processes and changing rules peculiarly in polar region as well as its interaction with other components of the Earth system. It is a comprehensive discipline consisting of several sub-disciplines including polar biology and ecology, polar oceanography, polar space physics, polar atmosphere science and climatology, polar geology, geophysics and geochemistry, Antarctic astrolithology, polar glaciology, polar mapping and remote sensing science, polar management and information science, polar observation and engineering technology, etc. For the past few years, significant progress has been achieved in international polar research. However, it is still the weakest area in earth science. Comprehensive and interdisciplinary study is the current trend in polar science, which is focused on the key scientific issues on global change and sustainable development for carrying out research on large-scale interactions of the five spheres in the polar region as well as their interactions with the middle and low latitudes. Polar science in China should develop research by focusing on key scientific issues such as global change and sustainable development based on the accumulation of existing research.

In 2015, 41 proposals on polar science were received and 13 were funded, with a success rate of 31.71%.

Division V of Earth Sciences

The primary funding areas of the Division V include meteorology, atmospheric physics, atmospheric environment and atmospheric chemistry.

Atmospheric science is to study various phenomena and their changing regulations occurring in the atmosphere so as to serve the mankind. In recent years, with the introduction of the Earth system science and sphere interaction concepts, atmospheric science enters a new historical phase of development. The atmosphere is one of the most active spheres in the Earth system. Its changes are affected and controlled by other spheres in the system and celestial bodies such as the Sun; at the same time the response of the atmosphere to the changes simultaneously results in direct impact on the ocean, terrestrial surface, ice and snow, as well as the ecosystem on the Earth. The atmosphere plays an important role in the interaction among different spheres of the Earth system, and regulates the whole behavior of the Earth system with the interaction of other spheres. Therefore, beside the study of dynamical-physical-chemical process within the atmosphere, atmospheric science currently focuses on the comprehensive researches on the essence of the atmospheric change in terms of the interaction among hydrosphere, lithosphere, cryosphere, biosphere, human activities and global climate, the regulation of climate system and theories and methods of climate change prediction the impact of human activities on weather, climate and environment system, and the influence of weather, climate and environment system change on human society. Atmospheric science deepens the study on its various sub-directions, and meanwhile, pays attention to the mechanism of the disastrous events occurrence and development of the weather, climate and environment, as well as the forecast and prediction; study on issues of global climate and environment change, and its impacts, adaptation and mitigation; the comprehensive, integrated, modeling and systematical studies on various processes; the interdisciplinary study which could provide the scientific basis for the livelihood and the sustainable development of society

In 2015, the Division received 513 proposals for the General Program and 156 projects were funded with the success rate of 30.41% and the average funding intensity of 704,700 yuan per project, including 1 project for the Small Fund for Exploratory Study with 200,000 yuan per project.

In 2016, the Division will continually encourage proposals for exploratory and original

basic studies in areas as follows: (i) the various phenomena, processes and mechanism in atmosphere, and the physical-chemical-biological processes of the substance and energy interaction between the atmosphere and other spheres by applying new ideas, methods, advanced equipment and technologies in fields of mathematics, physics, chemistry, biology and information science; (ii) applications regarding to disastrous weather, atmospheric dynamics, atmospheric physics, atmospheric chemistry, atmospheric environment, atmospheric detection and remote sensing, stratosphere and mesosphere, geophysical fluid dynamics and boundary layer turbulence; (iii) the climatic change and its relevant extreme synoptic and climatic events; (iv) new theories and methods for weather forecasting and climate prediction; (v) applied research on the data received by satellite remote sensing and other sources; (vi) analysis and applied research on the data received from the large scientific experiments and science plans being initiated, conducted or already completed, as well as large observation network established in China and aboard; (vii) research on the principle and method for meteorological observation, data analysis and applications; (viii) the interdisciplinary research of the atmospheric science and the field of the livelihood and the sustainable development of society (agriculture, energy, transportation, forestry, hydrology, health, economy, and ecology, etc.).

Department of Engineering and Materials Sciences

Engineering and materials sciences provide necessary and significant S&T knowledge for the assurance of national security, the improvement of people's living standard and the sustainable development of the society and economy. Aiming at cutting-edge areas and meeting the national strategic demands of the social and economic development as well, and committed to discoveries, inventions and innovations concerned, researches in engineering and materials sciences should pay full attention to scientific creativity and innovation, especially original creativity and innovation with independent intellectual properties, so as to achieve a higher level of sustainable development in the field of engineering and materials.

The Department will continue to support interdisciplinary and cutting-edge researches, especially the researches with such great significance that new knowledge could be formed, industrial development could be promoted and international competitiveness could be raised. Researchers are encouraged to focus on original and integrated innovation and to pay more attention to key scientific issues coming from application and propose related research contents. Priority is given to the researches that can lead the development of disciplines, and have the potential to form independent intellectual properties, especially those suitable for national conditions.

In 2015, the Department received 13,911 proposals (300 rejected), increased by 30.87% in comparison with that in 2014, and among them, 2,794 were supported with a total direct cost of 1,772.70 million yuan. The average direct funding is 634,500 yuan per project and the success rate is 20.08% (23.28% in 2014).

Applicants should pay full attention to the following points:

(l) The Department will support preferentially basic research with scientific merits and applicable prospects, with considerations to practical conditions and resource characteristics of China, which can either give an impetus to the development of relevant sciences or lead to independent intellectual properties. Proposals that meet

the needs of national economy and sustainable development of the society will be encouraged.

(2) Interdisciplinary researches will be encouraged so as to promote the progress of the cross disciplines involved. Applicants should put forward new conceptions and ideas as creative as possible with specific scientific issues.

(3) The fundamentality and innovation should be fully discussed in proposals. Applicants should pay attention to proposing key scientific issues, concentrating research contents and highlighting research focus.

(4) When applicable, applicants are required to provide the research achievements of the last completed project, and list the scientific papers published in domestic or foreign academic journals. The provided information must be objective and accurate; otherwise it will affect where the application is going.

Funding for the General Program Projects
in the Department of Engineering and Materials Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Average funding for direct costs	Funding rate (%)
Materials sciences I	Metallic materials	214	13,743	20.56
Materials sciences II	Inorganic and non-metallic materials	303	19,388	20.29
	Polymer materials	217	13,852	20.55
Engineering sciences I	Metallurgy and mining science	296	18,983	19.71
Engineering sciences II	Mechanical engineering	545	34,442	20.46
Engineering sciences III	Engineering thermo physics and energy utilization	215	13,746	20.69
Engineering sciences IV	Architecture, environmental and structural engineering	560	35,040	19.69
Engineering sciences V	Electrical science and engineering	191	12,078	19.69
	Hydrology and marine engineering	253	15,998	19.43
Total		2,794	177,270	20.08
Average direct funding per project		63.45		

Division I of Materials Sciences

The Division supports fundamental research on metallic materials. Research proposals should present the merits of the proposed fundamental research clearly, including clear objectives and scientific significance of the project, and the suitability of the methods to be employed. Proposals should target either to advance the materials science in cutting-edge areas or to promote development in the relevant areas that meet the national demands.

The funding spectrum of the Division covers compositions, microstructures, phases, surfaces and interfaces, scales effect, impurities and defects in metals, alloys, metal matrix composites, intermetallic compounds and metal-like materials, and their influence on mechanical, physical and chemical properties and performance; basic issues in the preparation and processing of metallic materials, including heat treatment, casting, forging, welding and cutting; basic issues in the strengthening and toughening, deformation and

fracture, phase transformation and alloy design; fundamentals in energy materials, environment-friendly materials, biomaterials, and materials in transportation, aeronautic and astronautic industries; interaction mechanisms of metallic materials and environment, damage, functional degradation and consequent failure mechanism, recycling mechanism and relevant fundamentals; theoretical fundamentals on metallic materials; development of theoretical methods, calculating methods, modern analysis and test methods, big data analysis and processing methods incorporating basic and applied basic researches of metallic materials.

In 2015, the Division received 1,041 proposals for the General Program, increased by 30.45% in comparison with that in 2014. Totally, 214 projects were granted with an average funding intensity of 642,200 yuan per project and a success rate of 20.56%.

It is noticed that the areas of metastable metals and alloys, functional materials and surface engineering kept the leading place in term of the amount of proposals. It is hoped that researchers should pay attention not only to the frontiers and the hot areas, but also to other fundamental issues with scientific merits and creative ideas, especially those common key issues beyond materials systems. In addition, some attention should be paid to the new understanding of classical issues in basic materials. Applications in the field of composites and surface engineering should focus on scientific aspects and proposing unique ideas. Applications with a cross-disciplinary background should focus on issues within the funding spectrum of the Division.

The Division would give more financial support to the selected areas that meet the national demands or is expected to achieve a breakthrough in the form of General Program project groups. In 2016, the following research orientations will be given preferential financing: (i) microstructure and defect control in the process of preparation and processing of high performance aluminum materials used in major projects; (ii) optimization design principle of multi-dimension, multi-scale and multi-architecture structural composite materials and their preparation methods.

Division II of Materials Sciences

The Division mainly supports fundamental researches on inorganic non-metallic and organic polymer materials.

Inorganic Non-Metallic Materials

The Division supports the fundamental and applied basic researches on various inorganic non-metallic materials. Along with the development of material design theories and the innovation in fabrication technologies, lots of new inorganic non-metallic materials have been invented, including high-temperature superconducting ceramics, smart materials, biomaterials, energy materials and nano-materials, etc., which have greatly stimulated the researches in the related areas. At present, researches on inorganic non-metallic materials, functional materials are developed towards high efficiency, high reliability, high sensitivity, smartness and functional integration; and structural materials tend to possess compositization, high toughness, specific strength, high wear-resistance, high corrosion-resistance, high-temperature endurance, low cost and high reliability. Meanwhile, conventional materials are being remolded, upgraded and developed as well. More and more attention is given to the applications of inorganic non-metallic materials in

information technologies, life science, energy and environmental science, etc.

In 2015, the Division received 1,493 applications for the General Program, with an increase of 21.88% compared with that in 2014, and 303 projects were funded with an average funding intensity of 639,900 yuan per project and a success rate of 20.29%.

Looking at the proposals submitted in the past three years, it is noted that with the increase of applications the researches involve various areas with broad interdisciplinary range. In 2015, researches on functional materials accounted for 56.48% of the total, which is still an active field. These applications presented many innovative ideas and induced the hotspots of various areas including nano-materials, ferroelectric and piezoelectric materials, carbon and super-hard materials, photoelectric information functional materials, composite materials and photo-catalysis materials and so on. Among them, applications regarding photoelectric information functional materials (accounted for about 18.8% of the total in 2015) ranked above all the others in recent years. There were also many applications regarding new energy materials, display materials, biomedical materials, in which the creativity needs to be further improved. The applications regarding structural ceramics accounted for 5.12% of the total and were relatively concentrated among a few institutions, and relevant researches significantly went towards the direction of high-toughness, easy processing ability, high reliability and low cost fabrication by new techniques. A fairly large number of proposals for inorganic non-metallic composites were also received, among which proposals on functional composite materials increased a bit more than before. However, in term of the quality, quite a number of them can be classified as follow-up, low level repetition, and lack of innovation and basic issues of inorganic non-metallic materials. The Division will support the researches with creative and innovative ideas, and interdisciplinary researches of inorganic non-metallic materials cross-cutting with other related fields.

The Division encourages and supports synthetic methodology and related applied basic researches in novel inorganic non-metallic functional information materials based on domestic resources; researches on low-dimensional and nano-materials, including new fabrication techniques, property characterizations, novel effects and the related physical and chemical issues; materials with external field induced phase transition and the related basic aspects; the surface, interface, connectivity and compatibility of composite materials; gradient functional materials and in-situ composite materials; “structure-function” integrated composite materials, synthetic techniques for high-performance, low-cost and high-reliability materials; the composition, structure, performance and characterization on smart materials, new energy materials, biomedical materials and eco-environmental materials; theoretical fundamentals on the design and corresponding fabrication techniques for inorganic non-metallic materials (in macro-, meso- and micro-scales, respectively); and the improvement and remolding of conventional inorganic non-metallic materials using new theories and techniques or new processes.

Organic Polymer Materials

The Division mainly supports the following areas in the field of organic and polymeric materials science: preparation chemistry of polymeric materials; theory and method for the characterization of polymeric materials; processing of polymeric materials; the surface and interface of polymeric materials; the implementation of the high performance and functional properties of general polymer materials; polymer-based composite materials; functional

organic and polymeric materials and organic solid materials; biomedical polymer materials; organic and polymeric materials related to energy, transport, ecological environment and resource utilization; smart and biomimetic polymer materials; special polymer materials.

In 2015, the Division received 1056 proposals for the General Program, with an increase of 36.25% compared with that in 2014. Finally, 217 applications were granted with an average funding intensity of 638,300 yuan per project and a success rate of 20.55%. Quite many of the applications were involved in the following areas: biomedical polymer materials, polymer blend and composite materials, functional inorganic/organic composite materials, structure-property relationships of polymeric materials, and opto-electronic functional materials, etc.

The Division encourages interdisciplinary basic researches involved with mathematics, chemistry, physics, life science, information science, energy, environment, mechanical and manufacturing science, transport and aerospace science, and oceanography, etc., which lead to creativity and innovation. To be specific, the researches in the following areas are encouraged: the preparation science of polymeric materials, including high efficient and controllable synthetic methods of polymeric materials, 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 high efficiency and stability; performance-directed biomedical polymer materials and evaluation method of their application; new concept in the design theory and preparation method of smart and biomimetic polymer materials; chiral polymer materials, including method in their controllable synthesis, assembly and construction, chirality at nano scale, and functional chiral polymer materials; eco-environmental polymer materials, including the structures, properties and efficient utilization of natural polymers, especially marine biopolymers, as well as the design theory and preparation method of environment-friendly polymer materials, the recycling and utilization of polymeric materials, and the stability and aging of polymeric materials; polymeric materials for environmental control and improvement in water and air pollution.

In 2016, two general program groups will be supported in the following selected directions with some financial preference: flexible electronics manufacturing and chiral polymer materials. On the application function-directed interdisciplinary researches will be encouraged.

Division I of Engineering Sciences

The Division supports fundamental researches in the metallurgy and mining sciences. It mainly covers resources exploitation, safety science and engineering, mineral engineering and separation sciences, materials and metallurgical physical chemistry, ferrous and nonferrous metallurgy, material preparation and fabrication, eco-environment of mining and metallurgy, and resources recycling, etc.

The Division received 1,502 proposals for the General Program in 2015, with an increase of 34.35% compared with that in 2014. Among them, 296 proposals were granted with an average funding intensity of 641,300 yuan per project and a success rate of 19.71%.

In recent years, because of continuous supports, the metallurgy and mining sciences have made great progress, especially in the specific resources field. The current trends of the relevant disciplines are as follows: (i) polarization and extension of the subject; (ii) interdisciplinary and integration of the subject; (iii) relationship between fundamental research and technology development is getting increasingly closer; (iv) basic research, applied research, specific technology development and product development have been closely linked and integrated.

The main research interests of the Division are petroleum and natural gas exploitation, safety science and engineering, preparation of metallic material processing, mineral engineering, metallurgical electrochemistry and battery electrochemistry, etc.

Focusing on the fundamental research, the Division will fund researches on process and engineering, and engineering science is the priority. The Division will continuously enhance the exploration about interdisciplinary research and novel methods, and focus on the new theory, new concept, new method, and their creative application. More attention will be paid to the basic research regarding specific resources. In the aspect of resources exploitation, more emphases will be laid on the engineering science about recovery efficiency, safety and environment. In the aspect of technology, process and equipment, structure optimization, process intensification and enlargement similarity theory of engineered equipment will be emphasized. Systematic and consistent researches will be encouraged. Priority will be given to fundamental researches with theoretical importance, with potential application, which might be the new fields for knowledge creation, and to young scientists who have creative capabilities and good domestic and international cooperation background. A part of cost-intensive projects with hard working environment, such as those in situ mining studies, pyro-metallurgy, high temperature electrochemical projects, etc., will be given higher intensity funding according to the research need.

Research areas to be encouraged are as follows: (i) theory and method of improving recovery efficiency in oil and gas resources; (ii) safe and efficient development method in complexly deep-layer or deep-water oil and gas resources; (iii) scientific exploitation theory of mineral resources; (iv) theory of environmental-friendly mineral separation; (v) clean extraction of polymetallic mineral resources with low grade or complexity; (vi) thermodynamic bases and metallurgical theory of metallic material production with newly high qualities; (vii) formation, transportation and control of contaminants generated in metallurgical process; (viii) information collection and data processing of mining and metallurgy; (ix) high-performance materials preparation and near net shape under multiple fields; (x) accident prevention, life safety insurance and rescue technology base in an accident.

Division II of Engineering Sciences

The Division supports fundamental researches in the areas of mechanical and manufacturing science.

Mechanical science is a fundamental technological discipline to study the functional synthesis, quantitative representation, and performance control of various mechanical products as well as to apply related knowledge and technologies of mechanical systems in developing novel design theory and methodology, including mechanism and robotics, actuation and transmission, mechanical system dynamics, strength theory of mechanical

structures, mechanical tribology and surface technology, mechanical design theory and methodology, mechanical bionics, etc.

Manufacturing science is a discipline mainly to study the manufacturing theories, methods, technologies, processes, equipment and systems for productions with high efficiency, low cost, intelligent methods and high performance. It includes component forming and machining, manufacturing systems and automation, metrology and measurement instrument, MEMS/NEMS, green manufacturing, intelligent manufacturing, and so on.

In 2015, 2,664 proposals for the General Program were received, a 29.82% increase compared with that in 2014. Among them, 545 proposals were funded with an average funding intensity of 632,000 yuan per project and a success rate of 20.46%.

The priority areas to be supported are as follows: (i) the fundamental research for national strategic needs, the frontiers of discipline development, as well as the fundamental research with potentials for industrial applications; (ii) the research directed to environment-friendly, resource-saving, and high energy efficient integration of sustainable design and manufacturing; (iii) the research on the innovative design, manufacturing principle, and measurement theory for ultra, high-precision, high-tech and especially large/heavy equipment and instruments, including processing mechanism, prototyping theory and technology; (iv) the development on the methodology of design and manufacturing for extreme working conditions, for instance, sizes from macro to meso, micro, nano, and multi-scales, and parameters from conventional to extraordinary or extreme conditions; and (v) the multidisciplinary research, multi-field coupling analysis and design method covering mechanical sciences, electronics, hydraulics, acoustics, optics, magnetism, information science and other subjects.

Based upon its mission, the Division will continue to support researches in the nature of fundamental, frontier, exploration and innovation, by encouraging continuous in-depth researches in a specific field, supporting fundamental researches that have achieved innovative results and need further in-depth development. The Division will also support substantial and profound interdisciplinary researches, especially those involving multidisciplinary areas such as electronics, information, biology, materials, and medical science, with the main objective to solve scientific problems in mechanical engineering field.

In 2016, high-intensity funding opportunities within the General Program will be given in form of project clusters to researches focusing on the frontier areas with high breakthrough potentials, such as fundamental theories and methods in complex product design, trans-scale manufacturing of flexible electronic products, and fundamental study of common problems in machining databases.

It is suggested that principal investigators concentrate themselves to the study of their on-going projects instead of applying new projects in short period of time. It is encouraged that young researchers not to participate in the proposals irrelevant to their own research fields.

Division III of Engineering Sciences

The Division supports fundamental research in fields of engineering thermo-physics and energy utilization that involves in engineering thermodynamics, refrigeration and

cryogenics and dynamic characteristics of thermodynamic systems, aerothermodynamics, heat and mass transfer, multi-phase flow, combustion, thermo-physical properties and measurement, and renewable energy utilization, as well as other fundamental and innovative researches related to engineering thermo-physics and energy utilization.

In 2015, the Division received 1,039 proposals for the General Program, increased by 29.23% compared with that in 2014. Totally, 215 were supported with an average funding intensity of 639,300 yuan per project with a success rate of 20.69%.

The main development trends of the discipline are as follows: (i) research on the basic issues has been deepen from macro-level to meso-level and micro/nano-level, from isolated studies to coupled studies, from common parameters to parameters under ultra- or extreme conditions, from routine thermo-physical problems to random, unsteady, multi-dimension, multi-phase and complicated thermo-physical problems and intercrossing research in the discipline; moreover, research becomes more quantitative and precise; (ii) research themes have been crossed over traditional disciplinary borders and integrated with related disciplines, for example, physics, chemistry, life science, information science, materials science, environment and safety. Researches in the following areas are active: the mechanism of new type thermodynamic cycles and non-equilibrium thermal dynamics, refrigeration and low temperature engineering, dynamics, optimization and control of complicated systems, turbulence properties of internal flows and properties and control of unsteady flows, porous media and micro-scale heat and mass transfer, radiation and heat exchange by phase transformation, clean, supersonic and micro-scale combustion, thermo-physical problems in the prevention of disasters, mechanism of interaction between phases and thermo-physical model in multi-phase flow, new principles and methods in thermo-physical measurement, and new thermo-physical principles in renewable energy transformation and utilization.

The Division will give priority to fundamental researches with theoretical importance, potential application and prior prospect, which might be the new fields for knowledge production, continuously promote interdisciplinary studies and the exploration of novel methods, and encourage original ideas and creations. The Division will continue supporting the researches with interdisciplinary nature, or international cooperation background or good achievements got in the completed projects.

Division IV of Engineering Sciences

The Division's funding scope mainly covers architecture, environmental engineering and civil engineering. The development trend of architecture is to study the development of region, city and building, and the innovation of construction techniques from the viewpoint of human-environment relationship, as well as the basic theory, methods of planning and design, and construction technology innovation based on sustainable development strategy. The environmental engineering research is focused on the water or air pollution control and quality amelioration, as well as theories and methods for the treatment, resourcelized and harmless disposal of various pollutants and wastes. Civil engineering stresses that studies should be closely combined with engineering practice to investigate basic theoretical issues and solve foresight key technological issues arising from engineering construction. The interdisciplinary interaction, application of advanced experiment and information technologies and adoption of new materials, new structures and new technologies are the

major features in the development of these research fields.

In 2015, the Division received 2,844 proposals for the General Program, increased by 37.19% in comparison with that in 2014. Totally, 560 were supported with an average funding intensity of 625,700 yuan per project with a success rate of 19.69%.

In the area of architecture, emphasis will be given to new scientific issues arising from urban construction, scientific method in urban planning and building design, and the exploration and innovation of new technologies and new methods. Research on environmental engineering will emphasize key scientific issues related to new theories and technical bases of new high-efficiency and low-consumption technologies, which include water purification, wastewater treatment and utilization, municipal water supply and drainage system, urban refuse disposal and utilization, air cleaning and air pollution control and renovation of the polluted water environment. In the area of civil engineering, more attention should be paid to innovative research on design theories and methods of complex structures. Key scientific issues on the following topics are encouraged: new structure systems and performance design theories, disaster effect and civil infrastructure failure mechanism and performance control, modern structure experiment, on-spot measurement and digital simulation technology. In the area of geo-technical engineering, researchers should focus their attention on the engineering properties of soil under complex conditions, and invalidation mechanism and control methods of geotechnical engineering. In the area of traffic engineering, the emphasis will be on the research of planning theory and key construction technology in traffic infrastructure.

Division V of Engineering Sciences

The Division mainly supports researches in the areas of electrical science and engineering, hydro-science and water research, hydraulic engineering and ocean engineering.

Electrical Engineering

The subject of electrical engineering includes two parts: electric (magnetic) energy science, the interaction between electromagnetic fields and materials. The related research fields include, not least, the electrical energy conversion (mutual conversion between electric power and other kinds of energy), electric machine and its control, power system, power electronics, superconducting technology, pulse power technology, high voltage and electrical insulation technology, engineering dielectrics, discharge and plasma technology, electromagnetic biological technology, environmental electro-technology, electromagnetic compatibility, electric drive and motion control, communication and information for power system, new technology of energy storage and power saving, etc. Furthermore, the two parts share some common basic research contents, such as electric network theory, electromagnetic field theory, electromagnetic measurement technology, and so on.

In 2015, 970 proposals were received for the General Program and 191 proposals were funded with an average funding intensity of 632,400 yuan per project with a success rate of 19.69%.

In the domain of electric energy science, the priority is given to researches on new theories and new technologies related to high efficiency, flexibility, safety and reliability, and eco-friendly electrical energy conversion, transmission and utilization. The research

fields include power generation of new energy and renewable energy, smart gird, wireless power transfer, high efficient conversion and utilization of electric energy, power electronic converters and integration, electric drive and motion control (including electric vehicle, railway traffic, ship and aircraft), superconducting electrical technologies, pulse power technology, efficient power consumption and also the involved information technology, control theory and method for electrical engineering.

As to the domain of electromagnetic field and interaction between electromagnetism and matter, the priority is given to investigation on new phenomena, exploration of new principles, and the establishment of new models and discovery of new applications, as well as the safety and reliability, which are related to power apparatus, novel high power electronic devices, new dielectrics and its application in electrical engineering, measurement of electromagnetic characteristics, coupling between electromagnetic pulsed energy and its applied objects, discharge theory and high active plasma generation. The proposals are highly encouraged for investigations based on electrical science for the interaction between electromagnetic field and biomatter, processing and utilization of biologic electromagnetic signals.

Hydro-Science and Water Research, Hydraulic Engineering and Ocean Engineering

The Division supports basic researches in three areas, hydro-science and hydraulic engineering, geotechnical engineering and hydro-power engineering, coastal and ocean engineering. The research themes include hydrology and water resource, water/soil science and irrigation engineering, hydro environment engineering and water eco-system research, dynamics of river and coast and sediment research, soil/rock mechanics and geotechnical engineering, hydraulics and hydro-informatics, hydraulic structural engineering, coastal and offshore engineering, and naval architectures and ocean engineering.

In 2015, 1,302 proposals were received for the General Program, and 253 proposals were finally granted with an average funding intensity of 632,300 yuan per project with a success rate of 19.43%.

In 2016, encouraged research areas are urban flooding, aquatic ecology and eco-hydraulic engineering. If they are interested in these areas applicants should focus the research on one of the above encouraged research areas in their proposals.

One of key tasks is to study the impact of climate change and human activities on hydrological cycling, extreme flood and drought disasters, and water resources management in the field of hydrology and water resources. Researches in the field of water/soil science and irrigation engineering are mainly focused on the transfer and interaction of water, heat and chemicals in farmland, mechanism of crop water-saving and high-efficient irrigation and drainage scheme and their ecological and environmental impacts. Physical, chemical and biological processes related with hydrological cycling and their responses to large projects are emphasized by researches in the field of hydro environment engineering and water eco-system research. Since water is closely correlated with economy, society, environment and energy, the interdisciplinary and integrated research is encouraged in fields of water resources, hydro environment and water eco-system research. Researches in the area of river and coastal hydrodynamics and sediment dynamics should give their focuses on the fundamental theory of sediment transport, river and estuarine evolutionary, and sediment problems related to large hydraulic works. The key frontiers of hydraulics consist

in the subjects related to water disaster mitigation and eco-environmental protection. The current emphasis of hydro-machinery is on the transit process. Hot research topics in the field of soil/rock mechanics and geotechnical engineering include constitutive modeling of geo-materials, multi-fields and multi-phases coupling, mechanism and process control of deformation and damage, and mechanism and prevention of geo-hazards. New breakthroughs need to be made in the basic research on hydraulic structural engineering under complicated conditions. Environment-friendly and function-based design is an important trend of development in the field of new hydraulic engineering materials. The recent hot research topics in coastal engineering include: port and waterway engineering, marine resources and offshore energy development as well as environment protection, disaster prevention and mitigation in extreme situation; in the area of ship and ocean engineering, more emphasis are put on the motions and response theory of ship and marine structures, new hull form design theory, deep-sea probing technology and relevant theory of deep water resources exploitation, numerical experiments and field test technology, new type underwater sound transducer and communication technology.

According to the statistics on proposals in recent years, the proposed themes have extended gradually and tend to be more interdisciplinary. In 2015, more proposals were found in research fields of ocean engineering, soil/rock mechanics and geotechnical engineering, water environmental engineering and eco-water system research, while less proposals in areas of hydraulics, hydraulic machinery and coastal engineering.

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. Based on the trends of disciplinary development and social progress, the following priorities are set for funding: nano electronics and bioelectronics, radio wave transmission and new types of antenna, information acquisition and information processing, future communication theory and system, space communication network and system, space information processing and application, key problems in theoretical computer science, computer software, computer system configuration and storage system, key technologies in computer application, computer network and distributed computing system, network and information security, bionic sensing and advanced sensors, modeling, analysis and control of complex systems, basic theory and application of intelligent science, advanced robot technology and application, basic research on semiconductor integrated chip system, quantum communication, quantum computation, basics of quantum information technology, optical information display and processing, advanced laser technology, biomedical optics, next generation network and applications, data science and computing science, cognitive science and intelligent information processing, etc. Preferential support will be given to basic researches that meet social 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, geosciences 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. 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. The Department will continue to give preferential funding to proposals that have a good background of international cooperation in order to encourage scientists to conduct substantial international cooperative research with scientists abroad in frontier areas of information sciences.

In 2015, the Department received 8,240 applications for General Program, a decrease of 22.13% from that in 2014, and funded 1,793 projects with a total direct cost funding of 1.09 billion yuan. The average direct cost funding is 607,900 yuan per project. Some projects are related to interdisciplinary areas with mathematics and health.

In 2016, the PIs of those projects making important progress will be given preferential support towards their new applications.

The Department of Information Sciences encourages creative basic research that is different from traditional research ideas, and welcomes researchers conduct discussions and studies on relevant topics.

Funding for General Program Projects
in the Department of Information Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Average funding for direct costs	Funding rate (%)
Division I	Electronics and technology	163	10,198	21.94
	Information and communication system	156	9,390	21.97
	Information acquisition and processing	149	9,030	22.51
Division II	Theoretical computer science, computer software and hardware	143	8,779	21.57
	Computer applications	248	15,137	21.29
	Network and information security	149	9,048	21.63
Division III	Control theory and control engineering	191	11,609	24.24
	Systems science and system engineering	47	2,664	15.46
	Artificial intelligence and intelligent systems	149	9,038	21.17
Division IV	Semiconductor science and information devices	173	10,523	22.21
	Information optics and photoelectric devices	112	6,889	21.92
	Theoretical computer science, computer software and hardware	113	6,695	22.55
Total		1,793	109,000	21.76
Average funding per project		60.79		

Interdisciplinary Research between Information Sciences and Mathematical Sciences

In 2016, the Department of Information Sciences and the Department of Mathematical and Physical Sciences will continue to fund interdisciplinary researches that require combined efforts from information sciences and mathematical sciences. The direct cost funding will be about 500,000 yuan per project. The areas to be included are mathematical

theory in information sciences, mathematical methods in information security, information system and advanced control theory.

Encouraged (but not limited to) areas of interdisciplinary researches are:

1. Theory and algorithm of integer representation of real numbers

Design the theory and algorithms of the integer representation of real numbers, to realize the algorithm by computer, and to give complexity analysis of the algorithm.

2. Theory and methods of formalized representation of software systems

Describe and represent, by using the formalization theory and methods, practical software systems applicable not only to real time application software systems, but also to interactive, discrete event software systems.

3. Theory and methods of designing security software systems

Combining typical software system (system software or application software) analysis and design, study the theory, algorithm and system structures of improving the safety performance of software systems, and verify the advantages of the theory, algorithm and system structures both theoretically and practically.

4. Theoretical studies on new software system structure

By addressing the contemporary needs of software application, study the structure, theory and methods of the system structure of novel software and to sum up appropriate scientific characteristics in combination with practical software system.

5. Theoretical studies on the validation of software systems

Establish the theory and methods on the validation of software system development so as to ensure the validity of the developed software.

6. Theory and methods of formalized representation of practical engineering projects

In 2015, we received 275 applications for the projects of interdisciplinary research between Information Sciences and Mathematical Sciences and funded 54 projects with average direct cost funding of 501,100 yuan per project and the funding rate of 19.64%. It should be noted that previous proposals were lacks of fundamental nature and challenge, and did not show complementary role of information science and mathematics. This type of project will support only exploratory research having substantial interdisciplinary nature with information sciences so as to promote the development of interdisciplinary studies between information and mathematics. **Applicants to this category should provide appropriate application codes in the application form. This category belongs to free exploratory research, and is supported only under the category of General Program.**

Division I of Information Sciences

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.

Electronic science and technology are related to the researches in areas of circuit and system, electronic science and technology, magnetic field and wave, as well as electronics and applications. Funding areas mainly cover the design, test and verification of circuits and system, diagnosis, reliability, micro-nano circuit and system design theory, methods and technology and low energy consumption design method, power, radio electronic circuit and system design theory and method, circuit and network theory, electromagnetic theory and computational methods in electromagnetic fields and waves, characteristics of electromagnetic field and waves in new types of media, scattering and back-scattering, mechanism of interaction between electromagnetic field and wave and objects,

electromagnetic compatibility and electromagnetic environment, electronic wave transmission and antenna, micro wave optics, tera hertz science and technology, transient electromagnetic field theory and application, vacuum device, cathode electronics, surface and membrane electronics, superconducting electronics, quantum electronic theory and device, plasma electronics, molecular and nano electronics in physical electronics, electromagnetic effect in bioelectronics, biochips, medical imaging, medical information detection and processing, medical imaging navigation and key medical instrument technology; information processing and analysis in bioinformatics, analysis of bio big data, detection and identification of cell and bio-molecular information, information network and analysis in biosystems, modeling and simulation of biosystem functions, methods and technology of bionic information processing; sensitive electronics and physical, chemical, (bio)chemical sensors, properties of new types of sensitive materials and sensors, and sensor theory and technology.

Information and information system are related to the researches on the theory and key technologies for information transmission, exchange and application in fields of communication and information system. The main funding areas include informatics, signal coding, channel coding, network service theory and technology, information system modeling and simulation, communication network and communication system security, diagnosis and evaluation, cognitive wireless in information theory and information system; wireless, spatial, underwater, multimedia, optical, quantum, computational, transducer network communication theory and technology, short range communication, body network, wearable devices network, new network access technology, mobile wireless internet technology, and new mobile communication theory and network, future information network theory and transmission mechanism, network communication theory and system, etc.

Information acquisition and processing related to the theory, methods and applied technology of information sensing, acquisition and processing. The main funding areas include signal theory and signal processing, the processing of multi-dimensional signals and array signals, and processing of radar, sonar, remote sensing and voice signals; mathematical theory and methods in information acquisition and processing, and information acquisition mechanism and technology, weak signal detecting and processing, detection and imaging system in information detection and processing, image processing and interpretation, integration of multi-sensor signals, multimedia information processing and presentation, space and marine information acquisition and processing, and applied basic research in mobile network big data, etc.

In 2015, the Division received 2,115 proposals for General Program, and funded 468 projects. The funding rate is 22.13% and the average direct cost funding intensity is 611,500 yuan per project.

In 2016, the Division will continue to support researches in areas of basic theory and key technologies that are significant to the national security in areas of detection and imaging technologies, detection data decoding, normalized interpretation of multi-source and multi-spectrum data, bioinformation acquisition and processing and space information acquisition and processing, under water information acquisition and processing, electromagnetic environmental effect, network information acquisition and processing, communication system security, electromagnetic vortex communication, ambient intelligence communication, wireless multi-domain recognition communication, indoor high speed large capacity wireless communication, green communication, under water communication, short range communication, internet of things and internet of energy resources. The innovative and cross-disciplinary research and exploratory studies with good prospects will be supported that may have some risk and are non-consensus, 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 projects which could open and share their research results, and research on the design of software and hardware on the opening data base; it is encouraged 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 areas of basic theories, basic methods and key techniques related to computer science and technology and relevant interdisciplinary areas.

Computer science and technology is one of the most active, fast-growing and widely influential areas in information sciences. The important trend of computer science and technology development is to obtain super speed, large storage, high performance, high reliability, easy interaction, networking, intelligent and universal applicability. Applicants are recommended to pay attention to these new features in this Division.

The Division emphasizes that proposals are encouraged to focus on key scientific issues and technologies in computer science, and original, fundamental and far-sighted research. We encourage researches on the theory of computer science, software theory and engineering, network security, architecture and system software, computer network, natural language interpretation, data and knowledge engineering, computer graph and virtual reality, image, audio and video processing, man-machine environment, mobile computation, embedded computation, pattern recognition and computer vision, artificial intelligence and machine learning, bioinformation processing, computation intelligence, etc. The Division also stress on funding of studies on theoretical method of new computation, big data analysis, new types of searching, brain-like computing, robot software system, and man-machine coordinated computation, etc.

The Division will continue to support collaborations with researchers in areas of life sciences, medical sciences, mathematics, physics, chemistry, geosciences, mechanical engineering, environmental science and management sciences to make joint explorations on new ideas, new theories, new methods and technologies, developing prototype systems in interdisciplinary areas so as to promote the mutual development of computer science and other sciences. The Division especially encourages and support scientists to 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 impact of computer science research in China.

In 2015, the Division received 2,517 proposals for General Program, and funded 540 projects (including 27 interdisciplinary projects with mathematics). The success rate is 21.45% and the average direct cost funding is 610,400 yuan per project.

It should be noted that such problems as lack of basic science problems, lack of clear scientific topics, lack of originality in research ideas, lack clear application background and lack of clear research goals and preparations still existed in proposals received in 2015. We suggest applicants aim at the national needs and research frontiers in the discipline, select fundamental, explorative and key scientific issues, and strive to make innovations and breakthroughs so as to make important achievements.

Division III of Information Sciences

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

economy and national security in areas of control theory and engineering, systems science and system engineering, artificial intelligence and intelligent systems, etc.

Research funded in the area of control theory and engineering includes control theory and applications, trouble shooting and system service, system emulation and evaluation, navigation, guidance and telemetry, sensor technology and sensor network, multi-information acquisition and fusion, etc.

Research funded in areas of systems science and system engineering includes system modeling and analysis, system dynamics and application, system simulation and visualization, emergence and laws of the evolution of complex systems, system biology, information physical system, system reliability and applications, engineering system design and optimization, engineering system scheduling and decision making, and supply chain, etc.

Researches funded in areas of artificial intelligence and intelligent systems cover basic theory and applications of pattern recognition, method and application of machine learning, method and application of the understanding of natural language, network information searching and processing, knowledge expression, reasoning and discovery, intelligent sensing and system robotics and robot technology, bionic sensing and bioinformation processing, cognitive science and intelligent information processing, etc.

In 2015, the Division received 1,796 proposals for General Program and funded 387 projects. The success rate is 21.55% and the average direct cost funding intensity is 602,400 yuan per project. Some projects are related to interdisciplinary areas with mathematics.

Statistics of recent years show that the following areas are becoming hotspots in application and research: intelligent and self-adaptive control of complex systems, design and application knowledge automation systems, theory and application of control of network security and protection, monitoring, warning and unified control of production process, coordinated control of multi-autonomous system, data and model based system analysis and control, quantum system analysis and regulation, network system analysis and control, intelligent traffic and internet of vehicles, theory and application of complex network analysis, analysis and application of bio-molecular network, theory and application of the internet of things and industrial cognition network; optimal dispatching management of large engineering systems; analysis and optimal design of complex supply chain system; advanced navigation and guidance theory and techniques; quantum navigation theory and system; new types of transducers and bionic sensing; sparse representation and compress cognition; new theory and methods of pattern recognition; new theory of computer vision and realization of high performance system; target identification and tracking in complex background and interference; natural language understanding and syntax computation; recognition of oral language and speakers in complex scenarios; new method and application of knowledge expression and reasoning, large scale knowledge correlation and discovery of new knowledge and application; efficient analysis and computation of big data; theory and application of particle computation; inter media analysis and searching; online machine learning methods of complex dynamic data, mechanism, new models and application of deep learning; advanced robot and bionic robot; micro and nano controlled robot and micro-nano robot; life like integration system and soft body robots; (bio)medical information acquisition, processing and applications; brain-machine interface theory and application, brain-like information processing method and application, cognitive science and computation models. In addition, the Division gives due support to farsighted and interdisciplinary researches such as modeling analysis and control of micro-nano scale systems, modeling, analysis and control of hypersonic aircraft, navigation and guidance and control in deep space and deep ocean exploration, new energy control, management and efficient use, smart medicine, smart city and agricultural information technologies.

In 2016, the Division will continue to encourage and support interdisciplinary research

with mathematics, mechanics, mechanical engineering, semiconductors, optics, energy, environmental science, management, economics, biology, neuroscience and psychology, etc.

Division IV of Information Sciences

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

The main scope of funding for semiconductor science and information devices includes semiconductor crystal and membrane material, design and test of integrated circuits, semiconductor photo electric devices, semiconductor devices, semiconductor physics, integrated circuit fabrication and packaging, semiconductor micro and nano mechanical and electrical devices and system, and new types of information devices including nano, molecular, super conducting, quantum functional information devices.

The main funding scope for optics and photo-electronics includes optical information acquisition and processing, photon and photoelectric devices, transmission and exchange photonics, inferred physics and technology (including tetra-hertz), nonlinear optics and quantum optics, laser, spectrum technology, applied optics, optics and photoelectric materials, space optics, atmospheric and marine optics, biomedical photonics and optical problems in interdisciplinary studies.

In 2015, the Division received 1,791 proposals, and funded 398 projects with a funding rate of 22.22% and an average direct cost funding intensity of 605,700 yuan per project.

In recent years, along with the development of information sciences, the above areas are now having more and more interactions with physics, chemistry, materials sciences and life sciences, and many new research directions are emerging. Among the major branch areas, applications remained the same in the following areas: semiconductor photoelectric devices, IC design and test, semiconductor crystals and membrane materials, photon and photoelectric devices, transmission and exchange photonics, optical information acquisition and processing, nonlinear optics and quantum optics, laser and applied optics, etc. Applications are increasing in such areas as semiconductor electronic devices, semiconductor micro-nano mechanical electronic devices and system, IC manufacturing and packaging, semiconductor physics, inferred physics and technology, biomedical photonics, optics and photoelectric materials, spectroscopic technology, etc. There are more applications in areas of new types of information devices, space optics, atmospheric and marine optics, and optical problems in interdisciplinary areas in 2015.

The Division will give priority to researches on high performance light source, low power consumption radio frequency chips and circuits, new types of sensor materials and devices and network technology, tera 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, biomedical optical imaging, and space optics, etc. In order to solve the bottleneck issues of devices in various fields in China, the Division will encourage studies to improve device performance (both yield and reliability) including scientific issues in device physics, structure and technology development.

Based on the trend of application in recent years, proposals that track international frontier and hotspot and those that frequently change research directions have low success rate. Researchers are advised to take concrete steps in their research by making in-depth and

persistent studies, and propose better and more creative research topics according to the international research trend and the national development needs.

Department of Management Sciences

Management is an interdisciplinary science which aims at revealing and applying the basic laws of various management activities. The research findings can be used to optimize the utilization of limited resources. The Department of Management Sciences consists of three divisions, handling proposals of Management Science and Engineering, Business Administration, and Public Administration and Economy Management, respectively.

During the thirteenth Five-Year period, the Department of Management Sciences will further encourage innovative studies, welcome research proposals of discovering universal scientific issues based on Chinese management practices and then to explore these issues, to enrich the knowledge of human management sciences.

The Department emphasizes applying "scientific methods" to explore the objective laws of management sciences; therefore ordinary management research will not be supported. The Department supports experimental research that observes and discovers the new management phenomena based on data obtained from experiments, observations, and measurements, etc. The Department also supports theoretical research that aims at addressing management issues by analyzing and explaining management phenomena through modeling, computation, induction and deduction. The Department will offer higher funding support than the average funding level for experimental research projects that do need long-term and large-scale data collection, data processing, and filed investigation, and high performance computing and experiments.

The Department of Management Sciences encourages and supports scientists from diverse academic backgrounds to take an active part in management science research and contribute to the development of management science, a comprehensive interdisciplinary science. However, please note that applications focusing on social science and humanities, as well as those within the funding scope of other scientific departments of NSFC, will not be accepted by the Department of Management Sciences. Applicants are advised to propose their research topics from the perspective of management science research.

General requirements for applications in 2016 are as follows:

1. No repetitive funding with the National Social Science Fund

To optimize the allocation of the National Natural Science Fund and to ensure that project leaders invest adequate time and energy in their on-going national projects, the Department will decline proposals by the following applicants in 2016:

(1) Applicants who were supported by the National Social Science Fund as a project leader within the past 5 years (from Jan 1, 2011), and have not yet got the project completion certificate awarded by the National Planning Office of Philosophy and Social Science until the deadline of this year's fund application.
Note: if an applicant has gained the project completion certificate from the National Planning Office of Philosophy and Social Science, and is applying for a NSFC project with the application code starting with G, he/she must provide a copy of the certificate with an official signature of his/her home institutions.

(2) Applicants who submit proposals to both the Department of Management Sciences of NSFC and the National Planning Office of Philosophy and Social Science in 2016.

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. For publications that are accepted and waiting to be published, a copy of the acceptance notice should be provided in the proposal.

(2) The Department does not allow applicants to 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 clarify the relations and differences between the newly submitted proposals and the previous NSFC projects. For applicants who are undertaking projects funded by other agencies, such as MOST, NSSF or local science funding organizations, they are required to clarify the similarities and differences between their on-going projects and the new proposals submitted to NSFC.

3. Special requirements for project leaders starting NSFC projects in recent years

To ensure that project leaders invest adequate time and energy in their on-going projects, the applications who gained any kind of NSFC projects as a project leader in 2014 or 2015 (especially 2015) 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 complete. The evaluation results will be released to the public on the NSFC website. Researchers with good performance evaluation results will be given priority for funding when they apply for new projects. However, researchers with bad performance evaluation results will undergo stricter review procedures when they apply for new projects.

In 2016, the average funding intensity for direct expenses of General Program projects will be from 450,000 to 550,000 yuan per project.

Funding for General Program Projects
in the Department of Management Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Average funding for direct costs	Funding rate (%)
Division I	Management science and engineering	198	9,522	21.95
Division II	Business administration	210	10,100	20.55
Division III	Macro-management and policy	292	14,038	17.81
Total		700	33,660	19.64
Average funding intensity for direct expenses per project		48.09		

Division I of Management Sciences

The Division of Management Science and Engineering mainly supports research projects associated with fundamental theories, methods and techniques in the field of management science, which include the history of management science, general management theory, operations management, decision-making and game theory, evaluation

theory and method, forecast theory and method, management psychology and behavior, management system engineering, industrial engineering, system reliability management, information system management, quantitative economics theory and method, technology and approach of risk management, financial engineering, complexity science, knowledge management, and engineering management, etc.

The Division emphasizes basic theories and frontier areas, gives funding priority to fundamental and frontier research in the above-mentioned field, and encourages innovative research on management theory and methods integrated with China's management practices, management philosophy, and cultural characteristics.

In 2015, the Division received a total of 902 applications for General Program and funded 198 projects. The funding rate was 21.95%.

During the recent years, the discipline of management science and engineering has experienced rapid development in China. The quantity of academic papers in the fields of operation and optimization methods, and information technology and management is increasing. However, the number of papers published by Chinese scholars in high-level international journals is still relatively small. Therefore, the quality of academic publications in China should be further improved.

In 2016, the Division will continue to support proposals aiming at innovative fundamental scientific issues, encourage scientists to publish their research results in high-level international journals, and provide consecutive support for projects and teams that have shown great research abilities and innovative potentials. The Division will strengthen the support for the projects associated with production practices, and encourage scientists to integrate theories and methods with the practical issues of enterprises, to solve the problems from management practices in China, and to form the management theory and methods for China. The Division also encourages integrations of management sciences and mathematics, economics, behavior sciences, information sciences, as well as other disciplines, supports studies that address the scientific issues of management science by developing new theory, methods, and practices though multi-interdisciplinary. The Division encourages the project leaders to track closely the international academic frontier, publish their research work in reputable international journals, and have innovative research achievement that can gain the attentions from the world.

Division II of Management Sciences

The Division of Business Administration mainly supports fundamental research and applied fundamental 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, business theory, innovation management, organizational behavior and company culture, human resource management, company finance and financial management, accounting and audit management, marketing, operations management, production management, quality management and quality engineering, logistics and supply chain management, service science and service management, technology management and technology innovation, project management, entrepreneurship and SME management, enterprise information management, e-commerce and business intelligence, non-profit organization management, etc.

In 2015, the Division received a total of 1,022 applications for General Program and funded 210 projects. The funding rate was 20.55%.

In 2015, many applications were focused on enterprise financing and finance

management, marketing management, logistics and supply chain, accounting theory and method, innovation management, strategy management, organizational behavior, and small and medium enterprises management, and correspondingly, the number of funded projects in these fields was larger than in other fields. Although the number of applications in the fields of service management, production management, quality management, and the non-profit organization management was small, their funding rate was increased compared to that in 2014. In general, the proposals aiming at new methods and technologies have shown some innovation, and the number of applications focusing on new issues and China's practical needs was increasing. From a perspective of funding structure, a balanced distribution of funding areas has been formed.

In 2016, the Division will continue to actively support innovative and frontier research, including theory innovation and new knowledge discovery and creation, scientific accumulation and discovery research by integrating empirical analysis, case studies, and observation experiments, scientific issues derived from China's management practices which have potential social application values, and those research with substantial international cooperation. The Division promotes scientific spirits, encourages exploration, and supports original fundamental research.

In order to promote the balance within the discipline, the Division will continue to support frontier fundamental research in areas of corporation strategy, company finance, accounting, organization behavior, entrepreneurial and innovation management, marketing, e-commerce and business intelligence, logistics and supply chain management, operation management, etc. Preference will be given to areas of human resource management, SME management, service management, logistics management, quality management, enterprise information and resource management, risk and safety management of large projects, and non-profit organization management. Meantime, the Division will strengthen the support for theory innovation research based on Chinese management practice.

Division III of Management Sciences

The funding areas of the Division of Macro-management and Policy include two disciplines, public administration and policies, and economy management. The former discipline covers public administration and policy, science and technology management and policy, health management and policy, education management and policy, public security and crisis management, labor, employment and social welfare, resources and environment management and policy, information resources management, etc. The latter discipline covers macroeconomic management and strategies, financial management and policy, tax management and policy, industry policy and management, agriculture and forestry economics management, and regional development management. These two disciplines focus on the behavior laws of the government and related public administrations on formulating macro-policies and implementing comprehensive management to achieve the economic and social development goals, which are aimed at promoting the discipline development, improving academic innovation, developing talented scientists and research groups. The Division encourages researchers to provide consultation, support and suggestions for national macro decision making when developing related theories and methodologies.

In 2015, the Division of Macro-management and Policy received a total of 1,639 applications for General Program (920 for public administration and policies, and 719 for economy management) and funded 292 projects (166 for public administration and policies, and 126 for economy management). The funding rate was 17.81%.

During recent years, within the public administration and policies discipline, the number of applications focusing on resource and environment management and health management and policy was high, and so was the number of funded projects. The number of applications focusing on public security management and education management increased rapidly, while the number of applications focusing on urbanization and aging increased even more rapidly. For the economy management discipline, the ratios of applications in the fields of agriculture and forestry economy management, financial management, and macroeconomic management were relatively higher, and the applications in tax management and policy was rather few, which reflects the differences between various research areas in scale of research capacity. Many applicants concentrated on hot topics associated with macro-management and policy practices in China, and submitted high-quality research proposals.

In 2016, the Division will pay more attention to research proposals in the fields of social governance, health service management, public security and crisis management (emergency management), and aging society of the public administration and policies discipline, and macro-economy regulation, internet finance management, industrial upgrading and transformation, and new-type urbanization development of the economy management discipline.

The applications should take China's practical management 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 need to be able to differentiate between management science research and actual management work, and between a Natural Science Foundation project and a humanity and social science project in terms of research methods. The scope of the research topic needs to be appropriate, the research goal needs to be concentrated, and the research content needs to be specific and concrete. The research method and technology roadmap, as well as how to address the key scientific issues, needs to be clearly clarified in the application.

Department of Health Sciences

In view of the fact that scientific research is both curiosity-driven and national needs-driven, the objective of the funding for General Program in the Department of Health Sciences is to support basic research on issues concerned with disease prevention, disease control and disease treatment in China. Major funding areas include: the structural, functional, developmental, genetic and immune abnormalities of organisms, the occurrence, development, outcome, diagnosis, treatment and prevention of diseases.

The Department encourages research areas as follows:

(1) Innovative theoretical and methodological research aimed at the scientific issues emerging from medical practices;
(2) Systematic and indigenous study on key scientific issues emerging from medical disciplines;
(3) Research on translational medicine through combination of basic research and clinical research;
(4) Integrative medical research on the occurrence, development and regression of diseases at various levels from molecular, cellular, tissue to the whole-organism, individual and population level by using new multidisciplinary and comprehensive techniques or methods;
(5) In-depth systematic and innovative study based on existing accumulated researches;

(6) Interdisciplinary medical research crosscutting with other scientific fields;
(7) Research on the development of new animal models of human diseases;
(8) International joint research.

The Department will give priority to basic research on major key diseases closely related to the national welfare, human livelihood, major emergency event of public health, and common or frequently encountered diseases that severely affect human health. Meanwhile, the Department will also highlight research of rare diseases and other weak research areas in an effort to keep the balance and coordinative development of various disciplines.

In 2016, the Department will give special support to research aimed at studying the development and prevention of human rare diseases. The rare diseases are defined by WHO as diseases accounting for 0.65‰ to 1‰ of the total population. Applicants are expected to take the advantage of genetic resources in China, and to carry out in-depth research on prevention, diagnosis, and drug development of rare diseases, making achievement with own proprietary intellectual properties, and high international impacts. Meanwhile, case studies of major key rare diseases are highlighted in an effort to advance the understanding of pathogenesis underlying the development of major key diseases, thus providing theoretical bases for their novel diagnostic and therapeutic strategies. The applicants are expected to choose the proper secondary application codes attached to the primary application codes (H01 to H31), and to write "Mechanism underlying rare diseases (including case studies) and their prevention and treatment" on the annotation column of the application form.

In 2016, the Department will also give special support to research aimed at the development and function of lymphatic system. Research aimed at the regulation mechanism underlying the generation, maturation and homeostasis of the lymphatic system, the relationship between lymph and blood, the roles of lymphatic system on lipid metabolism, the immune defense function of lymphatic system, and the pathogenesis of major key diseases related to lymphatic system, are all encouraged.

1. Specific instructions for applicants

(1) Applicants are encouraged to carry out in-depth basic research toward scientific issues, especially the original research. Applications with unique academic ideas or solid previously accumulated research work are encouraged to carry out further systematic research. Simple descriptive or observant applications and applications tracking others', without innovative scientific ideas should be avoided.
(2) Applicants are expected to propose a defined scientific issue or a specific hypothesis based on analysis of the relevant latest literature and research progress in the field, and elaborate the scientific significance and values of the anticipated research results in detail.
(3) Applicants are expected to propose adequate research contents, detailed research design, clear research methods and reasonable budget; the proposed research is supposed to be specific, scientific, feasible and logical. Besides, applicants are expected to elaborate how the proposed research will possibly solve the specific scientific problems or verify the hypothesis.
(4) Applicants are expected to provide detailed information about relevant previous research. In case of extensive applications of previously funded project, the innovative ideas and further scientific problems of the research are expected to be elaborate in detail. Besides, all the relevant published papers are expected to be listed, and relevant unpublished results including experimental data, tables and graphics, pictures, etc., are attached.
(5) Applicants are expected to provide true and accurate information in their

applications, including the curriculum vitae of applicant and major participants (both education and working experience are expected to be included, in chronological order with exact months and years, keeping the timeline consistent), previous grant information and relevant publications. For publications, detailed information including the names of all authors (in the same order in which they appeared in the publication), the article and journal title, book title, volume number, page number, and year of publication (abstracts or meeting proceedings should be specified) should be included. The corresponding authors should be marked "*", and the co-first authors or co-corresponding authors should be marked and listed as is in the paper. Accepted manuscripts should be listed along with an attached acceptance letter or online publication link, unaccepted submitted manuscripts or manuscripts in preparation should not be included. Patents and awards should also be listed.

(6) Applicants are expected to provide a signed written institutional certification or approval (the scanning copy should be attached to the electronic proposal) to meet the related ethical or informed consent requirement if their applications involve special medical research objects such as human subjects.

(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. Additionally, a commitment letter to guarantee bio-safety should be provided by the research institutions when applications are involving highly pathogenic microorganisms.

(8) Applicants are expected to have good performance records in their previous grants and will be given priority funding if they have done so in their previous grants.

(9) Applicants are expected to notice that: in 2016 the Department will generally not give further funding to applicants who either have got high funding intensity in 2015 from NSFC (such as Key Program, Major Program, Major International and Regional Joint Research Program, etc.), or are applying for repetitive or similar research to their on-going national scientific projects funded by other agencies.

(10) Applicants are expected to provide PDF copies of no more than 5 representative papers in their electronic applications.

(11) Applicants are expected to refer the specific requirements for various programs via the website of the Department (http: //health.nsfc.gov.cn).

2. General overview of applications in the Department in recent years and instructions to research institutions

The number of applications has been increasing in the Department of Health Science ever since its establishment in 2009. In 2014 and 2015, the number of applications was 40,696 (from 961 research institutions) and 44,635 (from 985 research institutions), accounting for 26.47% and 26.62% of the total applications in NSFC, respectively.

To enable the rapid and healthy development of both scientific fund and medical research in China, the research institutions are expected to further strengthen their organization and management in the process of NSFC grant applications, and make an effort to further improve the scientific quality of applications (rather than increase the number of applications) under the guidance of "Requirements of NSFC for Institutions to Improve Management of Scientific Projects".

3. Specific Explanations on application codes

Peer review activities of the applications in the Department are organized according to

the application codes attached to this guide. The application codes of the Department of Health Sciences compose of 31 primary application codes (H01 to H31) and many relevant secondary codes. The basic characteristics of the application codes are as following: (i) the primary application codes, which are mainly arranged in the order of organs or systems, include research areas relevant to both basic and clinical research, in an effort to ensure that applications on similar scientific issues from different disciplines are reviewed in the same reviewing system; (ii) The secondary application codes, which are arranged in the order from basic to clinical research and from structural, functional and developmental abnormalities to diseases, cover both basic and clinical research relevant to the given organ or system.

The applicants are expected to carefully choose the primary application code and the relevant secondary code. For the details, please refer to the following contents in the guide of each Division of the Department.

4. Special policy for applications involving the development of animal models of human diseases

Animal models for mimicking human diseases are requisite to biomedical research, not only for understanding mechanism of diseases, and identifying new drug targets, but also for drug evaluation in clinical trial phases. The Department will give special support to applications for General Programs involving the development of animal models of human diseases. Basically, animal models for mimicking human diseases include both spontaneous animal models and inductive (laboratory) animal models, the latter may include gene modified animals (transgenic models, gene knock in/out models, ENU inductive models and cloning models), surgical animal models and physical- or chemical-induced animal models.

The funding intensity of direct cost is averagely 1.1 million yuan, and the duration is 4 years. Research in the following areas are especially encouraged: (i) identification of spontaneous animal models of human diseases; (ii) the development and standardization of various new inductive animal models; (iii) studies on the impacts of various environments on animal models; (iv) comparative medical studies on various species of animal models of the same disease; (v) Resource information and databases of animal models; (vi) Technical improvements in developing animal models. New animal models for human diseases are one of the fundamental works in experimental medical research, thus the Department will give long-term continuous support in order to provide technical platforms and facilitate research progress in this area in China.

The applicants are expected to choose the proper primary and secondary application codes based on their proposed research, and “The Development of Animal Models for Human Diseases” should be written in the annotated column of the application form. The similarity and differences in disease susceptibility and clinical symptoms between animal models and human diseases should be elaborated, and a detailed analysis of the available animal models of a given human disease is required to avoid repeated research. All the government requirements concerning animal welfare and ethical issues should be met. There is an “animal model” special column on the website of the Department (http://health.nsfc.gov.cn), and the principal investigators are expected to submit the progress report of the project in time, and to contribute to the validation, spread, and application of the animal model.

5. Funding plan and budget for General Program in 2016

The funding intensity of direct cost funding of each project of the General Program in the Department is expected to be averagely 600,000 yuan, basically the same as that in 2015, and the duration will still be 4 years. Doubled funding will possibly be given to excellent innovative research built upon previous strong background. Applicants are expected to request the adequate budget for their proposed work by filling out the budget form with

detailed justification.

The support research areas of each Division, and an overview of the award number, funding, and success rate of the General Program in 2015 in the Department are listed in the table below.

Funding for General Program Projects
in the Department of Health Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Average funding for direct costs	Funding rate++ (%)
Division I	Respiratory system, circulatory system, blood system	439+25*	25,499+625*	22.13
Division II	Digestive system, urinary system, endocrine system/metabolism and nutrition support, ophthalmology, otorhinolaryngology head and neck science, oral and craniomaxillo-facial Science	543+17*	31,394+425*	21.54
Division III	Neurological and psychiatric diseases, gerontology	347+14*	20,457+350*	21.71
Division IV	Reproductive system/ perinatology/neonatology, medical immunology	228+12*	13,137+300*	24.84
Division V	Medical imaging and biomedical engineering, special medicine, forensic sciences	223+13*	12,859+325*	20.63
Division VI	Medical pathogenic microorganisms and infection, orthopedics and sports medicine, emergency and intensive care medicine/trauma/ burns/laboratory medicine/plastic surgery/ rehabilitation medicine	367+15*	21,165+375*	20.38
Division VII	Oncology (leukemia not included)	752+31*	43,229+775*	19.57
Division VIII	Skin and appendages, preventive medicine, endemiology, occupational medicine, radiology	224+12*	12,849+300*	24.89
Division IX	Materia medica and pharmacology	241+13*	13,808+325*	22.18
Division X	Chinese medicine, Chinese materia medica, integrated chinese and western medicine	558+28*	32,043+700*	18.61
Total		3,922+180*	226,440+4,500*	20.94
Average direct cost funding per project		56.30 (57.74**)		

Note: *One year program; ** One year program not included; ++ One year program included

Division I of Health Sciences

The Division I provides grant support for basic research on the diseases of respiratory, circulatory, and hematological systems.

Respiratory System (H01)

The Division mainly funds the basic and clinical basic research on the diseases of lung, airway, pulmonary circulation, mediastinum, pleura, thoracic cage, and diaphragm. Our

funding areas cover disease mechanisms, pathophysiological changes and treatment strategies involving the studies on lung and airway structure, function and developmental abnormalities, lung, airway immunity and transplantation, lung and blood barrier, lung fluid transport and pulmonary edema, respiratory infections, inflammatory and defense response, lung injury, repair and remodeling, airway inflammation associated with asthma, chronic obstructive pulmonary disease, pulmonary circulation and pulmonary vascular disease, interstitial lung disease, granuloma, sarcoidosis, respiratory control and sleep-disordered breathing, pleural disease and new methods, techniques and animal models of the respiratory system diseases.

In recent years, the effects of respiratory emerging infectious diseases and ambient particulate matter (such as haze, etc.) on human health have been attracting more and more attentions. Therefore, applicants are encouraged to carry out studies focusing on the basic and clinical basic researches related to: (i) environmental pollution-induced respiratory diseases and pathogens-induced respiratory barrier damage; (ii) pulmonary fibrosis, tissue damage repair and inflammatory microenvironment regulation; (iii) bronchial or alveolar epithelial cell dysplasia and nodular lesions; (iv) lung stem cells and lung regeneration; and (v) the priority research areas also cover studies on the establishment of respiratory research platforms and new research models. Applicants are largely encouraged to elucidate the mechanisms of respiratory diseases, explore the potential disease diagnostic and treatment targets by combining new techniques and concepts of biomedical research.

In the past, the submitted and funded proposals in the respiratory areas mainly focus on airway inflammation associated with asthma, lung injury, repair and remodeling and chronic obstructive pulmonary disease. We hope to emphasize studies in the areas of lung-blood barrier; respiratory infection, inflammation and defense responses; chronic cough; nodules and pleural diseases. We also encourage studies in: (i) cell therapy for respiratory diseases; (ii) combine of latest developments in biomedical research; (iii) genetic and epigenetic studies on respiratory diseases; (iv) immune regulation mechanism; and (v) seeking for new diagnosis and treatment approaches, the potential of molecular markers and intervention targets for precision medicine and personalized medicine.

All applicants who tend to apply for pulmonary circulation and pulmonary vasculature studies can chose the codes of either respiratory system (H01) or circulatory system (H02), according to their specific research contents.

Circulatory System (H02)

The Division mainly supports researches on morphological, functional and developmental abnormalities in circulatory system, including cardiac and vascular diseases, microcirculation and shock. Applicants are encouraged to carry out original and translational research, working together with clinicians, developmental biologists and genetic biologists, to study on the mechanisms of cardiovascular diseases and the development of therapeutic strategy. In the cutting-edge fields of cardiovascular diseases, researchers are encouraged to establish international collaborations, to propose innovational hypothesis based on their own research data, and eventually gain achievements with independent intellectual properties. Research on the roles of endogenous biological active substances on the regulatory and injury mechanisms of cardiovascular diseases and the screening and identification of potential biomarkers for the diagnosis and treatment are also encouraged. In the past years, proposals covered all scientific topics in circulatory system, but most proposals were focused on cardiac/vascular injury and protection, and followed on atherosclerosis, coronary heart diseases, arrhythmia, hypertension, and heart failure. Metabolic disorder is closely related to cardiovascular disease, and applicants are encouraged to conduct the researches on the internal relation and mechanism, as well as the

intervention targets, between metabolic disorders and cardiovascular diseases. The innovative proposals in this direction will be highly funded in 2016.

Hematological System (H08)

The Division will mainly support original research in the development and formation of hematopoietic cells and organs, hematopoietic stem/progenitor cell and hematopoiesis regulation, red cell and its diseases, leukocyte and its diseases, platelet and its related diseases, aplastic anemia and bone marrow failure, myelodysplastic syndromes, myeloproliferative diseases, blood infection and its treatment, bleeding, coagulation and thrombosis, leukemia, hematopoietic stem cell transplantation and its complications, mesenchymal stem cell and blood disease treatment, blood typing and blood transfusion, hereditary hematologic disease, lymphoma, myeloma, plasma cell diseases, diagnosis and treatment methods for hematological diseases, novel research methods for hematological diseases.

The current research hotspots in hematological field include: regulation of hematopoiesis and hematopoietic cell reprogramming; interaction between hematopoietic cell and leukemic cell and their microenvironment under the disease condition; clonal evolution of malignant hematologic diseases; drug resistance in malignant hematologic tumors; and hematopoietic stem cell transplantation and its biological and immunological issues; hematological disease omics; hematologic biomarkers and their functional validation; maintenance of leukemic stem cell and its clinical correlation; cellular and molecular targeting therapies of hematological diseases; in vitro differentiation of stem cells to hematopoietic stem cells; platelets, blood vessel and coagulation factors, their interaction and mechanisms.

Currently, most applications and funding are concentrated in fields of leukemia, lymphoma, myeloma, hematopoietic microenvironment and stem cell transplantation. Applications in other categories are relatively low especially in the areas of red cell diseases, blood coagulation and thrombosis, cell and molecular targeting therapies. Thus, the applicants this year are strongly encouraged to submit applications in the fields of hematopoietic microenvironment and hematologic disease development, clonal evolution of hematologic malignancies, heterogeneity of diseased cells, and precision medicine. Applications are encouraged to initiate clinical basic research and ask basic research questions from clinical perspective, translational research fully utilizing clinical resource, research using the state-of-the-art technologies with hematological research platforms and innovative disease research models, translational research in biotherapies such as HSC transplantation, MSC therapy, immunotherapy, etc. Selected application in these fields will receive more funding in this 2016 grant cycle.

In 2015 grant application cycle, grant application for hematologic lymphoma studies (H1616) was transferred to Division I with an application code of H0818. In 2016, hematologic lymphoma studies will further divided into lymphoma (H0818), and myeloma and plasma cell diseases (H0819). For malignancies in other system, please refer to the description in general section of medical sciences.

Division II of Health Sciences

Division II mainly supports basic researches on digestive system, urinary system, endocrine system/metabolism and nutrition support, ophthalmology, otorhinolaryngology, head and neck science, as well as oral and craniomaxillo-facial science.

Digestive System (H03)

The funding scope mainly covers basic researches on diverse non-infectious and non-neoplasm diseases of digestive system. Proposals on liver diseases, such as hepatic fibrosis, cirrhosis and portal hypertension, were the most dominant research areas in this field, amounts for 14.4% of all proposals last year. Other research interests in liver diseases were hepatic regeneration, liver protection, liver failure and artificial liver (10.3%), metabolic dysfunction of liver and related diseases (8.1%). Other proposals covered mechanisms of immune-related diseases of digestive tract (9.1%), internal environment disturbance of GI tract, intestinal mucosal barrier impairment and related diseases (8.5%), abnormal GI motility and functional GI disorders (6.7%), pancreatic exocrine dysfunction and pancreatitis (6.1%), digestive organ transplantation (7.1%). The number of applications on the structure and functional impairment of abdominal wall/peritoneum, endocrine and neuro-humoral regulation of digestive system, acid-related diseases and vascular circulation abnormalities of digestive system was kept at a relatively low level.

Various liver diseases, especially fatty liver diseases, hepatic fibrosis, cirrhosis, liver damage and regeneration, and liver transplantation are receiving more attention. Among the gut diseases, applications on the intestinal microecology disturbance, immune diseases of digestive system, mucosal barrier abnormalities and related diseases increased significantly in recent years. Mechanism of gastrointestinal motility and functional GI disorders got lots of attention. Drugs, toxicants or alcohols-related digestive diseases are also hot issues in this field. Research on these important problems mentioned above, and studies on the pathophysiology of pre-clinical phase of these diseases and the mechanisms of functional disorders, relationship among different digestive organs in the pathogenesis of digestive system diseases are encouraged.

Urinary System (H05)

Studies on the structure and functional disorders of kidney, ureter, bladder, prostate and urethral canal, and all the disease related proposals except tumor research were included in this code. The amount of proposals received in 2015 increased by 4.57% compared with that in 2014. The submitted proposals mainly focused on damage and repair of the urinary system (19.38%), secondary renal diseases (16.29%), primary renal diseases (10.76%), as well as renal failure (10.54%). The amount of proposals focus on prostate, bladder diseases and urodynamic study was similar as that in 2014. The research proposals on infection of urinary tract and renal endocrine dysfunction were still few. The Division will continue to support consistent and innovative researches in these fields.

Endocrine System/Metabolism and Nutrition Support (H07)

The Division mainly supports studies on the structure, function disorders of endocrine systems (except tumor research), including diseases related research of endocrine system, and endocrine function and abnormality of classical and non-classical endocrine organs, and supports various dysfunctions of metabolism, malnutrition and nutrition support. The amount of proposals in 2015 increased by 18.8% compared with that in 2014. The majority of proposals were diabetes related (53.9%). The percentages of proposals on energy metabolism/obesity, bone metabolic diseases, thyroid diseases and metabolic syndromes were 15.3%, 10.1%, 5.2% and 3.7% respectively. There were few proposals on abnormal of nucleic acid metabolism (such as hyperuricemia and gout), disturbance of water and electrolyte metabolism and abnormal acid-base balance, amino

acid metabolism, development or structure abnormal of adrenal gland, as well as thyroid and parathyroid transplantation. Division II will pay more attention and support preferentially on these areas in the future, and encourage innovative applications on questions arising from clinical practice, with proper research design and approach.

Ophthalmology (H12), Otorhinolaryngology Head and Neck Science (H13), Oral and Craniomaxillo-facial Science (H14)

The Division mainly supports non-neoplasm diseases of related fields. In the field of ophthalmology, the Division mainly supports inflammatory diseases, immune diseases, hereditary diseases, as well as degenerative and neo-vascularized diseases. Researches on fundus diseases were still the most concentrated areas in 2015, accounted for 32.0% of total proposals, followed by glaucoma (16.8%), corneal diseases (15.0%), and optic nerve and visual pathway related diseases (11.3%). The common hot topic of ophthalmology was the researches on the molecular mechanisms of diabetic retinopathy, neovascular eye diseases, glaucoma retinal ganglion cells (RGCs) damage and pathologic myopia.

The amount of proposals in otorhinolaryngology last year increased by 22.4% compared with that in 2014. The proposals mainly focused on auditory abnormality and balance disorders, amounted for 42.1% of the total proposals, followed by olfactory, nose and anterior cranial base diseases (26.4%), and throat and neck diseases (9.85%). Hearing related researches were key-issues in otology, including the genetic and molecular pathogenesis on various types of deaf, and signal pathways related with hear damages. The amount of proposals focus on words and music recognition related studies after cochlear implantation was similar as that in 2014. Pathogenesis of rhinitis and sinusitis, allergic rhinitis and its immunotherapy were hotspots in the field of nosology. Proposals on the throat diseases were mainly focused on pararthria and functional repair. Obstructive sleep apnea hypopnea syndrome (OSAHS) is another concerned area. Pathogenesis and interventional treatments Tinnitus, acoustic sensitivity, circumgyration, dysosmia will be the future direction. More general projects with high funding intensity will be supported in this field. In areas of oral and craniomaxillo-facial science, there were more proposals on the periodontal and oral mucosa diseases, accounted for 19.9% of total proposal, followed by tooth defect, anodontia, repair and correction of dentognathic deformity (14.8%), as well as dental pulp and periapical diseases (13.6%). The number of proposals on the dental-derived and adipose derived stem cells reached to 236. The researches on the implant materials were still hot fields, with 104 proposals. The Division will continue to support researches on most severe, common, complicated diseases or functional disorders in the above fields, support research on pathogenesis, diagnosis, novel treatment procedures and functional reconstruction, and support researches on areas related to general health of human body.

The Division does not support researches on drug design and pharmacology as well. Please submit the related proposals to Division IX of Health Sciences (H30, H31). Proposals on the male reproductive system and male sexual dysfunction are not included in code H05, so please submit related proposals to Division IV (H04). It is specially noted that the proposals on teeth repair and implant material should use code H1409, and the proposals on craniofacial bone, cartilage tissue in the field of oral medicine should use code H1402. Other proposals related with characters of oral orthodontic and repair should submit to code H1408. Division II does not support cancer research in above areas. All applications on cancer research in those areas please refer the general introduction of proposal guidance from Department of Health Science.

Division III of Health Sciences

Division III mainly supports basic research in the fields of neurological diseases, mental disorder and gerontology.

Neurological Diseases and Mental Disorder (H09)

The Division mainly supports basic and applied research on the structure, function, heredity and developmental anomalies of the nervous system, as well as the etiology, pathogenesis, diagnosis and treatment of non-tumorigenic neurological diseases. The Division supports research on common disorders in the nervous system such as cerebrovascular diseases, brain and spinal cord trauma and repair, pain, epilepsy, and neurodegenerative diseases. In addition, the Division supports research on pathologic mechanisms of rare nervous system diseases and CNS inherited metabolic diseases. Furthermore, research on the mechanism and the therapeutic approaches of inflammatory immune disease in the nervous system is also an important direction for funding. At the same time, research on the etiology and relevant clinical studies of comorbidity in neurological and psychiatric diseases will be focused.

Modern disease spectrum is characterized by a rapid rise in the prevalence of psychological and psychiatric diseases. Research efforts based on unraveling biological mechanisms are mainly aimed at increasing early recognition, reliable diagnosis and improvement on treatments of these disorders. There were fewer applications on crisis intervention in 2015. Most applications were written on schizophrenia and depression, yet an increase in the number of applications on autism and attention deficit syndrome has been seen. In order to reduce the prevalence of psychological and psychiatric disorders in China, research topics are encouraged to illustrate the mutual interaction between environment and genetics and their impact on the development of these diseases, unravel potential etiologies, discover practical biomarkers in order to monitor development, progression and prognosis of the conditions, establish early diagnostic methods, and develop pharmaceutical and non-pharmaceutical methods for early intervention and treatment.

In recent years, applications for research in neurological diseases were predominantly on stroke, epilepsy and neurodegenerative diseases. In 2015, research on clinical application of neural stem cells and epigenetic on neurological diseases has increased obviously as well as studies focused on miRNA. However, most of the research was on follow-up analysis and lack of originality. The Division will continue to fund studies on rare genetic diseases in the nervous system, especially studies based on the molecular classification of individualized diagnosis and treatment. Studies using animal models such as non-human primates, Drosophila and Zebrafish will be encouraged. Although the number of applications for clinical study on cerebrovascular diseases has increased, clinical data collection on the involved studies was not standardized and lack of specification. Therefore, a unified strategy for carrying out clinical trials and data collection is required to strengthen the basic and clinical studies in early intervention, revascularization and functional recovery in stroke patients. The role of Vein in acute stroke, neurotrauma and neurodegenerative diseases is also a topic of central interest. Researches on the mechanisms underlying pain, especially chronic pain, need to be strengthened through the collaboration of basic and clinical studies. Studies on postoperative cognitive dysfunction and the mechanisms of general anesthesia have attracted great attention from anesthesiologists. The progress of this field is great after given high strength support in 2014 and 2015. In 2016, one or two

general program projects will continue to be generously funded to encourage research in this field. The Division hopes to balance its support among applications from neurology, neurosurgery, psychiatry and related fields such as pediatrics and anesthesiology. Clinicians and researchers in basic neurosciences are encouraged to jointly apply to perform significant investigation.

Gerontology (H25)

Funding scope mainly covers studies on pathophysiological mechanisms of aging and its related diseases. Studies on organ pathophysiological changes and common mechanisms of various diseases with respect to the aging process are encouraged and supported, including factors of genetic, metabolism, damage, stress, inflammation with organ function and the development of aging-related diseases; molecular mechanisms of stem cell senescence and its association with organ function and maintenance; the anti-aging effect and mechanism of calorie restriction, exercise, health management and other approaches. The overall goal of gerontology is to fund research that can advance the prevention, prediction, diagnosis, treatment, and prognosis of aging and its related diseases.

The Division does not accept applications concerning tumors, which should be submitted to the Division VII of Health Sciences (H16). Applications on diseases not related to aging mechanisms should be submitted to the appropriate Division.

Division IV of Health Sciences

The Division mainly supports basic research on reproductive system, perinatology, neonatology, and medical immunology.

Reproductive System/Perinatology/Neonatology (H04)

The Division mainly supports studies including: (i) abnormalities of the function and development of reproductive system, damage and repair of reproductive system, inflammation and infection of reproductive system, and reproductive endocrinoloical disorders, hereditary diseases of reproductive system, non-neoplastic diseases of reproductive system; (ii) oogenesis, spermatogenesis, fertilization, embryo implantation and fetal development, prenatal diagnosis, the structure and function of placenta and pregnancy related diseases; (iii) neonatal diseases; (iv) abnormalities of breast structure, function and development; (v) contraception, birth control and termination of pregnancy; (vi) female infertility and assisted reproduction, reproductive medical engineering; (vii) new diagnostic and therapeutic technology for the reproductive system/perinatology/neonatology.

The Division received 1,347 proposals in 2015, among which, 192 proposals are aimed at neonatal diseases, 172 proposals at pregnancy and pregnancy related diseases, 115 proposals at female reproductive endocrine disorders, 97 proposals at abnormal spermatogenesis and male infertility, 94 proposals at female infertility and assisted reproduction, 91 proposals at endometriosis and adenomyosis, 78 proposals at prenatal diagnosis of fetal development, 69 proposals at embryo implantation and early embryonic developmental abnormalities, etc. The hotspots such as genetic and epigenetic studies of reproductive system, the use of stem cell transplantation in treatment of reproductive diseases and new animal models for reproductive diseases, are all involved. However, proposals aimed at contraception, female sexual dysfunction, female hereditary diseases, female menopause, and the abnormalities of structure, function and development of mammary glands, are relatively less. Thus the Division will give special support to these

neglected research area in 2016. Besides, the Division will continuously encourages the basic research jointly proposed by basic researchers and clicnians aimed at the issues emerging from clinical practices.

Medical Immunology (H10)

The funding areas of this discipline cover basic and translational research in the following areas: (i) morphological, structural, functional and developmental abnormalities of immune cells, tissues, organs and immune system; (ii) mechanism underlying immune pathological process, immune regulation and tolerance, immunization, immunodiagnostics and immunotherapy of various diseases.

Key research directions and areas include: (i) new immune cells and their subsets, new immune molecules and signal transduction pathways, and their relevance to diseases; (ii) stem cell and immune system; (iii) in vitro differentiation and preparation of immune cells; (iv) the effect of epigenetic modification on immune cell differentiation, and its relevance to diseases; (v) the immune-metabolic cross-talk; (vi) the mechanism underlying the immune recognition responses effects by both innate and adaptive immune systems; (vii) immunologica research involving major key diseases, such as infectious diseases, inflammatory diseases, hypersensitive diseases, autoimmune diseases, immunodeficiency diseases, transplantation immunology and organ transplantation; (viii) research on the mechanism underlying vaccines and adjuvant.

Totally 858 applications for General Program were received in 2015, and many of these applications were focused on autoimmune diseases (343), inflammation and infection immunology (150), organ transplantation and transplantation immunology (81), and immune responsive factors and diseases (66).

The Division will continuously give special support to: (i) studies aimed at taking the advantages of establishing unique research systems or technical platforms (such as unique cell models or animal models, molecular targeting techniques, etc.) to understand the common mechanism underlying human immune-mediated diseases; (ii) studies aimed at taking advantages of the unique genetic or disease resources in China; (iii) systematic immunological studies that are intended to understand the immune-related features across various diseases spectrum by immunoinformatics, immunogenomics, immunogenome library and computational immunological techniques; (iv) collaborative studies aimed at scientific issues emerging from clinical practices by both basic and clinic researchers; (v) visualized studies of immune systems and immune response processes by newly developed real-time dynamic imaging techniques (MRI, PET, co-focal laser microscopy and living cells imaging, etc.), and single cell sequencing.

Tumor research areas of reproduction system are not covered in application codes H04, but in application code H16.

Division V of Health Sciences

Division V mainly supports the basic research in the field of medical imaging, biomedical engineering, medical aspects of specific environments, and forensic medicine.

Medical Imaging and Biomedical Engineering (H18)

Medical Imaging and Biomedical Engineering are featured by multidisciplinary intercrossing, such as the intercrossing between medicine and mathematics, physics, chemistry, information sciences, material sciences or engineering, and life sciences, etc. The Division supports basic and applied basic researches in areas of medical imaging and

medical engineering.

In the field of Medical Imaging, the basic research of medical imaging and its application to solve the scientific problems related to medicine is mainly funded, including magnetic resonance imaging (MRI), X-ray and computed tomography (CT), ultrasound in medicine, nuclear medicine, and interventional medicine, etc., functional and molecular imaging. Meanwhile, the explorative interdisciplinary studies in the scientific forefront of this field, including the areas of multimodal imaging, functional imaging, molecular imaging, precision interventional medicine, theranostic integration, medical image processing and analysis, imaging genomics, and translational medicine are also encouraged. In addition, the research of new imaging technology which can be applied in the early diagnosis, the early treatment, the prognosis, and the therapeutic effect evaluation of various diseases are also supported.

In the field of biomedical engineering, the Division mainly funds the research on medical engineering associated with disease prevention and early-warning, disease detection and diagnosis, disease treatment and rehabilitation, as well as the basic research related to regenerative medicine and nanomedicine, including biomedical signals, data processing and analysis of medical images, biomedical sensors, medical optics such as medical photonics and optical imaging, chips and micro-nano system, biomedical system modeling and information system, physical therapy, rehabilitation engineering, neural engineering and brain-computer interface, treatment planning and navigation technology, robot-assisted therapy, biomedical instruments and medical equipments, micro-nano-sensors and system, drug delivery materials and gene transfer systems, medical biomaterials, tissue engineering, regenerative medicine, artificial organ, and other scientific issues. Basic researches on brain imaging and intervention, implantable electromechanical system, biomanufacturing and 3D printing, biological micro electromechanical system, non-invasive and minimally invasive medical engineering technique, the treatment planning and navigation technology, robot-assisted therapy, new scientific equipment, cell/stem cell therapy, bioreactor of tissue engineering/construction, and biomaterial-induced tissue regeneration are also encouraged.

Medical Aspects of Specific Environments (H21)

Medical aspects of specific environments are aimed at the special health care needs of the population under different special environments, to solve various special medical problems in practice, and to provide theoretical support for major national strategic needs, the main purpose is understanding the physiological and pathological phenomenon and regular patterns of the human body in special environments on the level of molecule, cell and entirety. In this area, the Division mainly supports basic research on the resolve of pathophysiological phenomena and the prevention and cure of the diseases under the condition of aeronautical, astronautic, nautical, submarine, plateau, polar region and other special or extreme environmental conditions. The applications of the medical, chemical, biological, and modern engineering technologies for systematical research of the medical aspects of special environments are also encouraged. Internal disciplinary in the medical aspects of specific environments, interdisciplinary between the medical aspects of specific environments and biomedical engineering or other natural sciences are also supported. In the area of the issues of medical science and disease prevention and cure under special or extreme environments such as aeronautical, astronautic, nautical, submarine and plateau hypoxia, etc., the Division funded 1 application in high funding intensity in 2015, and in 2016, the Division will fund 1 or 2 applications in high funding intensity.

Forensic Medicine (H23)

In the field of Forensic Medicine, the Division mainly funds the basic research on resolving the biomedical identification problems in the judicial practice with the studies of human body and other relevant human biological samples. The funding fields mainly include the identification of cause of death, the estimation of postmortem interval and wound age; the pathophysiological changes caused by abuse and dependence of drugs and poisons, in vivo metabolic process of poisons; the forensic evidence associated with the evaluation of the degree of injury and damage, the identification of the level of disability and loss of the working ability; the objective evaluation of the legal capacity of persons with mental disorders; the individual characteristics determination (age, height, appearance), individual identification from difficult samples, the paternity identification, the tissue origin identification and ethnic origin identification. The profound and systematic research using the theories and techniques of physics, chemistry, biology, medicine, law and informatics, etc., is strongly supported. The researches of internal disciplinary in the forensic medicine and the interdisciplinary between forensic medicine and bioengineering, other natural sciences and even social sciences are also strongly supported, which will provide the clues to the case investigation, the scientific evidence for the case justice, the basis for the legislation of relevant laws and regulations.

The development of medical imaging and biomedical engineering has been accelerated by multidisciplinary studies. In 2015, there were total 1,144 applications in the areas of medical imaging, biomedical engineering, medical aspects of specific environments and forensic medicine, of which 236 applications were funded, the funding rate is 20.63%. The funding rate decreased slightly compared with 2014. Meanwhile, the number of applications in biomedical engineering, medical aspects of specific environments and forensic medicine increased, but it is still less than the number of application in medical imaging. To further promote the rapid development of medical imaging, biomedical engineering, medical aspects of specific environments and forensic medicine disciplines, the Division will continue to encourage multidisciplinary researches and cooperation between scientists with different scientific backgrounds. At the same time, preferential support will be provided to young investigators working in the interdisciplinary scientific frontiers mentioned above. To promote the developments of the medical aspects of specific environments and the forensic medicine, the applicants with different academic background are encouraged to explore the scientific issues in the 2 areas above.

The Division does not accept applications on radiation oncology or radiation prevention, which should be submitted to the Division VII (H16) or Division VIII in the Department of Health Sciences (H22), respectively. The applications on pharmacology and drug administration should be submitted to the Division IX (H30, H31) in the Department of Health Sciences.

Division VI of Health Sciences

The funding scope of Division VI covers basic researches in fields of biological characteristics and infection of bacteria, fungi, viruses, parasites and other pathogenic organisms, laboratory medicine, emergency and critical care medicine, trauma, burns, frostbite, plastic surgery, abnormalities and diseases of locomotor system, and rehabilitation medicine.

Medical Pathogens and Infection (H19)

The Division mainly supports basic research focused on the medical microbes and

parasites as the main pathogenic biological resources, including the pathogen biological characteristics and genetic variation, the infection and drug-resistance mechanism, the host immune response, the epidemiologic trends in nosocomial infection, the discovery of the medium and the physiological-ecological-behavior based on the sources and the routes of infection. Key scientific issues in the field of pathogenic organisms and infectious diseases are focused on the heredity, variation and drug resistance acquirement of pathogenic organisms and the host-pathogen interaction. The innovative basic research regarding the issues mentioned above and biomedical research relating to various types of pathogenic organisms, especially the new hair and neglected pathogenic organisms are highly encouraged. The project application about pathogenic microorganism, should strictly implement "Biological safety management regulations of pathogenic microorganism laboratory" issued by the State Council and rules about "ethics and biological security" drawn by relevant ministries; the application involves highly pathogenic microbes should submit the commitment from supporting institutions to assure biological safety.

Laboratory Medicine (H20)

The Division mainly supports researches on new theory, new technology, new methods and new markers for prediction, diagnosis, monitoring and prognosis of all kinds of diseases. The key-funding field includes the discovery and identification of sensitive and specific markers, the detecting techniques for personalized therapeutics, and the quality control, the reference methods and materials in measurement. Interdisciplinary researches are encouraged.

Emergency and Critical Care Medicine, Trauma, Burns and Plastic Surgery (H15)

The Division mainly supports scientific issues involving the pathophysiology, pathogenesis, diagnosis and treatment, and prevention in the field of emergency and critical care medicine, trauma, burns and frostbite, etc. In the field of plastic surgery, the funding mainly supports researches in wound healing and scar treatment, the defect and deformity repair, regeneration and reconstruction of superficial tissues and organs, and scientific issues related to medical cosmetology.

Abnormalities and diseases of locomotor system (H06)

The Division mainly supports the researches on the abnormalities in structure, function and development of the bone, joint, muscle and ligament, and the researches covering the etiology, pathogenesis, prevention, diagnosis and therapy of the diseases in locomotor system including the genetic diseases, the immune-related diseases, inflammation and infection, injury and repair, grafting and reconstruction, fatigue and recuperation, degenerative disorders, sports injury, deformity and correction, and non-neoplastic diseases. Meanwhile, proposals on the scientific issues arising from research on medical biomaterials of bone, joint and soft tissue are encouraged. The submitted proposals in 2015 were mainly focused on the damage and repair of bone, joint and soft tissue (H0605), and the degeneration of bone, joint and soft tissue (H0609); researches in intervertebral disc degenerative disease, osteoarthritis, and medical biomaterials are the hotspots in this field. In addition, 3D printing related research becomes more and more in recent years. Researches in fatigue and recuperation of bone, joint and soft tissue (H0608) and soft tissue diseases are few. The proposals of the mechanisms in new phenomena and new problems found in clinical and the continuous and innovative basic researches are also encouraged. In view of the relatively weak basis in research on sports medicine, this Division will give

more support to the relevant applications.

Rehabilitation Medicine (H17)

The Division mainly supports the researches on the mechanisms, clinical evaluation and therapy in the rehabilitation of dyskinesia and injuries caused by the diseases of locomotor system, nervous system or other relative organ/systems.

Without biological security commitment of the supporting institution or not conforming to the rules of the State Council and the relevant ministries, the applications involving highly pathogenic microorganism will not be granted. In addition, the applications on therapeutic drugs and pharmacology should be sent to Division IX (H30, H31) or Division X (H28). Pathogenic mechanism of molecules and temporal and spatial expression and regulation of genes should not be sent to laboratory medicine, so please apply it in other appropriate Divisions. Researches on drug-resistant pathogens should choose the code of Variation of Pathogen and Drug-Resistance (H1908). Researches that are not involved in the mechanism, evaluation and therapy of rehabilitation should not be sent to rehabilitation medicine, so please apply it in other appropriate Divisions. About tumor related applications, please see the general part of Department of Health Sciences.

Division VII of Health Sciences

The Division mainly funds basic research in oncology.

Oncology (H16)

We provide funding for cancer research involving common features of tumors in occurrence, development and progression, as well as the distinctiveness of tumors of various systems/organs in etiology, pathogenesis, diagnosis, treatment and prevention. The scopes of funding cover not only tumor etiology, tumor development, tumor genetics and epigenetics, tumor immunology, tumor prevention, recurrence and metastasis, tumor stem cell, tumor diagnosis, chemotherapy, physical treatment, biological treatment, comprehensive treatment of the tumor, tumor rehabilitation including social and psychological rehabilitation, new techniques of tumor research, but also tumors of various systems/organs (excluding hematologic system) which include respiratory system, digestive system, nervous system (including special receptors), genitourinary system, breast and endocrine system, bone and soft tissue, head, neck and maxillofacial region, skin, body surface and other parts of the human body.

The scientific goal of the Division is to emphasize the common features of tumors, which focuses on the molecular mechanism of tumor biology, such as proliferation, differentiation, metastasis, autophage and apoptosis, thus to explore the mechanism and regularity of tumor occurrence, development, metastasis and recurrence, laying the foundation for tumor diagnosis, treatment and prevention. Also, we aim to highlight the distinctiveness of tumors of various systems and organs, and to promote the clinical practice in tumor diagnosis and treatment by carrying out translational research based upon clinical experiences and observation of specific systems/organs.

Proposals related to common scientific questions of tumor should select relevant application codes in tumor etiology, tumor occurrence, tumor genetics, tumor immunology, tumor prevention, tumor recurrence and metastasis, tumor stem cell, tumor diagnosis, chemotherapy, physical treatment, biological treatment, comprehensive treatment, rehabilitation (including social and psychological rehabilitation) and new techniques of tumor research. Proposals related to distinctiveness of tumor of specific systems/organs

should choose application codes of corresponding systems/organs. Application codes should be carefully selected in accordance with various scientific fields.

Oncology is one of the most active areas in medical sciences. With the rapid development and integration of cell biology, developmental biology, genetics and immunology, the trends of cancer research are steered towards tumor epigenetics, tumor stem cells, tumor immunology, and tumor systemic biology. Recently, research on cancer epigenetics has emerged as a rapid moving field, especially the studies of epigenetically regulated functional RNA in tumorigenesis and tumor progression. Additionally, study on the interaction between tumor cell and its microenvironment has gained increasing attention, for it emphasizes not only the regularity of microenvironment on tumor cell's biological property, but also the biological significance of tumor cell's effect on microenvironment. Moreover, aberrant cancer metabolism and its underlying mechanisms as well as its role in cancer biology have been appreciated, especially the reciprocal causality of metabolism and tumorigenesis and cancer development. Special interests have been aroused in the mechanisms of metabolic reprogramming of cancer cells and microenvironment, the association between specific metabolism of tumor cells and their biological behaviors, the roles of abnormal metabolites in oncogenesis and tumor development, and the crosstalk among different signal pathways in cancer cells. The other proposals have stressed the translational values of metabolic factors in tumor biology. For example, studies exploring in vitro and in vitro efficacy and mechanisms of agents regulating the metabolisms of glucose, lipids and nuclear acids in tumor cells may provide experimental evidence for the application of traditional drugs for cancer treatment. Studies probing the biology of tumor stem cells are making tremendous progress in recent years, which include the molecular mechanisms involved in maintaining the stem-cell like properties of tumor stem cells, abnormal metabolism of tumor stem cells, relationship between epithelial-mesenchymal transition (EMT) and tumor stem cells, formation and mechanisms of vascular mimicry, interactions between microenvironment and tumor stem cells, cancer cell dormancy, tumor heterogeneity, and resistance in therapy. Finally, tumor chemoprevention attacks more and more interest. By screening natural or synthetic compounds, new targets for cancer prevention and treatment were identified, reducing the incidence of cancer and improving survival for cancer patients.

In recent years, the quality of proposals in the field of oncology has been significantly improved, in terms of solid preliminary experimental data, scientific hypothesis based on sophisticated reasoning and complete and thorough studying items. Proposals derived merely through literature reviewing without preliminary experimental data, or descriptive and correlative studies are declining each year, and are lacking approval by reviewers.

Applicants are encouraged to conclude scientific questions from accumulated research findings or clinical practice, and to systemically investigate mechanisms for malignant tumors to improve cancer diagnosis, treatment, and clinical translation, as well as to develop new technology for cancer research. Integrated research proposals making the most of domestic clinical resources and focusing on common and high incidence tumors in the Chinese population are also encouraged.

Applicants should note that the proposals on tumor epidemiology should be submitted to the Division VIII of Health Sciences (application code: H26), and proposals of hematologic system tumor should be submitted to the Division I of Health Sciences (application code: H0818 in place of H1616). Proposals related to distinctiveness of tumor from specific systems/organs should carefully choose application codes of corresponding systems/organs. Proposals submitted in wrong application codes would be objected.

Division VIII of Health Sciences

Division VIII of Health Sciences provides funding for basic research in fields of skin and its appendages, endemiology, occupational medicine, radiology medicine, and preventive medicine.

Skin and Its Appendages (H11)

The funding scope mainly covers the basic research in the structure, function and dysplasia of skin and its appendages, as well as hereditary, autoimmune and inflammatory skin disease.

Radiology (H22)

Funding is given to basic research in radiation damage and repair, radiation toxicology and pathology, radiological hygiene and protection, and radiological therapy for non-tumor disease.

Endemiology (H24)

Funding is given to basic research regarding to the natural focal disease, biogeochemical disease and work-related or life style-related disease.

Occupational Medicine (H24)

Funding is given to basic research concerning diseases due to exposure to occupational hazards.

Preventive Medicine (H26)

The funding scope covers the basic research in environmental health, occupational health, human nutrition, food hygiene, maternal and child health care, children and adolescent health, toxicology, hygienical analytical chemistry, epidemiology of infectious disease, epidemiology of non-communicable disease, epidemiological methods and medical statistics.

With the severe increase and high threats to the public health, applicants should pay more attention to the pathogenesis and prevention of immune-related and infectious skin diseases.

Funding for radiology, endemiology, occupational medicine and preventive medicine will be mainly focused on research aiming at discovering new theory and developing advanced technology and methods for disease prevention and control. Projects with important scientific significance and original innovation are highly preferred. Investigators must focus on population based studies according to the actual demand of national population health and disease prevention. It is required to conduct the projects using integrated advance technology. A combined laboratory and field research is much more encouraged. Applicants should pay more attention to the multidisciplinary method, and look for a new growing point. In order to demonstrate our national characteristics and prestigious international standing, it is prerequisite to seek a novel research direction and to make great efforts in prospective research. Basic data accumulation and medical specimen collection will be encouraged in order to carry out in-depth, systematic study. The basic research in epidemiological cohort study is highly encouraged.

Tumor topics in the field of skin and its appendages are not accepted in Division VIII. These applications should be sent to Division VII (H1626). Division VIII does not accept applications for studying cancer radiotherapy. Applicants may refer to categories under

Division VII of Medical Sciences (H1610). Division VIII does not accept applications for medical imaging and radiological diagnosis. Applicants may refer to categories under Division V of Medical Sciences (H18). Applications for studying gynecologic diseases and pediatric diseases are not accepted. The former may refer to categories under Division IV of Medical Sciences (H04), while the latter depends on the classification of system characterization. Application of clinical test is not accepted under the category of hygienical analytical chemistry. Applicants may refer to categories under Division VI of Medical Sciences (H20). Applications of pure laboratory research are not accepted under the category of epidemiology. Application of hereditary disease without geographical features is not accepted under the category of endemiology. The criterion for selecting the category depends on the classification of system characterization. In addition, applications on drug toxicology will not be accepted, and applicants may refer to categories under Division IX of Medical Sciences (H31). Other issues in preventive medicine (H2612) do not accept applications for hygienical economics, hospital administration. Applicants may refer to categories under Department of Management Science. Also, applications for pathogen biology for infectious disease, as well as the pathogenesis, diagnosis and treatment will not be accepted. Applicants may refer to categories under Division VI of Medical Sciences (H19).

Division IX of Health Sciences

The Division IX mainly supports basic researches in the discipline of Materia Medica and Pharmacology.

Materia Medica (H30)

Funding granted in the discipline of Materia Medicacover research areas or sub-disciplines including Medicinal Synthetic Chemistry, Natural Products Chemistry, Microbial Medicines, Marine Drugs, Biotechnological Drugs, Special Medicines, Drug Design and Drug Informatics, Pharmaceutics, Pharmaceutical Materials, Pharmaceutical Analysis, Drug Resources, and other scientific issues related to Materia Medica.

Projects supported in the discipline of Materia Medica mostly focus on interdisciplinary and basic researches of druggability. Funding granted in Medicinal Synthetic Chemistry, Natural Products Chemistry, Microbial Medicines and Marine Drugs mainly support researches on innovative theories, technologies and approaches for structural modification and synthesis of compounds with potential to be developed into new drugs, and also for drug discovery from terrestrial or marine plants, animals and microorganisms. Funding granted in Biotechnological Drugs mainly support researches on innovative biotechnologies or approaches to obtain therapeutic antibodies, vaccines, proteins, nucleic acid drugs, cells, etc., while exploratory researches on new types of expression systems and large scale culture techniques will be supported reasonably. Funding granted in Special Medicines support drug researches related to aeronautics, astronautics, deep sea, radiations, militaries, special environments, etc. Funding granted in Drug Design and Drug Informatics support researches on innovative theories or approaches for drug design and safety prediction by applying principles of drug design, computer-aided drug design, pharmaceutical informatics on the basis of Biomedicine, Systems Biology, Structural Biology, Chemistry and Pharmacological principles (such as ADME and drug transporters). Funding granted in Pharmaceutics support researches on innovative theories, technologies and evaluation methods, which are associated with Physical Pharmacy, Biopharmaceutics, Molecular Pharmaceutics, Novel Drug Delivery Systems and Pharmaceutical Dosage Forms. Funding

granted in Pharmaceutical Materials mainly support basic researches on establishment and safety evaluation of new pharmaceutical excipients and carriers, which should have owned prominent features and can be distinguished from researches in the area of pharmaceutics. Funding granted in Pharmaceutical Analysis mainly support basic researches on establishment and development of innovative analytic approaches and techniques aimed at solving key scientific problems in the field of Materia Medica and Pharmacology. Researches characterized with multi-disciplines coordination, such as in the fields of "-omics", Drug Metabolism (ADME) and Pharmaceutical Analytical Informatics, should mainly focus on innovation of analytic approaches. To establish the novel theories and methods used for in vitro and in vivo detection of biotechnological drug, polysaccharides and bioactive molecules are also encouraged. Funding granted in Drug Resources mainly support researches on key scientific problems associated with discovery, exploration, sustainable utilization and protection of new pharmaceutical resources.

Pharmacology (H31)

Funding granted in the discipline of Pharmacology support researches on drug action mechanism or drug resistance mechanism, Drug Metabolism and Pharmacokinetics, Clinical Pharmacology and Drug Toxicology, etc., the involved drugs should be therapeutic drugs or drug candidates or bioactive substances with some advantages in treatment of diseases.

In the discipline of Pharmacology, projects should mostly focus on in-depth study on action mechanism of drugs or bioactive products including exploring the basic rule of life and the pathologic mechanism of disease by using drug molecules as probes. In addition, in-depth and systematic studies should be strengthened in proposals related with research fields as below: discovery and validation of new target or molecular biomarker, strategies and methods to effectively overcome multi-drug resistance, targets and mechanisms of new types of bioactive compounds, quantitative pharmacology and systemic pharmacology, drug epigenetics, etc. Basic research should be strengthened in proposals related with research fields as below: molecular regulatory network of complex disease and drug intervention, individualized drug therapy, new treatment approaches, new use of old medicine, translational medicine, innovative pharmacological models and disease models. In the sub-discipline of drug metabolism and pharmacokinetics, new approaches and new models should be constructed and developed to strengthen the researches on molecular mechanism involved in the research areas of pharmacodynamics, toxicology, clinical medication and drug intervention. To better understand drug efficacy and toxicity in molecular level, the researches on distribution and metabolism of drugs in cells and even subcellular organelles should be strengthened. To better understand profiles of biomacromolecular drugs in vivo distribution, metabolism, elimination, and their relationships between pharmacokinetic, pharmacodynamic and toxicity, the researches on pharmacokinetic analysis methods to sensitively, exclusively and accurately detect biomacromolecular drugs, such as monoclonal antibody drugs and antibody-conjugated drugs, should also be strengthened. In the sub-discipline of drug toxicology, researches should be strengthened in the research fields as below: molecular toxicology, mechanism on genetic toxicity and reproductive toxicity, mechanisms on metabolite toxicity, new models and new approaches for drug safety evaluation. The researches and clinical applications of gene polymorphism, microRNA, posttranslational modification of protein and small molecule metabolites used in the early stage of screening of drug toxicity, the discovery of toxicity biomarker and toxicity action mechanism should be strengthened.

In recent years, a large proportion of proposals in the discipline of Materia Medica were from sub-disciplines of Pharmaceutics, Medicinal Synthetic Chemistry, Natural Product

Chemistry, in which, many proposals were involved in antitumor drug research and nanocarrier design. The research fields should be expanded and the research contents should be in-depth and innovation, meanwhile, crosslink between Life Sciences, Medicine, Chemistry, Physics, Mathematics, Control Science and Pharmacy should be strengthened in the proposals. It is necessary to expand research directions to various diseases. Rare disease (orphan disease) and the often ignored diseases should be emphasized. The researches on the druggability of delivery systems and new compounds should be emphasized. In the discipline of Pharmacology, most proposals mainly focus on drug action mechanism or drug resistance mechanism, some special projects based on long-term accumulation could be founded; however, most studies on mechanism were still limited to the description of biological effects of drugs, and fewer proposals were focused on the discovery of new target, validation of new target and in-depth study on molecular mechanism. Some proposals with good research idea failed to be approved due to inadequate data, insufficient evidences, oversized research plan, insufficient study in depth, ambiguous research objects and incomplete scientific logic, etc. A few of proposals were not granted for lack of innovation or too simple without any preliminary data.

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

The scopes of funding do not cover conventional researches for drug development and pharmaceutical process for new drug approval. Usually, the entire chemical structures or backbone of compounds should 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. Confidentially core contents or techniques, which are not suitable to illustrate or describe in proposals such as chemical structures, should be sent directly to the office of Division IX by confidential letters and explained in proposals.

Division X of Health Sciences

The Division X of Health Sciences identifies its role as advancing the theories of Traditional Chinese Medicine while highlighting its advantages. It provides funds to basic research programs in Traditional Chinese Medicine (TCM), Chinese Materia Medica (CMM) and Integrated Chinese and Western Medicine (IM).

Traditional Chinese Medicine (H27)

Funding areas: (i) Fundamental theories of TCM: Essence of Viscera, Qi, Blood and Body Fluid, Body Constitution, etiology and pathogenesis, basis of TCM Syndromes, Therapeutic Principles and Methods, Prescriptions of TCM, and Diagnostics of TCM; (ii) Basic research in clinical medicine: Internal Medicine of TCM, Surgery of TCM, Orthopedics and Traumatology of TCM, Gynecology of TCM, Pediatrics of TCM, Ophthalmology of TCM, Otorhinolaryngology of TCM, Stomatology of TCM, Geriatrics of TCM, and Health Preservation and Rehabilitation of TCM; (iii) Acupuncture and moxibustion, Tuina and massage: Meridians, Collaterals, and acupoints, acupuncture, moxibustion and Tuina and massage; (iv) Other ethnomedicine.

Chinese Materia Medica (H28)

Funding areas: (i) Chinese Materia Medica: Resourceology of CMM, Identificology of CMM, pharmacodynamic material basis of CMM, quality evaluation of CMM, processing of CMM, pharmaceutics of CMM, and theories about the properties of Chinese herbs; (ii) Pharmacology of CMM: neuropsychopharmacology of CMM, cardiovascular and cerebrovascular pharmacology of CMM, anti-tumor pharmacology of CMM, endocrine and metabolic pharmacology of CMM, anti-inflammatory and immune pharmacology of CMM, antiviral and anti-infective pharmacology of CMM, respiratory pharmacology of CMM, digestive pharmacology of CMM, urinary and reproductive pharmacology of CMM, pharmacokinetics of CMM, and toxicology of CMM; (iii) Ethnopharmacology.

Integrated Chinese and Western Medicine (H29)

Funding areas: (i) Fundamental theories of IM; (ii) Basic clinical research of IM; (iii) Methodological or technical innovations in TCM research.

In recent years, funded projects in the field of TCM, CMM, and IM have the following features: (i) using TCM theory as the guidance and establishing clinical efficacy as the fundamental goal, these projects were generally conducted from both macroscopic and microcosmic levels, focusing a multilayer in-depth research including the whole-system, organ, cell and molecule levels, and exploring the wholelistic rules of human life activity and the integrating regulatory effects of TCM; (ii) these projects particularly emphasized on introducing cutting-edge theories, methods and techniques in the medical and other fields of modern science, incessant innovation of research thoughts and methods, dynamic integration of TCM and new emerging disciplines (such as systematic biology, network pharmacology, evidence-based medicine, and translational medicine) in terms of theory and research thought, which is one of the major driving forces for the development of TCM discipline; (iii) these projects also paid a great attention to the research of preponderant diseases treated by TCM and ethnomedicine (such as functional disease, immunological disease, neurodegenerative disease, complications of disease) and to identify its therapeutic mechanisms.

The Division's top priority is to support the best project proposals of basic research, continuous in-depth projects, and continues to encourage the integration of different disciplines. It has been emphasized that every interdisciplinary collaborative research using multidisciplinary concepts, methods, techniques and approaches must be conducted under the guidance of TCM theory and in an effort to promote the inheritance, development, and innovation of TCM fundamental theories. In light of the current TCM research situation, this Division will continue to value and support researches on the following aspects: Visceral Manifestation Theory; TCM syndromes; etiology and pathogenesis; therapeutic principle and method; basis of TCM treatment for its preponderant diseases and the preventive and therapeutic effects on major and refractory diseases; correlation between classical formula and disease-syndrome; basis for the Theory of Channels, Collaterals and acupoints, and the acupuncture treatment and prevention of disease; theoretical and clinical basis for traditional Chinese and western medicine integration; TCM innovative technology and method research; CMM resources; CMM identification; CMM processing and preparation; CMM property; material basis for efficacy, physiological disposition, and mechanism of CMM; CMM toxicity; correlation between toxicology and toxic-effect; and ethnomedicine.

A project proposal submitted to the Division needs to focus on the seamless integration with TCM theory, avoid implementing a mechanism research that is not clinical efficiency-oriented, or withstand the tendency of blindly using advanced and new

technology.

Any proprietary contents or techniques such as ingredients of a TCM formula and the names of acupoints, which may be inconvenient to disclose in the application should be sent to the Division directly by confidential mails, and should be explained in application documents.

Key Program

The Key Program constitutes an important type of research project series supported by the National Natural Science Fund. It supports researchers to conduct in-depth, systematic and innovative research in directions with sound research basis or where new growth points of scientific disciplines might emerge, so as to promote disciplinary development and breakthroughs in important areas or scientific frontiers.

Key Program projects should follow the principle of limited objectives, limited research scope and focused goals, pay attention to intercrossing of disciplines, make effective use of existing major scientific research bases at national and ministerial levels, and conduct active international cooperation and exchange with concrete contents.

Applicants should have the following qualifications:

(1) Experience of undertaking basic research projects;

(2) Senior academic position (title).

Post-doctors and postgraduate students are not qualified for application.

Key Program projects set research areas or directions and announce in the Guide to Programs. Applicants should follow the guidelines to prepare proposals, choose project title according to research content, and avoid using research area as project title. Please make sure to have clear research orientation and be specific in content, and not to cover all areas.

In general, one Key Program project is conducted by only one research institution. If necessary, two institutions at maximum are allowed to work as collaborators. The funding period of a Key Program project is 5 years.

In 2015, NSFC funded 625 projects under the Key Program, with a total funding of 1.788 billion yuan, and the average funding for direct costs is 2.86 million yuan per project.

Funding of the Key Program Projects in 2015

Unit: 10,000 yuan

Department	No.of applications	Awards				Success rate (%)
		No. of awards	Funding for direct costs	Average funding per project for direct costs	Share of NSFC' total funding for direct costs (%)	
Mathematical and Physical Sciences	266	73	21,670	296.85	12.12	27.44
Chemical Sciences	242	65	19,430	298.92	10.87	26.86
Life Sciences	522	95	26,350	277.37	14.74	18.20
Earth Sciences	451	80	23,610	295.12	13.20	17.74
Engineering and Materials Sciences	403	90	26,100	290.00	14.60	22.33
Information Sciences	272	85	25,100	295.29	14.04	31.25
Management Sciences	164	35	8,680	248.00	4.85	21.34
Health Sciences	485	102	27,860	273.14	15.58	21.03
Total	2,805	625	178,800	286.08	100	22.28

Please refer to the respective sections in each department for research areas and orientations of the Key Program projects.

Department of Mathematical and Physical Sciences

In 2015, the Department of Mathematical and Physical Sciences announced 90 areas for Key Programs, and received 266 applications. We funded 73 projects with direct cost funding of 216.7 million yuan and about 2.9685 million yuan per project.

In 2016, the Department of Mathematical and Physical Sciences plans to fund about 73 Key Program projects. The average direct cost funding will be more than 2.4 million yuan per project for mathematics, and more than 3.3 million yuan for mechanics, astronomy, physics I and physics II. The funding will be 5 years. Please provide with the proper application code when applying.

To ensure the high quality of projects, applicants are required to have ever held national projects, and relatively large research teams.

Please give the title of the proposed research directions in the note section of the application form, otherwise the application will be not accepted. Please provide with the specific application code when applying.

In 2016, the main research directions are as follows:

1. Arithmetic problems of algebraic clusters on number domain (A0101)

2. Representation of merge system and groups (A0102)

3. Model space, Hodge theory and applications (A0102)

4. Application of degrading and singular partial differential equations in geometry and physical (A0103, A0108)

5. Non Archimedes dynamical systems (A0105, A0101)

6. Teichmuller space theory and applications (A0105)

7. Oscillating integral method of grid estimation (A0105, A0101)

8. Theory and application of critical points (A0106)

9. Studies on attractors of infinite dimensional dynamical systems (A0106, A0107, A0108)

10. Dynamical instability of Hamilton systems (A0107)

11. Partial differential equation method for non determinant systems (A0107, A0108)

12. Mathematical theory of fluid boundary layer (A0108)

13. Nonlinear wave equation in geometry and physics (A0108)

14. Geometric structure and singular analysis of nonlinear integrable system (A0109)

15. Probability problems of non local operator and random environment (A0110)

16. Statistics and analysis of network data based on structures (A0111)

17. Statistical prediction of non stable and high frequency data (A0111)

18. Optimization and design of stochastic system (A0112)

19. Optimization method for big data driving (A0112)

20. Dynamic planning of controlled process (A0113)

21. Mathematical expression and understanding of complex network data (A011401)

22. Multi scale bio system dynamics and typical data analysis (A011403)

23. Randomness and regulation of genetic expression (A011403)

24. Theory and application of uncertainty in information system (A0114)

25. Computational differential algebra and approximate formalization method (A0115)

26. Algebraic and stochastic method of maximal combinations (A0116)

27. Graph theory and algorithm in chemistry and bio informatics (A011602)

28. High precision algorithm and analysis of non typical differential equations (A0117)

29. Theory, method and experiments of multi dimensional nonlinear system dynamics (A0202)

30. Modeling, analysis and control of complex system dynamics (A0202)

31. Deformation and damage mechanism of advanced materials and structures (A0203)

32. Damage, fatigue, fracture and structure reliability (A0203)

33. Mechanical behaviors of material and structure in multi field conditions (A0203)

34. Unsteady complex flow mechanism and control (A0204)

35. Hydro dynamics of ships, marine and coastal engineering (A0204)

36. Fluid dynamics of aircraft and space craft (A0204)

37. Biomechanical problems in human health and medicine (A0205)

38. Mechanical behavior of materials and structures in explosion and shock impact (A0206)

39. Computation methods for complex mechanical problems (A02)

40. New methods and technology in experimental mechanics (A02)

41. Key mechanical problems in environmental evolution and catastrophe (A02)

42. Key mechanical problems in high end equipment and advanced manufacturing (A02)

43. Key mechanical problems in extreme conditions (A02)

44. Key mechanical problems in new energy and resource areas (A02)

45. Theory and method of fluid solid coupling mechanics (A02)

46. Nature of dark matter and dark energy and physical process in early period of cosmos (A0301)

(1) Dark matter and dark energy and physical process in early period of cosmos

(2) Large scale cosmic structures

47. Galaxy evolution and impact of surrounding environment (A0302)

(1) Detection of medium high red shift celestial bodies and formation and evolution of galaxies

(2) Physical properties of galaxies and relations with surrounding dark matter and interstellar media

48. Structure, formation and evolution of large mass black holes and active galaxies (A0302)

(1) Structure and radiation of active galaxy cores

(2) Formation and evolution of large mass black holes and mutual evolution with the galaxies

49. Structure, composition, integration and evolution of the Galaxy (A0302, A0303)

(1) Galaxy structure, distribution dynamics and long term evolution of star groups

(2) Basic parameters and matter distribution (including dark matter) of the Galaxy

50. Formation of molecular cloud and stars, internal structure and evolution of stars and high energy process of dense celestial bodies (A0303)

(1) Formation of stars, molecular cloud, interstellar matter circulation

(2) Internal structure and evolution of stars and star systems

(3) Birth, explosion and high energy process of dense celestial bodies

51. Planet system exploration and dynamics (A0303, A0304, A0306, A0307)

(1) Exploration of solar system and outer planets, and dynamics of planetary system formation

(2) Atmospheric property and internal dynamics of planets

52. Solar atmosphere, magnetic field and activities (A0304)

(1) Structure and dynamics of solar atmosphere, fine structure of solar magnetic field, origin and evolution of solar magnetic field

(2) Solar eruption and its origin and evolution, forecast of solar activities

53. High precision astronomical frame and time frequency (A0306)

(1) Micro angular second frame celestial sphere, high precision earth reference frame and astronomical earth dynamics

(2) Precision time generation and transmission

54. Solar system dynamics and stability (A0307)

(1) Stability of solar system and orbit diffusion

(2) Discovery of small celestial bodies in solar system and its origin dynamics

55. Measurement, determination of precise orbit and dynamics of fast moving celestial bodies (A0306, A0307)

(1) Design and measurement of deep space probes and precision satellite navigation and positioning

(2) Monitor and dynamics of fast moving celestial bodies

56. Optical and inferred key technology based on large scale telescopes (A0308)

(1) Key technologies for land based extremely large optical and inferred telescopes

(2) Super high resolution, high contrast imaging technology

(3) Large view, high resolution imaging and spectrum detection technology

57. Key technology of radio astronomy (A0308)

(1) Key technology of low noise, array receiver

(2) Key technology digital signal processing

(3) Single array interference imaging and VLBI technology

58. Key technology for space astronomy (A0308)

(1) Key technologies of X-ray, ultra violet and inferred space telescopes

(2) Key technologies for high resolution cosmic ray, X-ray, inferred and ultra violet space detectors

59. Physical problems in new forms of energy (A0402, A0404)

(1) Exploration, design and physical studies of new energy materials

(2) Physical mechanism of advanced energy saving materials and device physics

(3) Physical problems in efficient energy conversion and storage

60. Physical basis of quantum information (A0402, A0403, A0404)

(1) Physical problems in quantum state generation, control and measurement

(2) Physical realization and measurement of quantum entanglement and multi composition association

(3) Quantum information processing and quantum computation for scalable physical system

(4) New mechanism and maintenance of quantum coherence

61. Physics of advanced functional materials (A0402, A0404)

(1) Surface, interface and artificial micro structure physics

(2) New functional materials and device physics of self-spin information carrier

(3) Physical problems of intelligent materials

(4) Physical problems of materials in extreme conditions (low temperature, strong magnetic field and ultra high voltage)

62. Physical problems in confined or relevant quantum systems (A0402)

(1) Properties of electric transport, thermal transport and self-spinning transport in low dimensional system

(2) Interface regulation of topological quantum state topological physical properties

(3) Ultra fast interference control of quantum state in micro nano structures

(4) Novel quantum state and quantum phase change in relevant electron systems

63. Physical problems in soft matter systems (A0401, A0402)

(1) Structure, property and regulations of surface and interface system

(2) Microstructure and multi scale interactions of soft matter

(3) Physical problems related to life sciences

64. Computation and simulation of matter structures and properties (A0402)

(1) Computational design and physical property prediction of new types of functional materials

(2) Computational simulation of structure and properties of complex system, real material system and in extreme conditions

(3) New method of first principle material computation based on super density functional theory

65. Atomic and molecular impact and physical properties of hot dense matters (A0403)

(1) Atomic and molecular property in high temperature and dense conditions

(2) Electron, highly charged atom, high excitation state atomic molecules and impact process

(3) New method and new technology of atomic molecular multi body relevant effect

66. Quantum dynamic process of atomic molecular system (A0403)

(1) Multi pieces relevance of large molecular system and quantum process of multi bodies

(2) Ultra fast atomic molecular process and operation and control of quantum state evolution

(3) Physical property of large molecule and cluster system and relevant quantum process

67. Physics of cold atoms and molecules (A0403)

(1) Preparation and quantum simulation of cold atom and molecule gas

(2) New principles and new method of cooling of molecular gas

(3) Precision control of internal state, external environment and interactions of atoms and molecules

(4) Precision spectrum measurement and imaging technology based on cold atoms and molecules

68. Ultra fast, ultra strong light physics (A0403, A0404)

(1) New principle and method of ultra strong and ultra fast laser

(2) New physical effect of interactions between ultra strong laser and matter

(3) Applications of ultra fast spectrum technology in physical science

(4) Behaviors of atoms, molecules and clusters in ultra fast strong light field

69. Frontier problems in nonlinear optics (A0404)

(1) New phenomena of ultra fastultra strong nonlinear optics

(2) Nonlinear optical process of weak light

(3) Nonlinear effect of strong local optical field

(4) New nonlinear optical phase matching method and applications

70. Manual control and interference control of optical field (A0404)

(1) Generation, regulation and coupling of new spatial temporal multi dimensional optical field

(2) New principles of interactions between structure optical field and matter

(3) Generation and application of new light sources such as THz and EUV

71. New physical and new mechanism in optical electric conversion process (A0404)

(1) New mechanism of optical electric conversion in artificial micro nano structures

(2) Optical physics and applications in efficient energy conversion

(3) Efficient luminescence and spectrum control

72. Studies on meso scale optics (A0404)

(1) Generation and transmission of interference optical field breaking diffraction space limit

(2) Characterization and regulation of nano scale extreme optical field

(3) New mechanism of interactions between photon and electron, phononetc. In micro and nano structures

(4) New method of physical modeling and numerical computation of multi scale optical field

73. Basic problems in quantum optics (A0403, A0404)

(1) Interactions of confined photon, atom and molecule

(2) Generation, control and application of quantum light source

(3) Quantum opto-mechanics

(4) Photon quantum simulation and quantum storage

74. Physical problems in new types of acoustic energy converter and its arrays (A0405)

(1) Acoustic energy converter and array

(2) Spatial temporal regulation of random media scattering and acoustic field

(3) New types of acoustic manmade structures and complex acoustic field

75. Spatial and temporal properties of marine acoustic field and its application (A0405)

(1) Properties of sound propagation, variation and scattering in 3-D uneven marine environment

(2) New principles and method of remote detection based on time, frequency and spatial interference properties of marine acoustic field

(3) New method of marine acoustic chromatography and its applications in fast forecast of speed of sound in sea water

76. Generation, propagation, measurement and interaction of sound wave in complex media (A0405)

(1) New theory and new methods for quantitative measurement and evaluation of acousticwaves

(2) Noise and vibration control in fluid solid coupled systems

(3) New physics and new mechanism of biomedical ultrasonic devices

(4) Sound propagation in non uniform isotropic earth media

77. Frontier problems in basic theory of quantum and classical physics (A0501)

78. Frontier problems in basic theory of statistical physics and physical systems (A0501)

79. Frontier problems in theory of gravitation, cosmology and dark matter (A0501, A0502)

80. Precision verification of standardmodels and new physics (A0502)

81. Studies on charm physics (A0502)

82. Studies on the properties of hadron and strong interactions (A0502, A0503)

83. Forms of matter and novel matter in extreme conditions (A0503)

84. Nuclear structure, reaction and nuclide formation (A0503)

85. Studies on radioactive and laser nuclear physics (A0503)

86. Advanced techniques and experimental methods of neutron physics, reactors and its applications (A0504)

87. Basic research on nuclear technology and applications in material, life, energy and environmental sciences (A0504)

88. Studies on key problems in radiation physics and radiation protection (A0504, A0505)

89. Accelerator physics and its advanced technology (A0505)

90. Mechanism, method and technology of particle and rays (A0505)

91. Technology and method of nuclear electronics (A0505)

92. Frontier problems of strong laser plasma and inertia confined fusion physics (A0506)

93. Magnetic confined fusion plasma physics and new methods of diagnosis (A0506)

94. Basic research on low temperature plasma physics and key technology (A0506)

95. Studies on advanced technologies and experimental methods of synchrotron radiation and free electron laser (A0507)

Department of Chemical Sciences

In 2015, the Department of Chemical Sciences funded 65 Key Program projects with 194.30 million yuan and 2.9892 million yuan of average direct funding intensity per project. The duration of each project is 5 years. In 2016, the Department will announce guidelines and accept proposals in 68 research areas, and the average direct funding intensity will be from 2.5 to 3.5 million yuan for each project. In order to further improve the quality of projects, proposals from those groups and teams with excellent research resources as well as innovative research ideas are welcomed, and proposals for interdisciplinary research suggested by teams which have strong background in cooperation are encouraged.

When filling in the application form, the applicant must indicate the selected research area in "the column of note", and must select the proper discipline code marked in brackets of the research area.

In 2016, the research areas for Key Program projects funded by the Department of Chemical Sciences are listed as follows:

1. Structure and properties of cluster compounds (B01)

2. Molecule-base oriented functional materials (B01)

3. Inorganic solid materials (B01)

4. Rare earth chemistry and functional materials (B01)

5. Metal coordinative compounds and their catalytic properties (B01)

6. Basis of applied inorganic chemistry (B01)

7. Function of inorganic nano-materials and their applications (B01)

8. Basis of bio-inorganic chemistry (B01)

9. Synthesis and properties of organometallic/element-organic compounds (B02)

10. New reaction, new reagent and new method in the organic synthesis (B02)

11. Cheap metal catalytic reactions (B02)

12. Controllable free radical reactions (B02)

13. Asymmetric synthesis chemistry (B02)

14. Strategies and methods for the synthesis of natural products (B02)

15. Biosynthesis and chemical regulation of complicated natural products (B02)

16. Synthesis and chemical modification of biological macromolecule (B02)

17. Molecular probes for interactions between protein-protein and protein-nucleic

acid (B02)

18. Structure and property of organic supermolecules (B02)

19. Chemical basis of organic photoelectric materials (B02)

20. Experimental research of function-oriented structural chemistry (B03)

21. New methods in theoretical and computational chemistry and their applications (B03)

22. Physicochemical basis of catalytic materials and catalytic processes (B03)

23. Experimental research on molecular reaction dynamics (B03)

24. Physicochemical basis of colloid and interface (B03)

25. Electrochemical basis in the process of energy and substance conversion and storage (B03)

26. Physicochemical basis of photochemistry and photoelectrical chemistry (B03)

27. Experimental and theoretical research of chemical thermodynamics (B03)

28. Experimental research of bio-physical chemistry (B03)

29. New spectrum and imaging methods used for studying physical chemistry (B03)

30. Physicochemical basis in utilization of resource/energy (B03)

31. Physicochemical basis of solid and surface (B03)

32. Physicochemical basis of new materials and devices (B03)

33. Precise and topologyfabrication of functional polymers (B04)

34. New coordination polymerization methods for olefins (B04)

35. Energy polymers for electric store and photo-electricity transformation (B04)

36. Bioimaging and biosensing polymers in medical applications (B04)

37. Theories, computer simulation and calculation of polymers (B04))

38. Structure in condensed state polymers (B04)

39. On the relations of structure with properties of polymers (B04)

40. High-performances polymers (B04)

41. Separation and analysis of complex systems (B05)

42. Micro-/Nano-analytical chemistry (B05)

43. Imaging and surface analysis (B05)

44. Analytic chemistry of mono-molecule and mono-cell (B05)

45. In vivo and in situ analysis (B05)

46. New methods for detecting markers of diseases (B05)

47. New proteomic methods and functional studies (B05)

48. Analytic chemistry basis of the chemical sensors and bio-sensors (B05)

49. Scientific foundation for industrial biological catalysis and conversion processes (B06)

50. Key scientific issues in the biorefinery processes (B06)

51. Chemical engineering basis in the area of foods and medicines (B06)

52. Chemical engineering foundation for the high effective clean utilization of fossil energies (B06)

53. Chemical engineering foundation in the explore and utilization of new type energies (B06)

54. Key scientific issues related to chemical product engineering (B06)

55. Design of new materials for chemical engineering and their functional regulation (B06)

56. Chemical engineering basis related to the high effective utilization of resources (B06)

57. Scientific and engineering basis of typical chemical reaction and scale-up of reactor (B06)

58. Scientific foundation for environment and safety of chemical engineering (B06)

59. Transfer process and separation process (B06)

60. Interfacial behavior and environmental process of persistent pollutant (B07)

61. Regional water pollution and control (B07)

62. Environmental pollution and food safety (B07)

63. Novel environmental function materials and their applications in pollution control (B07)

64. Basic environmental chemistry problems of air pollutants (B07)

65. Environmental exposure, molecular toxicological mechanisms and health risk of pollutants (B07)

66. Controllable polymerization catalyzed by organic small molecular (B0X)

This project will mainly support the development of functional organic small molecular catalytic systems based on the acid-base synergetic catalytic mechanism for controllable polymerization, aiming at developing new metal-free catalytic polymerization methods and obtaining none-metal residue functional polymers.

67. Synthesis of highly chiral-purity single-walled carbon nanotubes and their scale-up preparation (B0X)

This project will fund the studies on the effects of catalysts and growth conditions on the chiral selectivity of single-walled carbon nanotubes, aiming at realizing the growth of highly chiral-purity single-walled carbon nanotubes on wafer substrate and their applications.

68. Scientific foundation for efficiently artificial photosynthesis (B0X)

These key projects will understand the separation essence of photogenerated electrons and holes, study the preparation of efficient catalysts for artificial and natural photosynthesis, develop artificial photosynthesis theory and method, fabricate novel artificial photosynthetic systems and apply them into the overall water splitting. Following is the main research areas.

(1) Synthesis of novel and wide spectral absorption materials

The key point is to develop methods for adjusting the band gap structure, to understand the micromechanisms of light absorption as well as their relationship with the structure of materials, to design and synthesize highly efficient light absorption materials.

(2) Study on the temporal-spatial resolution characterization of photogenerated electrons

The key point is to study the separation mechanism of photogenerated charge carriers, to develop superfast and imaging spectra methods for the characterization of photogenerated electrons, to develop Operando spectroscopic technique to study the photocatalytic and photo-electronic water splitting over nanoparticles.

(3) Study on the mechanism for the separation of photogenerated charges and the photocatalytic reactions

Develop theoretical methods to study the photocatalytic water splitting reaction. Carry out the thermodynamics and kinetics theoretical study of the separation and transfer of photogenerated electrons as well as catalytic reaction during the photocatalytic overall water splitting reaction process.

(4) Study on the synthesis of high efficient co-catalysts and their performances in photocatalytic water splitting

Develop double co-catalysts system, including inorganic nanoparticles catalysts, molecular catalysts and biornimitic catalysis. Study the mechanism of water oxidation and proton reduction over co-catalysts.

(5) Fabrication of highly efficient artificial photosynthesis system

Construct efficiently artificial photosynthesis system rationally, explore the relationship among electron separation efficiency, reaction efficiency and solar conversion efficiency in an artificial photosynthesis integration system.

The research guides from 66th to 67th listed above are the Key Program projects driven by disciplinary frontier. The applicant may form collaborative research teams to apply for one of them accordingly. When filling in the application form, the applicant should select corresponding code based on the research contents (for code B0X, please select code from B01 to B07). The General Office of the Department will accept and handle the proposals.

Department of Life Sciences

The Department of Life Sciences accepts two types of applications for the Key Program. One of them, the majority of total applications, is guided by designated areas (ADA for short) and the other, complementary to ADA, is to freely select research areas (ANA for short). In 2015, the Department of Life Sciences received 522 applications, among which, 421 applications were for ADA and 395 were accepted, with 80 projects being funded at a funding rate of 19.00%. The rest 101 applications were for ANA, with 97 projects accepted and 15 of them being funded at a funding rate of 14.85% (counting by accepted applications).

In the fiscal year 2016, the Department of Life Sciences will continue to accept applications for ANA. We strongly suggest applicants should read the type of acceptance carefully in each discipline described in this Guide to Program. The nine disciplines accepting the projects in both patterns (both ADA and ANA) are the following: microbiology; biophysics, biochemistry and molecular biology; biomechanics and tissue engineering; physiology and integrative biology; cell biology; developmental biology and reproductive biology; basic agriculture and crops; food sciences and veterinary medicine. The other twelve disciplines, which will only accept ADA projects (application for ANA will be rejected), include botany; ecology; forest science; immunology; neuroscience; cognitive science and psychology; genetics and bioinformatics; plant protection; and horticulture and plant nutrition; animal husbandry and grassland science; aquaculture; and zoology. 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 categories, which are not within funding areas as described in the General Program part of this Guide to Program, are not applicable to Key Program.

The requirements for application to the Key Program projects of life sciences department are as follows:

(1) Applications to the Key Program projects in designated areas (ADA). For designated areas, applicants should propose research topics and compose every parts of the proposal following the guidelines of designated areas issued by the Department in 2015. In the column of Annotations on the basic information table of the application form, applicant should fill in the applied research area; with the corresponding application code lined out in each discipline's designated areas correctly. Please note that the designation of application codes for the Key Program projects is set for efficient project management, whereas the application codes appointed may not include all the research contents of the designated areas, therefore applicants should not be restricted by the application codes appointed in ascertaining their research themes according to the relevant contents of designated areas.

(2) Requirements for applications to Key Program projects for free application of

non-designated areas (ANA). Applicants for this category are required to specify with "Application for Free Areas" in the column of "Annotations". The ANA grant is set for applicants who have recently achieved major progress, and in an eager need of supporting for further investigation, while their research areas are not included in the ADA of the Department of Life Sciences. Or for studies that are cutting-edge to the fields, or are shedding lights to new orientations of the area, are not yet covered in ADA of the year. For either case, applicants should have profound basis of research work in the field, and urgently require intensive financial support in order to further their investigations. Therefore, a statement with about 800 Chinese characters on the important innovative progresses already achieved is required in addition to the routine application text for ANA. In the statement, applicants are expected to elaborate the rationale for ANA, as well as emphasize the important innovative progress closely related to this application, relevant research basis and publications in international major academic journals, etc. Research articles representing the "significant progress achieved" in the application should be published within three years, with applicants sitting as the first author or corresponding author.

(3) Applicants for the Key Program (including both ADA and ANA) of Life Sciences Department are required to attach the first pages of five representative research articles closely related to the proposal. Applicants for ADA should correctly fill in the corresponding application code as listed in each Division when submitting the proposals. Applications for ANA may choose the application code autonomously best suitable to its research content.

In 2016, based on the overall arrangement for the Key Program of NSFC, the Department of Life Sciences will arrange a total direct cost budget of 265 million yuan, to support 95 Key Program projects. The funding intensity is roughly 2.80 million yuan per project as direct cost. Applicants should put forward reasonable budget according to the actual financial needs of their research. The duration of the Key Program project is 5 years.

The designated areas of each Division in the Department of Life Sciences in 2016 are as follows:

1. Microbial population sensing and individuals information exchange (C0102)

2. Special metabolism of microbes and molecular regulation (C0102)

3. The dynamic mechanism of plants evolution and adaptation (C0203)

4. The structural basis and regulation mechanism of plant material and energy metabolism (C0204)

5. The epigenetic regulation mechanism of plant growth and development (C0204)

6. The ecological adaptive evolution mechanism of species (C0301)

7. Impact of global change on ecosystems and species (C0308)

8. The role of microbes in ecosystem nutrient cycling (C0309)

9. Genetic analysis of important traits in forest trees (C1610)

10. The mechanism and the control of major pests of forest pests (C1609)

11. Basic research on plantation cultivation (C1607)

12. The structure, function and dynamic regulation of biological membrane and organelle (C0504)

13. The function and regulation of lipid and lipoprotein (C0502)

14. The epigenetic regulation mechanism of immune response (C0801)

15. Interaction between immune cells and tissue microenvironment (C0805)

16. Interaction between tissue repair material and microenvironment (C1002)

17. Analysis of multi-scale and multimode imaging (C1004)

18. Cellular and molecular mechanisms of central nervous structure, function and abnormal activity (C0902)

19. Regulatory mechanism of the nervous system development and regeneration

(C0903)

20. Pathological and physiological mechanisms of homeostatic regulation or imbalance (C1103)

21. Psychological and brain mechanisms of cognition (C2101)

22. Psychological and social development characteristics of Children and teenagers (C2105)

23. The structure, editing and function of genome (C0605)

24. Genetic and epigenetic mechanisms of variation (C0606)

25. Multi gene interaction and genetic regulatory network (C0607)

26. The molecular mechanism of intercellular and intracellular communication (C0709)

27. Cell differentiation and plasticity (C0704)

28. Identification and function of adult stem cells in tissues and organs (C1201)

29. The regulation of meiotic initiation and chromosome behavior (C1202)

30. The biological basis of crop adaptation to abiotic stresses (C1302)

31. The formation and regulation mechanism of crop important agronomic traits (C1304)

32. Basic research on food fermentation and brewing process (C2003)

33. Population differentiation and genetic mechanism of pest outbreaks (C1401)

34. Mechanisms of crop and pest interaction (C1408)

35. The mechanism of biogenic materials effectingon crop pests (C1406)

36. Evaluation and resources investigation of wild and specific resource of horticultural crops (C1501)

37. Mechanism and regulation of horticultural crop quality formation (C1501)

38. The biological mechanism of crop nutrient high-efficient utilization (C1507)

39. Genetic analysis of high-quality livestock and poultry resources (C1701)

40. Mechanism and regulation of livestock and poultry breeding (C1701)

41. Animal nutrition metabolism and its regulation mechanism (C1701)

42. Mechanisms of the animal epidemic pathogen invasion, replication and pathogenesis (C1805)

43. The molecular mechanism of important properties of aquatic organisms (C1902)

44. Metabolic regulation of major nutrients in aquatic organisms (C1904)

45. Molecular mechanism of aquatic animal pathogen invasion and infection (C1906)

46. Mechanisms of animal species diversity formation (C0404)

47. The mechanism of wild animal adaptation to environmental changes (C0402)

48. The pattern and genesis of animal geography (C0402)

Moreover, considering common problems from the past years, the Department of Life Sciences particularly reminds applicants to avoid the following listed mistakes in 2016. Otherwise, proposals may be rejected during the preliminary checking procedure:

(1) Applications for ADA do not specify the title of designated research areas in the column of “Annotations” on the basic information table in main body of the application text;

(2) Applications for ADA do not fill in the corresponding application code specified by this guide;

(3) Applications for ANA do not specify “ANA” in the column of “Annotations” on the basic information table in the mail body of application text;

(4) Applications for ANA do not provide a description of 800-Chinese-character on the major innovative progress already achieved claimed by this guide;

(5) Applicants for Key Program projects (including both ADA and ANA) do not attach the first pages of five representative research articles to the application documents as requested;
(6) Applicants applying for ANA to certain disciplines, which however, do not accept ANA applications;
(7) Similarity or overlapping with projects already funded by the National Basic Research Program of China ("973" Project), the National High-Tech R&D Program of China ("863" Project) etc., and the National Science Fund for Distinguished Young Scholars;
(8) Applications indicate the designated areas in the "Annotation" column, but the actual research contents do not match the scope of funding;
(9) 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 writing, please refer to the guide to the General Program projects of the Department of Life Sciences.

Department of Earth Sciences

The Department of Earth Sciences announces the guideline for the Key Program according to the major issues in the priority funding areas in earth sciences for the 12th Five-Year Plan period. The criteria to identify priority areas are as follows: (1) to analyze the international trend of the frontier development of the earth science, to include related results of strategic research concerned, and to take in account of the former priority areas during the 11th Five-Year Plan; (2) guided by the major scientific issues, to put more emphasis on basic and frontier research; (3) with consolidated basis, showing the scientific promising prospection, promoting interdisciplinary research, and aiming to foster or even drive the progress of earth sciences and advance the research level and international role for the earth science research in China; (4) to pay attention to the major scientific issues related to the economic and social sustainable development of China, and to exert far-reaching impact on the society and economy. According to the scientific issues listed in the following specified areas, applicants are free to determine their research topics, goals, technical approaches and budget on the basis of summarizing research work carried out both domestically and internationally as well as stating clearly the new breakthrough points and ways for research.

For applicants, previous experience related to the proposed work must be stated in detail in the proposals. In the part of CVs, working experience, education, former NSFC grants (and results) and publications of all the PIs and co-PIs must be listed in detail. In the publication list, papers published and in press must be listed separately. For the published papers, all of the authors, paper titles, issue numbers of the journals and pages must be presented. All the publications must be classified as books, journal papers, conference papers, etc. In addition, the first pages of 5 representative publications must be attached to the hard copy of the application.

The relevance and academic contribution to the specific priority area must be stated in the proposals. To avoid duplication in funding, applicants shall state clearly the relations and differences between the research and related projects funded by other national agencies.

As one branch of fundamental sciences, the research object of earth sciences is the complex planet of the Earth. The challenges emerging from the research in the past, present and future of the earth system and its habitability have gone well beyond the capability of

any single traditional discipline. Interdisciplinary research has become the fertilizer for innovative ideas and original innovation. It is expected that scientists from various disciplines of earth sciences and scientists from other research areas such as mathematics, physics, chemistry, biology, materials and engineering sciences, information sciences and management sciences jointly provide your proposals for the Key Program in the Department of Earth Sciences. The application codes for interdisciplinary study should be filled in the application form.

In 2016, a standardized selection of "application code", "research field" and "key words" will be tried out continuously in Division I. When filling out the application forms, applicants should visit the "special focus" under the item of "application acceptance" on the official home page of the NSFC (http://www.nsfc.gov.cn/), and read carefully the "list of application code, research field and key words (D01 and subordinate codes)" and make sure their applications are in accordance with the funding areas of Division I.

In 2015, the Department of Earth Sciences received 451 proposals for the Key Program, and 80 were funded with a total of 236.1 million yuan as direct expenses. In 2016, 80 projects will be funded, with a preferred range of 300 to 400 million yuan. The required research period of a Key Program project is 5 years.

Special notes for applicants: in 2015, titles of 11 themes to accept proposals for the Key Program in the Department of Earth Sciences are as follows: "Environmental evolution and life processes on the planet Earth", "Origin, evolution of the continents and geodynamics", "Theoretical studies on the forming process and exploration of mineral resources, fossil energy", "Process and mechanism of weather, climate and atmospheric environment change" , "Global environmental change and multi-sphere interaction of the Earth", "The effect of human activities on environment and its mechanism", "Processes and mechanisms of the changes in terrestrial surface system", "Evolution and regulation of the water and soil resources", "Marine processes, resources and environmental effects", "Solar-terrestrial space environment and space weather", and "Earth observation and information processing".

In regard to the problems emerged when applying for Key Program projects, applicants must fill in "Annotations" in the proposal sheet with ONE of the above ELEVEN titles of the themes. Proposals with incorrect "Annotations" or without "Annotations" will not be accepted.

1. Environmental evolution and biological processes on the planet Earth

The scientific objectives of this field include: reevaluating the processes of major geological events and their environmental implications under the consistent high-resolution temporal framework based on the complete stratigraphic sequences and diverse fossil resources from China and multidisciplinary studies from geochemical, sedimentological, mineralogical, tectonic, paleontological and geobiological aspects, maintaining the advantage levels in our established directions, and striving to obtain achievements with originality in solving major scientific issues in geosciences.

Key scientific issues:

(1) Systematic paleontology of major fossil groups
(2) Macroevolution of life and high-resolution integrative stratigraphy
(3) Environmental backgrounds for global changes during critical transitions
(4) Life in extreme environments, geomicrobiology
(5) Biomarkers and their environmental implications
(6) Biogeochemical processes and evolution of surface environment

Research orientations in 2016:

(1) Origin and systematic evolution of important fossil groups and their environmental implications

(2) Biodiversity and evolution of ecosystems during critical transitions
(3) Reconstruction of life evolution and environment under the high-resolution temporal framework
(4) Geomicrobiology, biogeological processes and their environmental implications
(5) Biogeochemical processes in the Earth's history
(6) Life in extreme geological environments and its adaptive mechanisms
(7) Processes of sedimentation during critical geological period

About 6 to 8 projects will be funded.

2. Origin, evolution of the continents and geodynamics

Scientific objectives: research on the origin, evolution and geodynamics is an important approach to better understand the processes inside the Earth, and also a theoretical support for the natural hazard mitigation and natural resource capability. How the deep Earth components work and how the surface is affected by geodynamic processes are challenging issues faced by earth sciences. The challenges for scientific innovation include: accurately describing the spatial and temporal trajectory of the movement of the continental materials, calculating and correlating their links, establishing a basic framework to characterize the structure and evolution of the continents in the global scale, in the temporal and spatial dimension, and from the surface to deep mantle for understanding the history of the Earth, and predicting the effects on the natural resource, hazard and environment.

Key scientific issues: 3D crust-mantle structure, composition and interaction; origin and evolution of the continents and intra-continent processes; continental collision and geodynamics of the orogenic belts; interaction between the oceanic plate and continental margins; and the coupling of the deep Earth and surficial process.

Research orientations in 2016:

(1) Early Earth evolution, and forming, growth and rebuilding of the continents
(2) Dispersion of the continent and the role of mantle plume
(3) Rheological property of the continent and its effect on the continental deformation
(4) 3-D structure of mantle velocity discontinuity, lithosphere-asthenosphere interaction and inter-layer material exchange
(5) 3-D structure of the crust-mantle and deep-Earth dynamic process
(6) Convergence of plates and the dynamic of the orogenic process
(7) Basin and range system evolution and basin dynamics
(8) Oceanic plates and continental margin (and marginal sea) process
(9) Relation between the deep and surface process
(10) Mechanism of magmatic activities and metamorphic process
(11) Volcano and geothermal activities and related deep processes
(12) Deep Earth fluid and water-rock interaction
(13) Cenozoic structural deformation, seismogenic process and geoharzard mechanisms
(14) Correlation and interaction between the Earth and the terrestrial planets, geoplanetology in deep space exploration
(15) Experimental petrology and simulation of geological processes
(16) Important fundamental and innovative of this theme

About 6 to 8 projects will be funded.

3. The formation mechanism and the application of detection methods for mineral resources and fossil energy

The scientific objectives of this field are to realize the breakthrough of the metallogenic theory using shallow crustal structures and ore field tectonic analysis, regional ore-forming fluid tracers, unique metallogenic system and continental geodynamics; to carry out research on large-scale basin dynamics associated with oil and gas accumulation theory and on the reservoir forming dynamics of coal and non-conventional natural oil-gas; to improve

oil and gas geological system theory which is suitable to the complex geological conditions in China; to establish and improve the detection method and technological systems of concealed ore deposits and deep oil-gas reservoirs; to reveal the evolution characteristics of regional groundwater flow system and identify factors influencing formation and evolution mechanisms of the groundwater dynamic field and chemical field.

The main research directions in this field are as follows: continental geology and mineralization; metallogenic models; metallogenic system and mineralization mechanisms; the dynamics of sedimentary basins and hydrocarbon accumulation; regional groundwater hydrology and environmental geology evolution; deep and large deposit (pool) ore-bearing information detection and extraction.

Key research directions to be supported in 2016:

(1) The enrichment mechanism of the massive ore-forming materials in sedimentary basin and magma systems

(2) Mineralization and metallogenic regularity of unique metallogenic units

(3) Metallogenic specialization in different continental geo-dynamic setting

(4) Regional fluid system tracing and metallogenic system evolution in areas where large ore bodies are concentrated

(5) The characteristics, structural model and exploration indicators of different types of metallogenic system

(6) Formation mechanism and metallogeny of special or shortage nonmetal mineral resources

(7) Regional geo-dynamics evolution and hydrocarbon accumulation of large basin

(8) Hydrocarbon generation of buried deeply organic matter from hydrocarbon sources and distribution characteristics of oil and gas

(9) Systematic evolution of the Earth and the sedimentary environment of hydrocarbon reservoirs in basins

(10) The formation, evolution mechanism, geophysical response and characterization of concealed mine and deep, non-conventional oil-gas reservoirs

(11) The principle and method of ore bearing information detection and extraction of large, deep ore deposits

(12) The regional groundwater flow system and the space distribution law & detection theory of groundwater

(13) Groundwater hydrological process and its evolution in different geographical units

About 6 to 8 projects will be funded.

4. Process and mechanism of weather, climate and environment change

The scientific objectives of this research area are to investigate various physical, chemical and biological processes of disastrous weather and climate dominated by climate system, to understand their spatial and temporal characteristics, variability rules, mutual relations and physical mechanisms, to obtain early symptoms of significant weather and climate events, to improve the accuracy of weather forecast, and to develop new versions of climate model, forecasting methods and climate prediction theory. During the 12th Five-Year Plan period, innovative studies shall focus on the process of climate system, theory of modeling and prediction, theory of dynamics and predictability of disastrous weather, atmospheric chemistry, boundary layer physics and atmospheric environment, middle and upper atmospheric dynamics, cloud and mist physics, and so on. Significant and advanced progress in the mechanism of weather and climate system change is expected.

Key scientific issues:

(1) New theories and methods for critical atmospheric variables detection, observations system optimization and data integration

(2) Dynamical mechanism and predictability of the weather and climate change

(3) Processes of atmospheric physics and atmospheric chemistry, as well as the mechanism of their mutual influences
(4) Interactions among weather variations, climate change and atmospheric environment in Asia
(5) Exchange and cycling between substance and energy in climate system

Research orientations in 2016:

(1) New theories, method and data assimilation techniques for atmospheric probing
(2) Dynamical mechanism and predictability of the weather and climate change
(3) Processes of atmospheric physics and atmospheric chemistry, as well as the mechanism of their mutual influences
(4) Interactions among the Asian weather and climate and the global climate
(5) Exchange and cycling between substance and energy in climate system

About 6 to 8 projects will be funded.

5. Global change and interactions among different spheres of the Earth system

The scientific objectives of this area are to improve the understanding of global change regulations and future change trends, and explain the cause of formation of global change and its current situation and future prediction by focusing on key scientific issues in the Asian monsoon and arid regions for providing scientific and technical supports for addressing the enormous environment problems and challenges faced by human society.

Key scientific issues:

(1) Environmental system in the Asian monsoon and arid regions and global change
(2) Regional water cycle (including the cryosphere) and climate change
(3) Dynamical variations of the sea level and sea-land transitional belt, as well as their future trend regulations
(4) Key processes of the biosphere, mutual feedback with other spheres, as well as elemental biogeochemistry cycle and Earth system
(5) Causes of the global change induced by natural and anthropogenic activities
(6) Key scientific issues in Earth system simulations

Research orientations in 2016

(1) Mechanism of the Asian monsoon system evolution in the past, present and future
(2) Characteristic and mechanism of the typical climate events
(3) Regional water cycle and the linkage to climate change
(4) Regulation and mechanism of precipitation and dry-wet transform in westerly areas
(5) Mechanism of the marine environment change and its interactions with the climate system
(6) Global change and key processes of the biosphere
(7) Biogeochemical cycl and the climate change
(8) Causes of the global change induced by natural and anthropogenic activities
(9) Processes and mechanism of global warming slowdown in recent years
(10) Development in the Earth system model and simulations of the significant climate events
(11) Short-term prediction or long-term projection of the global climate change

About 6 to 8 projects will be funded.

6. Mechanisms of human activities' effect on environment

The scientific objectives are, by encouraging multi-disciplinary research and crossing, to study the mechanisms of human activities effect on environment related to industrial and agricultural production, infrastructure construction, resources and energy exploitation, urbanization process etc., to understand the role of human activities in global and regional environmental evolution and the potential catastrophic consequence in earth system caused by human activities, and to provide scientific basis for reducing global disaster, thus

protecting earth environment and promoting sustainable development of society with the guidance of the scientific development concept of human-nature harmonization.

Key scientific issues:

(1) Earth engineering and global changes, environmental effects of resource utilization
(2) Mechanisms of environmental impact due to major geological disasters and large-scale engineering activities
(3) Regional environmental process and control, interactions between natural processes and human activities
(4) Regional sustainable development

Research orientations in 2016:

(1) Regional development, urban and the environmental changes
(2) Land consolidation, change of land use and their environmental effects
(3) Environmental process of pollutants and impact mechanisms of ecological health
(4) Process of groundwater pollution and its environmental remediation
(5) Mechanisms of geological hazards caused by the exploitation of resources and prevention and control
(6) Geological environmental and hazardous effect in major infrastructural projects and major geological disaster prevention and control

About 6 to 8 projects will be funded.

7. Processes and mechanisms of changes in terrestrial surface system

The scientific objectives of this field are to reveal the interaction mechanisms, interfacial processes and their tempo-spatial evolution principles of key components including water, soil, air and organisms in the terrestrial surface system, to enhance the understanding of relationships between structure and function of terrestrial surface system, to elucidate the interaction processes and coupling mechanisms between human and nature, and finally to provide the scientific basis for the regional sustainable development.

Key scientific research fields are the interaction and interfacial processes of key natural components on the terrestrial surface, migration and transformation processes of terrestrial surface materials, the coupling processes of natural and human components, theory and methodology of integrated researches about the terrestrial surface system. Comparative studies will be encouraged across the regions and the geographic units (types) so as to deepen the knowledge of the differential disciplines on the terrestrial surface.

Research orientations in 2016:

(1) Interaction mechanisms between patterns and processes of terrestrial surface system
(2) Biogeochemical cycles and their spatial differentiation in critical zone
(3) Interactions between climate, hydrology and landform, and their environmental and disaster effects
(4) Processes and effects of cryosphere
(5) Interactions between soil and vegetation, and their spatial heterogeneity
(6) Mechanisms of ecosystem degradation and restoration
(7) Ecosystem processes and services
(8) Effects and responses of human processes on the evolution of terrestrial surface system
(9) Spatial quantification and simulation of human processes
(10) Scaling and scale effect in key geographic processes
(11) Synthetical integration and simulation of terrestrial surface system processes

About 6 to 8 projects will be funded.

8. Evolution and regulation of water and soil resources

The scientific objectives of this field are to elucidate the evolution processes of water and soil and their coupling mechanisms, to reveal the principles of formation and evolution

of water and soil resources, and to propose the sustainable approaches and regulation patterns of water and soil resources.

Key scientific research fields are soil processes and evolution, soil quality and resource effect, watershed hydrological processes and their ecological effects, formation mechanisms of regional water cycle and resource, coupling of regional water and soil resources and their sustainable utilization.

Research orientations in 2016:

(1) Tempo-spatial variation of soil properties and informatization of soil resource
(2) Soil biodiversity and its function
(3) Nutrient elements cycle and fertility evolution of soil
(4) Mechanisms of soil degradation and soil remediation
(5) Soil and water quality, and safety of agricultural products
(6) Regional soil erosion and conservation of soil and water
(7) Natural and social water cycle
(8) Watershed eco-hydrological processes and simulations
(9) Hydrological changes and effects under extreme environment
(10) Coupling mechanisms and regulations of water and soil processes
(11) Regional carrying capacity and safety of water and soil resources

About 6 to 8 projects will be funded.

9. Ocean processes, resources and environmental impact

Scientific objectives: applications should be focused on the scientific problems closely related to the key national demands and international research frontiers. The marginal sea along the Asia continent as well as the adjacent open ocean should be the key regions to be studied. By studying the oceanic physical, chemical, geological and biological processes as well as the interactions among them on different timescales and spatial scales, the researches should enhance the understanding on the oceanic processes and mechanisms, promote the fundamental research on oceanology in China and extend ocean researches in China from marginal seas to deep oceans.

Key scientific issues:

(1) Multi-scale processes in the western Pacific Ocean and the interactions between the low and high latitudes
(2) Ocean-continent interaction in the maritime China
(3) Oceanic microbiologic and biogeochemical cycle
(4) Oceanic ecosystem and eco-security
(5) Theory on mineral deposits of resources on the ocean bottom
(6) Environmental change and related oceanic process in the polar regions

Research orientations in 2016:

(1) Multi-scale ocean processes and their impact on the regional climate
(2) Dynamics of the small scale and meso-scale oceanic processes
(3) Environmental and ecosystem effect of the estuarine substances into sea
(4) Deep sea geophysical survey
(5) Marine magmatism and tectonic evolution
(6) Formation of oil-gas system in the deep ocean and the subsidence processes
(7) Formation mechanism of sea haze and the access to the sea of harmful substances
(8) Ocean physical-biogeochemical interaction
(9) Process and mechanism of coastal ocean environmental evolution and ecosystem disaster
(10) Ocean acidification and its effect on ecosystem
(11) Change of ocean, ice sheet and ecosystem in the Polar Regions
(12) Mechanism and prediction of the Arctic Ocean and sea ice

(13) Key technology on oceanic observation and detection

About 6 to 8 projects will be funded.

10. Sun-Earth space environment and space weather

The scientific objectives are to form a theoretical frame of the global cause-effect chain of space weather processes so to achieve new original knowledge based on the study of space weather processes among the different layers of the solar-terrestrial system; to establish the cause-effect chain model of the space events and develop the integrated method for prediction based on physics to provide basic data for the safety of astronautic activities and the space-to-earth survey; to conduct the interdisciplinary research with mathematics, physics, information, material and life sciences on the exploration of the mechanism of space weather effects on human activities for providing scientific basis in the policy making of administrations; to develop new concept and method in space explorations and new schemes of space weather satellite series for a new era of space weather study; to encourage fundamental research on space weather combined with national key projects; to encourage analysis, theoretical and simulation study based on the newest space borne or ground-based data from both home and abroad; to encourage studies on the space weather by using data from the Meridian Project observations; to encourage the related basic researches on space geodesy; to encourage the interdisciplinary study between space weather and space geodesy especially.

Key scientific issues:

(1) Basic space weather physical processes

(2) The coupling among solar-terrestrial space

(3) Space weather modeling

(4) Effects of space weather on human activities

Research orientations in 2016:

(1) Solar driving source of space weather, related physical mechanisms and activities during the solar cycle 24

(2) Fundamental physical process in space weather and Sun-Earth connection

(3) Multi-scaled spatial and temporal structures in solar wind, magnetosphere, ionosphere and upper atmosphere; their evolution and couplings

(4) Space weather of the solar system and planet

(5) Prediction model and method in space weather, early warning of hazardous space weather

(6) Investigations of effects of space weather on astronautics, telecommunication, navigation, materials and human health

(7) New concept, principle, method and technique in space weather exploration, project pre-research in space exploration

(8) New theory and techniques for integrated geodetic observation by land, sea, air and space-based observation systems

(9) Theory of geodetic survey, and the process and mechanism of mass transport of the earth theory of multi-source geodetic data fusion and its applications

(10) New theory and methodology for time-variable geodesy and theory of geodetic inversion

The intersection studies between the research directions are encouraged.

About 4 to 6 projects will be funded.

11. Earth observation and its information processing

The scientific objectives of this field are to orient toward the scientific research and synthetic monitoring of the Earth system based on the studies about the scientific issues in fields of the Earth observation, GIS and GPS, to develop the basic theory and methodology of the data acquisition, processing and analysis originated from the Earth system elements

observation, to construct parameter set of geometric and physical boundary conditions in the Earth system analysis and simulation, and to provide scientific and technical supports for promoting the ability of cognition and early-warning about the Earth system and resolving the key issues in resource, environment, ecology, hazard, human health and public security faced in the sustainable development.

Key scientific research fields are surface effects and transmission mechanisms of electromagnetic wave, distributed and reconfigurable Earth observation and synthetical Earth observation system, confirmation and maintenance of high precision time benchmark and space datum, geo-spatial cognition, tempo-spatial information model and theory of digital earth construction, multi-source Earth observation data fusion and synergistic inversion and assimilation of the Earth system parameters, multi-dimensional tempo-spatial processes analysis and synthetic simulation and prediction and warning of the Earth surface system.

Research orientations in 2016:

(1) Theory and methodology of determination of high precision time benchmark and space datum
(2) Assessment methodology of the quality and integration of ubiquitous geographic information
(3) Theory and methodology of geographic spatial big data presentation and management
(4) New theory and new methodology of geographic compute and spatial-temporal analysis
(5) New theory and new methodology of geographic information services
(6) GIS modeling and simulation of human and natural processes
(7) Construction of special ground feature spectral library and theory and methodology of deep mining
(8) Interaction mechanisms between electromagnetic waves and land surface environment, and theory of remote sensing modeling
(9) Remote sensing inversion of atmospheric composition and environmental analysis
(10) Theory and methodology of the remote sensing inversion of complex earth surface parameters
(11) Remote sensing analysis and systematic simulation of the cycle of global water, carbon and nitrogen
(12) Validation and analysis of global geographic information products
(13) Computing theory and service of geo-sensor network

About 4 to 6 projects will be funded.

Department of Engineering and Material Sciences

In 2015, the Department of Engineering and Material Sciences received 403 proposals for the Key Program, and among them, 90 proposals were supported in 81 fields with a success rate of 22.33%. The total direct cost is 261.00 million yuan and the average direct funding is 2.90 million yuan per project.

In 2016 about 90 projects will be supported in 82 fields with an average direct cost of 3 million yuan per project for 5 years. The 82 fields are as follows:

1. Key problems in the design, manufacture, processing and application of iron and steel materials (E0101, E0109)

2. Key problems in the design, manufacture, processing and application of nonferrous metals (E0101, E0109)

3. High temperature alloys, intermetallic compounds and metal matrix composite materials (E0101, E0102)

4. Metastable and nano-structured metallic materials (E0103, E0104, E0105)

5. Energy and catalytic metallic materials (E0105)

6. Biomedical metallic materials (E0105)

7. Magnetic and information metallic materials (E0105)

8. New phases, new functions in metals and new materials with metallic properties (E0104, E0105, E0106)

9. Characterization of surface, interface and structure of metallic materials (E0107, E0110)

10. Mechanical properties and service behavior of metallic materials (E0108, E0111, E0112)

11. Design, structure manipulation and device integration of high-performance thermoelectric materials (E0204) (support 3 ~ 4 items as a key project group)

12. New type of inorganic functional materials (E0204) (support 3~4 key projects in this broad field)

13. High performance structural materials (E0203) (support 3~4 key projects in this broad field)

14. Structure/property directed chemistry of polymeric materials (E03)

15. Manipulation of the aggregation structure of polymeric materials and its influence on properties (E0314)

16. New theories and methods for the processing (including micro-nano processing and additive manufacturing) of polymeric materials (E0315)

17. Basic issues on biomedical polymer materials (E0310)

18. Basic issues on optoelectronic organic polymer materials and devices with high performance (E0309)

19. Basic research on polymer materials related to energy, ecological environment and resources (E0313)

20. Basic research on structure/function design, preparation and properties of polymer composites (E0307)

21. Basic issues on biological and chemical oil extraction (E0403)

22. Safe and efficient mining of complex coal seam with a large dip angle (E0402)

23. Physical method of safety monitoring by rock burst (E0410)

24. Water circulation of metal mineral separation process (E0411)

25. Phenomenological theory of physical chemistry properties of metallurgical melt (E041204)

26. Performance control theory of battery anode material (E041203)

27. Thermodynamic parameters and new measurement methods of metallurgical melt (E041205)

28. Efficient extraction of rare earth and its associated resources (E0415)

29. Physical and mechanical metallurgy control in the iron and steel solidification process (E0416)

30. Key metallurgical issues in the preparation of cermets (E0417)

31. Formation and control principles of smelting pollutants (E0420)

32. Information detection and data processing in metallurgical process (E042205)

33. Innovative design of mechanisms and robots in advanced machinery (E0501)

34. New principle and methodology for efficient and precise motion actuation and transmission (E0502)

35. Mechanical dynamics design for high performances and qualities (E0503)

36. Failure mechanism and reliability design of components/structures under complex service environment (E0504)

37. Function design and performance control of mechanical surfaces/interfaces (E0505)

38. Design theory and methodology for electro-mechanical system (E0506)

39. New principle and method for bio- and bionic design and manufacturing (E0507)

40. Novel principle, method, process and equipment for integrated high-performance-precision manufacturing (E0508)

41. Novel principle and method for high energy-density beam and non-traditional energy-field based manufacturing (E0508, E0509)

42. Theory, technology and method for high efficiency and ultra-precision machining (E0509)

43. New principle, operation mode, system, and equipment for intelligent manufacturing (E0510)

44. Information sensing and precision measurement of mechanical system and manufacturing processes (E0511)

45. Design and manufacturing of micro/nano systems (E0512)

46. Thermodynamic system analysis, control and optimization for energy conservation (E0601)

47. Turbulent flow mechanism and flow control in fluid machinery (E0602)

48. Fundamentals on multi-phase flow, mass and heat transfer in power systems (E0603, E0605)

49. Mechanism of combustion, pollution and emission reduction of solid fuel (E0604)

50. Key thermo-physical issues on the utilization of renewable energy (E0607)

51. Interdisciplinary research of thermo-physical area with mechanics, materials, environment and life science, etc. (E0608)

52. Fundamental research on the high efficiency high quality electric machine system and its control (E070303)

53. Key issues on the new energy system based on electric power (E0704, E0706)

54. Key issues on the advanced power equipment with reliability and security (E0705, E0702, E0703)

55. Key issues on the efficiency and reliability of power electronic devices and its system (E0706)

56. Fundamental research on electromagnetic-biological effects and their medical application (E0711)

57. Key issues on the pulse power and discharge plasma (generation and application) (E0708, E0707)

58. Fundamental research on high efficiency low cost conversion and large scale storage of electric power (E0712, E0702)

59. Key issues on the advanced electric-magnetic energy conversion theory and technology (E0701, E0706)

60. Low-carbon design principle and methods to improve the living conditions and renovation of urban existing settlements (E0801)

61. Dynamic adjustment theory and control methods of building heating, ventilation and air conditioning (E0803)

62. Theory and method to reduce building energy consumption by low grade energy (E0803)

63. Principles of novel membrane technology for water treatment (E0804)

64. Fundamentals of novel processes for municipal waste water treatment and reuse (E0804)

65. New principles and methods for sustaining the purification function of urban water bodies (E0804)

66. Principles of optimized control and classification for regional atmospheric pollution sources (E0804)

67. Green high-performance concrete as structural materials (E0805)

68. High-performance structures of civil engineering (E0805)

69. Advanced and innovative method and technique for structural hazard prevention (E0805, E0808)

70. Improvement and control of life-cycle performance of engineering structures (E0805)

71. Civil structural safety evaluation and condition assessment based on monitoring data (E0805)

72. Theory and method of integrated multimodal urban transportation planning (E0807)

73. Flooding characteristics of urban or hilly areas (E0901)

74. Drainage networks of source areas of rivers and stream flow features (E0901)

75. High-efficiency agricultural water use and its eco-hydrologic effects (E0902)

76. Basic theory of ecological water conservancy (E0903)

77. Cavitation-corrosion characteristics under multiphase flow condition (E0905)

78. Vibration characteristics of fluid-structure interactions in hydraulic machinery system (E0906)

79. Disaster evolution behavior of soft soil in ocean engineering (E0907)

80. Earthquake input and response mechanisms of high dams in southwest China (E0908)

81. Ship hydrodynamics and structural performance in ice-infested waters (E0910)

82. Key technology of polar ships (E0910)

Department of Information Sciences

In 2015, the Department of Information Sciences announced 79 areas and 3 priority funding areas for the application of Key Program projects, and received 272 applications, of which, 85 projects were funded with direct cost funding total of 251 million yuan (13 million yuan moved in from Major Program), and average direct cost funding intensity of 2.9529 million yuan per project.The success rate of funding is 31.25%, with most of the Key Program projects in areas related to big data received big funding.

In 2016, the Department announces 82 areas for application, of which 3 areas are the departmental key funding areas. About 85 Key Program projects will be funded with average direct cost funding of about 3 million yuan per project for 5 years. Applicant should follow the guidelines for research directions in relevant areas, in accordance with the trend of development in the research area, 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 verifications. Apart from high level papers, research results should be verified in experimental system or in practical applications. Projects of priority funding will be managed according to the management method of Major Program projects.

Please provide proper application code in the application form. Please refer to NSFC's website http://www.nsfc.gov.cn/ for details.

The deadline for proposing areas of Key Program for 2017 is April 30, 2016, please

check the department website http://www.nsfc.gov.cn/cen/oo/kxb/xx/tztg.htm.

Key priority funding areas of the Department

1. Basic theory and technology for big data in wireless communication (F0103)

Big data in wireless communication is increasing fast in scale and complexity, which poses great challenges to wireless communication capabilities. This project group aims to, based on analysis of big data in wireless communication, study basic theory and technology of wireless communication in big data environment, so as to provide foundation for efficient development of wireless communication. This key project group consists of the following research directions. Applicant must have big data needed for the research, and research results are required to be verified in typical big data environment.

Main research directions include:

(1) Method of channel modeling based on big data

(2) Theory of wireless communication based on big data

(3) Equipment insertion based on big data

2. Analysis of performance of complex system and design of controllers (F0301)

There are two research directions, and we plan to fund 2-3 key program projects. Applicant should address difficult basic problems related to analysis of complex performance and design of good controllers in nonlinear or random system to determine topic of study, and carry out in-depth research on basic theory and creative methods, and try to make breakthrough in some basic problems and new methods that have important impact internationally.

(1) Performance analysis and controller design of nonlinear system

(2) Performance analysis and controller design of random system

3. Environmental sensing and target catch of underwater mobile robot (F0306)

To meet the need of machine harvesting of near shore aquaculture (sea cucumber, abalone, etc.), conduct in-depth studies on theory and technology of bio catcher robots in weak lighting and complex environment. Main contents of research include environmental sensing of sea bed, plants and ocean currents, fast identification, checking and tracking of targets, fast non destructive catching method, and setting up platform of underwater mobile robot by integrating above technologies. We plan to fund 3 projects in this research direction, and PIs need to participate in competitions of target catching with the underwater robot developed.

Key areas funded by Department are as follows:

1. Basic theory and key technology of highly dynamic wide spectrum statues (F0102)

2. Design theory and key technology of wide band digital sender (F0103)

3. Key technology of millimeter wave communication module and planar integration for ocean ships (F0103)

4. Basic theory of D2D coordinated transmission and computation for industrial automation (F0103)

5. Theory and technology of communication group network for coordinated multi radar detection (F0103)

6. Studies on under ice acoustic properties and water acoustic communication technology (F0107)

7. Studies on optical correlated imaging by multi parameter quantum detection (F0110)

8. Method and key technology of coordinated radar cognition imaging (F0112)

9. Monitor and forecast of disasters in China Mongolian border based on remote sensing data (F0113)

10. Theory and method of video processing for non coding transmission (F0117)

11. Method and key technology of restoration of historical audio documents (F0117)

12. Key theory and technology of large scale real 3-D video acquisition and integrated

image display (F0117)

13. Design and detection of whole life time safety of integrated circuits (F0118)

14. Microwave device and system based on surface plasma excimer (F0119)

15. Theory and technology of low RCS super wide band integrated aperture conformal antenna (F0120)

16. Basic theory and key technology of vacuum micro nano strong flux electronic optical system (F0122)

17. Theory and key technology of real touching sense of multi media terminal (F0123)

18. Theory and key technology of small laser proton accelerator for medical use (F0125)

19. New computation model and algorithm and mechanism of realization (F020102)

20. Theory and method of calculating pricing of network advertisement (F020104)

21. Analysis and verification of complex software system based on symbol execution (F0202)

22. Key technology of software engineering based on searching (F020202)

23. Theory and key technology of crowd sourcing data base (F020204)

24. Key technology of crucial safety system of embedded micro cores (F0203)

25. Secured computation for big data system (F020303)

26. New generation operating system and technology for network computation (F020306)

27. Analysis and searching of big media in mobile interactive environment (F020502)

28. Theory and method of efficient video coding for content analysis (F020502)

29. Studies on key technology of 3-D mixed modeling based on syntax and vision (F020503)

30. Real sense modeling of personalized goods for e-commerce (F020507)

31. Theory and applications of vision computation in bad weather conditions (F020508)

32. Theory and algorithm multiple source data learning for cognition (F020508)

33. Modeling and key technology of nerve system for higher cognition functions (F020513)

34. Theory and method of syntax computation of text emotion in social media (F020606)

35. Analysis and protection of information leaking in encryption system (F0207)

36. Theory and key technology of sourceless transmission network (F0208)

37. Structure and key technology of industrial internet system (F020801)

38. Method of privacy protection for group sensing (F020805)

39. Analysis and control method for asymmetric dynamics of variable wing aircraft (F0301)

40. Method and verification of interference resistant total control circuit of aircraft (F0301)

41. Control and application of complex network security of integrated communication and computation (F0301)

42. Trouble shooting and health maintenance of large ship main engine system (F0301)

43. Real time evolution of lunch system safety based on big data (F0302)

44. Theory and application of integrated control and optimal operation of large tunneling equipment (F0302)

45. Online monitor and optimal control of industrial crystallization and fermentation process based on multiple source data (F0302)

46. Method and application of safety management and efficient use of power battery (F0302)

47. Theory and method of autonomous navigation of deep sea offshore underwater traveling (F0303)

48. Theory and method of high performance error tolerant tracking of multi platform and multi non cooperative targets (F0303)

49. Coordinated monitor of underwater moving objects based on dynamic multiple source information (F0303)

50. Detection and diagnosis of multi dimensional information of cancer (F0303)

51. Method and identification of continuous voice identification of ethnic languages (F0304)

52. Basic theory and new models of deep learning (F0305)

53. Theory and application of wide range environmental sensing and scenario cognition of robots (F0306)

54. Theory and application of multi dimensional large span nano control based on new sensing method (F0306)

55. Method and application of brain machine interactions based on physiological electric signal of head (F0307)

56. Prediction and application of cognitive function based on nerve imaging technology (F0307)

57. Optimization and integration of performance of nano silicon quantum point non volatile storage chips (F0401)

58. Key technology of new integrated medical electric system capable of merging with human bodies (F0402)

59. 3-D crowd core processor architecture based on optical electrical mixed internet (F0402)

60. Key scientific problems efficient AlGaN base ultraviolet LED (F0403)

61. Opto-electro-magnetic effect in organic calcium titanium materials (F0403)

62. Key technology of detection of single ultraviolet blind photon of nitrate semiconductors (F0403)

63. Basic research on radiation effect and strengthening technology of advanced non volatile storage (F0406)

64. Hetero magnetic electric coupling and weak magnetic field transducer (F0408)

65. Study on integration of highly linear wide band simulation laser and optical detector arrays (F0502)

66. Key technology of deep compression of optical fiber laser width and precision regulation of wavelength (F0502)

67. Silicon base high gain light wave amplifier and laser for large scale integration (F0502)

68. High power optical fiber random laser (F0502)

69. Long distance transmission of single core multi channel light vortex (F0503)

70. Key technology and devices of photonic band gap optical fiber (F0503)

71. Large scale high speed low consumption integrated optical switch array for 100 ports (F0503)

72. Integrated devices and application of medium inferred light frequency comb (F0504)

73. Key technology of multi wave mixed frequency atomic matter wave interference control (F0505)

74. Basic theory and key technology of new nano laser (F0506)

75. High spatial resolution sample composition measurement and form imaging based on laser technology (F0508)

76. Processing and detection method and technology in super precision optical manufacture (F0508)

77. Method and technology of acquisition of high resolution snap shot light spectrum information (F0508)

78. Basic research on total solid heavy frequency high power super fast laser crystals (F0509)

79. Basic research on key technology of enhancing optical power effect of blood target (F0512)

Department of Management Sciences

In 2015, the Department of Management Sciences received a total of 164 Key Program applications, and funded 35 of them. The average funding level for direct expenses was 2.48 million yuan per project.

During the 13th Five-Year Plan period, the Department of Management Sciences will release funding fields of key programs on a yearly basis, and release funding fields of key program clusters and database construction timely. The Key Programs should be focused on (1) frontier scientific issues that can promote discipline development, obtain great innovative achievement, and generate international impacts; (2) important theoretical and application issues regarding economy construction, society development, reform and opening-up, and the improvement of China's comprehensive competitiveness, which need to be addressed immediately, and are possible to be addressed; (3) systematic and in-depth innovative research, which explores management theories and laws for China and has sound research background or good potential for discipline development.

The priority funding areas listed below outline the main contents, scopes and basic requirement of research work. 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, provide deep academic thoughts in their applications, make the research goals clear and concrete, focus on one or several key points of the research and actually address them (it is not required to include all aspects of the research content in the Guideline), and have theoretical breakthroughs. In addition, applications are required to relate theories to practice, discover key scientific issues from important practical management issues from a perspective of China's situations and conduct in-depth research, and try to provide new approaches to address practical management issues. Applicants should focus on scientific methodologies, emphasize on the application of scientific approaches, take real data and actual cases as the fundamental information of their research, and make sure not to be subjective. Please note that the title of application is not required to be exactly the same as the area titles of the following listed Key Programs.

Note that the requirements given in the general description section of the General Program of the Department of Management Sciences in this Guideline are also applicable to the Key Programs, therefore, please read these items carefully.

Key priority areas of Key Programs

In 2016, the Department of Management Sciences proposes 23 priority areas for Key Programs (including one Key Program Cluster), and plans to fund approximate 24 projects, with approximately 8 projects (including one Key Program Cluster) for each of the three divisions. The average funding intensity for direct expenses will be 2.2-2.8 million yuan per project, and the executive period of the Key Program projects will be 5 years.

1. Urban underground logistics system aggregation and management in the trend of new-type urbanization (G0103)

Key scientific issues: demand of new-type urbanization for urban underground logistics system and its characteristics, projection of traffic demand of urban underground logistics; urban underground logistics system planning and optimization; urban underground logistics system financing strategies and operation service (business) patterns; urban underground

logistics system operation management; urban underground logistics system assessment.

2. Experimental research and complexity analysis of individual and group choice behaviors (G0104, G0109)

Key scientific issues: experimental research on individual choice behavior for risk decision; experimental research on group choice behavior and collective rationality analysis for conflict of interest; computational experiments and emergent property research on group choices; assessment method and application research on the realizability of group choices.

3. Risk measurement and application research on internet finance-based structured financial products (G0115)

Key scientific issues: market risk and credit risk integrated measurement theories and methods for structured financial products in the internet financial environment; numerical simulation models of risk integrated measurement for internet finance-based multi-dimensional risk factor structured financial products in the big data environment; modeling theories and methods of liquidity risk management for internet finance-based structured financial products; intelligent risk control and its application in internet finance markets.

4. Research on information products and services management under the "Internet plus" economic pattern (G0112)

Key scientific issues: the internet effects and "complimentary and added-value" commercial pattern of information products and services (including digital storage, transmission, and usage information products and information service, etc.) markets; multi-attribute and multi-period differential design of information products and services; customized bundle, time bundle, and platform bundle of personalized information products and services; channel management of information products and services.

5. Research on impacts of information overload in the internet environment on individuals and enterprise decision behaviors (G0108)

Key scientific issues: impacts of information overload in the massive, fragmented, non-systematized information society on concentrations, knowledge cognition and processing, decision making, creativity, intertemporal decision of individuals, on emotional experiences of individuals, and on executive control of individuals; research on the impacts of information overload on enterprise operation management and strategy decision, and on the purchase behaviors of customers.

6. Assessment theories, methods, and application in the big-data environment (G0106)

Key scientific issues: structure processing methods for high-dimension non-structural data; dynamic evaluation theories and methods in the high-frequency data flow environment; general information mining technologies and assessment algorithm design in the massive data environment; related theories of on-line assessment and mechanism design of defensive behaviors; assessment theories and technologies based on human-computer interaction.

7. Measurement theory and method of economic policy assessment and analysis in the big-data environment (G0113)

Key scientific issues: high-dimensional panel data-based policy assessment method and application; high-dimensional assessment method and theory, as well as its application in financial market policy analysis; theory and method for high-dimensional or super-high-dimensional instrumental variable selection, and their application in economy management policy assessment; big-data quantile modeling and its application in policy assessment; non-structural data mining and modeling, as well as the application in policy assessment.

8. System reliability modeling and analysis theory and method (G0111)

Key scientific issues: focusing on the different environment, failure criterion, human behaviors, and security risk of each process within the system life-cycle, considering system maintainability and security, conduct research on system reliability modeling theory and method, system reliability analysis and assessment methods, system reliability optimal design theory and methods on the basis of data from various sources, such as test data, operation data, similar system data, expert experiences, etc.

9. Growth theory of enterprises based on China's practices (G0202)

Key scientific issues: taking state-owned enterprises, medium-small and family enterprises, and China international enterprises as study objects, conduct research on growth theory of enterprises in the China reform and open, and globalization environment, develop enterprises growth theory system based on China's management practices, including, regulations and conditions of state-owned enterprises to further develop; influence mechanism of entrepreneurs and succession on growth of medium-small and family enterprises; fundamental growth theory for China's enterprises in the internationalization process.

10. Organizational innovation in the new-technology environment (G0204)

Key scientific issues: based on the large scale sample data from different industries and enterprises with different level of innovation, conduct research on impacts of multiple internal and external factors of organizational innovation and their interactions in the new technology environment on organization innovation, including the dynamic influence mechanism of multi-layer system structures and associated interaction on organizational knowledge generation and innovation; organizational environment influencing factors for innovation and the mechanism of the effects; adaption and transition of organizations for new technology environments; analyze the key organizational factors that can affect innovation from various perspectives including individuals, teams, organizations, leaders, and strategic leadership; verity the validity of organizational innovation system.

11. Professional and specialized management patterns for China's enterprises (G0205)

Key scientific issues: the variation trend in professional and specialized management in China's enterprise management, including the formation, variation, and characteristics of professional management of China's enterprises during the transition process; positive and negative effects and the associated impact mechanism of relationship management and professional management from the perspectives of community, enterprises, teams, and individuals; the impacts of professional management and external factors of enterprises on employee professionalization; comparison between key features of specialized management and relationship management; formation and antecedent variables of specialized management, and its impacts on employees and organization behaviors.

12. Financial behaviors and governance characteristics of enterprises in the internet era (G0206)

Key scientific issues: taking fast-growing enterprises as research objects, conduct research on the financial behaviors and governance characteristics of fast-growing enterprises in the internet era, including financial behaviors and value assessment of growing enterprises in the internet and big-data era; financial policy choices, anomaly, and causes of fast-growing enterprises; control authority, governance characteristics, and financial decisions of fast-growing enterprises; information disclosure, dissemination, and enterprise financial decision in the internet and open-source information environment; the impacts of supervision policies and institutional innovation of capital market in the internet and big-data environment on enterprise financial policy and management pattern.

13. Family purchase decision processes and decision mechanism (G0208)

Key scientific issues: decision processes, influencing factors, and decision mechanism of family purchase within the Chinese culture context, including the processes of key family purchase decision making, and its related economic, social, and culture mechanism; relationship between family structure and family members and how it affects family purchase decision; connections and differences between family purchase decisions and individual purchase decisions; dynamic characteristics of family purchase decision during the family development progress; the impacts of mobile internet on family purchase decision.

14. Innovation mechanism of breakthrough technologies (G0210)

Key scientific issues: formation mechanism and evolution trends of breakthrough technology innovation in enterprises, including dynamic mechanism, risk, and uniqueness of breakthrough technology innovation; evolution and diffusion rules of breakthrough technologies from emergence to maturity, with interaction rules between technologies and markets highlighted, and descriptive dimension of technology roadmap emphasized; intellectual property right strategies and competition strategies of breakthrough technology innovation; organizational operation strategies of breakthrough technology innovation.

15. Sustainable supply chain collaborative management and innovation (G0212)

Key scientific issues: collaborative management characteristics, coordination mechanism, and performance evaluation of sustainable supply chain under the resources and environmental constraints, and social responsibility, and the management innovation and roadmap of sustainable supply chain, including characteristics of sustainable supply chain management under the resources and environmental constraints, and social responsibility; driving and diffusion mechanism of sustainable supply chain management; collaborative innovation development and coordination mechanism of sustainable supply chain management; comprehensive economy, environment, and social performance evaluation model for sustainable supply chain.

16. Transition and upgrading rules of manufacturing industry enterprises within the internet context (G02)

Key scientific issues: impacts and influencing mechanism of the internet on manufacturing industry enterprises, and transition and upgrading rules of manufacturing industry enterprises in the internet context, including value chain reconstruction and value co-creation of manufacturing industry plus internet; strategy transition and organization reform of manufacturing industry enterprises that implement transition to C2M in the internet environment; generation, development and evolution mechanism of intelligent manufacturing system on the basis of the internet and big-data; paths selection and strategy design methodology of manufacturing industry enterprise transition within the internet context.

17. China macro-economy model research (G0301)

Key scientific issues: on the basis of stylized facts of China's macro economy, conduct in-depth research on new features and new rules of China's macro economy during the economic transition period; based on these facts and features, establish macro econometric model of which can predict the future using the methods of modern econometrics and statistics; by applying the computable general equilibrium model technology, establish dynamic computable general equilibrium models that can reflects the major features of economic transition period in China; summarize and discover the operation rules of China's macro economy, propose related theories and research methods, provide scientific evidences for China's macro-control, and provide scientific support for policy making.

18. International trade and investment regulation reconstruction and management research (G0301)

Key scientific issues: fundamental theory, main contents, basic features, and evolution rules of new generation international trade and investment regulation; analyze the concerns and interest demand of each major country regarding rule reconstruction; propose new regulation topics that fit China's interest demand; conduct research on the major promotion platform of new regulations; create new methods that can be used to evaluate the influences of new generation trade and investment regulations; analyze the dynamic influence of new regulation to international and domestic economy development and its transmission path; provide strategies and policy suggestions for China to cope with the new international trade and investment regulation.

19. Evolution rules and change management of China's financial system (G0302)

Key scientific issues: features, innovation, and risk of major elements of China's financial system, as well as evolution rules of China's financial industry and financial organization form; on evolution of commercial pattern and operation mode of financial institutions; on features, innovation, pricing, and risk management of new financial instruments; operation mechanism and interaction between China's money market and capital market; macro evolution rules of China's.

20. China's national governance system research (G0306)

Key scientific issues: analyze and summarize the national governance theories and experiences of top modern countries in the world; conduct research on the structure of the state system, operation features, institutional environment, and related theories specifically for China; conduct research on the internal mechanism and interaction between governance targets, governance system, governance subjects, and governance ability, on the basis of not only international experiences but also the abundant data and cases from China's reform and open practices; national capacity requirements and governance system demand under the current environmental conditions and social risks; explore the methods and paths to improve China's national governance abilities and efficiencies.

21. Research on national metal resources security management and policies in the new normal (G031203)

Key scientific issues: analyze the effect mechanism of economic growth, technology transition, and institution change on national metal resources security, and their impact on demand and supply of metal resources; analyze the impact mechanism of unconventional emergency events on national metal resource security; design the national metal resource security management system that is suitable for China; develop national metal resource security management decision supporting and policy simulation platform, help the government make decisions by providing theoretical and scientific evidences.

22. New-media development and management theory and policy research (G0314)

Key scientific issues: analyze the impact mechanism of the new-media, as a mediating variable, on society development, national strategies, and industry structure optimization; establish the new-media management theory system from an interdisciplinary perspective; analyze the inter-generation evolution rules and development characteristics of the new-media technologies and application from the perspectives of science, technology, and society, and establish new-media industry map and ecological map; summarize the advanced experiences of new-media development, application, regulation, and management in the world, and propose new-media development paths and management policies for China.

23. Food quality security management research (Key Program Cluster)

This Key Program Cluster of public administration and policy discipline aims at the key management issues of China's food quality security, focusing on the following four research

subjects: (1) systematic risk of food quality; (2) food quality risk warning and control during the producing and supplying processes; (3) consumer behaviors on food quality security and risk communication strategy; and (4) food quality security governance pattern and public policies from the perspective of risk management. This key program cluster aims to explore the issues of identification, early warning, and public governance of food quality security in China, and to propose the theories, methods, and policy suggestions for food quality security supervision and governance.

To achieve the overall scientific goals and inter-disciplinary integration, the project leaders of funded projects need to make commitment to comply with the regulations of related data, cases, and information management and sharing. The applicants need to make the following notation in the Appendix section of the application: Food Quality Security Management Key Program Cluster of Division.

In 2016, the Key Program Cluster of the public administration and policy discipline plans to fund the following 4 research topics.

(1) Systematic risk of food quality security (G0310)

Key scientific issues: theories and methods of the key risk factor analysis of food quality security in China's food industry chain; causes of major food quality risks and their influencing mechanism; impacts of food quality risks on China's food industry development; internal risks of China's food quality security supervision regulations; the main issues existing in China's food quality security supervision, such as "supervision absence" and "supervision inefficiency", and their causes; measures to improve the information collection and disclosure mechanism of China's food quality security.

(2) Food quality risk warning and control during the production and supply processes (G0310)

Key scientific issues: early warning and control strategies of food quality security risks along various food industry chains, including those of fresh livestock products, food services, as well as other important food industries; food supplier risk control behaviors, such as motion mechanism of food suppliers to control food quality risk, cost-benefit analysis of food suppliers controlling food quality risk, and credit system establishment and strategies for food suppliers, etc.

(3) Consumer behaviors on food quality security and risk communication strategy (G0310)

Key scientific issues: behaviors of consumers to control risk, including the consumer behaviors on fuel quality risk identification and information collection, the impacts of food quality security on consumer purchase behavior and willingness to pay, self-protection behaviors of consumers for food quality security; food quality security credit promotion and risk communication strategies, including the trust of consumers for food quality security and it impact factors, generation and expansion mechanism of trust crisis of food quality security, major strategies of fuel quality risk communication and their effects.

(4) Food quality security governance pattern and public policies from the perspective of risk management (G0310)

Key scientific issues: comparison of food quality security management in the world; further comprehensive reform for food quality governance system; public-involved food quality security socialization pattern and public participation mechanism; top-level design for food quality social emotion management and social emotion regulation and guidance policy in the internet era; public policy system of food quality security; effects and paths of various public policies in food quality risk management; administrative theories, policy implementation, and effects evaluation of food quality security risk management.

Department of Health Sciences

Applications for Key Program in the Department of Health Sciences are accepted only if they are in response to the solicited thematic areas listed in Guide to Programs 2016. Applicants are expected to give their own specific project title, research contents and research plans according to the listed areas.

In 2015, 485 applications for the Key Program in responsive to 39 thematic areas were accepted, 102 of them were finally funded, with a total funding of 278.60 million yuan (direct cost) and an average funding intensity of 2.7314 million yuan (direct cost) per project.

In 2016, approximately 105 applications for the Key Program will be awarded by the Department of Health Sciences; the funding intensity of direct costs is expected to be 3 million yuan per project, and the duration is 5 years.

Detailed requirement for applications for the Key Program are described in the general requirement for the Key Program of NSFC in this guide. Special attention should be given to the following requirements:

(1) Applicants are expected to refer to the requirement for General Program in the Department of Health Sciences in this guide, and to pay special attention to the following contents: the Department in 2016 will generally not give further funding to applicants who either have got high funding intensity in 2015 from NSFC (such as Key Program, Major Program, Major International and Regional Joint Research Program etc.), or are applying for repetitive or similar research to their ongoing national scientific projects funded by other governmental agencies.

(2) Applicants are expected to choose the relevant application code corresponding to the given thematic area and to fill in the application form. Besides, the title of the selected thematic area should be written in the “annotated column” of the application form.

(3) Applicants are expected to attach PDF copies of 5 relevant representative papers to their electronic proposals.

(4) Applicants are expected to fill in the budget form with detailed justification.

The thematic areas for solicited Key Program in the Department of Health Sciences in 2016 are listed as following.

1. Mechanism and intervention of lung infection and injury-induced inflammation (non-viral) (H0104)
2. The pathological mechanisms and early intervention of pulmonary vascular disease (H0109)
3. The pathogenesis and intervention of heart failure (H02)
4. The pathogenesis and intervention of hypertension (H02)
5. Pathogenesis, prevention and treatment of inflammatory bowel diseases (H03)
6. The mechanism and intervention of abnormal development and function of reproductive system (H04)
7. Pathogenesis and intervention of severe prognosis of premature infants (H04)
8. Pathogenesis, prevention and treatment of chronic prostatitis and benign prostate hyperplasia (H05)
9. Mechanisms of degeneration, injury and repairation of locomotor system (H0609)
10. Roles and mechanisms of adipo/hepatic cytokines in metabolic disturbance of glucose and lipid (H07)
11. Novel strategies of targeted therapy for hematologic malignancies (H08)
12. Objective diagnosis and optimized treatments of psychiatric disorders (H0928)
13. Researches on inflammatory mechanisms of nervous system injury (H0909)

14. Regulation of adaptive immunity by innate immune system and relevant diseases (H10)

15. Immune-metabolic interactions and relevant diseases (H10)

16. Occurrence, development and outcome for infectious, inflammatory or autoimmune skin disease (H11)

17. Pathogenesis and intervention of degenerative eye diseases (H12)

18. Pathogenesis, prevention and treatment of chronic inflammatory diseases of nasal mucosa (H13)

19. Oral microorganism and systemic diseases: relationship and mechanisms (H14)

20. Key scientific basis for injury and repairation of skin and soft tissue, bone and joint (H1508)

21. The roles and mechanisms of tumor microenvironment in cancer therapeutic resistance (H16)

22. Epigenetic regulation of DNA damage repair in oncogenesis and cancer development (H1602)

23. Mechanisms of premetastatic niche and its role in cancer metastasis (H1606)

24. The role of intestinal microbiota in oncogenesis and development of digestive system neoplasms (H1617)

25. Study on new technologies and new methods of multi-modal and multi-parameter imaging for early diagnosis of breast cancer (H18)

26. Basic research of the assisted engineering system for human body function rehabilitation (H1817)

27. Study on new targeting drug controlled release system and its therapeutical response monitoring (H1818)

28. Basic research on the related factors of pathogens (bacteria, parasite or fungi) for pathogenicity and immunogenicity (H19)

29. Mechanisms of virus persistent infections (H1904)

30. Basic research of individual identification for trace biological evidence (H23)

31. Aging of organ tissues and its genetic and epigenetic mechanisms (excluding tumor) (H25)

32. Effects and mechanism of environment factors in early life on human health (H26)

33. New technology for toxicological evaluation based on toxicity pathways (H2607)

34. Biological basis for the correlations between classical formulas and TCM syndromes (H27)

35. Integrative analysis of toxicology and clinical effectivenessin CMM (H28)

36. Methodological research inthe integration of biomedical diseases and TCM syndromes (H29)

37. Discovery, function study and optimization of biomacromolecular drugs (H30)

38. Discovery and function study of new naturally occurring bioactive compounds (H3002)

39. Studies on new drug target and intervention mechanism of psychiatric disorders (H3101)

Major Research Plan

The Major Research Plan focuses on key basic scientific issues with strategic importance to the nation and major frontier areas and gives high priority identified on the basis of the capability and advantages of the country. Rather than individual project, the Major Research Plan is designed to be a program cluster which contains a number of projects with relatively identical objectives for innovative research resources integrity in order to explore the possible breakthroughs in the identified areas.

The Major Research Plan follows the principle of "definite objective, stable support, integration and refinement and leap-forward development". The funding period for Major Research Plan projects is 8 years in general.

Applicants should meet the following eligibilities:

(1) Having experience of undertaking basic research projects;

(2) Bearing a senior academic position (title).

Post-doctors in station and graduate students are not eligible to apply. Researchers without affiliation to a research institution or whose home institutions have not been registered at NSFC cannot apply.

One applicant may submit no more than one application in the same year (excluding Integrated Program and Strategic Research Program); and grantees of the Major Research Plan program are not allowed to apply for the same program in the following year.

Applicant should be the actual responsible person for the Major Research Plan program, and there is only one responsible person for one project under the Major Research Plan Program.

The number of applications one applicant may submit shall comply with the requirements defined in the annual Guide to Programs.

The Major Research Plan is framed with three types of programs, 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 for proposal preparation, featuring interdisciplinary research, emphasizing on the contributions to solving key scientific issues and fulfilling the overall goals of the Major Research Plan. Applicants should select "Major Research Plan" for the column of the funding type in the application form of proposal, and Fostering Program, Key Program, or Integrated Program for the column of sub-type, and give the titles of the Major Research Plan in the annotation. Proposal is not accepted in case of incorrect selections or without any selections.

Generally, duration for Fostering Program project is 3 years, for Key Program project is 4 years, and that for Integrated Program project is determined by the Steering Committee of each Major Research Plan according to the actual

need. For Fostering Program project and Key Program project, the collaborative organizations involved may not exceed 2 in number. The number of collaborative organizations involved in one Integrated Program project may not exceed 5. The Integrated Program project will not be counted in limitations of total number of NSFC funded projects applied and undertaken for senior academic title holder, and main participants must be the actual contributor to the Integrated Program project, and total number of main participants may not exceed 9.

Regulations on sharing of data and information should be observed in order to achieve the overall scientific objectives and multi-disciplinary integration of the Major Research Plan.

Each Major Research Plan should hold an academic workshop or seminar on related areas so as to strengthen academic exchange and achieve the overall scientific objectives and integration of disciplines. The principal investigator of the granted projects is required to participate in these activities.

For details of each Major Research Plan, please refer to the relevant sections of introductions on Major Research Plan in this Guide to Program.

Precision Measurement Physics

Precision measurement physics is the basis and frontier areas of modern physics development, and the result of integrating scientific exploration and precision measurement techniques, and the basis of national needs on relevant precision measurement. This major research plan aims at special target of precision measurement physics, along the line of atomic, molecular and photonic research, and to construct new system of highly stable precision measurement, explore new concept and new principles of precision measurement physics, develop higher precision measurement method and technology, improve precision of measuring basic physical parameters and test the range of application of basic physical principles at higher precision level.

I. Scientific targets

Overall scientific target: to further improve research capability of China in precision measurement area, promote development of precision measurement physics, increase international impact of disciplines in precision measurement physics, reach leading level in some areas, and strengthen the right of speech of the Chinese scientists in the world in basic physical constant measurement and basic physical quantities. Provide key concept, method and technology basis for national needs such as navigation and positioning, time keeping, resources exploration, national defense, etc. Build a high standard research team for China.

Specific scientific target: improve existing experimental system, increase measurement precision; construct new system of atomic and molecular cooling, propose new principles and new method for atomic and molecular cooling for precision measurement; break the standard quantum limit in measurement, reach the international leading level in noise compression; make the uncertainty in time frequency measurement to the level of 10-18, time frequency comparison and transfer precision higher than 10-19; make measurement value of more physical constants enter CODATA; and achieve international leading results in testing of physical laws such as equivalent principle and Newton’s reverse square law, etc.

On the basis of experimental measurements, achieve new discoveries, new understanding, new mechanism, and propose new concepts and new views.

II. Key scientific problems

1. Principles, method and technologies of measurement breaking the standard quantum limit

2. New principles and method breaking the existing atomic frequency standard precision

3. New mechanism and technology breaking the atomic precision control and molecular cooling

III. Application and funding in 2015

In 2015, we received 54 applications, among them, 19 were for Key Program projects, 35 for Fostering Program projects. After expert review, we funded 8 Key Program projects, 16 Fostering Program projects. Total direct cost funding was 42.8 million yuan.

IV. Key funding research areas in 2016

This Major Research Plan will focus on core scientific problems and support projects in the form of "Fostering Program" and "Key Program". We shall fund the applications having explorative and new ideas in the form of "Fostering Program" and the applications having original ideas, good research accumulation and prospects of making breakthroughs in the form of "Key Program". This Major Research Plan will last for 8 years, and the project selection and funding will be done in the first 5 years. In 2016 we plan to allocate direct cost funding of 3.2-4 million yuan per project for 4 years for Key Program, and 0.8-1 million yuan per project for 3 years for Fostering Program. The research directions are listed below.

Key Programs

Target of integration: applicants may choose all or part of the contents in each research direction. The main research directions are listed below.

1. Studies on quantum correlation measurement exceeding standard quantum limit

Main research contents:

(1) Precision quantum measurement based on quantum correlation systems such as photon and atoms (including ions): construct multi particle (photon or atom) self spincompression or entanglement. Use quantum correlation or non linear interactions between particles to demonstrate measurement precision exceeding standard quantum limit on phase change, reach or break Heisenberg limit.

(2) New principles and new methods of quantum precision measurement: explore other new principles and new methods of multi particle quantum correlation and quantum measurement that may break the standard quantum limit, including but not limited to new means such as quantum weak measurement to realize amplification of weak signals and quantum feedback control technology, and use experiment to demonstrate the increased resolution of small phase and quantum signals. Research target is to realize measurement that breaks the standard quantum limit, and achieve the world leading level in noise compression.

(3) Development of quantum correlation precision measurement technology: use quantum correlation system and principles such as photon and atom, develop relevant precision measurement technology with high precision, high sensitivity and high resolution. Include but not limited to new quantum interferometer, gravimeter, gyroscope and magnetometer, so as to achieve higher precision measurement of various physical quantities

(such as time, frequency, gravity, the rotation of the Earth, magnetic field, velocity, temperature, etc.) and quantum state and quantum operations.

2. Studies on principles and methods of precision measurement based on super cold atom and molecules

Main research contents:

(1) Preparation of super cold molecules (including ions) system and principles and methods for use in precision measurement; study method of applications of special energy level properties in precision measurement physics.

(2) Precision spectrum and super fine structure of diatom and dimolecule, precision measurement of highest confined state order in base state diatom and dimolecle and calibration of relevant low energy impact properties.

(3) Computation and experimental studies on the atomic and molecular structures related to precision measurement.

3. High precision testing of basic physical laws

Main research contents:

(1) High precision testing of quantum electro dynamics (such as experiment of hydrogen or hydrogen like atomic spectrum, measurement of hydrogen or hydrogen like atomic spectrum and computation of quantum electro dynamics, Lamb shift experiment and computation for correlative systems).

(2) Explore new physical quantity or interaction of time inversion and parity violation (such as high precision measurement of electron, neutron and atomic electric moment, new interaction force between spin polarized atoms and non polarized atoms in small scale), spectrum studies on low energy anti mass (such as trapped anti hydrogen atom) and comparison with corresponding mass.

4. High precision measurement of physical constants and physical parameters

Main research contents:

(1) High precision measurement of basic physical constants (such as fine structure constant, Planck constant h, Rydberg constant R) and possible changes with time and space.

(2) High precision measurement of basic physical parameters (such asmass ratio of proton and electron, radius of proton’s charge, eigen parameters such as charge, mass, magnetic moment, life of atom and molecules, and parameters of atomic interactions).

5. High precision atomic frequency markers

Main research contents:

(1) Generation of high precision time frequency. Study and solve the physical and technical problems affecting the uncertainty and stability of atomic frequency markers; develop a complete system of high performance optical atomic clock (focusing on atomic and ion systems other than calcium, strontium and aluminum); and method and technology high precision measurement based on UTI.

(2) High precision frequency comparison and transfer. Study method and technology of high performance optical frequency source, optical frequency signal transfer path and relay, construct system of remote opticalfiber or space optical frequency signal transfer and comparison better than existing optical frequency atomic clock stability; new method and new technology of ultr high precision microwave frequency transfer; and technology of high performance transfer clock frequency comparison and measurement.

Fostering Programs

Addressing issues in precision measurement physics, conduct studies in frontier areas of new physical system, new principles, new methods and new technologies for special problems in precision measurement physics. Applications should have clear scientific problems, new physical ideas and specific ways of solving the problem. For projects having

good research results and clear and important scientific issues to be further studied, we shall give continued support through Key Programs or Integration Programs later.

Main research directions are:

1. Noise mechanism and method of reduction in precision measurement physics
2. New principles of high precision atomic frequency marker
3. High precision transport and comparison of time frequency
4. Studies on atomic molecular structures and precision spectrum line
5. New principles and new methods of quantum measurement
6. Principle and methods of ultra cold atomic molecular precision measurement
7. New method of high precision testing of basic physical laws
8. New methods of high precision measurement of physical constants and physical parameters
9. Studies on key unit technology of precision measurement physics
10. New scheme and new technology of detecting gravitational wave

V. Basic selection criteria

1. Research contents should meet the requirement of this guide, and research and experiments should be creative, and focus on scientific problems in precision measurement physics based on atomic, molecular and photonic techniques.

2. We encourage exploratory studies in frontier areas, and give preferential support to original research on new ideas, new systems, new methods and new technologies in precision measurement physics.

3. Studies are mainly of the experimental type, but please pay attention to combining theory and experiments, and research targets should be higher measurement precision

4. We encourage multi interdisciplinary research, especially between mathematical physics, information, and geosciences.

5. We encourage international cooperation.

VI. Notes to applications

1. Please read this guide carefully before writing the application. This research plan aims at forming a research project group. Applications should have clear key scientific problems, and close relations with the problems given in this guide, and emphasize on contributions to the overall objectives and the key scientific issues of this research plan.

2. Please select the proper application code.

The Change of the Tibetan Plateau's Land-Atmosphere Coupled System and its Effects on Global Climate

The Tibetan Plateau (TP), as an important factor controlling atmospheric circulation and its change, have profound impacts on regional and global climate change through energy and water cycles. In accompany with the deepening research of global climate change, the TP's land-atmosphere coupled system with the increasing significance of its impacts on global climate has become a research frontier in the international community of climate and the earth system science. More research on the TP's influences upon disastrous weather and climate change in China will improve the ability of disastrous weather forecast and climate prediction.

I. Scientific goal

This Major Research Plan (MRP) is designed to explore the mechanism of the TP's impacts on the global climate and climate change, improve the regional and global weather/climate prediction capability, move the atmospheric research in China on the Tibetan Plateau into the world arena with a group of leading scientists in the advanced research teams making greater contribution to the sustainable socio-economic development.

The overall target of this MRP is to understand the TP's land-atmosphere coupled process, the cloud precipitation and water cycle processes and the troposphere-stratosphere exchange process over the TP, develop the TP's database and assimilation system, improve the numerical models of regional and global climate systems, and to reveal the mechanism of TP's impacts on regional and global energy/water cycles.

II. Key scientific issues

The key scientific issues to be addressed in this MRP are how the TP's land-atmosphere coupled system influences the Asian and global climate system? This plan will be focused on the following 3 critical scientific issues.

1. The regulation of the TP topography in the global atmospheric circulation

It is to investigate the land surface process and land-atmosphere interactions over the TP; dynamic effects of multi-scale topography of the plateau and their impacts; and topographic effects of the plateau on the general circulation.

2. Impacts of the changing TP's land-atmosphere coupled system on the global energy/water cycles

It is to explore cloud precipitation physics and atmospheric water cycle over the TP; linkage of energy to water cycle over the TP and its impacts; mechanism of impacts of the plateau's land-atmosphere coupled processes on monsoons, energy/water cycles; collaborative influences of the TP and oceans on the regional and global climate changes; and interactions of troposphere and stratosphere over the TP.

3. Mechanism of influences of the TP's land-atmosphere coupled system on disastrous weather and climate in China

The research will be focused on the mechanism of the influences of the TP's land-atmosphere processes on disastrous weather in China; impacts of multi-sphere interactions on Asian monsoons and droughts/floods in China; impacts of the TP on global monsoons and climate anomalies; and the key techniques for weather and climate system models, physical processes, data reanalysis and data assimilation.

III. Key research priorities and directions in 2016

The total fund for the MRP in 2016 is approximately 30 million yuan. For those projects, which have shown innovative research concepts and encouraging early-stage findings, and still need further exploratory research work for an extended period, will be funded through the "Fostering Program" with the duration of 3 years and the average direct funding level of about 0.8 million yuan per project. For those projects, which have demonstrated sound research ground work and accumulations, and have proposed in-depth systematic research on well-defined and innovative but important scientific issues, will be funded through the "Key Program" with the duration of 4 years and the average direct funding of approximately 3 million yuan per project. It is the fourth year of the Major Research Plan. Based on the arrangement and overall schedule of the Key Program and Fostering Program supported in the past three years, the expert group, through discussion and investigation, decide that, integrated and synthesized research will be gradually carried out from 2016, to more timely summarize the early-stage studies, and to better integrate/complement the

content/advantages of different projects. The duration of the "Integrated Program" will be 3 years with the average direct funding of approximately 3 million yuan per project.

Key research directions in 2016 include:

1. Studies on the assimilation of the land-atmosphere coupled data from the TP's multi-source land-atmosphere observations (especially the Third TP Observations)
2. Studies on the key physical processes in the TP's land-atmosphere coupled system numerical models (especially the TP's lake/wet land, gravity wave drag, boundary layer, radiation and stratospheric physical and chemical processes)
3. Mechanisms of the TP's atmospheric heat source formation in the TP's land-atmosphere coupled processes and the effects of the heat source on the disastrous weather in the downstream areas
4. Dynamical processes in the TP's convective precipitations and numerical studies on the processes; multi-scale change characteristics of the TP's complicated topography and the water cycle in the surrounding areas, and their effects on weather and climate
5. Effects of the TP's land-atmosphere coupled processes on the global and regional energy and water cycles
6. Effects of the TP on the interactions between the global tropospheric and stratospheric planetary waves; weather/climate effects of the TP on the transportation of atmospheric material in the troposphere and stratosphere (water vapor, aerosols, ozone, etc.)
7. Synergistic effects of the TP's land-atmosphere coupled system and ocean on the global climate
8. Influences of the interactions between low and middle latitude systems on the TP's dynamical and thermodynamic structures and their effects on weather and climate

Key directions for the integrated research in 2016

The integrated research will focus on the following three projects.

(1) Synergistic effects of the TP's land-atmosphere coupled processes and ocean on the regional energy/water cycles and global climate

It is to examine the main factors controlling the TP's atmospheric heat source and its variation; roles of transient processes in the synergistic effects of TP and sea-land-atmosphere interactions on the global climate change; mutual feedbacks among basic flow, TP's stationary wave and circulation anomalies of ocean and atmosphere, and their effects on the global climate anomaly. Integrated research will be carried out based on the related projects which have been approved.

(2) TP's multi-source information fusion, data assimilation and numerical model development

Based on the key and fostering projects that have already been carried out, a TP's reanalysis dataset integrating multi-source data will be established. Integration will focus on the data of atmosphere, land, ice/snow and hydrology from satellite remote sensing, sounding and surface observations, to produce a reanalysis product by combining modern observations, assimilation and frontier technologies; this product will have good quality control, many variables, large spatial coverage, long time span, high spatial and temporal resolution, etc. Integrate parameterizations of the TP's atmospheric physics and land surface processes and the uncertainties of the parameterizations, based on the key and fostering projects that have already been carried out. Improve high-resolution general circulation models and simulation performance of climate models in the TP area.

(3) Construction of the sharing platform of the TP's atmospheric multi-source integrated data

The platform construction will focus on the integration of the TP's long-term

meteorological service observations, data of atmospheric and land processes observed in all previous atmospheric science experiments, satellite remote sensing climate products, global and regional reanalysis products, and data products from the projects on atmospheric and land data analysis and reanalysis (supported by "The Change of the Tibetan Plateau Land-Atmosphere Coupled System and its Effects on Global Climate"). Study the TP's multi-source information storage models and construct the TP's multi-source information data bases. Study and establish data standard specifications that support integration of multi-source data, data management and data sharing. Design scalable system architecture and a uniform data interface, and build a standard, unified and open application platform for resource sharing of the TP's atmospheric multi-source information. The platform is required to satisfy the research of the current plan and future research/service.

IV. Notes to application

(1) Before filling in the Project Application Form, applicants should carefully read the guidelines. The theme selected in the Project Application Form should conform to the implementation principles set for this Major Research Plan, and description should be given to the scientific issues that are most relevant to the guidelines, including potential contributions to solve the key scientific issues and achieve the overall objectives of this Major Research Plan. The objectives and contents given in the Project Application Form should target at the key scientific issues of this Major Research Plan, highlight the limited goal and emphasize on specific research on innovative points and frontiers of basic scientific issues. Any applications that do not conform to the guidelines will not be accepted. Those who have been involved in other relevant scientific research project(s) should demonstrate the differences and relations between this proposal and other project(s) in the "Research Foundation" part of the Project Application Form.

(2) Targeting at specific scientific issues to be addressed, applicants may freely identify a project title, research contents, a research scheme and the corresponding fund required in support of the research work by clarifying the point for making a new breakthrough and innovative concept(s) based on analyses of research findings that are available nationally and internationally.

(3) Be sure that a corresponding application code should be selected according to the specific content of the research project to be applied for. "Major Research Plan" is selected in the "Funding Categories" column of the Project Application Form, "Fostering Program Project" or "Key Program Project" in the "Subcategory Description" column, and "the Change of the Tibetan Plateau Land-Atmosphere Coupling System and its Effects on Global Climate" in the "Explanatory Note" column. Any applications with incorrect or no selection will not be considered.

(4) Pay attention to the mutual support relationship with other projects in this research plan during the project execution process.

(5) The Department of Earth Sciences is responsible to accept applications.

Young Scientists Fund

The Young Scientists Fund is an important funding scheme under NSFC's talent funding system. It supports young scientists to freely choose their research topics within the funding scope of NSFC to conduct basic research, fosters the ability of young scientists to independently undertake research projects and do creative research, stimulates creative thinking of young scientists and trains backup talents for basic research.

Eligibility of applicants:

(1) Have experience of doing basic research;

(2) Have senior professional position (title) or PhD degree, or be recommended by 2 researchers in the same research area with senior professional position (title);

(3) Be less than 35 by January 1 of the year of application (born on or after January 1, 1981). For female applicants, be less than 40 by January 1 of the year of application (born on or after January 1, 1976).

Full time PhD students who satisfy the above criteria may apply through their host institutions with the consent of their supervisors, but full time master degree students can not apply. Those who are the PIs of ongoing NSFC projects or have undertaken projects of Young Scientists Fund, including one-year small fund for exploratory studies, and terminated or withdrawn projects, can not apply again.

The Young Scientists Fund adopts the same application, evaluation and management mechanism as the General Program. The creative potential of the applicant is mainly evaluated. Applicants should follow the outlines of proposal for Young Scientists Fund when preparing applications. They may be up to 2 collaborating units within one proposal and the research period is 3 years in general. The funding period for applications submitted by post-doctors is decided in consideration with the letter of commitment from their host institutions.

In 2015, the Young Scientists Fund supported 16,155 projects with a total funding of 3.1946 billion yuan and the average funding for direct costs was 197,700 yuan per project. The average success rate was 24.58%, which is 0.68% lower than that of 2014.

In 2016, the average funding for direct costs will be around 200,000 yuan per project. Please refer to actual funding scale in each department when submitting proposals.

Funding for the Young Scientists Fund in 2015

Unit: 10,000 yuan

Department	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	5,399	1,733	35,350	20.40	11.07	32.10
Chemical Sciences	5,253	1,428	29,990	21.00	9.39	27.18
Life Sciences	9,469	2,214	44,310	20.01	13.87	23.38
Earth Sciences	5,419	1,582	33,200	20.99	10.39	29.19
Engineering and Materials Sciences	11,194	2,900	59,160	20.40	18.52	25.91
Information Sciences	7,327	1,943	39,640	20.40	12.41	26.52
Management Sciences	3,273	675	11,800	17.48	3.69	20.62
Health Sciences	18,388	3,680	66,010	17.94	20.66	20.01
Total	65,722	16,155	319,460	19.77	100	24.58

Please refer to sections in each department introduction in this Guide to Programs for funding scope, funding statistics in recent years and relevant requirements.

Department of Mathematical and Physical Sciences

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 2016, the Department will maintain a higher funding rate for the Young Scientists Fund so as to give more young people the opportunity to do independent research, and to foster outstanding talents for basic research.

Funding for projects of the Young Scientists Fund in the Department of Mathematical and Physical Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Mathematics	Mathematics I	295	5,284	33.64
	Mathematics II	292	5,236	30.51
Mechanics	Basic problems and methods in mechanics	2	44	20.00
	Dynamics and control	55	1,159	32.16
	Solid mechanics	119	2,562	31.65
	Fluid mechanics	76	1,643	31.93
	Bio-mechanics	19	428	32.20
	Explosive and impact dynamics	37	814	31.36
Astronomy	Astrophysics	47	1,049	34.81
	Astrometry and celestial mechanics	50	1,101	31.25
Physics I	Condensed matter physics	228	4,986	31.93
	Atomic and molecular physics	43	919	32.33
	Optics	140	3,060	32.11
	Acoustics	28	605	34.57
Physics II	Fundamental physics and particle physics	68	1,255	33.17
	Nuclear physics, nuclear technology and its application	85	1,843	32.82
	Particle physics and nuclear physics experimental facilities	82	1,876	29.71
	Plasma physics	67	1,486	33.84
Total		1,733	35,350	32.10
Direct cost funding per project		20.40		

Department of Chemical Sciences

The Department of Chemical Sciences upholds the principle of people first and fosters innovative talents, brings into full play the maintaining and fostering role of the Young Scientists Fund, and steadily expands the funding scope with the idea of controlling a proper funding intensity and further raising the funding scope to young scientists. The Young Scientists Fund stresses on supporting research projects with innovative ideas and gives less weight to research accumulation and the quality of the relevant research teams, so as to facilitate the growth of young scientists.

Funding for projects of the Young Scientists Fund in the Department of Chemical Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Division I	Inorganic chemistry	203	5,263	27.69
	Analytical chemistry	162	3,402	27.74
Division II	Organic chemistry	242	5,083	27.72
Division III	Physical chemistry	285	5,986	27.67
Division IV	Polymers	106	2,226	27.82
	Environmental chemistry	170	3,570	27.69
Division V	Chemical engineering	260	5,460	25.05
Total		1,428	29,990	27.18
Direct cost funding per project		21.00		

Department of Life Sciences

In 2015, the Department of Life Sciences received a total of 9,469 applications for the Young Scientists Fund. 9,263 applications were accepted and 2,214 projects were funded with a funding rate of 23.38%. The average direct cost of funding was 200,100 yuan per project. The Department will continue to follow the principle of "stabilizing research teams, fostering young talents, stimulating innovative thinking and supporting independent research" for the Young Scientists Fund, and provide steady support to researchers in the early stage of their academic career. In 2016, the funding for the Young Scientists Fund will be 250,000 yuan per project. For application details and special notifications, please refer to the section of General Program of the Department in this guide.

Funding for projects of the Young Scientists Fund in the Department of Life Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Division I	Microbiology	157	3,141	25.32
	Botany	144	2,889	25.44
Division II	Ecology	164	3,282	29.23
	Forestry	124	2 485	18.99
Division III	Biophysics/Biochemistry/Molecular biology	107	2,139	29
	Immunology	61	1,222	31.12
	Biomechanics and tissue engineering	61	1,224	21.18
Division IV	Neurosciences	50	996	23.15
	Psychology	57	1,146	21.84
	Physiology & integrative biology	45	901	23.08
Division V	Genetics and bioinformatics	115	2,302	27.12
	Cell biology	75	1,496	30.36
	Developmental biology and reproductive biology	51	1,018	24.52
Division VI	Agriculture and crop sciences	183	3,653	21.45
	Food science	192	3,844	18.68
Division VII	Plant protection	125	2,510	22.4
	Horticulture and plant nutrition	126	2,513	20.69
Division VIII	Zoology	76	1,513	31.02
	Animal husbandry and grassland science	109	2,193	20.76
	Veterinary medicine	116	2,327	25.95
	Aquaculture	76	1,516	19
Total		2,214	44,310	23.38
Direct cost funding per project		20.01		

Department of Earth Sciences

In 2015, the Department of Earth Sciences received 5,419 applications for the Young Scientists Fund from 796 research institutions. Among them, 2,980 were from universities, accounting for 55.0%, and 2,264 from research institutes, accounting for 41.8%. Totally, 1,582 projects were funded with a fund of 332 million yuan (direct cost and hereinafter). The average funding was 210,000 yuan per project and the funding rate was 29.2%. Among the projects funded in 2015, 838 were obtained by universities, accounting for 53.0%, and 693 by research institutes, accounting for 43.8%. One of the most important goals of NSFC is to foster outstanding young scientists continuously and steadily. The Department will further strengthen the funding for young scientists, especially outstanding young scientists. The main function of Young Scientists Fund is "cultivation", and to provide more opportunities for young scholars at the very beginning of their career, especially for the researchers who were just awarded the PhD degrees and started their basic research. In 2016, the average funding will be about 250,000 yuan per project.

In 2016, a standardized selection of "application code", "research field" and "key words" will be tried out continuously in Division I (Geography). When filling out the application forms, applicants should choose "application code 1 (D01 and subordinate codes)" and relevant "research field" and "key words" precisely according to the "list of application code, research field and key words for trial disciplines" and make sure their applications in accordance with the funding area of Division I. The list of the application code, research field and key words are available from the "special focus" under the item of "application acceptance" on the official home page of the NSFC (http://www.nsfc.gov.cn/).

Funding for projects of the Young Scientists Fund in the Department of Earth Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Division I	Geography (including soil science and GIS)	607	12,731	29.21
Division II	Geology	347	7,285	29.18
	Geochemistry	124	2,610	29.11
Division III	Geophysics and space physics	143	3,008	29.12
Division IV	Marine science	225	4,717	29.22
Division V	Atmospheric science	136	2,849	29.25
Total		1,582	33,200	29.19
Direct cost funding per project		20.99		

Department of Engineering and Materials Sciences

In order to encourage and foster innovative young researchers, the Department will continue to carry out favorable funding policy for the Young Scientists Fund. In 2015, the Department received 11,194 applications (274 rejected) for the Fund with an increase of 3.73%. 2,900 projects were funded with a total direct cost of 591.60 million yuan. The average funding was 204,000 yuan per project with a success rate of 25.91% (28.13% in 2014).

Please refer to the General Program and other related parts of this Guide to Programs for detailed requirements on application.

Funding for projects of the Young Scientists Fund in the Department of Engineering and Materials Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Materials sciences I	Metallic materials	231	4,747	25.47
Materials sciences II	Inorganic and non-metallic materials	353	7,255	25.62
	Polymer materials	232	4,737	25.66
Engineering sciences I	Metallurgy and mining science	299	6,141	24.07
Engineering sciences II	Mechanical engineering	506	10,294	25.84
Engineering sciences III	Engineering thermo physics and energy utilization	227	4,643	26.12
Engineering sciences IV	Architecture, environmental and structural engineering	585	11,786	27.03
Engineering sciences V	Electrical science and engineering	193	3,972	26.47
	Hydrology and marine engineering	274	5,585	26.27
Total		2,900	59,160	25.91
Direct cost funding per project		20.40		

Department of Information Sciences

In 2015, the Department of Information Sciences received 7,327 applications for the Young Scientists Fund, which was decreased by 3.15% compared with that in previous year. 1,943 projects were funded with sucess rate of 26.52%. The total direct cost funding was 396.4 million yuan and the average direct cost funding was 204,000 yuan per project. In 2016, the Department will continue to pay attention to the Young Scientist Fund, and increase the funding rate in a moderate way. The direct cost funding intensity will be 200,000 yuan per project.

In 2016, a standardized selection of "application code", "research field" and "key words" will be tried out continuously in Division 1. When filling out the application forms, applicants should choose "application code 1 (F01 and subordinate codes)" and relevant research field" and "key words" precisely according to the "list of application code research field and key words for trial disciplines" and make sure their applications in accordance with the funding area of Division 1. The list of the application code, research field and key words are available in the "Special focus" under the item of "Application acceptance" on the official home page of the NSFC (http://www.nsfc.gov.cn/).

Funding for projects of the Young Scientists Fund in the Department of Information Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Division I	Electronics and technology	167	3,500	26.94
	Information and communication system	191	3,835	27.25
	Information acquisition and processing	173	3,453	26.99
Division II	Theoretical computer science, computer software and hardware	130	2,661	28.20
	Computer application	256	5,194	28.07
	Network and information security	162	3,307	28.13
Division III	Control theory and control engineering	201	4,136	25.64
	Systems science and system engineering	59	1,206	20.07
	AI and intelligent system	164	3,369	24.37
Division IV	Semiconductor science and information devices	173	3,531	26.66
	Information optics and photoelectric devices	126	2,571	26.81
	Laser technology and technical optics	141	2,877	26.65
Total		1,943	39,640	26.52
Direct cost funding per project		20.40		

Department of Management Sciences

In the recent years, the application quality and research level of the Young Scientists Fund in the Department of Management Sciences have shown significant improvement. Most applicants paid attentions to scientific frontier areas, proposed appropriate research methods and have published high-level academic papers. On the other hand, some applicants still lacked the understanding of NSFC's policies; therefore, the proposed research content could not be completed with the limited budget or within the proposed time period. Some other applicants repeated their PhD or postdoctoral research work, or failed to provide information as required by NSFC.

In 2015, the Department received 3,273 applications for the Young Scientists Fund, equivalent to the figure in 2014, 675 projects were funded with a funding rate of 20.62%, and the average funding for direct cost was 174,800 yuan per project.

In 2016, the Department will continue to follow the principle of "expanding the funding scope properly and limiting the funding intensity" for the Young Scientists Fund. The average funding for direct cost in 2016 will be 190,000 yuan per project, and the executive period will be 3 years.

Please note that the requirements given in the general description section of the General Program of the Department of Management Sciences in this Guideline are also applied to the Young Scientists Fund, so please read carefully before submitting proposals.

Funding for projects of the Young Scientists Fund in the Department of Management Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Division I	Management science and engineering	197	3,444	21.44
Division II	Business administration	186	3,252	21.14
Division III	Macro-management and policy	292	5,104	19.81
Total		675	11,800	20.62
Direct cost funding per project		17.48		

Department of Health Sciences

The Department of Health Sciences mainly supports basic and fundamental of clinical research on the occurrence, development, outcome, diagnosis, therapy and prevention of diseases.

Eligible young scientists are encouraged to submit proposals to the Department for funding. Applicants are expected to have the ability to undertake and complete research project independently, and the ability to propose creative scientific questions and research schemes. The PDF copies of no more than five representative papers relevant to the application should be attached to the proposal. More detailed information is to be refered to sections in the Young Scientists Fund and General Program in this guide.

The funding intensity for the Young Scientists Fund has been increased along with the continued increase of national investment in basic research, and the direct cost per project for the Young Scientists Fund in 2016 will amount to around 200,000 yuan.

An overview of the award number, funding, and success rate of the Young Scientists Fund in 2015 by the Department is listed in the table below.

Funding for projects of the Young Scientists Fund in the Department of Health Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Division I	Respiratory system, circulatory system, blood system	393	7,047	21.28
Division II	Digestive system, urinary system , endocrine system/ metabolism and nutrition support, ophthalmology, otorhinolaryngology head and neck science, oral and craniomaxillo-facial science	510	9,143	19.84
Division III	Neurological and psychiatric diseases, gerontology	312	5,597	21.27
Division IV	Reproductive system/ Perinatology/Neonatology,medical immunology	217	3,895	21.03
Division V	Medical imaging and biomedical engineering, special medicine, forensic sciences	205	3,678	21.20
Division VI	Medical pathogenic microorganisms and infection, orthopedics and sports medicine, emergency and intensive care medicine/Trauma/ Burns/Laboratory medicine/Plastic surgery/ Rehabilitation medicine	320	5,740	18.93
Division VII	Oncology (leukemia not included)	748	13,407	18.85
Division VIII	Skin and appendages, preventive medicine, endemiology, occupational medicine, radiology	196	3,522	24.90
Division IX	Materia medica and pharmacology	275	4,938	24.77
Division X	Chinese medicine, Chinese materiamedica, integrated Chinese and western medicine	504	9,043	17.08
Total		3,680	66,010	20.01
Direct cost funding per project		17.94		

Fund for Less Developed Regions

The Fund for Less Developed Regions supports scientists in specified regions of China to conduct creative research within the funding scope of NSFC, so as to foster and support researchers in these 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.

Applicants for the Fund for Less Developed Regions should be satisfied with following qualifications:

(1) Have the experience of undertaking basic research project or doing other basic research;

(2) With senior academic position (title) or doctoral degree, or recommendations by 2 researchers with senior academic position (title) in the same research area.

Researchers meeting above qualifications and working in Inner Mongolia Autonomous Region, Ningxia Hui Autonomous Region, Qinghai Province, Xinjiang Uyghur Autonomous Region, Tibet Autonomous Region, Guangxi Zhuang Autonomous Region, Hainan Province, Guizhou Province, Jiangxi Province, Yunnan Province, Gansu Province, Yanbian Korean Prefecture of Jilin Province, EnshiTujia 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,Yanan City and Yulin City in Shaanxi Province may apply for the Fund for Less Developed Regions. Researchers seconded by the Organization Department of the Central Committee of the CPC to Xinjiang Uyghur Autonomous Region and Tibet Autonomous Region as aid scientists for 3 or more years are also eligible to apply for this fund, on the condition that they provide 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 other provinces and regions, and researchers from the affiliated institutions to the central government or the PLA in the above regions and provinces cannot apply, but may join the application as main participants. Graduate students can not apply, but on-job students may apply through their employer institutions at the consent of their supervisors. Researchers without an home institution or their home institutions have not been registered at NSFC cannot apply for the Fund for Less Developed Regions.

In order to provide preference 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, researchers who have been granted 3 or more projects under the Fund for Less Developed Regions are not be allowed to apply for this fund again since the year 2016, and the Fund for Less Developed Regions grants approved in 2015 and earlier will not be counted in.

Applicants are advised to refer to the outlines of applications for the Fund for Less Developed Regions and make out their application form accordingly. The collaborative units cannot exceed 2, and the research period is 4 years. The funding period for applications submitted by post-doctors is decided in consideration with the letter of commitment from their host institutions.

In 2015, the Fund for Less Developed Regions suported 2,829 projects with a total funding of 1.096 billion yuan. The average funding was 387,400 yuan per project, and the funding rate was 21.48%, which is 0.37% higher than that in 2014 (please refer to the table below for the funding statistics).

In 2016, the average funding for direct costs will be 400,000 yuan per project. Please refer to the actual funding levels of relevant departments and make budget request in a practical manner.

Funding for projects of the Fund for Less Developed Regions in 2015

Unit: 10,000 yuan

Department	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	588	176	7,000	39.77	6.39	29.93
Chemical Sciences	1,040	238	9,380	39.41	8.56	22.88
Life Sciences	2,994	729	29,230	40.10	26.67	24.35
Earth Sciences	742	169	7,110	42.07	6.49	22.78
Engineering and Materials Sciences	1,721	341	13,620	39.94	12.43	19.81
Information Sciences	1,076	231	8,690	37.62	7.93	21.47
Management Sciences	648	125	3,770	30.16	3.44	19.29
Health Sciences	4,361	820	30,800	37.56	28.10	18.80
Total	13,170	2,829	109,600	38.74	100	21.48

Please refer to sections of the General Program of various departments for the funding scope of the Fund for Less Developed Regions and funding statistics in recent years and relevant requirements.

Department of Mathematical and Physical Sciences

The Fund for Less Developed Regions in the Department of Mathematical and Physical Sciences is aiming at creating a favourable research environment for these regions, fostering and stabilizing an appropriate amount of researchers, training talents in basic research for local scientific and technological development, and increasing the capability of solving urgent scientific problems in the development of national economy and society. In the evaluation of proposals for the Fund, special attention is paid to researches that have relative good research background with characteristics and advantage, so as to give full play to the role of the Fund for Less Developed Regions in talent fostering, and strengthen the support to researchers in the western regions of China.

Funding for projects of the Fund for Less Developed Regions in the Department of Mathematical and Physical Sciences in 2015

Unit: 10 000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Mathematics	Mathematics I	37	1,249	29.13
	Mathematics II	41	1,416	29.29
Mechanics	Basic problems and methods in mechanics	0	0	0
	Dynamics and control	6	259	42.86
	Solid mechanics	9	390	29.03
	Fluid mechanics	6	276	30.00
	Bio-mechanics	0	0	0
	Explosive and impact dynamics	0	0	0
Astronomy	Astrophysics	6	264	40.00
	Astrometry and celestial mechanics	3	146	25.00
Physics I	Condensed matter physics	22	981	28.95
	Atomic and molecular physics	7	310	31.82
	Optics	13	583	28.89
	Acoustics	3	126	42.86
Physics II	Fundamental physics and particle physics	14	601	35.90
	Nuclear physics, nuclear technology and its application	8	362	34.78
	Particle physics and nuclear physics experimental facilities	0	0	0
	Plasma physics	1	37	7.69
Total		176	7,000	29.93
Direct cost funding per project		39.77		

Department of Chemical Sciences

On the basis of stabilizing the funding scale of the Fund for Less Developed Regions, the Department of Chemical Sciences will make efforts to further promote improvement of the research quality and efficiency of the Fund, stabilize a batch of research talents for basic research, and continuously bridge the gap with developed regions. Applicants are encouraged to carry out research by taking advantage of the local resources so as to promote the economic development of the regions in a coordinated way.

Funding for projects of the Fund for Less Developed Regions in the Department of Chemical Sciences in 2015

Unit: 10 000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Division I	Inorganic chemistry	33	1,303	23.08
	Analytical chemistry	33	1,303	23.40
Division II	Organic chemistry	54	2,123	23.18
Division III	Physical chemistry	32	1,263	23.02
Division IV	Polymers	18	702	22.78
	Environmental chemistry	30	1,183	22.73
Division V	Chemical Engineering	38	1,503	21.97
Total		238	9,380	22.88
Direct cost funding per project		39.41		

Department of Life Sciences

In 2015, the Department of Life Sciences received 2,994 applications for the Fund for Less Developed Regions (accepted 2,906 as eligible applications), and funded 729 projects. The funding rate was 24.35% with the average direct cost of 401,000 yuan per project. The average funding for 2016 will be similar with that of 2015. In the future, the Department will continue to follow the principle of "fostering regionaltalents, supporting sustained exploration, gathering outstanding talents and promote regional development" for this Fund, provide steady support tolocal talents and support researches related to local resources and natural conditions. For details about funding scope, etc., please refer to the sections in the General Program of the Department in this Guide.

Funding for projects of the Fund for Less Developed Regions in the Department ofLife Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Division I	Microbiology	51	2,035	24.76
	Botany	57	2,277	24.57
Division II	Ecology	80	3,224	24.69
	Forestry	54	2,146	25.23
Division III	Biophysics/Biochemistry/Molecular biology	14	572	25.93
	Immunology	8	304	27.59
	Biomechanics and tissue engineering	4	162	16.00
Division IV	Neurosciences	12	463	26.09
	Psychology	6	222	26.09
	Physiology & integrative biology	9	373	24.32
Division V	Genetics and bioinformatics	23	937	23.96
	Cell biology	8	302	25.81
	Developmental biology and reproductive biology	9	363	23.68
Division VI	Agriculture and crop sciences	91	3,658	23.76
	Food science	60	2,398	24.00
Division VII	Plant protection	49	1,975	23.90
	Horticulture and plant nutrition	52	2,076	23.74
Division VIII	Zoology	27	1,088	24.32
	Animal husbandry and grassland science	63	2,549	24.42
	Veterinary medicine	38	1,532	23.75
	Aquaculture	14	574	24.14
Total		644	32,190	24.35
Direct cost funding per project		40.10		

Department of Earth Sciences

In 2015, the Department of Earth Sciences received 742 applications for the Fund for Less Developed Regions from 128 research institutions. Among them, 624 were from universities, accounting for 84.1%, and 113 from research institutes, accounting for 15.2%. Totally, 169 projects were funded with a direct expense of 71.1 million yuan. The average fund was 421,000 yuan per project and the funding rate was 22.78%. Among the projects funded in 2015, 146 were obtained by universities, accounting for 86.4%, and 21 by research institutes, accounting for 12.4%.

In 2016, a standardized selection of "application code", "research field" and "key words" will be tried out continuously in Division I (Geography). When filling out the application forms, applicants should visit the "special focus" under the item of "application acceptance" on the official home page of the NSFC (http://www.nsfc.gov.cn/), and read carefully the "list of application code, research field and key words (D01 and subordinate codes)" in order to make sure their applications in accordance with the funding areas of Division I.

Funding for Projects of the Fund for Less Developed Regions in the Department of Earth Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Division I	Geography (including soil science and GIS)	112	4,705	22.81
Division II	Geology	21	882	22.83
	Geochemistry	15	642	22.39
Division III	Geophysics and space physics	7	297	22.58
Division IV	Marine science	4	172	22.22
Division V	Atmospheric science	10	412	23.26
Total		169	7,110	22.78
Direct cost funding per project		42.07		

Department of Engineering and Materials Sciences

According to NSFC policy on the Fund for Less Developed Regions, the Department of Engineering and Materials Sciences will provide steady support to foster researchers in these regions, and encourage applicants to do basic researches by taking advantage of local resources and for regional economic development. In 2015, the Department received 1,721 applications (43 rejected) for the Fund with an increase of 3.93%. 341 projects were funded with a total direct cost of 136.2 million yuan. The average funding was 399,400 yuan per project with a funding rate of 19.81% (20.41% in 2014).

Please refer to the General Program and other related parts of Guide to Programs for the funding scope of the Fund.

Funding for projects of the Fund for Less Developed Regions in the Department of Engineering and Materials Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Materials sciences I	Metallic materials	33	1,330	19.19
Materialssciences II	Inorganic and non-metallic materials	38	1,527	18.72
	Polymer materials	23	900	20.54
Engineering sciences I	Metallurgy and mining science	45	1,807	20.00
Engineering sciences II	Mechanical engineering	60	2,394	20.20
Engineering sciences III	Engineering thermo physics and energy utilization	17	664	21.79
Engineering sciences IV	Architecture, environmental and structural engineering	68	2,731	19.60
Engineering sciences V	Electrical science and engineering	22	875	19.82
	Hydrology and marine engineering	35	1,392	19.89
Total		341	13,620	19.81
Direct cost funding per project		39.94		

Department of Information Sciences

In 2015, the Department of Information Sciences received 1,076 applications for the Fund and funded 231 projects with a total direct cost of 86.9 million yuan (of which 4 million yuan came from the Major Program). The funding rate was 21.47% and the average direct cost was 376,200 yuan per project. In 2016, the Department will continue to give preferential support to the Fund for Less Developed Regions, and properly increase the funding rate. The average direct cost will be 400,000 yuan per project.

Funding for projects of the Fund for Less Developed Regions in the Department of Information Sciences in 2015

Unit: 10 000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Division I	Electronic science and technology	16	575	22.22
	Information and communication system	19	694	22.35
	Information acquisition and processing	20	741	19.80
Division II	Theoretical computer science and computer software and hardware	24	885	22.02
	Computer application	47	1,789	22.17
	Network and information security	23	866	22.33
Division III	Control theory and control engineering	19	715	21.84
	Systems science and system engineering	13	498	21.31
	AI and intelligent systems	24	909	21.54
Division IV	Semiconductor science and information devices	10	391	20.83
	Information optics and photoelectric devices	8	313	21.05
	Laser technology and technical optics	8	314	21.05
Total		231	8,690	21.47
Direct cost funding per project		37.62		

In 2016, a standardized selection of "application code", "research field" and "key words" will be tried out continuously in Division 1. When fi1ling out the application forms, applicants should choose "application code 1 (F01 and subordinate codes)" and relevant research field" and "key words" precisely according to the "list of application code research field and key words for trial disciplines" and make sure their applications in accordance with the funding area of Division 1. The list of the application code, research field and key words are available in the "Special focus" under the item of "Application acceptance" on the official home page of the NSFC (http://www.nsfc.gov.cn/).

Department of Management Sciences

In 2015, the Department of Management Sciences received 648 applications for the Fund for Less Developed Regions, fewer than those in 2014. 125 projects were funded with a funding rate of 19.29%, and the average funding for direct expenses was 301,600 yuan per project.

In 2016, the average funding for direct expenses will be 320,000 yuan per project, and the executive period will be 4 years.

Please note that the requirements described in the general description section of the General Program of the Department of Management Sciences in this Guideline are also applied to the Fund for Less Developed Regions, so please read carefully before submitting proposals.

Funded projects of the Fund for Less Developed Regions in the Department of Management Sciences in 2015

Unit: 10,000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Division I	Management science and engineering	27	814	20.15
Division II	Business administration	36	1,086	19.78
Division III	Macro management and policy	62	1,870	18.67
Total		125	3,770	19.29
Direct cost funding per project		30.16		

Department of Health Sciences

The Department of Health Sciences mainly supports basic research and clinical basic research on the occurrence, development, outcome, diagnosis, therapy and prevention of diseases.

Applicants are encouraged to propose creative research ideas, conducting basic research on local diseases by using modern medical research concepts and methods. Joint research by applicants with researchers in developed regions is also encouraged in order to fully utilize the various advanced research facilities in developed regions.

The PDF copies of no more than five representative papers relevant to the application should be attached to the proposal. More detailed information is to be refered to sections in the Fund for Less Developed Regions and General Program in this guide.

In 2016, the direct cost for the Fund for Less Developed Regions will be 400,000 yuan per project. The budget form inside application should be prepared in a practicle and objective way.

An overview of the award number, funding, and success rate of the Fund for Less Developed Regions in 2015 by the Department is listed in the table below.

Funding for the Fund for Less Developed Regions in the Department of Health Sciencesin 2015

Unit: 10,000 yuan

Divisions		Projects	Direct cost	Funding rate (%)
Division I	Respiratory system, circulatory system, blood system	86	3,221	18.57
Division II	Digestive system, urinary system , endocrine system/ Metabolism and nutrition support, ophthalmology, otorhinolaryngology head and neck science, oral and craniomaxillo-facial science	105	3,934	19.55
Division III	Neurological and psychiatric diseases, gerontology	51	1,907	16.45
Division IV	Reproductive system/ Perinatology/Neonatology,medical immunology	34	1,289	16.43
Division V	Medical imaging and biomedical engineering, special medicine, forensic sciences	28	1,057	17.18
Division VI	Medical pathogenic microorganisms and infection, orthopedics and sports medicine, emergency and intensive care medicine/Trauma/Burns/Laboratory medicine/Plastic surgery/Rehabilitation medicine	74	2,761	18.50
Division VII	Oncology (leukemia not included)	123	4,610	14.52
Division VIII	Skin and appendages, preventive medicine, endemiology, occupational medicine, radiology	55	2,105	23.81
Division IX	Materia medica and pharmacology	53	2,007	21.99
Division X	Chinese medicine, Chinese materiamedica, integrated Chinese and Western medicine	211	7,909	21.93
Total		820	30,800	18.80
Direct cost funding per project		37.56		

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. It mainly supports applicants who meet the following qualifications:

(1) Citizenship of the People's Republic of China;

(2) Under the age of 38 (for male, born on or after January 1, 1978) or 40 (for female, born on or after January 1, 1976) by January 1 of the year of application;

(3) Good scientific integrity;

(4) Senior professional position (title) or PhD degree;

(5) Experience of conducting basic research projects or other basic research;

(6) No employment with foreign institutions;

(7) Able to work in home institution for no less than 9 months per year.

Young Chinese scholars without Chinese citizenship may apply if they meet the conditions from (2) to (7) listed above.

The following people may not apply:

(1) Grantees of the National Science Fund for Distinguished Young Scholars or the Excellent Young Scientists Fund;

(2) Applicant for the National Science Fund for Distinguished Young Scholars in the same year;

(3) Post-doctors and graduate students.

In 2015, NSFC received 3,520 applications for the Excellent Young Scientists Fund and granted 400 awards with a total funding of 520 million yuan for direct cost.

In 2016, the Fund plans to grant 400 projects, and the average funding is 1.3 million yuan per project for 3 years.

Funding of the Excellent Young Scientists Fund in 2015

Unit: 10,000 yuan

Department	Applications	Awards	Funding rate (%)
Total	3,520	400	11.36
Mathematical and Physical Sciences	388	47	12.11
Chemical Sciences	499	57	11.42
Life Sciences	544	59	10.85
Earth Sciences	349	39	11.17
Engineering and Materials Sciences	661	74	11.20
Information Sciences	564	59	10.46
Management Sciences	110	14	12.73
Health Sciences	405	51	12.59

National Science Fund for Distinguished Young Scholars

The National Science Fund for Distinguished Young Scholars supports young scholars who have made outstanding achievements in basic research to select their own research directions and conduct creative research, so as to speed up the growth of young scientific talents, attract overseas talents and foster a group of prominent academic pacemakers in the forefront of international science and technology.

Eligibility for application:

(1) Citizenship of the People's Republic of China;

(2) Under the age of 45 by January 1 of the year of application (born on or after January 1, 1971);

(3) Good scientific integrity;

(4) Senior professional position (title) or PhD degree;

(5) Experience of conducting basic research projects or other basic research;

(6) No employment with foreign institutions;

(7) Able to work in home institution for no less than 9 months per years.

Young Chinese scholars without Chinese citizenship may apply if they meet the conditions from (2) to (7) listed above.

The following people may not apply:

(1) Post-doctors doing research or graduate students;

(2) Grantees of ongoing project of the Excellent Young Scientists Fund (application is allowable on the year of completion of the ongoing project of the Excellent Young Scientists Fund);

(3) Applicant for the Excellent Young Scientists Fund in the same year;

(4) Having received the National Science Fund for Distinguished Young Scholars.

In 2015, NSFC received 2,148 applications for the National Science Fund for Distinguished Young Scholars and granted 198 awards with a total funding of 679.35 million yuan for direct cost.

In 2016, the National Science Fund for Distinguished Young Scholars plans to fund 200 projects, and the average funding is 3.5 million yuan per project for 5 years (2.45 million yuan per project for 5 years in the Department of Mathematical and Physical Sciences and the Department of Management Sciences).

Funding of the National Science Fund for Distinguished Young Scholars in 2015

Unit: 10,000 yuan

Department	Applications	Awards	Funding rate (%)
Total	2,148	198	9.22
Mathematical and Physical Sciences	227	24	10.57
Chemical Sciences	315	30	9.52
Life Sciences	269	24	8.92
Earth Sciences	220	21	9.55
Engineering and Materials Sciences	431	38	8.82
Information Sciences	316	28	8.86
Management Sciences	70	7	10.00
Health Sciences	300	26	8.67

Science Fund for Creative Research Groups

The Science Fund for Creative Research Groups supports prominent middle-aged and young scientists to work as academic leaders and PIs on creative research focusing on key research issues, and fosters research groups with international influence.

Applicants and participants should meet the following requirements:

(1) Experience of conducting basic research projects or other basic research;

(2) Guarantee to work in home institutions for no less than 6 months per year within the funding period;

(3) Have a research team based on long-term collaboration, including 1 academic leader and 5 or more backbone researchers;

(4) The academic leader or the PI should have senior professional position (title), high academic qualifications and international influence, and be less than 55 years old by January 1 of the year of application (born on or after January 1, 1961);

(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 may not apply again. PI and participants with senior academic title of an ongoing project supported by the Science Fund for Creative Research Groups may 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 in 2 years after the quit.

Applicants with senior academic titles may only apply for one project of the Science Fund for Creative Research Groups each year.

In 2015, a total of 249 applications for the Science Fund for Creative Research Groups and 38 awards were made with a total funding of 389.55 million yuan for direct costs.

In 2016, the Science Fund for Creative Research Groups plans to support 38 awards, with a funding amount of 10.5 million yuan per award for direct cost (7.35 million yuan for awards by the Department of Mathematical and Physical Sciences and the Department of Management Sciences).

Awards granted by the Science Fund for Creative Research Groups in 2015

Unit: 10,000 yuan

Department	Applications	Awards		Funding rate (%)
		No. of awards	Funding for direct costs	
Total	249	38	38,955	15.26
Mathematical and Physical Sciences	34	5	4,935	14.71
Chemical Sciences	29	5	5,250	17.24
Life Sciences	39	5	5,250	12.82
Earth Sciences	22	5	5,250	22.73
Engineering and Materials Sciences	43	6	6,300	13.95
Information Sciences	31	5	5,250	16.13
Management Sciences	12	2	1,470	16.67
Health Sciences	39	5	5,250	12.82

Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao

The Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao is an important category in the talent-training program of NSFC. In order to take advantage of the overseas (including Hong Kong and Macao) resources of science and technology and encourage overseas excellent young scholars to serve mainland China, NSFC sets up the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao to support excellent overseas (including Hong Kong and Macao) Chinese scholars under the age of 50 to conduct high-level joint research with scientists in mainland China.

The Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao adopts a "2+4" funding mode, and extended funding may be requested at the end of the two-year period.

Two-Year Funding Projects

1. Eligibility for application:

(1) Under the age of 50 by January 1 of the year of application (born on or after January 1, 1966);

(2) Have good scientific integrity;

(3) Hold professional title of associate professor (or above) in the country (region) that applicant lives in;

(4) Engagement in scientific research abroad, in Hong Kong or Macao, and in charge of a laboratory or an important research project, and have made outstanding academic achievements recognized by international peers;

(5) Have collaborator in mainland China, and sign with the host institution of the collaborator the collaborative agreement wherein clarifications are contained on the title, research direction and the proposed goals of the joint research projects, the commitment of the host institution to providing main experimental facilities, human resources and other materials necessary for the joint research;

(6) Have strong research capabilities in both sides and the proposed research should be focused on the international frontiers of sciences;

(7) Guarantee to work in the host institution for more than 2 months per year.

Both the applicant and the collaborator may apply for no more than one two-year project of the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao. Those who have not finished their post-doctor or graduate studies are not eligible collaborators in mainland China.

2. Notes to applicants:

(1) The two-year proposals of the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao are mainly evaluated on the academic aspects, and the capacity of the applicants and the background of the cooperation with their collaborators;

(2) Applicants are advised to prepare the research proposals in accordance with the outlines for the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao, and submit the proposal with relevant required supplementary documents, including (i) valid certificate documents for their professional positions and research work, and (ii) agreement on collaboration.

In 2015, NSFC received 327 applications for the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao and granted 116 awards with an average funding amount of 180,000 yuan per project for direct cost. The total funding for direct cost amounted to 20.88 million yuan.

In 2016, the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao plans to fund 120 projects and the total funding for direct cost will be 180,000 yuan per project for 2 years.

Extended Funding Projects

1. Eligibility for application:

(1) Grantees of two-year projects of the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao that were approved in 2013 are eligible, if their projects have made substantial progress and have been completed in due time. For grantees of two-year projects of the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao that were approved in 2012, they are eligible for application if they did not apply for extended funding after the completion of the two-year project or failed to obtain extended funding;

(2) Applicants have to ensure enough time to stay at the host institution for work during the funding period (2 years) of the project;

(3) Applicants have to sign extended agreement of cooperation with the host institution. The agreement should include the such content as the title, research direction and proposed goal of the joint research project, the host institution's promise to provide main experimental facilities, human resources, and other materials necessary for the joint research;

(4) Proposed extended cooperation should be focused on the international science frontiers with much of significance and should facilitate disciplinary development and talent fostering;

(5) The applicant are reqired to work in the host institution for more than 2 months per year.

Both the applicant and the collaborator may apply for no more than one extended project of the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao. Those who have not finished their post-doctor or graduate studies are not eligible collaborators in mainland China.

2. Notes to applicants:

(1) The extended funding mainly evaluate the progress of the cooperative work, whether the proposed research for extended funding is at the international frontier areas of research, and its contribution to disciplinary development and talent fostering;

(2) Applicants are advised to prepare their research proposals by providing accurate information in accordance with the outlines for the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao, and submit the proposals with relevant required supplementary documents, including (i) valid certificate documents for their professional positions and research work, and (ii) agreement on collaboration.

In 2015, NSFC received 72 extended funding applications for the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao and granted 20 awards with a total funding of 36 million yuan for direct cost.

In 2016, the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao plans to fund 20 extended projects and the total funding for direct cost will be 1.8 million yuan per project for 4 years.

International (Regional) Cooperation and Exchange Programs

In order to promote China's scientific research capability and its international competitiveness, the International (Regional) Cooperation and Exchange Programs aim at funding Chinese scientists to conduct substantial cooperation with their international collaborators in science frontiers and take full advantage of international scientific and technological resources on the basis of "equal cooperation, mutual benefits, and equal sharing of research results".

The funding scheme of the International (Regional) Cooperation and Exchange Programs is currently comprised of Key International (Regional) Joint Research Program, International (Regional) Joint Research and Exchange Programs funded under the Agreements/MOUs between NSFC and its foreign partners, and Research Fund for International Young Scientists.

Key International (Regional) Joint Research Program

The Key International (Regional) Joint Research Program (hereafter referred to as Key Joint Research Program), gives priority to the following aspects: joint research in the priority funding areas of NSFC, joint research in areas that China urgently needs to develop, international mega projects and programs with Chinese participation, and joint research projects utilizing large-scale scientific facilities abroad.

Researchers applying for this program shall, in accordance with the priority funding areas announced by relevant scientific departments, choose innovative joint research subjects centering on major scientific issues, and clarify the necessity and complementarities of the cooperation. The partners from each side shall have long-term steady collaboration (e.g., coauthored publications and continued personnel exchanges and communications) and the overseas partners shall have matching fund for this research. In the collaborative research, attention shall be given to the protection of intellectual property rights.

In 2015, altogether 105 out of the total 618 applications under the Key International (Regional) Joint Research Program were funded with a total funding of 300 million yuan for direct costs, with an average success rate of 16.99%.

In 2016, the Key International (Regional) Joint Research Program plans to fund 100 projects with an average funding amount of around 3 million yuan per project for direct costs, and each project usually lasts for 5 years.

Eligibility of Applicants

(1) With the title of professor or associate professor;

(2) Principal investigators of on-going or completed NSFC research project with the duration of no less than 3 years.

Eligibility of Foreign Partners

(1) Independent researchers in charge of research laboratories or key research projects abroad;

(2) With the title of professor or associate professor in the host countries/regions.

Appendix documents

Aside from the Chinese application form, the applicant should also submit the following documents as required.

(1) English Application Form: the blank English Application Form can be downloaded in the Internet-based Science Information System (ISIS) of NSFC and should be uploaded online after completion.

(2) Letter of Agreement: a copy of the Letter of Agreement signed between the collaborating PIs should be provided. Unilaterally signed letters are not valid. The Letter of Agreement mainly covers but is not limited to the following items:

(i) Research contents and objectives;

(ii) List of PIs and participants from each side;

(iii) Period, mechanism and plan of joint research;

(iv) Ownership, use and transfer of IP rights;

(v) Relevant budgetary arrangements.

The applicant can refer to the sample Letter of Agreement which can be downloaded at http://www.nsfc.gov.cn/nsfc/cen/gjhz/cjwt/cjwt2011-10-26-06.html.

(3) Documents verifying the foreign partners' involvement of in research projects related to the submitted application, as well as a list of publications related to the submitted application by the foreign partners in the past 3 years.

(4) Letter of confirmation by the foreign collaborator: if the foreign collaborator cannot sign the English Application Form, a letter of confirmation by him/her should be provided. The letter of confirmation should contain true contact information about the foreign collaborator.The letter should be written in official forms including the title, logo and contact information of the foreign collaborator's host institution. In addition, the letter should contain detailed in formation such as the title of the research, the content and period of cooperation, the way to share IPR, etc. The foreign collaborator should confirm in the letter that he/she has read and agrees with the full contest of English Application Form.

Priority Funding Areas of the International (Regional) Joint Research Program in 2016

Department of Mathematical & Physical Sciences

(1) New methods and new technologies of experimental mechanics
(2) Nonlinear mechanical issues of complex systems
(3) Sky surveys and space observations
(4) New astronomical technological methods associated with the large telescopes
(5) Superfast and super strong light physics and precision measurement physics
(6) Advanced materials physics
(7) Key acoustic issues in complex media
(8) Low-dimensional systems of quantum transport experiments
(9) Research on high performance particle detector
(10) Hadron structure and new cutting-edge research of hadron states
(11) Magnetically confined fusion beam injection and related physical and technical issues

(12) Physical issues in new energy
(13) Joint research based on large-scale scientific facilities at home and abroad

Department of Chemical Sciences

Applicants are encouraged to focus on topics featuring basic, interdisciplinary, frontier and complementary research.

(1) Process and mechanism of surface and interface chemistry
(2) Biological analysis and imaging
(3) Molecular assembly, structure and function
(4) Theoretical and computational chemistry
(5) New system of materials chemistry related to energy and resources
(6) Green chemical processes and technique
(7) Natural products chemistry and drug discovery
(8) Environmental pollution chemistry and control
(9) Chemical biology

Department of Life Sciences

International Joint Research proposals are encouraged to be guided by national needs and interest, with reference to the national mid- and long-term plan of S&T development and major S&T research program. Due attention will be paid to joint research between strong partnering research teams and joint research between Chinese researchers and foreign counterparts with superior research capacities or facilities. Chinese applicants are encouraged to take the lead in joint research activities.

(1) Basic and applied research on stem cells
(2) Synthetic biology
(3) Theory on the construction and bionic building of vital organs
(4) Collection, data base and analysis of large-scale biological data
(5) Adaptation and response of species and ecosystems to global climate change
(6) Biodiversity
(7) Cross-border monitoring, warning and prevention of major animal and plant diseases and biological invasion
(8) Collection, evaluation and utilization of agricultural biological germplasm resources
(9) Response of agricultural production to global climate change

Department of Earth Sciences

(1)Global change and surface process
(2) Environmental pollution and its impacts
(3) Eco-environment effect of globalization and human activities
(4) System and mechanism of metallogenic accumulation
(5) Processes in and between continental plates
(6) Coupling relation between deep and surface earth processes
(7) Solar-terrestrial energy transfer between and its impact on human activities
(8) Water cycle and ecohydrological process
(9) Mechanism and numerical simulation of weather and climate system changes
(10) Asia monsoon-arid environmental systems and global environmental change
(11) Mechanism, monitoring, early warning and risk prevention and control of geological disasters
(12) Origin and major evolutionary events of key biological taxa and the environmental backgrounds
(13) Life process under extreme conditions

(14) Dynamic process and mechanism of marine multi-scale interactions
(15) Marine ecological system security and deep-sea biological resources
(16) Advanced technology platforms to promote the development of earth sciences
(17) Resources, environment and ecology along the "One Belt and One Road" regions

Department of Engineering and Materials Sciences
(1) Energy materials
(2) Nano material and devices
(3) Biomedical materials
(4) High performance structural materials
(5) Resource circulation and clean metallurgy
(6) Advanced manufacturing
(7) Efficient utilization of energy and the environment
(8) High efficiency power electronic system
(9) Water resources and water environment
(10) Urban water environment and water quality safety
(11) Civil engineering disaster prevention
(12) Deep-sea engineering

Department of Information Sciences
(1) Basic theory and key technology of electromagnetic vortex
(2) THz science and technology
(3) Intelligent network and E-Health science applications
(4) Brain-like computing and machine intelligence
(5) Big data calculation theory and system practice
(6) Next generation internet exploration and practice
(7) Design method and application verification of new control system analysis
(8) Novel high precision and reliable testing technology and system
(9) High-performance robotics and advanced artificial intelligence system
(10) UV photo detectors
(11) Integrated circuit design
(12) Narrow linewidth fiber laser
(13) Interactions between spatial structure light field and semiconductor materials
(14) Micro-nano structure optoelectronic devices
(15) Integrated theory and design of millimeter wave circuits and antennas
(16) Calculating camera and its applications

Department of Management Sciences
(1) Urban logistics and city traffic management
(2) Service innovation design and service operations management
(3) Information system management
(4) Chinese management practices based theoretical innovation of leadership, strategic management, technological innovation and entrepreneurship
(5) Change behavior and management innovation of China's companies/organizations
(6) Management of medical operations
(7) Big data based management decisions and business management
(8) Public (emergency) safety management
(9) Financial risk management
(10) Management of urbanization

Department of Health Sciences

In principle, PIs of programs with large funding amounts such as Key International (Regional) Joint Research Program, Major Program, Key Projects of Major Research Plan Program granted in 2015 will not be considered for funding under the Key International (Regional) Joint Research Program in 2016.

(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, agingrelated 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

International (Regional) Cooperation and Exchange Programs under Agreements/MOUs

Jointly organized and funded by NSFC and foreign 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 foreign partners. NSFC has by far concluded 85 cooperation agreements/MOUs with science funding agencies and research institutions in 40 countries/regions. By consultation, NSFC has reached agreements with some foreign partners on cooperation and exchange pattern, funding area, amount of awards, funding amount and review mechanism. Based on mutual agreement, NSFC launches joint call for proposals with its foreign partners on their websites and does follow-ups like correspondent review and joint panel review, etc. The International (Regional) Cooperation and Exchange Programs under Agreements/MOUs include Joint Research Program, Personnel Exchange Program and Academic Conference Program.

The Joint Research Program under Agreements/MOUs includes bilateral or multilateral joint research projects funded by NSFC and its international partners under the framework of agreements/MOUs signed between them in hope of supporting Chinese researchers and their collaborators abroad to carry out research in basic sciences.

The Personnel Exchange Program under Agreements/MOUs aims to encourage NSFC grantees to participate in extensive international cooperation and exchange activities, and to enhance the innovativeness, talent training, disciplinary development and research quality of the on-going NSFC projects. The Personnel Exchange Program under Agreements/MOUs include personnel exchange program and academic conference program featuring the mobility of scientists. Meanwhile, it encourages scientists to maintain sound bi/multilateral relations with overseas partners through wide cooperation and exchange, laying a solid foundation for future substantial collaboration. Academic Conference Program under Agreements/MOUs is aimed at supporting scientists to hold bilateral or multi-lateral international conferences in China with a view to enabling Chinese scientists to keep pace with the latest research frontiers and hotspots in the international academic arena, to enhancing the partnership between Chinese scientists and their foreign peers, and to promoting the visibility of the results achieved by NSFC funded projects and raising the profile of China's academic community.

Applicants can refer to the following introductions and the calls for proposals irregularly launched on NSFC website for application eligibility, funding priority, funding duration, and application requirements. Besides, applicants can also refer to the International Cooperation column of NSFC's website for relevant information about these programs in 2015. An introduction of the funding opportunities under this category in 2016 is listed as follows.

Asia and Africa

Japan

Japan Science and Technology Agency (JST)

The NSFC and JST Joint Research Program initiated in 2004 on the theme of "S&T for Environmental Conservation and Construction of a Society with Less Environmental Burden". Every year both sides negotiate and define specific priority areas for cooperation, followed by a bilateral workshop alternately held in China and Japan in the defined priority area. Participants in the annual workshop will propose concrete research topics for joint funding. Since 2015, the priority area for both sides has been changed into biological genetic resources.

In 2016, the joint call for proposals with specific collaborative topics will be launched by NSFC and JST on their websites respectively, and no more than 5 projects with duration of 3 years will be funded per year, with an investment of 2 million yuan (including direct and indirect cost) by NSFC for each project.

Japan Society for the Promotion of Science (JSPS)

The call for proposals of exchange project and bilateral workshop is issued jointly by both NSFC and JSPS on their respective websites in June every year. The submission deadline is on Friday of the first complete week in September.

(1) Exchange Project

NSFC and JSPS jointly support 10 exchange projects each year, the duration of which is 3 years. The exchange volume shall not exceed 60 person-days per year for each side.

(2) Bilateral Workshop

NSFC and JSPS support 4 bilateral workshops per year organized jointly by Chinese

and Japanese scientists, of which two are held in China and two in Japan. Participants of a bilateral workshop from each side must come from at least three institutions.

South Korea

NSFC and National Research Foundation of Korea (NRF) will jointly support joint research project, exchange project and bilateral workshop in 2016.

The call for proposals would be released twice in 2016 by both organizations on their respective websites for joint research project, and exchange project & bilateral workshop. The joint funding for exchange project and bilateral workshop will be decided at the Sino-Korean Joint Committee meeting on basic science.

(1) Joint Research Project

2 three-year joint research projects are planned to be funded by NSFC and NRF in 2016 with NSFC investing 2 million yuan (including direct and indirect cost) for each project.

(2) Exchange Project

Around 20 two-year exchange projects are planned to be funded by NSFC and NRF in 2016.

(3) Bilateral Workshop

Around 10 bilateral workshops are planned to be funded by NSFC and NRF in 2016. Participants of bilateral workshops from each side must come from at least three institutions.

Israel

NSFC and Israel Science Foundation (ISF) carry out their joint funding on joint research project and bilateral workshop.

(1) Joint Research Project

Since 2012, NSFC and ISF have launched joint calls annually for proposals on their respective websites. The priority areas are Life Sciences and Medical Sciences in 2016. No more than 25 three-year projects are planned for joint funding with NSFC investing 2 million yuan (including direct and indirect cost) for each project.

(2) Bilateral Workshop

Each year, no more than 2 bilateral workshops are planned to be funded by NSFC and ISF. The workshop themes are decided by both sides through negotiation.

Three Asian Countries (China, Japan and South Korea)

A3 Foresight Program

Jointly sponsored by NSFC, Japan Society for the Promotion of Science (JSPS) and National Research Foundation of Korea (NRF), the A3 Foresight Program supports the cooperation of scientists from China, Japan and South Korea to conduct cutting-edge research in selected strategic areas, so as to foster excellent young researchers and make contributions to the solution of common regional issues.

The priority area of A3 Foresight Programfor each year is in accord with the theme of the Northeastern Asian Symposium jointly organized by NSFC, JSPS and NRF in the previous year. The funding priority in 2016 is chemical biology.

The call for proposals is simultaneously announced on the websites in November by the three parties and 2 five-year projects will be jointly funded annually, with NSFC investing 4 million yuan (including direct and indirect cost) in each approved project.

South Africa

NSFC and National Research Foundation of South Africa (NRF) carry out their joint

funding on joint research project and bilateral workshop.

(1) Joint Research Project

Starting from 2014, NSFC and NRF launch joint call for proposals every two years on their respective websites. The duration for joint research project is 3 years with NSFC investing 0.8 million yuan (including direct and indirect cost) for each project. The priority areas in 2014 were physics and life sciences and 9 projects were jointly funded.

(2) Bilateral workshop

NSFC and NRF support bilateral workshops every year. The themes and number of workshops to be funded are decided by both sides through negotiation.

Thailand

National Research Council of Thailand (NRCT)

NSFC and NRCT would jointly support joint research project, exchange project and bilateral workshop.

(1) Joint Research Project

In 2016, the joint call for proposals with specific collaborative topics will be launched by NSFC and NRCT on their websites respectively, and no more than 6 projects with duration of three years will be funded, with an investment of 3 million yuan (including direct and indirect cost) by NSFC for each project.

(2) Exchange Project

Chinese and Thai scientists are required to submit proposals to NSFC and NRCT respectively. The two agencies will make a funding decision after consultation.

(3) Bilateral Workshop

NSFC and NRCT support bilateral workshops every year. The themes and number of workshops to be funded are decided by both sides through negotiation.

Thailand Research Fund (TRF)

NSFC and TRF would jointly support joint research project, exchange project and bilateral workshop.

(1) Joint Research Project

In 2016, the joint call for proposals with specific collaborative topics will be launched by NSFC and TRF on their websites respectively, and no more than 5 projects with a duration of three years will be funded, with an investment of 3 million yuan (including direct and indirect cost) by NSFC for each project.

(2) Exchange Project

Chinese and Thai scientists are required to submit proposals to NSFC and TRF respectively. The two agencies will make a funding decision after consultation.

(3) Bilateral Workshop

NSFC and TRF support bilateral workshops every year. The themes and number of workshops to be funded are decided by both sides through negotiation.

Other Cooperation Channels

NSFC has signed scientific agreements for funding personnel exchange projects and bilateral workshops with the Department of Science and Technology of India (DST), Council of Scientific & Industrial Research of India (CSIR), Academy of Scientific Research and Technology of the Arab Republic of Egypt (ASRT), Pakistan Science Foundation (PSF) and etc. The specific projects are jointly decided on a case by case basis through mutual agreement. NSFC and PSF will jointly fund joint research project in 2016. The joint call for proposals, with specific collaborative topics and the targeted number to be funded, will be launched by NSFC and PSF on their websites respectively.

International Scientific Organizations

1. Center of European Nuclear Research (CERN)

According to the cooperation agreement with CERN, NSFC supports Chinese scientists' participation in LHC experiment at CERN together with the Chinese Ministry of Science and Technology and the Chinese Academy of Sciences.

2. International Center for Theoretical Physics (ICTP)

About 50 Chinese young scholars 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.

The list for specific activities and an open call for candidates is announced on NSFC's website in November every year. A name list of candidates would be recommended by NSFC to ICTP after being selected by relevant experts. The recommended candidates should apply to ICTP according to ICTP requirements.

3. International Institute of Applied Systems Analysis (IIASA)

NSFC encourages Chinese scientists to conduct multilateral cooperation with various IIASA project groups in the areas of energy, environment, land use, water, population, etc., and to jointly apply for research funding from various governmental organizations, private and national foundations, World Bank and EU Framework Program.

NSFC provides full support for 5-7 Chinese young scholars to participate in the annual 3-month Young Scientists Summer Program (YSSP) from June to August at IIASA in Vienna every year. For detailed information and application forms, please refer to the IIASA website at http://www.iiasa.ac.at. Besides, NSFC also supports workshop, personnel exchange and joint research projects jointly applied by Chinese and IIASA scientists.

As per its 10-Year Strategic Plan (2011-2020), Chinese scientists and IIASA researchers are encouraged to conduct joint scientific research on 3 global issues, i.e., food and water, energy and climate change, poverty and equity, based on systematic analysis methods.

For more information about 2016 funding oppotunities, please refer to the call for proposals to be launched by NSFC on its website in due time.

4. Consultative Group on International Agricultural Research (CGIAR)

NSFC has reached agreements with 11 CGIAR institutes/centers (i.e., Bioversity, CIAT, CIFOR, CIMMYT, CIP, ICARDA, ICRAF, ICRISAT, IFPRI, ILRI and IRRI) to fund joint research projects conducted by scientists from both sides.

The call for proposals will be released by NSFC on its website in February every year, and the deadline for application is April 20th. No more than 15 projects are planned for funding in 2016 with an average funding amount of 2-3 million yuan (including direct and indirect cost) per project for 5 years.

5. United Nations Environment Program (UNEP)

According to the cooperation agreement between NSFC and UNEP, both sides would support scientists to conduct scientific collaborative research in the fields of eco-system management, climate change and chemical management. Special emphasis is attached to cooperation with developing countries in Africa and Asian-Pacific regions.

17 priority funding areas have been defined for the years from 2013 to 2017 as follows.

Eco-systems: research on the soil erosion mechanism and rain-fed farming on the sloping fields of the Upper Nile hilly areas; Amazon Basin ecosystem assessment system (elevation gradient+ rainforest); study on mechanisms for maintaining spatial patterns of the ecosystem diversity in East Africa; service functions of ecosystem in East African Natural Reserves (biodiversity hotspots); assessment of changes in land use and their effects on environment (application of China's satellite data product); centennial changes in Asian

land-use and ecological environment elements.

Climate change: ecological adaptation (water cycle/water and climate change) in the Greater Mekong Basin; impact and response of climate change on the patterns and processes of ecosystems in Northeast Asia (China-Mongolia-Russia-North Korea-South Korea); climate and environmental changes in the semi-arid regions in Central Asia; regional analysis of the impacts of climate change on Africa's food security and water resource vulnerability; mechanism and scenario analysis of the ecosystem degradation (desertification) in Niger River Basin in Africa.

Chemicals: key technologies and methods for global POPs monitoring and effectiveness evaluation; chemical hazard assessment and prioritization methods and tools; toxicity mechanism and screening methods for propagation and development of environmental endocrine disruptors (reproductive); survey methods for listing unconsciously produced POPs; life cycle assessment of typical chemicals and environmentally sound management techniques; substitutes and alternative processes for high-risk chemicals.

The call for proposals will be released by NSFC on its website in February every year, and the deadline for application is April 20th. 3 projects are planned for funding in 2016 (one project in each field), with an average funding of 3 million yuan (including direct and indirect cost) per project for 5 years.

6. International Union of Pure and Applied Chemistry (IUPAC)

According to the agreement among NSFC, Sao Paulo Research Foundation (FAPESP), the US National Science Foundation (NSF), the German Research Foundation (DFG), and the International Union of Pure and Applied Chemistry (IUPAC), scientists from above countries were co-funded to carry out joint research in the field of sustainable chemistry starting from 2013. IUPAC is responsible to provide the project implementation framework and scientific guidance including the launch, review and funding of multilateral projects under the support of all contracting funding agencies and research organizations. For more information regarding application in 2016, please refer to the call for proposals to be launched by NSFC on its website.

7. Multilateral Collaboration under Belmont Forum (BF/IGFA)

According to the agreement between NSFC and Belmont Forum, since 2014 NSFC has supported Chinese scientists to participate in the multilateral cooperation under the framework of Belmont Forum. For more information regarding application in 2016, please refer to the call for proposals to be launched by NSFC on its website.

America and Australasia

USA

The National Science Foundation (NSF)

NSFC and NSF jointly support research projects and bilateral workshops.

(1) Joint Research Project

NSFC and NSF accept joint research applications in the areas of environment sustainability, biodiversity, etc., irregularly throughout the year.

NSFC-NSF Joint Research Program on Biodiversity

To promote joint research on biodiversity between Chinese and US scientists, NSFC and NSF together fund joint research projects with an implementation period of 5 years between scientists from both countries. NSFC provides up to 3 million yuan for each approved project. One project of this kind was jointly funded by NSFC and NSF in 2015. For information about the specific application requirements in 2016, please refer to the call for proposals to be released on NSFC's website.

NSFC-NSF Joint Research Program on Environment Sustainability

NSFC and NSF together fund joint research projects in the area of Environment Sustainability between scientists of China and the US NSFC provides up to 3 million yuan (including direct cost and indirect cost) for each approved project with an implementation period of 4 years. Three projects of this kind were jointly funded by NSFC and NSF in 2015. For information about the specific application requirements in 2016, please refer to the call for proposals to be released on NSFC's website.

(2) Bilateral Workshop

NSFC and NSF will continue to fund bilateral workshops in areas and numbers mutually identified and agreed by both parties.

The National Institutes of Health (NIH)

NSFC and the US National Institutes of Health (NIH) signed an MOU in October 2010 to jointly support research projects and bilateral workshops.

(1) Joint Research Project

NSFC and NIH launched joint call in 2013 for joint research projects with duration of 3 years on cancer, allergic diseases, infectious diseases including HIV/Aids and comorbidities, medical immunology, mental health, etc. A total of 33 projects were granted for joint funding with around 2 million yuan each project.

In 2014, NSF and NIH launched a call in HIV/Aids with an average funding of 3 million yuan for 3 years per project. Five projects of this kind were jointly funded and NSFC provided approximately 3 million yuan for each project.

In 2016, NSFC and NIH will continuously support research projects in the above areas. For information about the specific application requirements in 2016, please refer to the call for proposals to be released on NSFC's website.

(2) Bilateral Workshop

NSFC and NIH will continue to fund bilateral workshops in areas and numbers mutually identified and agreed by both parties.

Canada

Canada Institutes of Health Research (CIHR)

NSFC and CIHR jointly support research projects and bilateral workshops.

(1) Joint Research Project

In 2016, NSFC and CIHR will jointly support Healthy Life Trajectories Initiative. For information about the specific application requirements, please refer to the call for proposals to be released on NSFC's website.

(2) Bilateral Workshop

NSFC and CIHR will continue to fund bilateral workshops in areas and numbers mutually identified and agreed by both parties.

Natural Sciences and Engineering Research Council of Canada (NSERC)

Exchange of Postdoctoral Fellows

Based on the agreement between NSFC and NSERC, the two agencies will jointly support Canadian postdoctoral fellows to do basic research in China for two years starting from 2015. NSERC will cover the salaries and living costs of the Canadian postdoctoral fellows. NSFC will cover relevant research costs of the Canadian postdoctoral fellows. For specific application requirements in 2016, please refer tothe call for proposals to be released on NSFC's website.

Fonds de Recherche du Québec (FRQ)

NSFC and FRQ jointly support research projects and bilateral workshops.

(1) Joint Research Project

In 2015, NSFC and the Department of Natural Science and Technology of FRQ

(FRQ-NT) launched a call for proposals in areas of global change and photonics. Three projects of this kind were jointly funded. In 2016, NSFC and the department of Health Research of FRQ (FRQ-S) will launch a call for proposals in the area of cancer research. For specific application requirements in 2016, please refer tothe call for proposals to be released on NSFC's website.

(2) Bilateral Workshop

NSFC and FRQ will continue to fund bilateral workshops in areas and numbers mutually identified and agreed by both parties.

Australia

National Health and Medical Research Council of Australia (NHMRC)

NSFC and NHMRC signed an agreement on cooperation in January, 2013 to jointly support research projects and bilateral workshops.

(1) Joint Research Project

Based on mutual agreement, NSFC and NHMRC launched a joint call for research proposals in the field of type-2 diabetes in February 2015. Funding results will be released at the end of 2015. For specific application requirements in 2016, please refer to the call for proposals to be released on NSFC's website.

(2) Bilateral Workshop

NSFC and NHMRC will continue to fund bilateral workshops in areas and numbers mutually identified and agreed by both parties.

Brazil

National Council for Scientific and Technological Development (CNPq)

In May 2014, NSFC and CNPq signed an agreement of scientific cooperation to jointly support research projects and bilateral workshops. Biodiversity, green energy, aerospace and ocean research were identified as priority research areas for collaboration.

For specific application requirements in 2016, please refer to the call for proposals to be released on NSFC's website.

Chile

National Commission for Scientific and Technological Research of Chile (CONICYT)

In August 2014, NSFC and CONICYT signed a MOU to jointly support research projects and bilateral workshops. Aerophysics and seismic study were identified as priority areas of collaboration.

For specific application requirements in 2016, please refer to the call for proposals to be released on NSFC's website.

Argentina

National Scientific and Technical Research Council of Argentina (CONICET)

In June 2015, NSFC and CONICET signed a MOU to jointly support research projects and bilateral workshops.

For specific application requirements in 2016, please refer to the call for proposals to be released on NSFC's website.

Ecuador

Secretaria de Educacion Superior, Ciencia, Tecnologia e Innovacion (SENESCYT)

In January 2015, NSFC and SENESCYT signed a MOU to jointly support research

projects and bilateral workshops.

Europe

European Union

European Research Council (ERC)

Talent Program

NSFC and ERC together fund Chinese researchers to go to Europe for single long-term (6-12 months) or multiple short-term research visits. NSFC-funded researchers could join the ERC-funded project teams to carry out joint research of mutual benefits in closely related scientific fields. NSFC will support the international travel costs of the Chinese researchers while ERC will provide local costs in Europe through its funded projects. For detailed requirements, please refer to the call for proposals to be launched on NSFC's website.

UK

Royal Society (RS)

(1) Exchange Program

NSFC and the Royal Society of UK (RS) provide support for exchange visits between Chinese and UK researchers with duration of 2 years. NSFC provides up to 100,000 yuan for each project, covering international travel costs of Chinese scientists and local costs of British scientists in China. RS provides at most 12,000 pounds for each project, covering international travel costs for British scientists to China and local costs for Chinese scientists in UK. In August 2016, NSFC and RS will announce their call for proposal simultaneously in both countries. Chinese scientists shall submit proposals directly to NSFC and UK scientists to RS, and the results will come out in January 2017. Projects approved will start on April 1, 2017 and end on March 31, 2019.

(2) Talent Program

NSFC, RS and the Academy of Medical Sciences (AMS) together set up the Talent Program to support the exchange visits as well as joint research activities between excellent young Chinese researchers and their British collaborators. NSFC will provide, in a period of three years, up to half a million yuan for each grantee while RS or AMS will offer up to 111 thousand pounds for each grantee to use as salary top-up, research and training as well as international cooperation and exchange costs. For detailed requirements, please refer to the call for proposals to be launched on NSFC's website.

Royal Society of Edinburgh (RSE)

Exchange Program

NSFC and the Royal Society of Edinburgh (RSE) provide joint funding for 2-year joint research projects between scientists from China and Scottish region in areas of common interest, according to the MOU signed between NSFC and RSE. The specific areas for cooperation and the number of projects to be approved each year are decided by both sides through negotiation. NSFC provides up to 100,000 yuan for each project, covering international travel costs for Chinese scientists to UK and local costs for British scientists in China. RSE provides at most 6,000 pounds for each project, covering the international travel costs for British scientists to China and local costs for Chinese scientists in UK. NSFC and RSE will announce their call for proposal simultaneously in both countries at the end of 2016. Chinese scientists should submit proposals directly to NSFC and Scottish scientists to RSE, and the result will come out at the start of 2017. Projects approved start on May 1, 2017 and end on April 30, 2019.

Research Councils UK (RCUK)

(1) Joint Research Program

NSFC and RCUK support substantial collaborations between scientists of both countries in areas of common interest, in consideration of the existing cooperation between scientists. NSFC and the RCUK will announce their call for proposal after discussion, and scientists from both countries shall submit proposals to their respective funding agencies. According to the evaluation results, NSFC and RCUK will jointly make decisions for funding regarding research expenditure, international travel costs and living expenses for personnel exchange. For detailed requirements, please refer to the call for proposals to be launched on NSFC's website.

(2) Bilateral Workshop

NSFC will continue to cooperate with RCUK such as EPSRC, BBSRC, NERC, MRC and ESRC to fund small-scaled bilateral workshops co-organized by Chinese and British scientists.

British Council (BC)

Bilateral Workshop

NSFC will together support small-sized bilateral academic workshops between young Chinese and British researchers in 2016. For detailed requirements, please refer to the call for proposals to be launched on NSFC's website.

Germany

German Research Foundation (DFG)

According to the agreement on cooperation between NSFC and DFG, both sides provide support for short-term (no longer than 3 months) research visits, bilateral workshops and joint research projects.

(1) Joint Research Program

NSFC and DFG encourage substantial joint research between scientists of both countries.

(2) Exchange Program

Chinese and German scientists shall submit their applications to their own funding organizations 3 months in advance. Applicants may submit their applications anytime throughout the year.The final decision for funding will be jointly made after evaluation and consultation.

(3) Bilateral Workshop

Chinese and German scientists shall submit their applications for workshops to their respective funding organizations 3 months in advance. Applicants may submit their applications anytime throughout the year.The final decision for funding will be jointly made after evaluation and consultation.

France

French National Center for Scientific Research (CNRS)

Exchange Program

NSFC and CNRS support exchange visits with duration of 3 years between Chinese and French scientists. NSFC funds up to 150,000 yuan for each project, covering the international travel costs for Chinese scientists to France and the local costs for French scientists in China, and CNRS funds the local expenses for Chinese scientists in France and international travel costs for French scientists to China. For detailed application requirements, please refer to the call for proposals launched on NSFC's website.

French National Research Agency (ANR)

According to the MOU signed between NSFC and ANR, both sides encourage substantial cooperation in areas of common interest between scientists and research groups from both countries. For detailed application requirements, please refer to the call for proposals launched on NSFC's website in 2016.

Italy

Ministry of Foreign Affairs and International Cooperation (MAECI)

According to the cooperative agreement between NSFC and MAECI, both sides encourage and support substantial joint research between researchers and research teams from both countries. For detailed requirements, please refer to the call for proposals to be launched on NSFC's website.

Russia

Russian Foundation for Basic Research (RFBR)

According to the MOU between NSFC and RFBR, both sides support personnel exchange (usually less than 3 months) and joint research program between Chinese and Russian researchers.

(1) Joint Research Program

NSFC and RFBR encourage scientists or research teams of both countries to carry out substantial joint research in areas of common interest. Funding for the projects includes research expenditure and international exchange costs. The call for proposals will be launched on NSFC's website in January 2016.

(2) Exchange Program

NSFC and RFBR jointly support exchange activities between Chinese and Russian researchers for duration of 2 years. Projects approved receive a two-year funding of 90,000 yuan from NSFC, for Chinese researchers' international travel and living expenses in Russia. RFBR also provides funding for Russian researchers' international travel and living expenses in China. The call for proposal will be announced on the websites of NSFC and RFBR in January 2016.

Finland

Academy of Finland (AF)

According to the agreement of scientific cooperation between NSFC and the Academy of Finland (AF), both sides provides necessary support for exchange activities (usually less than 3 months) and bilateral academic workshops between Chinese and Finnish researchers.

(1) Joint Research Program

NSFC and AF encourage scientists or research teams of both countries to carry out substantial joint research in areas of common interest. Funding for the projects includes research expenditure and international exchange costs. For detailed requirements, please refer to the call for proposals launched on NSFC's website.

(2) Exchange Program

Chinese and Finnish researchers shall submit their applications for personnel exchanges and visits anytime throughout the year to their respective funding agencies 3 months in advance, and the joint funding decision is made according to respective evaluations and consultation.

(3) Bilateral Workshop

Chinese and Finnish researchers shall submit their applications for bilateral workshops anytime throughout the year to their respective funding agencies 3 months in advance, and

the joint funding decision is made according to respective evaluations and consultation.

Netherlands

Netherlands Organization for Scientific Research (NWO)

According to the MOU between NSFC and the Netherlands Organization for Scientific Research (NWO), both sides support short-term academic studies, personnel exchange (usually less than 3 months) and bilateral academic workshops between Chinese and Dutch researchers.

(1) Joint Research Program

NSFC and NWO encourage scientists or research teams of both countries to carry out substantial joint research in areas of common interest. Funding for the projects includes research expenditure and international exchange costs. For detailed requirements, please refer to the call for proposals to be launched on NSFC's website.

(2) Exchange Program

Chinese and Dutch researchers shall submit applications for personnel exchanges and visits to their respective funding agencies 3 months in advance, and both organizations will make joint funding decisions based on respective evaluations. Applicants may submit their applications anytime throughout the year.

(3) Bilateral Workshop

Chinese and Dutch researchers shall submit applications for bilateral workshops to their respective funding agencies 3 months in advance, and both organizations will make joint funding decisions based on respective evaluations. Applicants may submit their applications anytime throughout the year.

Austria

Austrian Science Foundation (FWF)

Joint Research Project

NSFC and FWF support substantial joint research between scientists from both countries in areas of mutual interest based on the existing collaboration. NSFC and FWF will together publish guide to programs, determine through discussion how to organize evaluation and jointly make the final funding decision. Researchers from both countries shall submit their proposals to their respective funding organizations.

Switzerland

Swiss National Science Foundation (SNSF)

Joint Research Project

NSFC and SNSF support substantial joint research between scientists from both countries in areas of mutual interest based on the existing collaboration. NSFC and SNSF will together publish guide to programs, decide through discussion how to organize evaluation and jointly make the final funding decision. Researchers from both countries shall submit their proposals to their respective funding organizations.

Portugal

Portuguese Foundation for Science and Technology (FCT)

Joint Research Program

NSFC and FCT support substantial joint research between scientists from both countries in areas of mutual interest based on the existing collaboration. NSFC and FCT will together publish guide to programs, decide through discussion how to organize evaluation and jointly make the final funding decision. Researchers from both countries shall submit their

proposals to their respective funding organizations.

Sweden

Swedish Research Council (VR)

Exchange Program

NSFC and VR jointly support exchange visits and small-sized bilateral workshops between scientists from both countries, and the duration of the approved projects is 2 years. NSFC provides the international travel costs for Chinese researchers to Sweden as well as the accommodation, meals and inter-city transportation of the Swedish researchers in China; VR supports the international travel costs for Swedish researchers to China as well as the accommodation, meals and inter-city transportation of Chinese researchers in Sweden. Up to 250 thousand yuan from NSFC and up to 700 thousand Swedish krona from VR is allocated for each approved joint project. For detailed requirements, please refer to the call for proposals to be launched on NSFC's website.

Swedish Foundation for International Cooperation in Research and Higher Education (STINT)

Exchange Program

NSFC and STINT together support the exchange visits and small-sized bilateral workshops between Chinese and Swedish researchers, and the duration of the approved projects lasts 3 years. The funding from NSFC and STINT will cover the international travel costs for Swedish researchers to China and Chinese researchers to Sweden, as well as the accommodation, meals and inter-city transportation of Swedish researchers in China and Chinese researchers in Sweden.

Belgium

National Fund for Scientific Research (FWO)

Exchange Program

NSFC and FWO together funds the exchange visits between Chinese and Belgian researchers from the Flanders regions, and the duration of the approved projects lasts 2 years. NSFC will provide the international travel costs for Chinese researchers to Belgium and the local costs of Belgian researchers in China, while FWO will pay for the international travel costs for Belgian researchers to China as well as the local costs of Chinese researchers in Belgium. For detailed requirements, please refer to the call for proposals to be launched on NSFC's website.

Czech Republic

Academy of Science of the Czech Republic (CAS)

NSFC and CAS together funds the exchange visits between Chinese and Czech researchers. NSFC supports the international travel costs for Chinese researchers to Czech Republic as well as the accommodation, meals and inter-city transportation of Czech researchers in China. CAS funds the international travel costs for Czech researchers to China as well as the accommodation, meals and inter-city transportation for Chinese researchers in the Czech Republic. For detailed requirements, please refer to the call for proposals to be launched on NSFC's website.

Hong Kong and Macau SARs and Taiwan Region of China

NSFC has established cooperation with the Research Grant Council of Hong Kong (RGC), Beijing-Hong Kong Academic Exchange Centre, Macau Foundation, Macau

Foundation for the Development of Science and Technology, and K.T. Li Foundation for the Development of Science and Technology in Taiwan, jointly funding cooperation and exchange between researchers from mainland China and Hong Kong and Macau SARs, and between researchers from two sides of Taiwan Strait in areas of common interest. Types of activities that can be funded are joint research projects and exchange projects (including academic workshop and exchange visit).

Hong Kong

NSFC and the Research Grant Council of Hong Kong (RGC) will continue to fund join research in areas of natural sciences in 2016. Priority funding areas include information sciences, biological sciences, new materials, marine and environmental sciences, medical sciences, and management sciences. For detailed requirements, please refer to the call for proposals launched on NSFC's website.

Macau

In 2016, NSFC and Macau Foundation for Science and Technology Development (FDCT) will, under the framework of the newly signed cooperative agreement, together fund joint basic research projects between scientists from inland China and Macau. The priority areas include: information science, TCM research, marine science, environmental science, biological science, new materials, as well as management science. Meanwhile, NSFC and FDCT will organize and fund bilateral academic workshops in areas of mutual interest for academic communities from inland China and Macau region. For detailed requirements, please refer to the call for proposals launched on NSFC's website.

Taiwan

NSFC has been dedicating to encouraging and promoting scientific cooperation and exchange between scientists on both sides of the Taiwan Straits. In 2016, NSFC will continue to support cross-Straits academic workshops held by scientists from mainland China and 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. For detailed requirements, please refer to the call for proposals launched on NSFC's website.

In view of the fact that some universities in Hong Kong and Macao have established research branches in different forms in mainland China, NSFC will not accept applications by one scientist as both inland and outside PIs at the same time.

Sino-German Center for Research Promotion

The Sino-German Center for Research Promotion, jointly founded by NSFC and DFG, aims at promoting scientific cooperation and exchange between Chinese and German researchers in the fields of natural sciences, engineering sciences, and management sciences. NSFC and DFG provide respectively 50% of the Center's budget and the budget for 2016 is around 4,350 million yuan.

The budget of the Center is a special fund from NSFC and DFG. Scientists from universities and academic institutions from both China and Germany are eligible to apply for the funding. The funded projects by the Center will not be counted into the limitation on the number of projects one PI may hold according to NSFC regulations. Chinese applicants shall have been previously funded by NSFC, with the exception of young researchers under

the age of 35 with a PhD degree. German applicants should apply in line with DFG requirements. The Center accepts proposals submitted jointly by Chinese and German scientists at any time of the year, but applications have to be submitted at least 3 months prior to the implementation of the planned academic activities. Applications must be written in both Chinese and German or Chinese and English and the content of the Chinese and German (English) version applications shall be the same. In the applications, the content, theme, academic significance and academic purpose of the project, the participants, contact information, detailed schedule as well as specific costs and distribution shall be specified. Related personnel costs shall be listed according to the funding standard set by the Center on its website. The application form can be downloaded from the Center's website, and shall be submitted directly to the Center after completion (8 hard copies and one electronic copy for each application). The applications will be evaluated by Chinese and German reviewers and the Center will make final decision according to the evaluation results.

Specific requirements and relevant information are available on the website of the Center (http://www.sinogermanscience.org.cn).

The Center currently provides funds for the following categories of activities.

1. Bilateral Academic Workshop

The Center encourages Chinese and German scientists to have in-depth discussion on cutting edge issues in a certain scientific research area. The main purpose of the workshop, which can be held either in China or in Germany, is to foster joint research projects through discussion and exchange. Each workshop can have 8-15 participants from the sending party, more but at most 25 participants from the host party. Participants shall represent the academic level of the relative country and come from different universities or scientific institutions. The Center provides funding for international travel expenses and local subsistence of all formal participants and other necessary costs for the workshop. The Center does not provide funding for participants from industries or administrative institutions or postgraduates. Participants from a third country can be invited to attend the workshop and their costs will be covered by the workshop, but the total number of them should be no more than 20% of the number of participants from the sending party.

2. Sino-German Joint Research Group

The Center adopts flexible modules to funds Sino-German joint research groups for in-depth cooperation between Chinese and German scientists in areas of common interest. Chinese and German scientists may apply for this program to plan for larger projects and establish necessary collaborative platform. Funding for this program covers costs for bilateral workshops, short-term exchange visits, joint research, publications and consumables, etc. Applicants may apply for funding according to the funding requirements of the Center, which does not provide staff salaries. Applicants must be participants of workshops or undertakers of projects funded by the Center so as to ensure a solid foundation for cooperation. The funding period is 3 years and should not be extended. Funding for each project approved is usually 3 million yuan (or equivalent Euros) for both Chinese and German scientists.

3. Funding Schemes for Young Scientists

(1) Short-term Seminar

The scheme aims to introduce advanced scientific methods, techniques and their applications and provide training on specific issues in a certain area. The Center may fund 4 to 6 senior scientists from both countries as lecturers and participants shall be mainly university undergraduates, graduates or young researchers. The number of participants is assessed according to specific conditions, such as equipment and infrastructure of the laboratory, but it shall not exceed 40 people in total. The number of participants shall not exceed 15 from sending party, and 25 from the hosting party. The seminar can be held either

in Germany or in China and usually lasts at most 14 days, including two days for arrival and departure. Funding includes international travel, local accommodations as well as costs for the organization of the meeting and academic tours.

(2) Lindau PhD Students Program and Post-Lindau Program

The Center, together with Lindau Nobel Laureates Foundation, funds 30 (including 15 in the field of economics) excellent PhD students or post-doctors under the age of 35 to participate in the Nobel Laureate meeting in Lindau, Germany, followed by a week-long visit to the German research institutions. Candidates are selected throughout the country and must be recommended by their home institutions. The final approval list is decided by correspondence review and interviews by Chinese and German reviewers.

Post-Lindau Program: grantees with PhD degree of this program may apply for the funding from the Center for a stay of less than 12 months in Germany if they could get invitations from German research institutes or universities, and approval from their host institutions.

(3) Visit of German Excellent Young Researchers to China

This funding scheme is launched by the Center for excellent young German scientists. During the trial period, eligible applicants for this program are grantees of DFG's Emmy Noether Program or other programs of equivalent quality, such as the principle investigators of SFB-excellent Young Research Groups, grantees of the ESF Starting Grants, Lichtenberg Professorship and principle investigators of Young Research Teams. The Center funds German young scientists to come to China for academic visits and research, and explore bilateral cooperation with their Chinese partners. The funding covers international and domestic travel costs and local subsistence in China. Short-term academic visits usually last less than 2 weeks, cover at most 3 cities, and shall be arranged by host institutions and hosts.

(4) Young Scientists Forum

The forum aims at providing an opportunity for Chinese and German young scientists to meet and discuss with the outstanding scientists in their own fields. The forum shall have a specific focused theme and can in principle invite at most 40 young scientists under the age of 40, and several senior scientists depending on the scale of the forum. Funding includes international and domestic travel costs, local subsistence and other necessary costs for the forum.

4. Publication

The Center funds publication of proceedings, joint publications and special journals for scientific results of Chinese and German cooperation. Funding will be at most 5,000 Euros or 50,000 yuan. The Center does not fund publication of textbooks, translated works, etc.

5. Pre-Activity Planning

The Center invites application from qualified applicant who would like to pay a visit to make preparation and plans for a meeting or a project, and to organize small-scale meetings to formulate such plans. The funding is provided for a short visit and only 1 person can be funded.

The Research Fund for International Young Scientists

The Fund supports foreign young scientists to conduct basic research in mainland China in all areas of NSFC's funding scope so as to promote long-term sustainable academic collaboration and exchanges between Chinese and foreign young scientists.

Grantees are also eligible for renewing the existing Fund once in case of need.

Applicants with foreign citizenship should meet the following qualifications:

(1) Less than 40 years old by January 1, 2016 (born on or after January 1, 1976);

(2) Have a PhD degree;

(3) Have the experience of conducting basic research or postdoctoral research;

(4) Guarantee of full-time work at the host institutions during the project implementation;

(5) Abide by Chinese laws and NSFC's relevant rules and regulations while doing research in China.

The host institution should assume the following conditions:

(1) Appoint a contact person responsible for providing consultation to the institution's applicant and assist project management such as the use of budget.

(2) Sign an agreement with the applicant. The agreement should include the following items:

(i) The title of the research project and the expected outcomes;

(ii) Living expenses and necessary working conditions that the host institution offers;

(iii) The attribution of the intellectual property;

(iv) Obligation to have applicant work in full time at the host institution during the project implementation.

The PI of the granted project can apply for renewal if needed and provided that the on-going project has made good progress.

In 2015, 107 foreign young scientists were granted with 28 million yuan direct cost. Among them, 17 foreign young scientists were granted project renewal. It is expected that 120 foreign young scientists (includes 20 project renewal) will be granted with 30 million yuan direct cost in 2016.

Project duration: one year or two years starting from January 1, 2017.

Award size: 200,000 yuan per project for one year or 400,000 yuan per project for two years, the award includes direct cost and indirect cost.

Application procedure

Applicants should fill out and submit on-line proposal forms via the Internet-based Science Information System (ISIS) with the following supplementary documents:

(1) Copy of agreement signed by applicant and host institution;

(2) Copy of applicant's PhD degree certificate;

(3) Copies of the front pages of no more than five representative papers.

Please pay attention to the column of Research Fund for International Young Scientists on NSFC's homepage for more detailed information on application and requests.

http://www.nsfc.gov.cn/nsfc/cen/gjhz/jjzb/index.html

Programs of Joint Funds

The joint funds set up by NSFC and other relevant government departments, provincial governments and industrial sectors aim at supporting basic research in agreed scientific areas.

The joint funds are designed to play a guiding role of the National Natural Science Fund, guide and integrate social resources in basic research, promote cooperation of relevant departments, industries and regions with universities and research institutes, foster scientific and technological talents and enhance China's indigenous innovation capabilities in relevant areas, industries and regions.

In 2016, the joint funds in the Guide to Programs include NSAF Joint Fund, Join Fund of Astronomy, Joint fund of Research on Major Science Facilities, Iron and Steel Joint Fund, NSFC-General Technology Joint Fund on Basic Research, NSFC-Yunnan Joint Fund, NSFC-Xinjiang Joint Fund, Joint Fund for Promoting S&T Cooperation across the Taiwan Strait, NSFC-Liaoning Joint Fund, NSFC-Zhejiang Joint Fund for the Fusion of Informationization and Industrialization, and NSFC-Shanxi Joint Fund for Coal-Based Low Carbon Research.

The joint funds are managed according to NSFC's regulations, NSFC's Rules on Joint Fund Management and project selection procedures.

Applicants for the Joint Funds should be:

(1) Have the experience of conducting basic research;

(2) Have senior professional position (title) or PhD;

(3) Meet other requirements in the Guide to Programs.

Applicants shall only apply for the Joint Fund with the same name once a year. If in the previous year the applicant received funding for the Joint Fund, he or she can not apply for the Joint Fund with the same name as the principle investigator again this year.

For any research achievements of 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 to Programs with the name of the joint fund and the project number.

Applicants for the joint funds should be prepared according to relevant project type (such as General Program or Key Program) outlines. Please select "Joint Fund" for funding category, "Fostering Program Project" or "Key Program Project" or "Foster Local Talents" or "Center Project" for sub categories, and select the name of the joint fund in the notes section. Applicantions without correct selection will not be accepted.

NSAF Joint Fund

Jointly set up by NSFC and the China Academy of Engineering Physics (CAEP), the Fund is aimed to encourage scientists in related fields to carry out basic and applied researches for national security, so as to explore new research directions, discover new phenomena and laws, upgrade the innovative ability of science and technology in national defense, and foster young professionals in this area.

In 2016, this joint fund plans to fund two types of projects, namely "Key Program Project" and "Fostering Program Project". The Key Program project has 10 directions, with average direct cost funding of 2.4-3 million yuan per project for 4 years. There are 15 encouraged research directions for Fostering Program Project, and 80 projects with defined targets are planned to be funded with an average funding of 640,000 yuan per project for 3 years.

I. Directions for Key Program Project

ZD1. Research on computation method for multi media fluid dynamics in high energy and density conditions

ZD2. Research on laws of relative motion between reversing layers under complex loading conditions

ZD3. Research on high pressure phase change of HMX crystals

ZD4. Research on atto second X-ray radiation generated by high power strong laser target interactions

ZD5. Research on non equilibrium physics of high temperature radiation field plasma interactions

ZD6. Research on quantum verification mechanism based on physically non clone-able micro nano photon structures

ZD7. Precision regulation and characterization of strong corelated f electron region properties

ZD8. Research on the electron structure and surface reaction behaviors of uranium nitrates

ZD9. Highly efficient computation method for problems in partial differential equations with extreme physical properties

ZD10. Research on material phase change dynamical properties in high pressure conditions driven by strong laser

Note: CAEP researchers can apply for or participate in applying for this program. Collaboration among two or three institutions is encouraged.

II. Directions and Projects for Fostering Program Projects

1. Projects for encouraged research directions

GL1. Research on generation and optimization of 3-D non structural mixed grids including complex boundaries

GL2. Studies on high power efficient beam transformation mechanism based on photon crystal structures

GL3. Studies on heat transfer stability of plate fuel accelerator cores

GL4. Studies on analysis and optimization of parallel programming based on big data technology

GL5. Risk analysis of internal network leakage based on human and data behavior trace

GL6. Studies on the impact of plasma instability on BRA process

GL7. Studies on methodology of low gamma dosage radiation effects

GL8. Research on the structure design and mechanism of vibration reduction of polymer composite damping materials

GL9. Studies on synthesis of energy materials in extreme conditions

GL10. Studies on performance and mechanism of friction wear of high strength temperature resistant lubrication composite materials

GL11. Studies on solid cells using solid ion theory

GL12. Studies on design and preparation of gradient functional ceramic materials

GL13. Studies on synthesis and quantum devices of single layer 2-D MoS2 semiconductor materials

GL14. Studies on key problems of data system modeling for multi disciplinary coordination

GL15. Studies on the method of security evaluation of measurement and control system software with high security level

Note: CAEP researchers may not apply, but may be a participant.

2. Projects with defined targets

(1) Studies on reaction flow model of solid explosives and precision calibration of parameters
(2) Studies on theory and application of metal explosive driving
(3) Studies on direct numerical simulation and mixing mechanism of compressible Rayleigh Taylor instability
(4) Signal separation and imagine processing based on low order matrix recovery
(5) Studies on mechanical mechanism of radiation damage of TiN gradient coating
(6) Studies on simulation of acoustic vibration of structure in under wide band excitation
(7) Studies on validation of dynamical models with function output
(8) Studies on high temperature high pressure phase change of TATB explosives exposed to laser radiation
(9) 3-D grid-spring model of brittle materials during impact process
(10) Studies on non destructive testing of polymer viscous explosive residues
(11) Studies on efficient ultrasonic milling technology of small glass tools
(12) Studies on manufacture of high elasticity precision grid structure
(13) Studies on analysis and safety evaluation of structural defects under coupling conditions of multiple factors
(14) Studies on numerical simulation of plastic deformation fractures of high strength vanadium alloy
(15) Analysis of multi scale coupling of FBAR mechanism
(16) Studies on high temperature phonon spectrum of beryllium and its non elastic neutron scattering
(17) Studies on stopping ability of laser driven charged particles in low Z dense plasmas
(18) Studies on selenium group nano crystal radiation detection materials
(19) Studies on credible covariance of neuron cross section and number of neutrons in fission nuclei
(20) Studies on method of evaluation of reaction data of neutron and unsteady nuclei
(21) Studies on theoretical analysis and design of micro multi channel cooling flow field
(22) Studies on detection of trace in tight and small space
(23) Studies on ion beam of molybdenum diffusion in molybdenum based hydrogen titanium membrane
(24) Studies on controls and design of dynamic programmable THz functional devices

(25) Studies on quantum point single photon source of nitrates in room temperature
(26) Studies on leakage mechanism of GaN base HEMTs buffer layer
(27) Studies on optimal design and damage mechanism of high threshold super wide band laser membrane dispersions
(28) Studies on damage resistance LBO crystal membrane technology in continuous working conditions
(29) Studies on error tolerant variable structural flight control method
(30) Studies on surface charging of vacuum ceramics and its impact on pulse characteristics
(31) Studies on cyclic trace synthesis radar imaging and motion compensation technology
(32) Studies on arc evolution behaviour of trigger type vacuum switch
(33) Studies on radiation properties and spectrum detection method of negative corona discharge
(34) Studies on multi coupling mechanism of radio micro floating induction in high impact conditions
(35) Studies on total MEMS antenna based on flexible materials
(36) Studies on interference resistant short range pulse laser based on smoke particle size distribution function optimization
(37) Studies on integration of multi phase power driven and its energy transportation
(38) Theoretical studies on restoring surface texture by THz imaging
(39) 3-D imaging of near target based on coarse arrays
(40) Studies on wide band stealth technology of low RCS platform antenna
(41) Studies in efficient electro magnetic computation method for target echo in complex environment
(42) Studies on composite interaction technology for large network controls
(43) Studies in multi source data merging analysis technology for large physical experiment
(44) Studies on mechanism of interaction of vortex light field and silicon materials
(45) Studies on the laws of physics of raising damage threshold of quartz by surface enhancement
(46) Studies on super narrow stopping membrane technology with high damage resistant propertied in continuous working conditions
(47) Damage properties of optical membrane device laser with micro nano structures
(48) Technology of high acceleration gradient super conductive cavity mismatch mechanism and controls
(49) Analysis of micro disturbance properties of low loss materials in high quality quasi cavities
(50) Electrolysis dynamics of burnt fuel salts
(51) Mechanism of copper glass forming based on high energy beam and its properties of strong laser absorption
(52) Macro/micro mechanism and modeling of squeeze forming process sub stable liquid state alloy
(53) Electrode reaction process of typical fracture element in chloride molten salts
(54) Theory and experiment studies of molecular reaction of cerium atom and its clusters with typical gas
(55) Computer simulation of chemistry of water solution of neptunium compound
(56) New method of synthesis of nitrate explosives based on micro chip structure controls
(57) Design and mechanism of PBX in situ 3-D composite interface enhancement

based on energy containing binders
(58) Elastic water repellent wide temperature range thermal control materials and its mechanism of heat isolation
(59) Transport process of lithium ion/electron in multiple layer in micro lithium batteries
(60) Low temperature alloy welding of PZT ceramics and its evolution mechanism on interface
(61) Optimization of properties of carbon fiber enhanced aluminum based material and its application in optical mechanical structures
(62) Studies on fast solution of large scale explosion based on image source method
(63) Mechanism of impact of minor element on the strength of chrome molybdenum alloy
(64) Studies on the method of load coupling characterization and design technology in acceleration field with multiple axial changes
(65) Studies on mesoscale damage of polymers with particle enhancements during low speed impact
(66) Studies on robust control and optimal end guidance for small portable air crafts
(67) Studies on mechanism of SPDT defect formation in KDP crystals based on in situ measurement
(68) Hard X-ray single energy imaging technology based on spherical lens crystal
(69) Total field dynamic measurement of internal temperature distribution of semiconductor materials
(70) Ultra fast dynamics of semiconductor carrier based on nonlinear effect
(71) Dark mechanism and devices of high power Ytterbium doped optical fiber
(72) Multi photon effect mechanism and devices of femto second laser induced photon crystal grate
(73) Super wide angle ASE absorption laser membrane
(74) Studies on the improvement of penetration capacity on high voltage electrode surface
(75) Conformal array manifold modeling and dimension reduction techniques based on wave field models
(76) TMulti bit reverse effect mechanism in ultra deep sub micro CMOS IC
(77) Key technology of safety control of virtual machine
(78) Bio chemical mechanism of producing deuterium from micro algae
(79) Simulation of molecular dynamics of phase shift properties of transition metals in high temperature
(80) Studies on nonlinear random vibration analysis of structures in high temperature

Note: CAEP researchers may not apply, but may participate in projects.

Please refer to separate publications or the CAEP website (http://www.caep.ac.cn) for detailed information on specific content and form of research results, etc.

Joint Fund of Astronomy

NSFC and the Chinese Academy of Sciences (CAS) jointly set up the Joint Fund of Astronomy, which opens to all universities and research institutions in China (especially non-astronomy research ones), combine NSFC's strength in evaluation, funding and management with the function and roles of the national research platforms (observation bases) in astronomical fields that have already been established by the Chinese Academy of Sciences. This combination will promote the effective use of these facilities to conduct

astronomical research by researchers in universities and other research institutions, develop astronomical methods and technology, improve observation capacity of these facilities, foster research talents in related areas, improve innovation capabilities and academic positions internationally, and make astronomical research in China better serve the national strategic needs.

The Joint Fund of Astronomy includes “Fostering Program Project” and “Key Program Project”. Key Program Project will not specify project titles and applicants may decide their project titles, research contents, research schemes and research funding according to the following 1-5 important scientific issues. The sixth issue is not within the scope of Key Program Project. In 2016, the Joint Fund of Astronomy plans to fund about 6-9 Key Program projects.

As a part of the National Natural Science Fund, the application, evaluation and management of the Joint Fund of Astronomy comply with the regulations of NSFC and the agreement signed between NSFC and CAS. In 2016, for the Fostering Program Project, the average direct cost funding will be 500,000 yuan per project for 3 years, and for Key Program Project, the average direct cost funding will be 2.5 million yuan per project for 4 years.

Funding areas in 2016

(1) Use of observation facilities of all wave band and data to conduct observation and theoretical research on cosmology, galaxies, stars, the sun and solar systems and other basic astronomical areas by scientists from research institutions and universities outside CAS astronomical observatory system (researchers in CAS astronomical observatory system are not allowed to apply as PIs, but may participate in the research as principal members of the research group).

(2) Focus on observation techniques for space programs, including new observation techniques, new methods in space and pre-studies on key techniques of astronomical satellite, etc.

(3) High energy, ultraviolet, optical, infrared and radio techniques related to astronomical observations, including high energy X, gamma imaging technology, high resolution detector technology (position resolution and energy resolution) and polarized measurement, the detection of week photoelectric signals, storage and transmission techniques, high energy, optical, infrared and radio techniques related to astronomical telescopes, automated control techniques and machinery, etc.

(4) Applied basic research on problems in major astronomical projects such as data, computation and information access, etc., including storage and sharing of mass astronomical data, data mining, high performance computation and virtual observatory techniques.

(5) Basic astronomical methods (astronomical measurement and celestial mechanics) and key scientific issues originated from national strategic needs.

(6) Pre-studies on scientific problems and technical schemes in large astronomic observation facilities that are under planning, including frontier scientific problems to be studied, assessment on proposed technical scheme for planned observation facilities, clarify technical parameters of the facilities, and verification of scientific targets according to the capability of the planned observation facilities (only Fostering Projects are accepted in this area).

Joint Fund of Research on Major Science Facilities

NSFC and the Chinese Academy of Sciences (CAS) have jointly set up the Joint Fund of Research on Major Science Facilities, which aims at making use of NSFC's strength in evaluation, funding and management to attract researchers in universities and research institutes to conduct frontier, multidisciplinary and intercrossing researches by using national major science facilities built by the CAS, foster research talents of major science facilities, develop new research directions, bring into full play the overall capability of these major science facilities, promote the exchange and opening up, upgrade our innovation capability in basic science and creativity in frontier science areas and improve international standings of China, and make Chinese basic research better serve the national strategic needs.

As a part of the National Natural Science Fund, the application, evaluation and management of the Joint Fund of Research on Major Science Facilities comply with the regulations of NSFC and the agreement signed between NSFC and CAS. The major science facilities referred to in this joint fund are BEPC and BES in Beijing, HIRFL-CSR in Lanzhou, SSRF in Shanghai (including protein facilities), and NSRL and SHMFF in Hefei.

The Joint Fund of Research on Major Science Facilities includes "Fostering Program Project" and "Key Program Project. In 2016, the average direct cost funding for a Key Program Project is 2.4-2.6 million yuan per project for 4 years and that for Fostering Program Project is not less than 540,000 yuan per project for 3 years.

I. Three Major Funding Areas

(1) Research using general equipment, focusing on multi-disciplinary research in physical sciences, information sciences, material sciences and environmental sciences, etc. and the development of new research directions.

(2) Research using special devices, such as high energy physics research on BESIII and nuclear physical research on HIRFL-CSR in Lanzhou.

(3) Research on techniques and methods that improve the experimental capability of major facilities and the development and key technology for small specialized devices.

II. Priority Research Areas in 2016

Fostering Program Project

Multidisciplinary research on synchrotron radiation in physics, chemistry, life sciences, medical sciences, environmental sciences, material sciences, geology, agriculture, metrology, microelectronics and micromechanics; experimental studies on τ-charm physics on BESII and basic research on relevant software and data analysis; nuclear physics experimental studies on HIRFL-CSR in Lanzhou and applied basic research on heavy ions; studies on ion beam in life sciences, medical sciences, material sciences and semiconductor defect engineering; new technology and methodology of beam line; key technology of advanced X ray detector; particle accelerator and key technology, method and equipment for particle detectors, magnetic resonant technology and new method of preparation for functional materials in steady high magnetic field.

Key Program Project

Research areas are more than funded projects in number. Applicants may decide the project title, research content and research scheme according to their own situation. It is encouraged that applicants collaborate with researchers working in labs of facilities.

1. Research on scientific problems based on Synchrotron Radiation Facility

(1) Transit and transfer process of environmental pollutants
(2) Structure and property of energy materials
(3) Structure and physical properties of complex materials
(4) Structure and functions of macro biomacromolecular complexes and membrane protein
(5) Fine structure of cells and bio tissues
(6) New catalyst and mechanism of catalysis
(7) Structure of matters inside the earth

2. Research on scientific problems based on Steady State Strong Magnetic Field Facilities

(8) Correlated materials in strong magnetic field conditions (≥20 T)
(9) Studies on mechanisms related to life activities based on strong magnetic field resonant spectroscopy and imaging
(10) Chemical synthesis, material preparation and properties under high magnetic field (≥20 T)

3. Frontier physics and expanded studies based on BEPCII and HIRFL

(11) New resonant state in Tau-charmonium energy region
(12) Hadron spectroscopy in Tau-charmonium energy region
(13) Singular nuclei reaction and structure
(14) Highly ionized ion and fine spectroscopy
(15) Heavy ion radiation effects

4. New principles, new methods and key technology for the facilities

(16) New method and new technology of HIRFL experiments
(17) Experimental method, key technology and devices for beam station
(18) New theory and methods of imaging
(19) New principles, new methods and new technology and key components for accelerator
(20) Key technology of detector and electronics
(21) Method and software of experimental data analysis and processing
(22) Self (ferro magnetic) resonance method in strong magnetic field
(23) New theory and key technology of advanced light sources

Joint Fund of Iron and Steel Research

The Joint Fund of Iron and Steel Research is financially supported by NSFC and Baosteel Group Corporation. Aiming at common basic issues and key technology in the development of Chinese iron and steel industry, it funds prospective and innovative research that can speed up the advance of new technologies in metallurgy and material. In 2016 the direct cost will be 0.5 to 0.8 million yuan per project for 3 years with the Fostering Program, and 2 to 3.8 million yuan per project for 4 years with the Key Program.

Nationwide the Joint Fund's funding range covers new metallurgical technologies and relevant techniques, materials, energy, environment, equipment, to information sciences, etc. Proposals should be submitted to the Department of Engineering and Materials Sciences of NSFC.

I. Areas encouraged with the Fostering Program

1. Process of coke consumption in blast furnace and its influence factors
2. Basis of new process and technology for comprehensive treatment of gas from

sintering or coke oven

3. Refining mechanism and key technology of high performance welding wire steel
4. Manufacturing fundamentals of homogeneous high-toughnesssuper-thick polar-ship steel plate
5. Basic issues of advanced high-strength automotive steel
6. High strengthening and high toughening mechanism and process basis of Cr13 martensite stainless steel
7. Hot dipped interface reaction kinetics of free pickling hot rolling sheet
8. Ultra fast cooling uniformity and process control of hot rolling sheet strip
9. Controlled cooling model and microstructure transformation behavior of hot rolling seamless steel pipe
10. Microbiological corrosion mechanism of marine steel
11. Delayed cracking mechanism of medium manganese steel
12. Manufacturing basis of electric vehicle body framework using lightweight steel and process
13. Strengthening and torsional fracture mechanism of high strength bridge cable wire
14. Fabrication, strengthening and toughening mechanism of bainite dual phase high speed train wheel steel
15. Toughening mechanism and process control of micro-nitrogen alloyed, high hardness and long life hot die steel
16. Plasticity improvement mechanism and rolling basis of 6.5 wt% high silicon steel strip
17. Steel supply chain collaborative optimization and flexible manufacturing basis

II. Areas supported with the Key Program

1. Contaminant formation mechanism and control technology in the sintering process of iron ore resources (E0414)
2. Basic theory related to continuous casting mold flux of high manganese and high aluminum steel (E0412)
3. Alloying mechanism and key properties of high temperature ferrite stainless steel for new-generation automobile (E0101)
4. Microstructure design principle and weldability evaluation of low-activation high-temperature ferrite steel for nuclear power (E041607)
5. Multi-step real-time intelligent optimization scheduling theory, method and application for steel production line (E042205)
6. New process and technology for iron and steel industry, and related energy and environmental protection basic theory and method (E0422)

In the above 6 areas about 5-8 projects will be funded according to application and evaluation situations.

NSFC-GenerTec Joint Fund for Basic Research

The NSFC-GenerTec Joint Fund for Basic Research was jointly established by NSFC and China Academy of General Technology in 2015. The joint fund aims at pooling talented scientists and research teams to solve major scientific issues and key technical problems for China Academy of General Technology in serving the country and fulfilling its mission, and promoting research and team building in related disciplines.

The NSFC-GenerTec Joint Fund for Basic Research is open to all Chinese researchers and is an integral part of the National Natural Science Fund. NSFC is responsible for the application, evaluation and management of the joint fund in accordance with NSFC's Rules on Joint Fund Management and the Agreement on NSFC-GenerTec Joint Fund for Basic Research.

In 2016, the NSFC-GenerTec Joint Fund for Basic Research calls for proposals for "Key Program Project" and "Fostering Program Project". Average funding (direct cost) for each "Key Program Project" will be 2.55 million yuan for 4 years and the funding could be increased for projects of exceptionally high quality. Average funding (direct cost) for each "Fostering Program Project" will be 0.68 million yuan for 3 years.

1. Themes for Key Program Project

(1) Mainstream media content-aware, interaction analysis and presentation technologies in a big data environment
(2) Key technologies for semantic analysis and quantitative calculation of sentiment in a big data environment
(3) Bigdata-driven target tracking and localization technology
(4) Technology of privacy protection and risk management for network users in a big data environment
(5) Technology of information hiding, covert channel exploitation and countermeasures based on big data
(6) Scenario deduction and early warning of specific international events based on big data
(7) External data acquisition and analysis of integration applicationfor target behaviors
(8) Identification, transcription, comparison and translation of specific signal or media
(9) Theory, methodology and key technology of information hiding
(10) Vulnerability analysis and countermeasures of mobile network and terminal
(11) Covert channel detection and countermeasures of mobile network
(12) Vulnerability analysis of backbone network and core network devices
(13) Measurement theory of chip data leakage and vulnerability analysis method
(14) Theories and key technologies of novel cryptosystem in a cloud computing environment
(15) Key technologies of sensor network security
(16) Integrative testing technology for anonymous network communication
(17) Immunity-based active network security technology
(18) Technology for behavior analysis of mobile network users

2. Themes for Fostering Program Project

(1) Network big data platform and data acquisition technology

New methods and technologies for the acquisition, aggregation and analysis of open network data, and technologies for the acquisition, storage and management of multi-source, heterogeneous, massive data, including key technologies for anonymous cloud storage in mobile network.

(2) Big data preprocessing technology

Automatic identification and transliteration of speech data, including feature extraction of speech in a noisy environment, training technology for acoustic models based on massive data, and encoders/decoders that can support ultra large scale acoustic models or language models; theories and key technologies of multispectral video processing, including coordinated expression, collaborative sensing and target identification and tracking technology for video data; automatic analysis, recognition and processing technology for images and texts, including text and image recognition technology for Chinese, English, Tibetan, Uighur and other languages; ID identification and verification based on lip-reading.

(3) Big data analysis technology

Data fusion techniques, correlation analysis, early warning analysis, camouflaging techniques, authenticity analysis for big data, including statistical analysis and modeling of network user behaviors, theory and modeling methods of intelligent search in cyberspace, evidence forensics and tracking technology for the new generation of network, automatic sentiment identification for specific fields, mobile internet encrypted data analysis and mining, identification of spam and false information, and measurement of the distortion of big data during transmission.

(4) Big data presentation and utilization technology

Modeling theory of network graph based on big data and large-scale networks, information exchange and transmission mechanism of different network graph models, technology for virtual and real object correspondence in online and offline network graph, cognitive convergence in visualization and interactive analysis of video big data.

(5) Technologies of analysis and utilization for mobile communication

Miniaturization and diversification of mobile terminal devices and battery technology, analysis of mobile communication protocol and analysis of intelligent devices security, intelligent terminal forensics and anti-forensics, mobile terminal user behavior analysis, and covert communication technology in mobile applications.

(6) Steganography and steganalysis

New theories, methods and technologies of steganography and counter measures for big data, including theories and technologies of secure steganography and steganalysis of behavior data, theories and technologies of steganalysis without prior knowledge, theories and technologies of attack-resistant steganography, and theories and technologies of stealth signals.

(7) Vulnerability analysis and countermeasures

Methods and technologies of software vulnerability analysis based on topological invariants; software steganography, anti-tracking and anti-debugging technologies based on different operating systems or carriers; new models and methods of malicious code detection for multi-source data; firmware security analysis technologies and etc.

(8) Cryptography technology

High strength password and cryptanalysis technologies, especially cryptanalysis based on reconfigurable symmetric cryptography algorithms, quantum attack-resistant cryptography theories, side-channel analysis of public-key cryptographic algorithms in the post-quantum era, vulnerability analysis of network security protocols and cryptosystems, security analysis of cryptographic protocols and codes and deciphering techniques, security analysis technologies for white-box cryptography and cryptographic obfuscation.

(9) Signal and information processing

Technologies of information acquisition and transmission in complex and isolated network environment; key technologies of decoding, monitoring and locating wireless signals; position information acquisition and locating technology based on visible light; signal modeling, analysis and screening technologies based on physiological characteristics.

(10) Effectiveness, reliability and security of mega-data center network

Studies on new network topology, routing and forwarding technologies for mega-data center to meet the requirements of non-blocking, high-speed, low-delay, reliable and secure transmission of data center; studies on measures to solve the problem of super-linear increase of costs and energy consumption of Ethernet, IP-based network and other implementation technologies of the data center; studies on problems arising from the exponential growth of data center volume due to the development of cloud computing and big data.

NSFC-Yunnan Joint Fund

The NSFC-Yunnan Joint Fund is jointly established by NSFC and the Yunnan Provincial Government to implement the National Medium-and Long-Term Program for Science and Technology Development 2006-2020, the guidelines of the National Conference on Science and Technology and the Action Plan on Building an Innovation-Oriented Yunnan. It aims at pooling talented scientists across the country to carry out basic researches on important scientific issues and key technical problems that are closely related to the socio-economic and scientific development of Yunnan and surrounding regions, boosting the development of science and technology and the growth of scientific talents in Yunnan, improving indigenous innovation capability and international competitiveness, and promoting the sustainable development of regional economy and society.

The NSFC-Yunnan Joint Fund is open to all Chinese researchers and is an integral part of the National Natural Science Fund. NSFC is responsible for the application, evaluation and management of the joint fund in accordance with NSFC's Rules on Joint Fund Management.

In 2016, the NSFC-Yunnan Joint Fund calls for proposals of "Key Program Project" in 4 priority research areas. Average funding (direct costs) for each project will be 2.4 million yuan for 4 years. Qualified researchers all over the country are welcomed to apply for this fund according to the research scope and requirements listed in this Guide.

I. Biodiversity conservation

1. Biodiversity

Studies on the biodiversity of important animals, plants and micro organisms in the plateau regions of Yunnan at the molecular, genetic, species and ecosystem levels.

Main research orientations:

(1) Studies on the biodiversity of important ecosystems in Yunnan;

(2) Studies on the exploitation and protection of endemic species and medical plants and animal resources in Yunnan;

(3) Studies on the adaptive evolution mechanism of endemic species in Yunnan.

2. Agricultural and forest resources

Main research orientations:

(1) Genetic analysis and application of good traits of important economic animals and plants in Yunnan;

(2) Basic researches on the pathogenic mechanism and prevention and treatment of important diseases and insect pests of main plants in Yunnan;

(3) Mechanism of controlling water and soil erosion through new crop cultivation methods;

(4) Basic researches on the prevention and treatment of main diseases of livestock and poultry.

3. Nutrition analysis and exploitation of special food in Yunnan

II. Population and health

1. Basic researches on discovery of active substances aiming at major human diseases by using typical resources in Yunnan

Main research orientations:

(1) Studies on the discovery, structure, function and functional mechanism of new natural active substances based on special resources in Yunnan;

(2) Studies on the material basis and functional mechanism of ethnic medicine and

featured Chinese medicine in Yunnan.

2. Basic researches on the pathogenesis, prevention and treatment of major diseases in Yunnan

Main research orientations:

(1) Basic researches on high incidence diseases and endemic diseases in Yunnan;

(2) Basic researches on the epidemiology, pathogenesis, prevention and treatment of insect-borne tropical diseases and major infectious diseases in Yunnan and surrounding areas;

(3) Disease modeling using special animals in Yunnan and related basic researches.

III. Resources and environment

1. Environmental changes and eco-environmental effect in Yunnan-Guizhou Plateau

Main research orientations:

(1) Studies on the evolution mechanism of ecosystem in key geological period in Yunnan;

(2) Studies on the changes of climate, vegetation and soil in dry-hot valley and sustainable utilization of related resources;

(3) Studies on the migration and transformation mechanisms and regulatory mechanisms of nutrients and pollutants in plateau lake basins;

(4) Studies on the distribution of carbon and nitrogen and key distribution processes in typical forest ecosystems in Yunnan.

2. Formation mechanisms and early warning of major natural hazards in Yunnan

Main research orientations:

(1) Causes and forecast of meteorological disasters in low latitude plateau;

(2) Mechanisms and early warning of major geological disasters in Yunnan;

(3) Mechanism and monitoring of strong earthquake and secondary disasters in Yunnan and surrounding regions.

3. Metallic mineralization and mining risk management of metallic mineral deposit in Yunnan

Main research orientations:

(1) Metallogenetic mechanism and conditions of typical mineral deposit in Yunnan and surrounding regions;

(2) Control of environmental risk and environmental remediation in exploitation of non-ferrous metal resources.

IV. Comprehensive utilization of mineral resources and new materials

Researches are expected to be focused on theories, methods and cutting-edge technologies that meet the demand of comprehensively utilizing the mineral resources of Yunnan and developing advanced material industries with special features.

1. Comprehensive utilization of mineral resources

Main research orientations:

(1) Enrichment and extraction of nonferrous metal minerals;

(2) Comprehensive control and recycling of solid wastes from mining and metallurgy industries;

(3) Studies on the low-toxic and innocuous treatment of toxic and hazardous wastes from nonferrous metallurgy.

2. Basic researches on the development and application of new materials

Main research orientations:

(1) New battery materials and application;
(2) Precious metal materials and application;
(3) New photo-electron conversion devices based on silicon, germanium and other new materials.

3. Material preparation and process control

Main research orientations:

(1) New theories, methods and technologies of deep processing of nonferrous metal materials;
(2) Basic researches on key technologies of 3D printing with metal.

NSFC-Xinjiang Joint Fund

The second phase of the NSFC-Xinjiang Joint Fund is jointly established by NSFC and the Government of Xinjiang Uygur Autonomous Region for the period from 2016 to 2020 to implement the guidelines of the National Working Conference on Scientific and Educational Assistance to Xinjiang. It aims at making full use of the guiding role of the National Natural Science Fund, attracting a number of talented scientists to work in Xinjiang, boosting the development of science and technology and the growth of scientific talents in Xinjiang, improving innovation capabilities of universities and research institutes in Xinjiang, and promoting the sustainable development of regional economy and society.

The NSFC-Xinjiang Joint Fund is open to all Chinese researchers. It is an integral part of the National Natural Science Fund as well as a platform for providing scientific and technological assistance to Xinjiang. NSFC is responsible for the application, evaluation and management of the joint fund in accordance with NSFC's Rules on Joint Fund Management.

In 2016, the NSFC-Xinjiang Joint Fund calls for proposals of "Fostering Program Project", "Key Program Project" and "Special Grant for Local Young Talents" in 4 priority research areas. For "Fostering Program Project", the average funding (direct costs) for each project will be 600,000 yuan for 3 years; for "Key Program Project", the average funding (direct costs) for each project will be 2.8 million yuan for 4 years. "Special Grant for Local Young Talents" supports researchers with good research achievements in Xinjiang to conduct innovative research within the scope outlined in the Guide. It supports up to 2 outstanding local young researchers under the age 45 in each research area, with a funding of 900,000 yuan (direct costs) for 4 years. Qualified researchers are welcomed to apply for this fund according to the research scope and requirements listed in the Guide.

I. Agriculture, biodiversity and biological resources

1. Agriculture

Proposals are expected to be basic researches on the varieties, quality, special features, product safety and control of diseases and insect pests of livestock and agricultural and forestry products to support the sustainable development of agriculture and animal husbandry in Xinjiang.

Main research orientations:

(1) Biological basis of the formation of good traits of featured fruits and vegetables in Xinjiang;
(2) Changes of nutritional ingredients and the formation mechanism and control of hazardous substances in the processing and storage of featured fruit products in Xinjiang;

(3) Occurrence regularity, mechanism and control of major diseases and insect pests of agriculture and forestry;
(4) Genetic basis of the essential traits of important livestock and poultry in Xinjiang.

2. Biodiversity and bioresources

Proposals are expected to be basic researches on conservation and sustain able utilization of special bioresources in deserts and oases of Xinjiang or on biodiversity and utilization of important species and ecosystems in Xinjiang.

Main research orientations:
(1) Structure and function of desert ecosystems in Xinjiang;
(2) Biodiveristy of steppe ecosystems in Xinjiang;
(3) Basic researches on the analysis and utilization of main components of featured bioresources in Xinjiang;
(4) Reproductive and evolutionary ecology of wild flower resources in Xinjiang;
(5) Molecular mechanism and exploitation of environmental stress resistance of desert plants in Xinjiang.

II. Water resources and mineral resources

1. Water resources

Proposals are expected to be basic researches on water resources and environment to guarantee water security in Xinjiang.

Main research orientations:
(1) The impact of global change on water resources and ecosystems in arid regions;
(2) The temporal-spatial process and ecological effect of surface-shallow ground water exchange in desert oasis;
(3) Snow cover changes and changes of mountain-desert ecosystem in Xinjiang;
(4) Glacier changes and formation mechanism of dam-break floods in Xinjiang.

2. Basic researches on geology of mineral deposit

Proposals are expected to respond to the demands of guaranteeing of security of national resources and building a mineral resources base in Northwest China, focus on advantageous mineral resources in Xinjiang and neighboring areas, conduct researches on tectonic changes, metallogenic mechanism and prognosis of the main metallogenic belt in Xinjiang and provide guidance and support to mineral exploration.

Main research orientations:
(1) Metallogenic system and mechanism of typical mineral deposit in the main metallogenic belt in Xinjiang;
(2) Evolution and metallogenic mechanism of ancient Xinjiang block;
(3) Phanerozoic geological evolution and metallogenic mechanism of the West Kunlun-Karakorum Mountains;
(4) Compound orogenic process and metallogenic mechanism of the Altun Mountains;
(5) Evolution and metallogenic mechanism of Paleozoic volcanic rocks in northern Xinjiang;
(6) Metallogenic prognosis of large-scale ore-concentration area based on big data;
(7) Metallogenic system and continental dynamics of unconventional energy.

III. Information security

Proposals are expected to focus on the complexity of the multilingual network environment in Xinjiang, especially the dissemination of multilingual information, analysis of cyberspace security based on network traffic big data, and language production and perception mechanism of ethic languages.

(1) Analysis, identification and prediction of network behavior patterns in complex multilingual network environment;
(2) Network traffic big data analysis and visualization techniques for cyber security;
(3) Theories and key technologies of identification of ethnic languages and speeches.

IV. Population and health

Proposals are expected to focus on pathologic mechanism and control of high incidence diseases in Xinjiang, influences of local environment on human body and medicine with resource advantages and ethnic characteristics in Xinjiang.

Main research orientations:

(1) Pathogenesis and control of skin diseases such as vitiligo, Kaposi's sarcoma and etc.;
(2) Impact of environmental and genetic factors on neurological diseases, respiratory diseases and high incidence cancers and related pathologic mechanisms;
(3) Mechanisms of the pathophysiological impact of local environment of Xinjiang on human body and control of related diseases;
(4) Basic and applied basic researches on the epidemiology and etiology of important natural focal diseases in Xinjiang;
(5) Material basis and functional mechanism of the effective substances of ethnic medicine in Xinjiang.

Joint Fund to Promote Cross-Strait Scientific and Technological Cooperation

The second phase of the Joint Fund to Promote Cross-strait Scientific and Technological Cooperation is jointly established by NSFC and Fujian Provincial Government for the period from 2016 to 2020. It aims at making full use of the guiding role of the National Natural Science Fund to guide social S&T resources into basic research, attracting and gathering scientists across the Taiwan Strait to conduct S&T cooperation, solving major scientific problems and key technological problems of mutual concerned by Fujian and Taiwan, boosting the growth of scientific talents, improving innovation capabilities of the cross-strait economic zone, and promoting the sustainable development of regional economy and society.

The joint fund is open to all Chinese researchers on a fair and competitive basis. It is an integral part of the National Natural Science Fund. NSFC is responsible for the application, evaluation and management of the joint fund in accordance with NSFC's Rules on Joint Fund Management.

In 2016, the joint fund calls for proposals of "Key Program Project" in 4 priority research areas. Average funding (direct costs) for each project will be 2.8 million yuan for 4 years. Qualified researchers all over the country are welcomed to apply for this fund according to the research scope and requirements listed in the Guide.

I. Agriculture

(1) Molecular mechanism of the formation of agronomic traits of important economic crops in Fujian and Taiwan
(2) Reproductive and developmental mechanisms of main economic crops in Fujian and Taiwan
(3) Occurrence regularity and control mechanism of major diseases of featured

economic plants in Fujian and Taiwan
(4) Biological basis of processing of featured agricultural products in Fujian and Taiwan
(5) Basic researches on the breeding of featured aquatic species in Fujian and Taiwan
(6) Occurrence regularity and control of diseases of important economic animals (livestock, poultry and aquatic animals) in Fujian and Taiwan

II. New materials and manufacturing

(1) Design, manufacture and application of materials and devices of new lithium batteries and all-solid-state supercapacitor
(2) Organic phtovoitaic materials and devices
(3) High spatial-temporal resolution surface and interface characterization methods for energy materials
(4) Basic researches on design and application of advanced structure-function integrated materials
(5) Basic researches on extraction, purification and functionalization of cellulose
(6) Basic researches on the preparation of high performance recycled concrete and its application in marine environment
(7) Design, preparation and application of new materials for industrial waste water treatment and drinking water purification
(8) 3D manufacturing technology for complex structures
(9) Preparation of semiconductor quantum dot materials and perovskite nano crystalline materials and studies on optoelectronic devices

III. Population and health

(1) Researches on innovative drug using featured resources of Fujian and Taiwan
(2) Basic researches on craniofacial tissue and organ regeneration and repair by induced differentiation of stem cells
(3) Researches on the pathogenesis of cardiovascular diseases
(4) Researches on the pathogenesis and intervention strategies of high incidence malignant tumors in Fujian and Taiwan
(5) Immune regulation and regulation mechanism of related diseases
(6) New biological materials and new technologies of precise diagnosis and treatment

IV. Electronic information

(1) Theories and key technologies of cloud computing and trustworthy network
(2) Theories and techniques of big data analysis
(3) Key technologies of visual perception and augmented reality
(4) New laser and optic field manipulation technology
(5) Basic researches on application of photoelectric technology in biology and medicine
(6) Theories and techniques of architecture and access of heterogeneous underwater acoustic sensor network

NSFC-Liaoning Joint Fund

The NSFC-Liaoning Joint Fund is jointly established by NSFC and the Liaoning Provincial Government for the period from 2015 to 2019. It aims at making full use of the guiding role of the National Natural Science Fund to guide social S&T resources into basic research, attracting and gathering a number of talented scientists, solving major scientific problems and key technological problems in the industrial development of Liaoning,

improving innovation capabilities of Liaoning, and promoting the revitalization of old industrial base.

The NSFC-Liaoning Joint Fund is open to all Chinese researchers. It is an integral part of the National Natural Science Fund. NSFC is responsible for the application, evaluation and management of the joint fund in accordance with NSFC's Rules on Joint Fund Management.In 2016, the NSFC-Liaoning Joint Fund calls for proposals of "Key Program Project" in 4 priority research areas. Average funding (direct costs) for each project will be 2.5 million yuan for 4 years. Qualified researchers all over the country are welcomed to apply for this fund according to the research scope and requirements listed in the Guide.

I. High-end equipment manufacturing

1. Theories and methods of high-end equipment design

Proposals are expected to be oriented to the development needs of Liaoning's equipment manufacturing industry, focus on the design and performance improvements of products such as large-scale machinery and equipment, high-performance compressor, ultra high voltage converter transformer and etc., conduct researches on the theories and technologies of collaborative design, reliability-based design and dynamics analysis of mechanical and electrical equipment and support indigenous innovation of the equipment manufacturing industry of Liaoning.

Main research orientations:

(1) Theories and methods of multidisciplinary collaborative design for large and complex mechanical and electrical equipment;
(2) Dynamics analysis of key functional components of large high-speed rotating machinery in unsteady flows;
(3) Vibration failure mechanism and reliability-based design of large centrifugal compressor;
(4) Theories and key technologies of the design and manufacturing of ultra-high voltage converter transformer.

2. Theories and technologies of precise and efficient processing of high-performance components

Proposals are expected to be oriented to the demands of the revitalization and development of equipment manufacturing industry in Liaoning, aim at solving difficult problems in the high quality and efficiency processing of key components of high-end equipment in aviation, energy and petrochemical industries, focus on high quality and efficiency processing of difficult-to-cut materials and components, functional surfaces of components and etc., research on basic theories and key technologies, and improve high-end equipment manufacturing capability of Liaoning province.

Main research orientations:

(1) Basic research on theories and technologies of single crystal components processing technology;
(2) Mechanism and regulation techniques of surface hardening of aeronautical thin-walled workpiece by laser shock;
(3) Theories and technologies of ultra-low temperature processing of components made of difficult-to-process materials;
(4) Research on the structure-activity relationship, design and manufacturing techniques of bionic functional surface of important equipment.

3. Robot technology

Proposals are expected to be in line with the intelligent manufacturing strategy proposed by Made in China 2025 and oriented to the advantages and development needs of intelligent manufacturing industry of Liaoning, focus on basic theories and key technologies of visual

sensing techniques of a new generation of industrial robots, aerial and ground multi-robot cooperation and etc., and improve the robot and intelligent equipment industry of Liaoning.

Main research orientations:

(1) Theories and key technologies of visual sensing and control of industrial robots for human-robot cooperation;

(2) Theories and the system of aerial and ground multi-robot cooperation.

II. New materials

1. Clean separation and efficient recycling of rare and noble metal resources

Proposals are expected to focus on rare and noble metal resources that are needed urgently by industries of Liaoning, conduct researches on the basic theories and key technologies of clean extraction-separation and efficient recycling of rare and noble metal, and promote the eco-friendly development of relevant industries.

Main research orientations:

(1) Efficient separation and extraction of rare and noble metal from waste high-temperature alloy;

(2) Basic theories and technologies of bioleaching and clean extraction of low-grade, fine-grained and mixed nonferrous metal.

2. New technologies for the design and preparation of advanced structural materials

Proposals are expected to be oriented to the transformation and upgrading of equipment manufacturing industry of Liaoning, conduct basic researches on new technologies for the design and preparation of advanced structural materials, and improve greatly the performance of traditional-structure materials.

Main research orientations:

(1) Mechanism of the influence of nanostructure on the performance of engineering alloys;

(2) Design and preparation technology of alloys for laser additive manufacturing;

(3) Basic researches on clean smelting and fine-grain casting of high-quality aluminum-lithium alloy.

3. Basic biomedical materials

Proposals are expected to focus on biomedical materials to provide basis for the development of biomedical industry of Liaoning.

Main research orientations: regulation of molecular weight of medical Chitosan/Chitooligosaccharades and related physiochemical process

III. Fine chemical industry

1. Synthesis of fine chemicals

Main research orientations:

(1) Methods (process) of precision synthesis of chiral intermediates of important drugs;

(2) Methods of efficient and clean synthesis of fine chemicals and novel functional dye.

2. Chemical engineering of functional materials

Main research orientations:

(1) Scientific basis of membrane materials for high-performance flow battery;

(2) Scientific basis of process intensification and regulation bymicrochannel reactor.

IV. Medicine and pharmacology

1. Targeting effect evaluation and drug delivery system of drugs for breast cancer

Main research orientations:

(1) Targeted drug delivery system of drugs for breast cancer treatment with drug transporters as new targets;
(2) Targeted anti-tumor effect and immune mechanism of epitope of breast cancer associated antigen.

2. Drug metabolism and pharmacokinetics

Main research orientations: effective substances and pharmacokinetics of high-quality local medicinal materials of Liaoning

NSFC-Zhejiang Joint Fund for the Integration of Industrialization and Informatization

The NSFC-Zhejiang joint fund for the integration of industrialization and informatization is jointly established by NSFC and the Zhejiang Provincial Government for the period from 2015 to 2019. It aims at attracting and gathering talented scientists across the country, solving major scientific problems and key technological problems related to the integration of industrialization and informatization in the social, economic and scientific & technological development in Zhejiang National Demonstration Zone of Integration of industrialization and informatization and neighboring regions, and promoting the scientific and technological development and the building of talent teams in the region.

The joint fund is open to all Chinese researchers. It is an integral part of the National Natural Science Fund. NSFC is responsible for the application, evaluation and management of the joint fund in accordance with NSFC's Rules on Joint Fund Management.

In 2016, the NSFC-Zhejiang Joint Fund for the Integration of Industrialization and Informatization calls for proposals of "Key Program Project" in 5 priority research areas. Average funding (direct costs) for each project will be 2.1 million yuan for 4 years. Qualified researchers all over the country are welcomed to apply for this fund according to the research scope and requirements listed in the Guide.

I. High-end industrial automation

Proposals are expected to be oriented to needs of the integration of industrialization and informatization in areas such as medical and pharmaceutical industry, chemical engineering, papermaking, textile, equipment manufacturing and etc., focus on "saving manpower by using machines" and "intelligent factory", give emphasis to basic theories and key technologies of advanced industrial automation, improve the application of automatic, intelligent and network-based systems in enterprises, and facilitate the transition from "made in Zhejiang" to "created in Zhejiang"

Main research orientations:

(1) Precise modeling and quality optimization in the production process of advanced polymer materials;
(2) Methods and key technologies of skill learning and perception based on intelligent programming of industrial robot;
(3) Methods and key technologies of real-time optimization in industrial equipment based on independent platform;
(4) Basic theories and key technologies of motion control system based on real-time industrial Ethernet;
(5) Methods and key technologies of intelligent optimization and control of emission from combustion;
(6) Theories and key technologies of sensing in real-time control of micro-nano

manufacturing process.

II. Industrial cyber-physical system

For the reason that Zhejiang has numerous small and medium enterprises and industrial data is dispersed and characterized by heterogeneity, uncertainty, correlative coupling and complexity in spatial and temporal distribution, proposals are expected to be oriented to the needs of industrial transformation and upgrading and acceleration of industrialization-informatization integration in Zhejiang, conduct researches on basic theories and key technologies of industrial cyber-physical system, and comprehensively improve the intelligent level of industrial production of Zhejiang.

Main research orientations:

(1) Application basis and key technologies of the integration of quantum communication protocol and classic communication protocol;
(2) Active defense mechanism and technologies of dynamic networks;
(3) High-resolution, high-sensitivity, quick responding fluorescent sensor for the Internet of Things;
(4) Core technologies of STT-MRAM non-volatile memory chip;
(5) Theories and key technologies of reliable and safe chip for solid-state memory controller;
(6) High-end industry-oriented control equipment and system.

III. Intelligent manufacturing

Proposals are expected to be oriented to the needs of transformation and development of manufacturing industry in Zhejiang, focus on a broad range of industries such as equipment manufacturing, light industry, textile, chemical engineering, medical industry, electric power, building materials, metallurgy, automobile, shipbuilding, logistics and etc., develop high and new technologies, take the integration of industrialization and informatization as the means, give emphasis to key theories and technologies of intelligent manufacturing such as network-based collaborative design, manufacturing and service, intelligent industrial robot, intelligent equipment, intelligent basic components and etc., and push forward the upgrading of equipment manufacturing industry in Zhejiang by promoting digitized, network-based and intelligent production process, components and equipment products.

Main research orientations:

(1) Basic theories and key technologies of network-based individualized textile customization;
(2) Kinematics, dynamics and control of macro/micro operation robots for precision manufacturing;
(3) 3D printing in biomedical applications;
(4) Precision laser processing of complex components/curved surfaces;
(5) Design and manufacturing of intelligent flow metering device.

IV. Smart city

Proposals are expected to be oriented to the major needs of the sustainable development of smart cities in Zhejiang, take typical cities of Zhejiang as the research objects, aim at improving the management and decision-making capability of these cities by information technology, focus on basic theories and key technologies of smart city for which major breakthroughs are urgently needed, improve the use of ICT in city management in Zhejiang, set up smart city management and service networks based on big data, cloud computing and the Internet of Things, and provide technological support to the application of ICT in city

management and various industries.

Main research orientations:

(1) Theories and key technologies of intelligent multi-mode integrated circuits for emerging network systems of smart city;
(2) Modeling and visualization of multi-source and heterogeneous data in city management;
(3) Basic theories and semantic integration technologies of big data analysis in smart healthcare;
(4) Calculation and analysis methods of visual mobile e-commerce experience.

V. Intelligent ocean

Intelligent ocean is an important strategy for Zhejiang to perceive the ocean, utilize marine resources and protect the ocean. Proposals are expected to be oriented to the needs emerged from the development of National Marine Economy Demonstration Zone of Zhejiang province, focus on themes such as application of remote sensing in marine industries, intelligent marine monitoring technology, pre-warning and forecasting of marine environmental disasters, new theories and methods of on-site and remote sensing technology for sea surface and underwater targets in the ocean-land integrated monitoring of marine environment security and etc., promote the application of digital technology in marine environment detection and socialization of marine information service, facilitate the development of marine information industry and provide theoretical and methodological support to the development of marine economy.

Main research orientations:

(1) Offshore environment and environmental disasters;
(2) New mechanism and technology of real-time security detection system for offshore environment;
(3) Application methods and key technologies of satellite remote sensing in offshore fishing industry.

NSFC-Shanxi Joint Fund for Coal-based Low-Carbon Technology

The NSFC-Shanxi Joint Fund for Coal-based Low-carbon Technology is jointly established by NSFC and the Shanxi Provincial Government for the period from 2015 to 2019. It aims at attracting and gathering talented scientists across the country, solving major scientific problems and key technological problems of coal-based low-carbon energy in Shanxi, and promoting S&T development and team building in the region.

The joint fund is open to all Chinese researchers. It is an integral part of the National Natural Science Fund. NSFC is responsible for the application, evaluation and management of the joint fund in accordance with NSFC's Rules on Joint Fund Management.

In 2016, the NSFC-Shanxi Joint Fund for Coal-based Low-carbon Technology calls for proposals of "Key Program Project" and "Fostering Program Project" in 4 priority research areas. For the "Key Program Project", the average funding (direct costs) for each project will be 2.9 million yuan for 4 years. For the "Fostering Program Project", the average funding (direct costs) for each project will be 670,000 yuan for 3 years. Qualified researchers all over the country are welcomed to apply for this fund according to the research scope and requirements listed in the Guide.

I. Coal chemical industry

1. Key program project

(1) Basic researches on coal coking process and high value-added utilization of coking products;
(2) Chemical basis of direct conversion of coal into light hydrocarbon and fuel oil;
(3) Key basic scientific issues in enhanced wastewater treatment and recycling in coal chemical industry.

2. Fostering program project

Priorities include composition and structure, activation and transformation mechanism and new high-efficiency utilization technology of coal conversion solid wastes (include coal gangue); composition, structure, catalytic and thermal conversion mechanism of coal tar and coal pitch and high value-added utilization of coal tar; catalyst and chemical reaction engineering basis of directional conversion of syngas.

II. Coal machinery

1. Key program project

(1) Forecasting of performance degradation, mechanical failure and endurance of key components of coal machinery;
(2) Basic researches on intelligent sensing and control for single machine or multi-machine collaboration;
(3) Basic researches on intelligent monitoring, diagnosis and control of high-speed, long-distance and large-capacity belt conveyor.

2. Fostering program project

Proposals are expected to be oriented to the demand of safe, highly efficient, environmental friendly and intelligent mining, focus on key equipment and production process such as mining, excavating, transportation and hoisting, conduct basic researches on the mechanical properties of the coal cutting and fragmentation process and optimization of working mechanism, dynamic characteristics of equipment, new composite transmission, collaborative analysis and design, intelligent monitoring and control, green manufacturing and energy-saving operation, dust suppression and etc., and provide theoretical basis to the improvement of energy efficiency, reliability, endurance and intelligent level of coal machinery.

III. New materials

1. Key program project

(1) Structural design, controllable preparation and functionalization of advanced coal-based carbon materials;
(2) Design, preparation and formation of low-cost high-performance magnesium alloy;
(3) Preparation and processing of stainless steel materials for ultra-supercritical power plants and microstructure evolution and mechanical properties of stainless steel materials under working conditions.

2. Fostering program project

Priorities include preparation of controllable functional carbon materials for high-efficiency CO_2 capture and storage by using elements from coal by fractional extraction; preparation and processing of special new metal material for low-temperature service in the transportation and storage of liquid natural gas; and basic researches on the design and preparation, structure and properties, forming and processing, toughening mechanism and service performance of advanced magnesium-based materials for the production of low-cost and high value-added magnesium products.

IV. Coal power and new energy

1. Key program project

(1) Basic researches on pollutant removal mechanism, pollutant migration and transformation mechanism, and high-efficiency low-cost control of pollutants for ultra-low emission of coal-fired power plants

(2) Engineering basis of high-efficiency clean combustion of low calorific value coal and pollutant control

(3) Basic theories and key technologies of safe operation of smart power distribution systems in coal mines

2. Fostering program project

Priorities include basic researches on precise identification and control of gaseous pollutants, thermal convertion and utilization of ash in the power generation process of low calorific value coal; applied basic researches on high-efficiency conversion and utilization of low-concentration coalbed methane for power generation and electrochemical energy conversion; basic researches on peak load regulation of coal-fired power units and high-efficiency low-cost operation of large ultra-supercritical air-cooled coal-fired power plants; mechanism and technical basis of CO_2 convertion and utilization through artificial photosynthesis to reduce CO_2 emission; research on new energy storage devices, wind power and energy storage, coordinated control of solar power generators for the integration of large scale new energy with the grid.

Tianyuan Fund for Mathematics

Tianyuan Fund for Mathematics is a special fund to integrate collective wisdom of mathematicians, explore funding method that suits the unique features of mathematics, and make China a strong country in mathematics. This fund supports researchers to conduct research according to the features and need of mathematics, foster young talents, promote academic exchange, optimize research environment, spread mathematical culture and thus strengthen creativity of China in mathematics. The fund mainly provides the following 6 types of funding in the year 2016.

1. Tianyuan Youth Grants

The main objective of the Tianyuan Youth Grants is to encourage young people to devote to mathematical research and applications, and foster more mathematical talents. The qualifications for the applicants are as follows: the host institutions should be non-"985 Program" supported universities, and applicants should be under the age of 33 for males and 35 for females by January 1 of the year of application and hold PhD degrees for less than 3 years (please make sure to state the graduation time in the resume), and have not been PIs of NSFC's project (excluding international or regional cooperative projects). Post-doctors working at the post-doctor stations are not qualified to apply for this grant. The funding for Tianyuan Youth Grant project is 30,000 to 50,000 per project for 1 year.

2. Mathematical summer schools and training workshops for young teachers

The summer schools offer high quality core basic courses for mathematical postgraduate students and young teachers so as to consolidate their knowledge of mathematics. There are 3 types of summer schools in terms of theme, namely, basic mathematics, applied mathematics and statistics. One or two summer schools will be funded under each theme.

The training workshops are for young teachers in the western and northeastern regions of China for improve their capability in mathematical research and teaching. Training workshops will focus on two themes, one for teachers with mathematical major and the other for teachers with no mathematical backgrounds. Either of teachers training workshops may be organized in the west or the northeast, but the total number may not exceed two.

The training workshop is conducted in a contract-bonded way and the selection of host is decided by the Academic Steering Committee of the Tianyuan Fund in consultation with candidate institutions.

3. Special lectures on mathematics, high level workshops and important academic meetings

Special lectures are organized for postgraduate students focusing on one or

several related themes so as to introduce frontier topics in mathematical research. Lasting for about 3 weeks, lectures may include basic and special courses with a large scale of audience. Special lectures will be financially supported through free application or through contract. Application should provide teaching outline, teaching contents and name list of the lecturers. Each special lecture will funded with up to 200,000 yuan.

High level workshop programs mainly support research groups of high level and excellent middle aged and young mathematicians to sponsor workshops on clear topics and important international mathematical issues. The funding is up to 150,000 yuan per workshop.

Except for a few annual meetings of national academic societies, academic meetings will not be supported.

4. Publication of mathematical books and development of information resources in network environment

This funding mainly supports the import and introduction of excellent foreign monographs and text books of mathematics and mathematical information resources in network environment. The funding is provided by contract only and decided through consultation between the Academic Steering Committee of the Tianyuan Fund with relevant publishers or units in accordance with the needs of mathematical development.

5. Mathematical culture, mathematical knowledge dissemination and mathematical education programs

This category of funding provides support for the following 4 sub-types of activities.

(1) Publications: the publication of popular mathematical books, including domestic and translated foreign books, so as to raise the interest of primary and middle school students in learning mathematics and enhance the public understanding of mathematics. Applications should be proposed by book editors.

(2) Journals: the publication of national influential journal related mathematical culture, dissemination of mathematics, mathematical education and mathematical modeling, so as to improve journal's quality and impact on the public. Applications should proposed by journal editors.

(3) Activities of mathematical dissemination: the import national activities of mathematical dissemination by universities, research institutes, science associations and mathematical society above provincial level. Applications should be proposed by organizers.

(4) Website of mathematical dissemination: the websites that disseminate mathematics and mathematical culture to the public. Fund is provided through contract by invitation.

6. Seminar on problem driven by applied mathematical topics

This category of program aims at building a platform for mathematicians to encourage and promote them to cooperate closely with actual users to develop applied mathematical workshops which are closely related to other areas, so as

to find out hidden mathematical problems, identify and foster research focus and growth points, enhance capabilities of mathematicians to conduct applied mathematical research according to major national needs, and encourage mathematicians to tackle national tasks.

The funding is given by contract for one year, which may be extended up to 4 years. The funding amount will be up to 200,000 yuan per year.

Timing and requirements: application for the Tianyuan Youth Grant is at the same time of application for the Young Scientists Fund program. Applications for other types of project may be submitted to the Department of Mathematical and Physical Sciences 3 months before the projects commence, but not later than December 31, 2016.

Special Fund for Research on National Major Research Instruments

The Special Fund for Research on National Major Research Instruments aims to encourage and foster the exploratory research and development of instruments with creative ideas, and major research instruments and equipment with original creative ideas, which should be based on frontier of science and national needs and guided by scientific targets, so as to provide new means and tools for scientific research and enhance indigenous innovation in China.

Projects funded by the Special Fund for Research on National Major Research Instruments comprise of departmental recommendation projects and free application projects.

Funding of the Special Fund for Research on National Major Research Instruments in 2015

Unit: 10,000 yuan

Category	Applications accepted	Awards	Funding for direct costs	Average funding per award for direct costs
Departmental recommendation	59	5	36,947.70	7,389.54
Free application	593	81	50,263.55	620.54

The funding period for projects of the Special Fund for Research on National Major Research Instruments is 5 years, and the number of collaborating institutions in one project should not exceed 5.

1. Funding scope

(1) Research and development on indigenous scientific instruments and equipment with originality and important roles for exploring research frontiers.

(2) Research and development on scientific instruments for discovering new phenomena, revealing new laws, verifying new principles and acquiring new data on the basis of breakthroughs in core technology and integrated innovation.

Besides, free application projects of the Special Fund for Research on National Major Research Instruments are also encouraged to target development of new scientific instruments with potentials of applications in broad areas.

2. Eligibility and requirements for application

(1) Eligibility: qualified applicants should meet the following criteria:

(i) Have the experience of conducting basic research;

(ii) Have senior professional position (title).

Post-doctors, postgraduate students, researchers without home institutions, and researchers whose home institutions have not been registered at NSFC are not eligible for application.

(2) Requirements:

(i) For free application projects in 2016, applicants may submit research proposals via their home institutions. The budget cap for direct costs is 10 million yuan per project.

(ii) For departmental recommendation projects in 2016, the following departments are entitled to recommending projects of the Special Fund for Research on National Major Research Instruments: Ministry of Education, Chinese Academy of Sciences, Ministry of Land and Resources, Ministry of Industry and Information Technology, Ministry of Environmental Protection, Ministry of Agriculture, National Health and Family Planning Commission, China Earthquake Administration, State Administration for Quality Supervision and Inspection and Quarantine, China Meteorological Administration, State Oceanic Administration, China Academy of Engineering Physics, PLA General Armament Department and PLA General Logistics Department. In 2016, the budget for direct costs of the departmental recommendation projects of the Special Fund for Research on National Major Research Instruments should be no more than 10 million yuan per project.

3. Notes on application

(1) Applicants are advised to read this Guide to Programs carefully and prepare research proposals in accordance with the Outline of Preparation of Applications of the Special Fund for Research on National Major Research Instruments. Please choose the “Special Fund for Research on National Major Research Instruments” from the funding categories, and choose “free application” or “departmental recommendation” under the subcategory of funding. Applicants are advised to clarify the details if they are carrying out projects which have some links with to the current application. Explanation of the similarities and differences in research contents between the ongoing project and the current application should be presented in the application.

(2) For applicants and participants with senior academic positions (titles), the number of applications plus ongoing projects of the Special Fund for Research on National Major Research Instruments as well as the Special Fund for Research on National Major Research Instruments administered by the Ministry of Science and Technology should not exceed 1 in total.

(3) Projects of the Special Fund for Research on National Major Research Instruments are funded by way of cost reimbursement, so applicants are advised to make their budget requests in an objective and practical manner according to the real costs of the development of instruments.

Appendix

Contact of NSFC Departments and Bureaus

Department		Tel
Department of Mathematical and Physical Sciences		
Division of General Affairs		62326910
Division of Mathematical Sciences		62327178
Division of Mechanics		62327179
Division of Astronomy		62327189
Division of Physical Sciences I		62327181
Division of Physical Sciences II		62327182
Department of Chemical Sciences		
Division of General Affairs		62326906
Division I	Inorganic Chemistry	62327170
	Analytical Chemistry	62327075
Division II	Organic Chemistry	62327169
Division III	Physical Chemistry	62327172
Division IV	Polymer Science	62327167
	Environmental Chemistry	62327173
Division V	Chemical Engineering	62327168
Department of Life Sciences		
Division of General Affairs		62329190
Division I	Microbiology	62329135
	Botany	62329135
Division II	Ecology	62327197
	Forestry	62329321
Division III	Biophysics, Biochemistry and Molecular Biology	62327213
	Biomechanics and Tissue Engineering	62327213
	Immunology	62329240
Division IV	Neurosciences	62329352
	Psychology	62329352
	Physiology and Integrative Biology	62329352
Division V	Genetics and Bioinformatics	62329117

Department		Tel
Division VIII	Animal Husbandry and Grassland Science	62327194
	Veterinary Science	62327194
	Fisheries	62327194
	Zoology	62326914
Department of Earth Sciences		
Division of General Affairs and Strategic Planning		62327157
Division I	Geographical Sciences	62327161
Division II	Geochemistry	62327158
	Geology	62327166
Division III	Geophysics and Space Physics	62327160
Division IV	Marine Sciences	62327165
Division V	Atmospheric Sciences	62327162
Department of Engineering and Materials Sciences		
Division of General Affairs		62326884 62326887
Division of Materials Science I	Metallic Materials	62328301
Division of Materials Science II	Inorganic Non-metallic Materials	62327144
	Organic Polymer Materials	62327138
Division of Engineering I	Metallurgy and Mining	62327136
Division of Engineering II	Mechanical Sciences	62327098
Division of Engineering III	Engineering Thermal Physics	62327135
Division of Engineering IV	Architectural Engineering	62327142
Division of Engineering V	Hydraulics	62327137
	Electrical Engineering	62327131
Department of Information Sciences		
Division of General Affairs and Strategic Planning		62327146
Division I	Electronics and Information Systems	62327147
Division II	Computer Sciences	62327141
Division III	Automation Sciences	62327149

Continued

Department		Tel	Department		Tel
Division V	Cell Biology	62329117	Division IV	Optical Information Devices	62327143
	Developmental Biology and Reproductive Biology	62329170	**Department Management Sciences**		
Division VI	Agricultural Infrastructure and Crop Sciences	62326918	Division of General Affairs		62326898
	Food Sciences	62326918	Division I	Management Science and Engineering	62327155
Division VII	Plant Protection	62327193	Division II	Business Management	62327152
	Horticulture and Plant Nutrition	62327193	Division III	Macro Administration and Policy	62327151
Department of Health Sciences			**Bureau of Planning**		
Division of General Affairs		62328991 62328941	Division of General Affairs		62326980
			Division of Programs		62327230
Division I	Breath, Blood	62327215			62325557
	Cycling	62328559	Division of Talent Fostering		62328623 62325562
Division II	Digestive, Urinary, Endocrine, Eye, ENT, Oral sciences	62329153	Division of Interdisciplinary Sciences		62327015
					62328484
Division III	Neurological, Psychiatric, Geriatric medicine	62327198	**Bureau of International Cooperation**		
Division IV	Reproductive, Perinatal, Neonatal, Medical Immunology	62326924	Division of Foreign Affairs Planning		62327001
Division V	Medical Imaging, Biomedical Engineering, Special medicine, Forensic Medicine	62329131	Division of Asian, African and International Organizations Affairs		62326998 62325449
Division VI	Medical Microbiology and Infectious Diseases, Movement Disorders, Trauma, Burns, Surgery, Severe Acute Medicine, Laboratory Medicine, Rehabilitation Medicine	62327195	Division of American and Australasian Affairs		62325377 62325540
			Division of European Affairs		62325309 62327014
Division VII	Oncology I	62327207	Office for Hong Kong, Macao, and Taiwan Affairs		62327005
			Center of Administrative Services		
	Oncology II	62329157	General Office		62327218
Division VIII	Skin, Preventive Medicine, Science Endemic, Occupational Medicine, Radiology	62327212	**NSFC Periodical Office**		
			General Office		62327204
Division IX	Pharmacology	62327199	**Sino-German Center for the Promotion of Science**		
Division X	Traditional Chinese Medicine, Integration of Traditional Chinese Medicine and Western Medicine, Chinese Materia Medica	62328552	Operator		82361200