National Natural Science Fund

Guide to Programs

Fiscal Year 2015

National Natural Science

Foundation of China

Brief introduction on this book

The Guide to Programs of the National Natural Science Fund 2015, 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 NSFC, and explains the definition of application quota and introduces the funding policies for various types of programs in 2015. 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.

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Foreword

The year of 2014 is the 4th year for the 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 (hereinafter abbreviated as NSFC) fully implemented the National Program for Medium and Long-Term Scientific and Technological Development (2006-2020), the 12th Five-Year Plan, and its strategy of "supporting basic research, encouraging free exploration and playing a guiding role", and adhered to its evaluation principle of "relying on experts, promoting democracy, funding excellent research, advocating fairness and justness" to nurture creative ideas and foster talents, further strengthen the 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 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 environment for basic research.

Most of the applications for the National Natural Science Fund are accepted during the batch application period every year. A total of 151,445 research proposals were received during that period in 2014, down by of 4.14% (6,541 applications) year-on-year over that of 2013. The applications for the General Program decreased by 17.95% (12,944 applications) over that of 2013. The applications for the Young Scientists Fund increased by 6.64% (4,046 applications) over that of 2013, higher than of 1.98% in the increase 2012, and its total volume of application exceeds that of the General Program, ranking the highest of all programs. Applications for the Fund for Less Developed Regions continued to increase. In 2014, the number of application increased by 10.07% (1192 applications) from the corresponding period in 2013. The increase from 2012 to 2013 was 5.15%. The applications for the Key Program have been steady in the past years, while in 2014, it had a major increase of 15.15% (398 applications). For the first time, the application for Science Fund for Creative Research Groups switched from ministry recommendation to free application, with a total submission of 262 applications. In addition, there was moderate increase in application of the Excellent Young Scientists Fund and International (Regional) Cooperation and Exchange Programs and Programs of Joint Funds. The applications of National Science Fund for Distinguished Young Scholars remained stable. After the Special Fund for Basic Research on Scientific Instruments was incorporated into the Special Fund for Research on National Major Research Instruments and Facilities, the number of applications is less than the total sum of these 2 programs last year.

After preliminary evaluation, 4,175 applications were declined, accounting for 2.8% of the total applications received, the same as that of 2013. A total of 586 appeals for re-evaluation were received before the deadline for appeal, and 427 of them were accepted and the other 159 appeals were rejected because of the lack of required documents or other reasons. After serious checking and verification, the previous decisions of rejection, both well-founded and justified in nature, were maintained for 404 appeals, and the other 23 appeals were approved in that the previous decisions of rejection were wrongly made, accounting for 0.55% of all the declined.

After compulsory review procedures, in 2014, 15,000 projects in the General Program were approved, 605 projects in the Key Program, 23 projects in the Major Program, 453 projects in the Major Research Plan Program, 105 projects in the Major International (Regional) Joint Research Program, 198 projects in the National Science Fund for Distinguished Young Scholars, 400 projects in the Excellent Young Scientists Fund, 16,421 projects in the Young Scientists Fund, 2,751 projects in the Fund for Less Developed Regions, 38 projects in the Science Fund for Creative Research Groups, 143 projects in the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao, 64 projects in the National Science Fund for Talent Training in Basic Research, in the Research Environment Program, 64 projects in the Special Fund for Basic Research (free application) and 7 projects in the Special Fund for Basic Research (ministry recommendation), 574 projects for Joint Funds, 107 projects in the Research Fund for International Young Scientists. 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:* 2015 (hereinafter abbreviated as the *Guide to Program*s) is published to all applicants for the selection 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 Program*s introduces various types of programs, of which applications will be accepted during the batch application period in 2015. Notes on application and regulations on the limits of applications are introduced in details. 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 on NSFC's website (http://www.nsfc.gov.cn). Applicants are advised to pay due attention to the update 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: 2015*

November 22nd, 2014

Information for Applicants

In applying for the NSFC funds in 2015, applicants and their host institutions should comply with the following provisions:

I. Eligibility for Applicant

1. As the principle investigator, the applicant should comply with Article 10 Item 1 of The National Natural Science Foundation Regulations (hereinafter 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.

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, is able 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 of the proposal and research experiences in CV, together with the agreement signed with the supporting institution in the hard copy of application form.

3. Students pursuing the postgraduate degree (degree not obtained by the deadline of NSFC program submission) can not 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 can not apply for NSFC programs. Those who are employed at the supporting institutions can not apply for or participate in NSFC programs as both roles of international or regional collaborator and domestic researcher at the same time. If the researcher has on-going projects of the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao, or the International (Regional) Joint Research 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 can not apply for the Overseas Chinese Scholars and Scholars in Hong Kong and Macao Program or participate in the International (Regional) Joint Research project 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 can not 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 can not apply for any NSFC funds.

II. About Proposal

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

2. The proposal shall be prepared by the applicant in person and in accordance with the outline. Caution 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 require "choosing" can only be chosen in the pull-down menu; content that require "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, except for Key Programs and Joint Funds which should be strictly according to this *Guide*).
   (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 are designated.

(3) Application codes with the initial letter “L” shall only be used for applying NSFC-Guangdong Joint Funds, NSFC-Yunnan Joint Funds, NSFC-Xinjiang Joint Funds, Joint Fund for S&T Cooperation across the Taiwan Straits, and NSFC-General Technology Basic Research Funds, etc. Codes “A06”, “A03” and “A08” are only used for NSAF Joint Funds, Joint Fund of Astronomy and Joint Fund for Research on Major Science Facilities.

(4) In 2015, the trial for the standardization of “application code”, “research direction” and “key word” starts. Applicants should accurately select “application code1” and the corresponding “research direction” and “key word” when filling out the application form.

(5) 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 employers 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 employers should not be seen as collaborative research institutes. If the researcher is unable to sign in person, a paper document with his or her signature and willingness 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 exceed two.

6. In the personal resume of the proposal, the applicant and the major

participants with a senior academic rank (title) shall indicate in the CV if:

(1) They have more than one supporting institute when applying or participating in NSFC projects in the same year.

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

7. If the research proposed in the application has received funding through other resources, the applicant should specify the funding details and their difference and connection with the current proposal. Avoid applying for funding from different funding agencies for the same research content.

8. As for the research period, the start time shall be Jan. 2016 and the finish time shall be Dec. 201x, depending on the funding periods (unless otherwise specified). Researchers at postdoctoral research centers should fill out the closing date according to the written guarantee of the supporting institute.

9. Since 2015, all proposals are completed on-line. Special requirements: applicants and major participants should use the same identification for application. If they have received funds with 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. Since 2015, all program costs consist of direct and indirect cost. Among these, direct expenditure includes equipment, materials and supplies, test/calculation/analysis, power consumption, travel, conference, international cooperation, labor cost, consulting and miscellaneous. Indirect costs refers to the relevant costs that cannot be listed in the direct costs during the implementation of the project, which mainly includes utilization of the existing equipment that the supporting institution provides and consumption of the housing, water, electricity, gas, heating, and management fees and performance. The funding listed

in this Guide refers to the sum of direct and indirect costs. The applicant only fills in the direct cost while the indirect cost and the total will be automatically calculated.

III. About the Supporting Institution's Responsibilities

1. The supporting institutions should strictly abide by *the Regulations, the Guide to Program, the Management Regulations* and other relevant notices and management procedures about application reception and relevant program management.

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 unit 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 and attach the written contract to the paper form proposal.

4. The supporting institute 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. 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.

V. Suspension after Two Unsuccessful Applications for General Program

The unsuccessful applicant for 2013 and 2014 General Program consecutively (including rejection at the eligibility check) will be suspended from applying for the 2015 General Program.

VI. Special Notice

To prevent academic misconduct and repeated funding, NSFC uses computers for proposal comparison. Applicants shall not:

1. Use the identical or similar proposal to apply for different programs from the same or different science departments.
2. Use the identical or similar proposal to apply from different supporting institutions the applicant is employed at more than one supporting institutions.
3. Use the identical or similar proposal to apply by different applicants.
4. Use the granted project content to apply for repeated funding from the same or different science departments.

If the above condition is verified, treatments shall be in accordance with the circumstances. Those with academic misconduct shall be handled by the NSFC Supervisory Committee.

Limit on the Number of Applications

1. Application Limit in General

(1) Applicants shall only apply for one type of program once in a year.

(2) Applicants can not 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. 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 the 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, National Science Fund for Distinguished Young Scholars (no limit during application), International (Regional) Cooperation and Exchanges, 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 should not exceed 1. After the National R&D Program for Major Research Instruments (recommended by the department) is funded, the principle investigator can not apply for any other NSFC funds other than the National Science Fund for Distinguished Young Scholars before the program terminates.

3. The applicant is allowed to receive fund only once for the following programs

Young Scientists Fund, Excellent Young Scientists Fund, National Science Fund for Distinguished Young Scientists, Science Fund for Creative Research Groups

4. 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.

5. The programs not limited by the total number Limit

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) Exchange Program (not restricted by Rule 1), Assigned and soft projects, projects lasts 1 year or less, and other programs notified 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 any inconsistency between other management methods and this Limit in terms of total project numbers, the latter shall prevail.

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General Program

General Program is the main research program category in the National Natural Science Fund. It supports scientists doing basic research on free selected 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) Experience of undertaking basic research projects or other types of basic research project(s).

(2) Senior professional title or a Ph.D. degree, or recommended by two peers holding senior professional titles.

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, and capable of leading a research group to conduct research. Home institutions should have necessary experimental research infrastructure. Applicants should follow the guideline to prepare proposals. The proposed research should be of significance, and have research merits, and good theoretical basis, new academic ideas, clear research objectives, specific research contents and feasible research schemes. The number of collaborative institutions for General Program projects should not exceed two, and the duration of General Program projects is 4 years in general.

In 2014, NSFC funded 15,000 General Program projects with total funding of 11.93487 billion yuan and average funding of 795,700 yuan per project, which is 54,700 yuan more than that in 2013. The average funding rate was 25.35%, about 3% higher than previous year (please see table below for detail). In 2015, NSFC will maintain the funding scale and average funding for the General Program. NSFC will focus on funding innovative proposals, and give researchers strong support on free explorations in broader disciplinary areas. Applicants are advised to put forward their budget according to actual needs and take account of the funding intensity described in relevant departments of NSFC.

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

Funding of the General Program Projects in 2014

Unit: 10,000 yuan

Departments	Applications	Approved				Success rate (%)
		Projects	Funding	Average funding per project	Percentage of the total (%)	
Mathematical and Physical Sciences	4,288	1,375	114,350	83.16	9.58	32.07
Chemical Sciences	4,996	1,400	118,730	84.81	9.95	28.02
Life Sciences	8,699	2,313	189,910	82.11	15.91	26.59
Earth Sciences	4,386	1,405	128,070	91.15	10.73	32.03
Engineering and Materials Sciences	10,630	2,475	205,427	83.00	17.21	23.28
Information Sciences	6,747	1,572	127,230	80.94	10.66	23.30
Management Sciences	3,227	660	39,610	60.02	3.32	20.45
Health Sciences	16,197	3,800	270,160	71.09	22.64	23.46
Total	59,170	15,000	1,193,487	79.57	100	25.35

Department of Mathematical and Physical Sciences

With focus on the structures of matter and the laws of its motion, mathematical and physical sciences are important foundations of natural science, and the precursor and basis for the development of contemporary science. Besides 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 interdisciplinaries 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 on basic research that takes as its primary goals advancing the disciplinary development, promoting original innovation and training talented researchers and meeting the needs of national long-term development, as well as interdisciplinary research within the Department and with other departments.

According to the NSFC's strategic policy of "supporting basic research, adhering to free exploration and playing guiding role", and 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 2015, the Department will continue to pay attention to the following aspects:

(1) Emphasize on fostering outstanding young talents. In 2014, the principal investigators under the age of 40 in General Program projects reached 52.44%. In 2015, 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 or 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 2015, 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 technology 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 change 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 the Last Two Years

Unit: 10,000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Mathematics	Basic mathematics	199	11,233	31.78	170	10,887	34.76
	Applied and computational mathematics	187	10,621	28.25	175	11,438	31.93
Mechanics	Basic problems and methods in mechanics	6	492	30.00	4	327	28.57
	Dynamics and control	61	5,014	30.05	58	4,945	30.69
	Solid mechanics	150	12,715	29.70	128	11,551	31.45
	Fluid mechanics	89	7,334	29.87	77	6,773	31.43
	Bio-mechanics	27	2,294	29.35	19	1,697	30.65
	Explosive and impact dynamics	33	2,697	27.97	30	2,723	31.25

Divisions		2013			2014		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Astronomy	Astrophysics	44	3 827	36.07	41	3 734	33.33
	Astrometry and celestial mechanics	31	2 643	24.80	35	3 174	33.33
Physics I	Condensed matter physics	197	16 483	29.32	194	17 407	31.80
	Atomic and molecular physics	36	2 882	30.00	38	3 325	31.93
	Optics	109	9 214	29.54	97	8 798	31.70
	Acoustics	37	3 110	29.60	36	3 222	32.43
Physics II	Fundamental physics and particle physics	73	5 471	30.29	65	5 409	31.10
	Nuclear physics, nuclear technology and its applications	78	6 736	28.89	92	8 325	33.09
	Particle physics and nuclear physics experimental facilities	82	7 406	32.03	68	6 373	31.05
	Plasma physics	46	3 958	29.87	48	4 242	32.43
Total		1 485	114 130	29.75	1375	114 350	32.07
Average funding per project		76.86			83.16		

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 2015, the average funding will be 650,000 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, 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, bio-information 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 2015, 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 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 of 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
Description and representation, 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), applicants are advised to stress on 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

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 2015, the average funding will reach 900,000 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 and fluid, 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 research 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 and failure mechanism; the mechanical behavior of new materials and structures; experimental measurement techniques and representation methods, high performance computational methods; structural optimization, endurance analysis and safety evaluations, and the deformation, damage mechanism of rock and soil materials and stability control 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 concept, 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 strengthen studies on fluid mechanical issues in energy, transportation, environment and other high-tech and advanced technological areas.

Applications in biomechanics should pay attention to mechanical problems related to human health and medical sciences, 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 closely focus on the safety issues of relevant engineering projects, pay attention to frontier areas and major national needs, 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 research 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 2015, in addition to strengthening continuous support for projects integrating theory and observation and projects conducted by young scientists, emphasis will be given on 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 2015, the average funding will be 950,000 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 have 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, encourages researches in new computational methods and simulation software closely related to experimental physics and explorative types, physical problems in new energy field, key basic physical issues serving national needs, and new physical concepts and methods in interdisciplinary areas. It is noted that NSFC encourages in-depth studies on less-booming but important physical problems, and researches in new areas and directions. In 2015, the average funding level will be 900,000 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, structural and physical properties of surface, interface and membrane, physical properties of nano systems, physics in advanced technologies and methods of device and nano structure characteristics, and physical issues in the structure, performance, preparation and application of advanced functional materials. Encouraged areas include basic physical issues in soft matters, physical issues and experimental methods related to life science, and interdisciplinary issues related to condensed matter physics.

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 application, complex interactions of atomic and molecular systems, interactions between laser and atoms or molecular, physical issues in ultrafast and extremely strong light conditions, propagation process of light in new media and its characteristics, quantum frequency markers, 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 and nano photonics and surface plasma exciter. The basic research on the generation, transmission, display and application of 3-D

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, studies on key fundamental acoustic problems generated from the major needs of social development, 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 2015, the average funding will be 900,000 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 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 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, 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 all over China 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, and, 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.

The Divission will continue to support innovative development and improvement of instrument, advanced experimental techniques and methods, advanced method and key technology 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 a core discipline 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 basic disciplines, and to solve scientific issues raised in the large-scaled production of chemical materials and products.

The mission of the Department is to facilitate the development of chemistry and chemical engineering, strengthen the capability of original innovation in basic research for promoting the role of chemistry as core science in multidisciplinary research, improve the overall quality and international status of chemical science in China, and foster creative talents and groups with international reputation. The Department supports researches on the multi-patterns and variety of molecules at different levels and the control of chemical reactions and processes, and enhances the multi-level and multi-scale research 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 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.

In 2014, a total number of 4,996 proposals (12.46% less than that of 2013) for General Program from 607 research institutions were received by the Department. 1,400 proposals were funded with the success rate of 28.02% and the average funding intensity of 848,100 yuan per project.

In 2015, 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 2015, the funding for the General Program will be between 0.7 and 1.1 million yuan per project, and the average funding intensity per project will be at the same level as that of 2014.

Funding for General Program Projects in the Last Two Years

Unit: 10,000 yuan

Division		2013			2014		
		Projects	Funding	Funding rate（%）	Projects	Funding	Funding rate（%）
Division I	Inorganic chemistry	184	14,725	26.78	164	13,909	28.87
	Analytical chemistry	156	12,485	26.90	154	13,058	28.89
Division Ⅱ	Organic chemistry	268	21,445	26.75	252	21,374	28.77
Division Ⅲ	Physical chemistry	281	22,485	27.18	261	22,137	29.03
Division Ⅳ	Polymers	137	10,965	27.68	130	11,020	29.48
	Environmental chemistry	172	13,765	25.94	167	14,162	28.50
Division V	Chemical Engineering	285	22,800	22.87	272	23,070	24.89
Total		1,483	118,670	25.99	1,400	118,730	28.02
Average funding per project		80.02			84.81		

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.

In the study of synthesis and preparation，inorganic chemistry is aimed to

develop new synthetic methods and approaches, reveal reaction mechanisms and rules, carry out function-oriented research on the synthesis, structure and property of new compounds by using of the concept of molecular engineering, strengthen studies on the functional assembly and composition of inorganic materials and relations between structure and property of functional inorganic matters as well as new materials, and enhance studies on devices and properties of inorganic compounds and materials by using of the basic theory and characterizing techniques of physical sciences. The chemical basis 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. On the one hand, more and more scientists have paid attention to the creativity of research theme and made outstanding achievements in some areas. On the other hand, more applicants have emphasized their studies on the synthesis and assembly methods of inorganic materials, 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. The applications for Young Scientists Fund should attach importance to the innovation of academic idea and the independence of research work. The exploratory studies combined with local characteristics will be encouraged by the Division for the Fund for Less Developed Regions.

In 2015, applicants should focus their researches 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, bio-inorganic

chemistry and radiochemistry will be encouraged. Those function-oriented design ideas, systematic 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 time and space. It covers wide fields including many sub-disciplines such as spectrographic analysis, electrochemical analysis, chromatographic analysis, mass spectra analysis, NMR analysis, stoichiometry, surface and interface analysis; or 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 micro-/nano-analysis, analytical chemistry of chips, omics-analysis, imaging analysis, *in vivo* analysis, on-line real-time analysis, chemo-informatics and bio-informatics, 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 specially 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 & processing were more emphasized; (v) Research is not limited to the instrument analysis based on the tradition and simple principle, new principles and knowledge from nano-science and micro-fluidic 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, 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 & environment, new-type of energy, exploration of aviation/space and so on; (vii) To bring more important role of analytical chemistry into full play in the national security, national needs and economic development.

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. New theories, methods and reactions in organic chemistry have promoted not only the development of chemical science, but also the penetration and intercrossing with life science, materials science, energy, information, agricultural and environmental science in a greater extent, which has further pushed forward the progress of organic chemistry and produced many new growing points of discipline. The features of current research in organic chemistry are incarnated as follows: The concept of organic molecular design & preparation, recognition and self-assembly is promoting the development of many scientific fields. Selective reaction (catalytic asymmetric synthesis in particular) as well as activation and conversion of inert chemical bonds have become hot-point issues in the area of organic chemistry. Green chemistry, as an important strategic frontier of organic chemistry, is playing an important role in optimizing utilization of resources and resolving environmental pollution problems. The intercrossing between organic chemistry and life science has provided new research methods and means for studying and recognizing complex phenomena and processes in life

systems. The intercrossing between organic chemistry and materials science has promoted the discovery, manufacture and utilization of new functional organic matters. At the same time, the theoretical breakthrough and application of new technologies in physical sciences are fundamentally promoting the development of organic chemistry.

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 organometallic chemistry, asymmetrical catalysis, organic synthesis methodology, elemento-organic chemistry and natural product chemistry have been among the most advanced ones internationally. The Division will continually support those projects with original innovation guided by scientific problem in these prevailing areas, which are encouraged to pay their attention to fundamental issues and method in organic chemistry for promoting the discover of new reaction, new agent and mechanism, and the development of high-efficient, green and sustainable synthesis chemistry. Meanwhile the Division will give further emphasize on basic researches as follows: (i) in the areas of physical organic and organic analytical chemistry, the development of new theory, new method and new idea, and the application of new technologies; (ii) in the area of super-molecular chemistry, the design of new synthesis acceptor and tectonic unit, new molecular recognition mechanism, method and theory of self-assembly and function of assembly bodies; (iii) in the area of natural organic chemistry, the discovery, synthesis and reformation of natural products with unique structure and important bio-activity found in China for strengthening the intercross with life and medical sciences; (iv) in the area of medicine and pesticide, the drug design based on molecular target, new precursory compound, seeking new target and relation between structure and activity; (v) in the area of organic functional materials, the study of molecular design, high-efficient synthesis, molecular assembly and innate physicochemical properties with novel structure and property.

Chemical Biology

Chemical biology is a science to accurately modify, manipulate and explain biological systems at the molecular level by means of exogenous chemical substance, method and route. As a new intercrossing discipline, 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 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. Study focuses are: (i) to develop diversified catalytic and non-catalytic reaction with bio-compatibility, as well as its reactive mechanism, rule and application in living system; (ii) to achieve explore and regulation of living action with real-time, in-situ and quantity by using design and synthesis of molecular probe; (iii) to exploit new method and technology for the synthesis of biological macromolecules, such as protein, nucleic acid, polysaccharide etc., and biological micromolecules, such as lipid compounds, coenzyme factor, living nature products etc.; (iv) to detect the biological process in cell by interference of small organic molecules, thereby to appraise the bio-macromolecules attending in the bio-process for revealing interactive rule between bio-macromolecules and finding active route, medicinal target and precursive compound; (v) to synthesize target molecule or completely special chemical reaction by using bio-system (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, to carry out chemical assembly and simulation of complex living system, to exploit new technique for disease diagnosis and to solve chemical biological issues in medicine.

The study of chemical biology in China has excellent basis, and has been initiated synchronously with the international works. Under the supports of Major Research Plan program “Research on signal trans-conduction process based on small chemical molecular probe” etc., the number of research teams working in the area of chemical biology is continuously increasing and some important results have been achieved. But some problems such as lacking depth of intercross and inter-permeation between chemistry and biology are existed. The Division will encourage those intercrossing projects with core content as chemical material, reaction and technology, emphasize the themes on (i) synthesis of chemical molecular probe and utilization in living process; (ii) new method and new technique of analytical detection for important substance and process in living system; (iii) study of molecular mechanism in key biological events, in order to strengthen basic research of solving biological events using chemical means for promoting intercross and cooperation between chemistry and biology.

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 sub-disciplines 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 & interface chemistry focused 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, must 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 the applicants 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, biomacromolecules and superamolecular polymers.

In the field of polymer chemistry, it needs to develop the synthesizing methodologies of polymers, to explore the novel catalysts or initiators for polymerizations expired by new ideas from other disciplines, to develop the reaction with mild, high efficiency and high selectivity. Emphasis will be put on the polymerizing reaction with controllable structure and molecular weight as well as its distribution, the bio-synthesizing methodologies and the chemical reaction involving polymers. Attention should also be paid the polymers synthesized by non-oil resource, and polymers with new structure, such as superamolecular polymers, hyper-branched polymers or dendrimer.

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 to pay attention to 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.

In the field of functional polymers, it should be addressed to develop and add knowledge in 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 emphasizing the polymers related to energy technology. To finding novel issues from studies of natural polymers & 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.

For applied science of polymers, it needs to further 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 derived from polymer industries, pay attention to the research on high performance polymer, polymer composites, chemical fibers, polymeric elastomers, flame retardant polymer, natural polymer, hybrid polymer & reactive oligomer as precursor of thin films, composites and coatings.

It should be noted that, in recent years, few proposals have been received in methodologies of polymerization and structural characterization, and also, few proposals have been received for the Fund for Less Developed Regions.

Environmental Chemistry

Environmental chemistry contains the following branches: environmental analytical chemistry, environmental pollution chemistry, pollution-controlled chemistry, pollution ecological chemistry, environmental theoretical chemistry, regional environmental 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 & transformation, effects & 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 & simulation, and enhanced the creativity and systematization. But there are certain problems in some proposals, e.g. lack of new idea when selecting theme; less focusing on fundamental scientific issues; without giving 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; (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 fundamental scientific issues of environment chemistry in areas of occurrence, behavior, effects and control of pollutants, in consideration of real environment condition and combing with modern scientific means and methods.

Division V of Chemistry

Funding areas by the Division cover two disciplines of 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 aiming 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 teams have been continuously strengthened, research quality has been constantly enhanced, and research ideas have also become more and more innovative and unceasingly opened up. The situation has been changed dramatically compared with that of ten years ago. Basic research on key scientific issues extracted 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; (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 research areas, especially in traditional chemical engineering areas, should keep up their defined study direction instead of blindly following hot subjects, and carry out their researches 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 for enhancing 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, it should be good at extracting the chemical engineering issues from the intercrossing study of multi-disciplines and emphasize 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, it should strengthen systematic basic research and accumulation for understanding the laws, improving 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 engineering related to metallurgy, chemical engineering related to environment and resources, as well as transfer processes in uncommon condition with creative idea.

Department of Life Sciences

The funding of the Department of Life Sciences covers a broad spectrum which includes biology, agricultural sciences and basic medicine. The funding scope of the Department 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 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 the Last Two Years

Unit:10,000 yuan

Scientific Divisions		2013			2014		
		Projects	Funding	Funding Rate (%) ++	Projects	Funding	Funding Rate (%) ++
Division I	Microbiology	152+11*	12,149+165*	24.85	143+7*	12,134+210*	25.64
	Botany	173+11*	13,832+165*	27.34	157+7*	13,296+210*	29.50
Division II	Ecology	154+11*	12,321+165*	23.74	143+6*	12,189+180*	30.53
	Forestry	152+12*	12,172+180*	22.50	143+7*	12,184+210*	26.79
Division III	Biophysics/Biochemistry/ Molecular Biology	135+10*	10,817+150*	27.99	124+4*	10,531+120*	30.99
	Immunology	76+8*	6,087+120*	30.55	61+5*	5,157+150*	34.38
	Biomechanics and tissue engineering	72+8*	5,798+120*	25.16	72+7*	6,129+210*	27.15

Scientific Divisions		2013			2014		
		Projects	Funding	Funding Rate (%) [++]	Projects	Funding	Funding Rate (%) [++]
Division IV	Neurosciences	64+8[*]	5,468+120[*]	29.39	68+3[*]	5,897+90[*]	29.60
	Psychology	53+2[*]	3,878+30[*]	25.82	46+3[*]	3,772+90[*]	26.90
	Physiology & Integrative Biology	72+8[*]	5,731+120[*]	31.25	67+5[*]	5,674+150[*]	30.00
Division V	Genetics and Bioinformatics	121+10[*]	9,701+150[*]	28.48	107+6[*]	9,073+180[*]	29.58
	Cell Biology	92+9[*]	7,367+135[*]	31.08	88+6[*]	7,490+180[*]	28.66
	Developmental Biology and Reproductive Biology	72+8[*]	5,766+120[*]	29.96	64+5[*]	5,441+150[*]	29.49
Division VI	Agriculture and Crop sciences	183+13[*]	14,636+195[*]	21.44	169+7[*]	14,360+210[*]	24.72
	Food Science	155+13[*]	12,415+195[*]	18.90	150+7[*]	12,754+210[*]	21.22
Division VII	Plant Protection	117+10[*]	9,334+150[*]	22.88	109+6[*]	9,228+180[*]	26.14
	Horticulture and Plant Nutrition	127+11[*]	10,175+165[*]	21.66	116+6[*]	9,882+180[*]	26.29
Division VIII	Zoology	124+9[*]	9,917+135[*]	29.36	113+6[*]	9,612+180[*]	35.10
	Animal Husbandry and Grassland Science	104+10[*]	8,345+150[*]	20.88	96+6[*]	8,166+180[*]	23.39
	Veterinary Medicine	107+10[*]	8,570+150[*]	20.21	98+6[*]	8,311+180[*]	24.13
	Aquaculture	68+8[*]	5,391+120[*]	23.82	59+5[*]	5,030+150[*]	27.35
Total		2 373+200[*]	189,870+3 000[*]	24.45	2 193+120[*]	186,310+3 600[*]	27.84
Average Funding Per Project		74.96（80.01[**]）			82.11（84.96**）		

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 2014 the Department of Life Sciences received 8,699 proposals, of which, 8,477 were accepted for General Program and 2,313 projects were funded, including projects of Small Fund for Exploratory Studies, with a funding rate of 27.84% (counted by the accepted proposals, and all the data bellow are also calculated by the number of accepted proposals). The average funding intensity is 849,600 yuan per project, among which, there are 2,193 projects funded as 4-year General Program. The funding rate for 4-year General Program projects is 25.84% and the average funding intensity is

849,600 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.

The funding of General Program projects will reach 500,000 to 1,200,000 yuan per project in 2015, and the average funding will be about 800,000 yuan per project, therefore 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 facilitate the evaluation for peer reviewers and panel experts. For proposed research with more exploratory nature but weak research basis, it is suggested applicants apply for lower funding. For those with solid research basis and good progress in previous work and requiring more funding to carry out further research, it is suggested that applicants 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 reviewers and the panel, so the applicants should seriously fill in the budget table.

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 of 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 keep 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.

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. Funding policy is implemented depending on the performance of previous funded project, and

preferential consideration is given 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 for the eight scientific divisions, the funding scope is emphasized and the categories that are not to be accepted have been clearly noted. Therefore applicants should read them carefully according to his/her subject of application. It should be stressed, that the category not to be funded by the Division in *the General Program Guide* also applies to other types of programs in the same Division.

(2) In the resume section, detailed information of the applicant and main members of the group is required, including employment, education background from college with beginning and ending dates, as well as names of thesis advisors. If the applicant held NSFC funding previously, results achieved and related publications should be provided. Papers published and to be published should be listed separately. As for the papers published, a list of authorship, titles of the papers, names of the journals, year, periodical and page numbers should be provided, and be listed according to the order of treatises, paper abstracts and conference papers, etc., respectively. As for paper accepted but not published, please enclose the acceptance letter of the journal. Please do not list papers that are in submission or peer-reviewing stage. If the first author or correspondence author is concurrent, please list them by the actual order or publish and note the language used. If the order of authorship is not authentic, it will be regarded as academic misconduct, resulting in refusal of award.

(3) Applicant should elaborate his/her research background in detail related to the proposal, and relevant results of pre-research as the experimental basis of his her new assumption or new hypothesis. Previously published papers should be indicated in detail, and for papers to be published, related data of important experiment results, such as photographs or diagrams of the experiment, etc., should be enclosed.

(4) The research schemes, technique paths, materials and methods are the pivotal basis for reviewers to evaluate the feasibility of a project application. The experiment plan should be complete and accurate, technical paths should be clear and concise. To avoid ambiguity by all means, please prepare optional schemes in case of some key technique scheme failing, and the alternative can be regarded as a backup by reviewers.

(5) For new proposals based on previous funded projects, applicants should describe the already achieved progress in detail, and indicate the difference and connection between the application proposals and their previously funded projects. If there is some conjunction with other projects funded, the similarities and differences between them should also be elaborated. Applicants should not only give enough consideration to the continuity of research contents, but also avoid repetition with previous projects.
(6) Concerning applications related to medical ethics, applicants should give the certification of ethic committee from their home 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.
(7) Concerning applications related to operation with highly pathogenic microbe, applicants should abide by relevant national regulations, and perform under bio-safety qualified conditions.
(8) 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 inconsistent with the printed form is not acceptable. Please note specially that the signature and the name in printed form should not be in different languages, for instance Chinese and English, otherwise, the proposal may be declined due to determination difficulty.
(9) 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.
(10) The applicants should note that the fund should be filled in unit of ten thousand yuan, misfiling will cause errors in the budget, leading to be declined.

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 be 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. Systematic studies aiming at basic biology of microbes, basic and cutting-edge research of life sciences by using model microbes are encouraged.

Based on previous years of grant application and funding situation, it is observed that there is an obvious lack of balanced development of different branches in microbiology. The number of proposals aiming at studying 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 2015.

In 2015, the Discipline will continue to give preferential funding to areas in the taxonomy of microbes, so as to improve the cultivation of young researchers in the field of taxonomists.

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 inter-disciplinary 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.

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.

The applications accepted and funded in recent years show 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, 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 fields of plant systems biology, plant tropism biology, invasive plant biology, 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 2015, especially to strengthen the support to young taxonomists. The Discipline encourages 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 address 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 is 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 technique, high-throughput screening technique, advanced imaging technique, 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 encourages collaborations among applicants with institutions or groups with 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 that 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, 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 2014, 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 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 for the Fund for Less Development Regions.

The Discipline reminds applicants to pay attention to the following points in 2015: 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 of multidisciplinary and regional research should put enough emphasis on the combination of the theoretical study with the national need; the utilization of new technologies such as molecular biology should be combined with specific scientific questions.

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 of shrinking. The proposals failed to focus on important basic scientific issues in some important fields, such as silviculture and nonwood product forestry. Most of the proposals on gene homologous cloning and transformation in forest genetic breeding are still in

the tracking stages, in lack of close connection with production of forestry industry.

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 formulate 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 2015, the Discipline of Forestry will not accept proposals on pharmaceutical functional verification of effective components targeting at animals.

Applicants should pay close attention to the following points: Proposals should focus on targeted scientific questions with a precise title; According to objects and contents of research, application code should be specific; Proposals should provide detailed and specific research plan to demonstrate the feasibility of the project.

Division III of Life Sciences

The Division covers three disciplines as follows: biophysics, biochemistry and molecular biology, immunology, 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 phenomenon and activities of life

process at the level of biological molecules. The Division mainly supports studies on the following issues. (1) 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; (2) the interaction between macromolecules (including small molecules); (3) the role of post-translational modifications on stability and function of proteins; (4) classical biochemistry of protein and peptide, nucleic acid and enzymology; (5) molecular mechanisms of sugar/lipid/nucleic acid metabolism; (6) computational biology, bioinformatics, systematic biology and synthetic biology; (7) interaction and regulation between bio-plasma membrane and membrane proteins; (8) studies on polysaccharides and glycoconjugates; (9) the effect and role of the physical environment to organisms, including microgravity and space radiation; (10) novel technology and methodology in biophysics, biochemistry and molecular biology.

The contents of applications received in recent years show that fields with more applications as well as more funding are: 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 as 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 bio-membrane, 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 as for quality of proposals. Applications for structure and function research on glycoconjugates and environmental biophysics showed significant improvement in 2014. 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.

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 are given to the four following fields: (1) 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. (2) Applications with new methods and ideas from mathematics, information sciences, and interdisciplinary subjects, to carry out researches on bioinformatics, systems biology or integrative biology. (3) Molecular mechanism studies of the regulation of glucose, polysaccharide and glycol-conjugates will be moderately encouraged. (4) 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:

(1) 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, develop, migrate，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 and studies of antibody engineering.

(10) Scientific problems on the establishment of new techniques and methods and new research system of immunity.

It is clearly demonstrated from the applications in 2014 that there is a rapid progress of immunological research in China, the proposals covered a wide range of subjects, and the quality of research contents has improved obviously. Most of the proposals were based on solid background and pre-studies; some applications were able to provide alternative resolutions as backup plans; a few proposals are carrying out systematic cutting-edge studies based on novel hypothesis. However, problems such as lack of substantial subject intercrossing still exist.

In 2015, the Discipline will continue to support applications with creative academic thoughts, stable research direction, solid academic basis, encourage applicants 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 high light 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 function abnormal, and encourage close cooperation of scientists working in basic and clinic studies.

Biomechanics and Tissue Engineering

This Discipline is a branch intercrossing life science with other research areas. 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, 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 mainly covers bio-signal detection and recognition, biosensor, biomedical imaging and image processing, appropriators and systems of bio-system detection.

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

There is an imbalanced development among the above five sub-disciplines. Most of the proposals funded in 2014 showed solid research basis and provided clear scientific questions with novelty. The main weakness of applications is lack of original ideas, or lack of substantial interdisciplinary collaboration.

In 2015, the discipline will continue to encourage applications to carry out systematic multi-disciplinary 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 process of important tissue/organ reconstruct engineering, as well as interdisciplinary studies, especially long term, systematic and in-depth study on 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 bio-electronics and biological systems related to the study of bionics, and nano bio detection, nanometer biological safety evaluation and application of ethics.

Special notes for applications: the mechanism and treatment of disease other than tissue regeneration is excluded in this Discipline.

Division IV of Life Sciences

The Division's funding area covers three disciplines: neuroscience, physiology and integrative biology, and psychology.

Neuroscience

This Discipline is to study the structure and functions of nerve system, investigate the essence and mechanisms of human/animal behavior and cognition activity. 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 half of the proposals submitted and projects funded in 2014 are focused on molecular neurobiology and cellular neurobiology. The third

largest group of application was developmental neurobiology, taking up about 10% of total number of applications, whereas there are fewer applications under the application code of sensory neurobiology, computational neurobiology and neuronal informatics. There is a climbing number of proposals on malfunction neuronal system, such as inflammation, influence on neuronal system by oxidized stress and initiation and development of neurodegenerative diseases. The funded proposals normally demonstrated high degree of novelty, with precise description of scientific questions and proper research plans. Areas with most funding include development of neuron and glial cells, generation, maintenance and differentiation of neuronal stem cells, function and regulation of glial cells in neuronal activities, integration of sensory information and mechanisms of neuronal coding, damage and repairing of neuronal system, function and plasticity of synapses, neuronal mechanisms of learning, memory and behavior; neuronal basis of mental disorders. Meanwhile, there are major shortcomings in some applications, such as: low degree of novelty in research topic, repetitive following- up study, lack of focus on key scientific questions, poor previous work as supporting evidence for the proposal, incomplete research plan and lack of feasibility, etc.

In 2015, the Discipline will continue to encourage basic research in the following areas: neuronal basis of cognitive study with animal models, analysis of molecular, cellular and circuit mechanism of brain activity, the development, improvement and application of new techniques relating to optogenetics， nerve transsynaptic tracing, biomolecular imaging, etc., 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.

Special note for applications in 2015: from year 2015, the original discipline of neuroscience, cognitive science and psychology is divided into two independent disciplines. Studies on cognitive science are divided into either neuroscience, or psychology according to the research concept. Please select the correct application code according to the Guide to Programs. Cognitive studies with human being should be submited to the Discipline of Psychology.

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.

Among the applications for General Program, Young Scientists Fund and Fund for Less Developed Regions in 2014, there were a great number of proposals in areas of system physiology, exercise physiology, whereas the number of integrative physiology, biological rhythm and aging climbed. Funding for circulation physiology is mainly for researches on myocardial remodeling; reperfusion injury and protection; diabetes cardiomyopathy; vascular endothelial injury; transformation of vascular smooth muscle; central and peripheral mechanisms adjustment of blood pressure. Proposals funded in the area of respiratory physiology focusedes 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 covereds regulation and control mechanisms of water-salt metabolize of kidney, renal fibrosis，functional regulation of ladder. Most of the applications in neurosystem concentrated their researches on the hypoxic-ischemic encephalopathy, neurodegeneration, injured nerve repair, brain and cognitive behavioral etc. Most of the applications supported in the area of reproductive physiology covered researches on the occurrence and fertilize of germ cells, implantation of embryo, and the regulation and control mechanism of the placenta function. Most of the applications in the area of human anatomy concerned about basic research of applied anatomy. The embryology, which covers regulation mechanisms of embryo development, tissue damaging and regeneration, was also the major funding area. Most of the applications in the area of exercise physiology mainly focused their researches on the physiology mechanisms of the health by

exercise, and the prevention and treatment of diseases. Moreover, endocrine, and glucose metabolism, lipid metabolism, insulin resistance, trace elements (include calcium and phosphorus metabolism) nutrition, senescence, and biological rhythm were also the key funding areas. The Division will continue to encourage basic researches on the multi-layers of molecular, cell, tissue, organ and systems, as well as studies on the functional integrative and regulative mechanisms between different systems.
Please note in particular that applications concerning researches on 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 ultimate 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.

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. From 2015, the discipline of psychology will become an independent discipline in the process of application review and funding.

In 2014, the Division accepted 441 applications including General Programs projects, Programs for Young Scientists projects and Programs for Less Developed Areas projects, while 117 of them were funded with an average funding rate of 26.53%. Most of the applications studied the fields of cognition psychology, development psychology, brain structure and nerve bases of cognition, social psychology and applied psychology, especially focused on sensory perception, language, learning and memory and social development. In addition, applications on genetics and genes, behavior decision, psychometrics measurements are also increasing. General Programs with relatively good review generally demonstrated innovation,

interdisciplinary collaboration and combination between behavior study and cognitive neuronal studies, while the less recommended applications were lack of novelty or focused on specific scientific questions. Some of the applications for Program for Young Scientists were not funded due to incomplete research plan, lack of feasibility and lack of professional proposal writing.

In 2015, the Discipline will pay more attention to the area of psychology to encourage applications in the following fields: (1) The implementation of new research techniques and methods, with the combination of other subjects especially the research techniques of neuroscience, by synthesized application of multi-research methods with multi-subjects, to prompt the increase of the scientific significance and research level of psychology study. (2) With the combination of basic and applied research, to strengthen the interdisciplinary studies, to concrete scientific problems based on the research frontier and national requirement of development, especially to stress researches on social hot spot with Chinese characteristics, and to encourage applied research to play fully the prompting role of psychology to the national social development. (3) To enforce the setup of psychology research teams, the Division will give preferential support to young psychologists with creative academic thoughts.

Division V of Life Sciences

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

Genetics and Bioinformatics

Genetics studies the inheritance and variation of organisms. With the rapid development of molecular biology and related technologies, modern genetics mainly carries out investigation 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 prioritize support to 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, studies on basic genetic laws and the molecular mechanisms of gene expression and regulation by using model organisms, 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, 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.

In 2014, the number 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. In 2015, there will be a new code “Heredity and Variation in Human Genetics”.

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 studies the principles and mechanisms of life activity. Cell

biology mainly aims 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, and other cytological issues relating to medicine and agriculture.

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. Priority will be given to endeavors on solving important problems on 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 2014, 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 2015, 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 3 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, apomixes, influences of genetics, epigenetics and environment factors on reproductive health, the mechanisms of reproductive system diseases, the security of assisted reproductive techniques, 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 micro-environment, immunogenicity of stem cell, cell transdifferentiation; stem cell and tissue and organ engineering, etc.

Modern developmental biology and reproductive biology emphasize on the continuity of development and dynamic process of change, emphasize the collaborate 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 emphasizes on the laws of crop growth and development; the interaction between crops and environment; the genetic improvement of crops; 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, bio techniques, 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, 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 home institutions of applications. However, major problems remain as the following: (i) Researches on crop genome are generally concerned, but more attention is yet to be paid 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 and woods, and model plants of Arabidopsis thaliana, etc.

Food Science

Food science, as an interdisciplinary subject with close combination of theory and application, mainly 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 fresh keeping, food safety, etc.

The Discipline mainly supports basic researches based on food and its stuff 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 funding scope of this Discipline. Problems existing in proposals accepted in 2014 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 application didn’t 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 lack of 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 some of the proposals in food inspection studying the same method applied in various fields.

In 2015, the Discipline will give priority to important scientific issues concerning the national development of nutrition and health, and factors restricting the growth of Chinese food production industry. Proposals 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 priority to support theoretical research on the establishment of new techniques and methods for food inspection, and the formation and control of hazardous during the processing and storage. The Discipline will not accept proposals focusing on food technology, processing technology, food development, chemical modification and studies related to the prevention and treatment of diseases, and drug development, growth, development and metabolic physiological studies of plant and animals; and preclinical experimental research directly using human body will not be accepted.

Division VII of Life Sciences

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

Plant Protection

The Discipline covers plant pathology, agricultural entomology, agricultural weeds, agricultural rats and other pests, 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 wildly 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.

It is demonstrated from the applications in 2014, many applicants were able to grasp the research progress at home and abroad, and pay close attention to concrete scientific problems from the practice of agricultural production,

and to the scientific significance and application potential in topic selection. Other improvements include: the novelty of academic thoughts and research methods have been improved; the research basis is more solid; the academic level and condition of research team is improved; and the composition of proposals is more professional. But the following problems still exist: (i) quite a number of applications simply trace or imitate researches related at home and abroad, or grafting one research method (or material) to another material (or method), with a lack of original ideas; (ii) for some of the researches, emphasis were putting on the simulation studies in the laboratory at the molecular levels, whereas more attention should have been paid to the field study and verification; （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.

In 2015, 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 attentions 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 theories 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 filed should be elaborated. Preferential support will be given to continuous and systematic research. Excellent proposals will be prioritized to fund 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 conversation.

The Division supports applications focusing on crop pests as objects, and the

prevention and control of pests as its scientific aim. Applications taking woods or model organisms such as Arabidopsis and Drosophila as main research objects will not be accepted.

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 recently 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 approaches 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 biological mechanisms and regulation of fruit ripeness and senescence, biological basis and regulation of color, pattern, scent, florescence of ornamental crops, etc. In addition, new fields of study have been explored, for instance, the interaction mechanism of rootstock scion and the usage of plant allelopathy to slow the cropping obstacle etc.

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 were 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 2014, major problems in the application for horticulture were the following: (1) There are a large number of proposals with pertaining copying and tracing research, but only a few demonstrated original creativeness and systematic study; some applications concentrate their researches on practical problems of horticulture, but are lack of sufficient scientific issues. (2) 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. (3) Some of the application used garden crop as research stuff to study the interaction mechanisms of plant and pathogen, and mechanisms of plant nutrition; quite a few proposals were even aiming on medical category or industrial microbe areas, which should have been submitted to other disciplines according to the funding scopes. (5) 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 are as follows: (1) Many applications put their studies emphasizing on molecular biology of plant nutrition, without in-depth study on mechanisms on the physiology and genetics aspects of plant nutrition. (2) There was a lack of substantial interdisciplinary studies among crop-soil-microbe, lack of in-depth study on the efficient nutrient utilization under intensification conditions. (3) There was a lack of basic researches on nutrient resources and fertilizing science.

In 2015, 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. 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. Applicants are especially encouraged to apply for the experimental testifying 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 such as Arabidopsis as its research objects will not be accepted by this Division.

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, bio-informatics, computing biology, and related subjects have 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 on 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 hot spots without solid research basis, the lack of justification for proposed research and feasibility of technical routes. Less experimental accumulation was provided by some of applications, or the insufficient description of detailed research progress and contents. Some proposals were lack of scientific problem or hypothesis with explicit definition, or overstated research objectives. The budget for research is

impractical in some proposals.

In the future, the identification and description of unknown species of animals, 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 are currently focused 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.

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 also 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.

Animal husbandry and grassland science 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 2014 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 the near future, the Division 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 livestocks, and the genetic breeding of grazing; encourage 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.

In 2015, special notes for applicants are the following: (1) Study objects 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 not be funded. (2) For research topic selection, essence of key scientific issues in related fields should be grasped, instead of simply following up the new research progress at home and abroad.

Veterinary Science

Veterinary science studies the occurrence, development, diagnosis, prevention and cure of animal diseases. The Discipline covers the following branchings: 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, clinical veterinary science.

Proposals accepted and funded in 2014 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 the following: 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. are 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, animal (veterinary) pathology, etc.

In 2015, 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 not be funded in the discipline of veterinary science. Special reminds to applicants are that the application for experimental studies of highly pathogenic bacteria should be strictly abided by related decrees and regulations concerned in China, as well as the basic safety requirements.

Aquatic Science

Aquatic science studies 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 conversation, 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 2014, 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 conversation 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 2015, 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. Support to proposals with original ideas will be strengthened. 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 among 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 science studies 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 expand the frontier of research, and hence to build up a robust basis for the development of the earth science.

In 2014, the Department received 4,386 proposals for the General Program submitted from 631 institutions. Among them, 1,405 were funded with a total budget of 1.28 billion yuan, with a success rate of 32.0% and an average budget of 912,000 yuan for individual project. Among the funded projects from the General Program, 776 (55.2%) are from universities and 607 (43.2%) from research institutes. The PIs of 920 projects (65.5%) are younger than 45 years old. There are 126 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, 8 proposals were approved as the Small Fund for Exploratory Studies projects in 2014 and 1.65 million yuan were allocated.

The criteria for the selection of General Program projects in 2015 are 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, it should be acknowledged that the importance of the basic or traditional disciplines, strengthened the weak or endangered disciplines, maintained the international status of the privileged discipline or fields in China, promoted the disciplines which are still weak or even “endangered” in China yet predominant in the world, encouraged the intercrossing, integration, infiltration and synthesis among disciplines, improved the development of the frontier and basic sub-disciplines, fostered the development of the sub-disciplines closely related to experiment, observation, data integration and simulation, and recognized 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 for 4 years.

Funding for General Program Projects in the Last Two Years

Unit: 10,000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding rate++ (%)	Projects	Funding	Funding rate++ (%)
Division I	Geography (including soil science and remote sensing)	518+3*	38,963	23.43	467+2*	40,291	27.87
Division II	Geology	365+4*	31,159	33.30	327+2*	31,604	35.38
	Geochemistry	139+1*	11,660	36.18	123+1*	11,708	37.24
Division III	Geophysics and space physics	183+1*	14,984	30.72	165+1*	15,460	33.67
Division IV	Marine science	188+1*	15,292	30.78	173+1*	15,994	32.46
Division V	Atmospheric science	156+1*	12,629	30.49	142+1*	13,013	34.79
Total		1,549+11*	124,687	28.64	1,397+8*	128,070	32.03
Average funding per project		79.93（80.32**）			91.15（91.56**）		

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).

++ Success 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 is aiming at the understanding of evolution processes, spatial heterogeneity and interaction mechanisms of natural and human elements in the terrestrial surface system. The main research purposes of physical geography are focused on interactions of modern natural environmental elements and their spatial heterogeneity, especially the evolution processes at multiple tempo-spatial scales. The main research purposes of human geography concentrate on spatial structure and distribution and their driving mechanisms of different historical and modern human elements, especially on spatial evolution processes of humanity phenomenon at multiple scales. As the linkage of natural and social sciences, human geography also emphasizes on natural background of spatial structure organization of regional human elements, and its interrelationship with human science. Landscape geography emphasizes on the land surface structures and their types impacted by complex actions of natural and human elements, especially on the scaling-effects of the complex actions. The direction of the environmental change and prediction emphasizes on the evolution of human-earth relationship since Quaternary period, especially during historical period, and the comprehensive contrasts and contemporary processes of environmental change proxy indicators in high resolution and short time scales to provide essential theories, methodologies and basic data for the prediction of future environmental changes. Soil science is an independent discipline for the understanding of pedogenic processes and spatial distribution, the exploration of chemical, physical and biological mechanisms of soil function changes caused by the intensive utilization of human and the scientific support of reasonable use and management of soil resource. It emphasizes on the material cycle and the interactions with organisms inside the soil system, as well as the changes of soil environment and quality. Geographic information science is a discipline of acquiring, processing, managing, interpreting, analyzing and presenting 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). As an important branch of geography, environmental geography emphasizes the eco-environmental impacts of large infrastructure building, the emission of greenhouse gases and the migration,

transformation and differentiation of pollutants. Natural hazards and risk research, as a new field, emphasizes the risk assessment of natural hazards and public security, and the coping mechanisms at multiple scales. Furthermore, the Division I also supports the researches about the evolution of renewable resources, the management of natural resources, the regional sustainable development and other related directions. With the increase of comprehensive national strength and request of peaceful development, geographical relation and planetary remote sensing is also well involved in the funding system of the Division I.

Terrestrial surface is a critical zone where the interactions among the hydrosphere, biosphere, atmosphere, pedosphere and lithosphere are most frequently occurring. Thus, it is the key to interpret the complicated terrestrial surface system by using the earth systematic scientific principles. Since studies about the terrestrial surface system have been expanded to both micro- and macro- scales, it is a trend to use the methodology and technology of data acquisition and analysis derived from other related disciplines, which promotes the development of the terrestrial surface system research.

In 2014, the Division I received 1,683 applications for General Program projects, among which 469 projects including 2 projects of the Small Funds for Exploratory Studies supported with a total fund of 402.91 million yuan (0.4 million yuan were for the Small Funds for Exploratory Studies). The funding rate including the projects both of General Program and Small Funds for Exploratory Studies was 27.87%. The average funding was 861,900 yuan for each project excluding projects of the Small Funds for Exploratory Studies, and 859,100 yuan for each projectincluding projects of the Small Funds for Exploratory Studies. The research fields of these funded projects were categorized into physical geography (including D0101, D0103 and D0104) with 127 projects, human geography with 46 projects, soil science with 101 projects, RS, GIS, geodesy and cartography with 114 projects, processes and effects of pollutants, regional environmental quality and safety with 59 projects, and natural resources, regional sustainable development with 22 projects.

In 2015, 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 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/).

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 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, *insitu* 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 research 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 2014, 930 proposals for General Program projects were received and 329 were funded with a success rate of 35.4% and an average funding intensity of 961,000 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 17.5% of the total funds, projects in areas of mineralogy, petrology, volcanology, economic geology and geo-mathematics for 17.4%, projects in areas of petroleum geology and coal geology for 11.2%, projects in areas of structural geology, Precambrian geology and regional geology for 15.6%, projects in areas of Quaternary geology and environmental geology for 13.8%, and projects in areas of hydrogeology and geo-engineering for about 24.5%.

The predominant defects in the applications in 2014 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 couldn't demonstrate the necessity to be carried out, and 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. The budget is not matched with the proposed activities or lack of feasibility.

Geochemistry

Geochemistry is the discipline that investigates the chemical composition, chemical process and chemical evolution of the epigeosphere and the Earth's interior. It also includes cosmochemistry and comparative planetology. It utilizes primarily elemental and isotopic analyses, macroscopic and microscopic structural observation, molecular and microbiological tracer method, radiometric dating theory and methods. Geochemistry focuses mainly on evolution and interaction of different geospheres through the Earth's history. It also emphasizes the origin, distribution, migration, transformation, cycling and destination of chemical elements and substances of the Earth's surface influenced by human activities, and these impacts to our ecosystem.

The characteristics of modern geochemical studies are as follows:

(1) In the solid geochemistry field, the research hotspots have shifted from the material composition and chemical reactions of the Earth's interior to the interactions of different geospheres and their boundaries. It takes great advantage of in situ microscopic analysis with high-resolution, high-precision and high-sensitivity. It pays more attention to geochemical processes and compositional structures of Earth's layers. It

emphasizes the integration of plate tectonic evolution and global change research.

(2) In the research filed of the Earth's environmental changes, supergenesis and environmental pollution processes, it focuses on the superimposed effect of natural processes and human activities, and to the coupling mechanism of chemical and biological effects. It pays closer attention to source apportioning 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:

(1) To promote coordinated development of different branches of geochemistry;

(2) To encourage studies on the fundamental theory, the development of experimental analysis technology, and the establishment and improvement of geochemical model;

(3) 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 the Earth, the changes and protection of ecological environment;

(4) To concentrate on the basic research of 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 natural disasters;

(5) To encourage interdisciplinary research of environmental sciences, life sciences and other disciplines of geosciences using geochemical theory and method.

In 2014, 333 proposals for General Program projects were received. The funding rate (including the Small Fund for Exploratory Study) is 37.24%. The average funding (excluding the Small Fund for Exploratory Study projects) is 950,000 yuan per project. The proportions of received and

funded proposals of different research fields are as follows: 12.3% and 22.6% for isotope geochemistry, 1.5% and 0.8% for trace element geochemistry, 9.0% and 11.3% for ore deposit geochemistry and organic geochemistry, 1.8% and 2.4% for isotopic and chemical geochronology, 6.3% and 7.3% for experimental geochemistry and computational geochemistry, 2.4% and 2.4% for cosmochemistry and comparative planetology, 16.8% and 12.9% for biogeochemistry and 41.7% and 33.1% for environmental geochemistry. The most received and funded proposals and the funded projects are in environmental geochemistry and biogeochemistry fields in recent years.

The major inadequacies of accepted proposals in the past are as follows. (1) It emphasizes only on the importance of the research field, but fails to clarify the creative scientific issues. (2) It only elaborates literature supporting its own academic viewpoints, but fails to include comprehensive literature review in the current research field. (3) The research approach, perspective and methodology are uncreative and indistinctive. Innovation of the research is exaggerated excessively. (4) The research goals and contents are too broad and too many to accomplish during the supporting period and with the support budget. These problems are more prominent in proposals for Young Scientists Fund of NSFC. The key methodology and technology for the success or failure of a project are lack of specific and detailed feasibility studies.

Division III of Earth Sciences

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

Geophysics

Geophysics，which include 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 progresses in space physics have 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. These progresses provide 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 2014，493 proposals for General Program in geophysics and space physics were received and 166 of them were funded with a success rate of 33.7% and an average funding of 931,000 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 (17.5%), solid-earth geophysics (36.8%), exploration geophysics (19.3%), space physics (22.3%) and experiment and facilities (4.2%).

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. Therefore, the Division encourages scientists to participate in the NSFC Open Ship-time Sharing Program 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.

To meet the demands of research projects in ocean observation, NSFC initiated the pilot Open Ship-time Sharing Program. An additional application form for ship time should be attached if it is necessary to the proposals for NSFC program if needed. The application for ship time is required to describe the contents, plans and expected data outputs of the proposed observations in detail. Applicants are suggested to pay close attention to the bulletin and announcements for cruise timing in 2015.

In 2014, 1,279 proposals for marine science were received and 399 proposals were funded. The total funding amounts to 216.83 million yuan. Among the awards, 174 projects are the General Program with a success rate of 32.46% and the average funding of 919,200 yuan per project, 222 projects are the Young Scientists Fund with a success rate of 30.45% and the average funding of 249,500 yuan per project, and 3 projects are Fund for Less Developed Regions, with a success rate of 21.43% and the average funding of 496,700 yuan. 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. Absence of one or some of the above elements may lead to a failure. Among them, the scientific innovation is the most decisive. For the Young Scientists Fund application, frequent defects include too broad scope and less of focus of researches.

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 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 2014, 62 proposals on polar science were received and 30 were funded, with a success rate of 48.39%. Among the awards, there are 15 projects for the General Program and 15 projects for the Young Scientists Fund.

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 into 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, besides 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 control technique and measures affecting weather and climate, 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 pay more attention to the interaction of different spheres, the comprehensive, integrated，modeling and systematical studies on various processes based on the integration of different methods such as observation, analysis, theory, simulation and prediction, study on issues of global climate and environment change, and its impacts, prediction and adaptation, as well as the optimization of human life-supporting environment and human orderly activities, the interdisciplinary study which could provide the scientific basis for the livelihood and the sustainable development of society.

In 2014, the Division received 411 proposals for the General Program and 143 projects were funded with the success rate of 34.79% and the average funding intensity of 910,000 yuan per project including 1 project for the Small Fund for Exploratory Study with 250,000 yuan per project.

In 2015, the Division will continually encourage proposals for exploratory and original basic studies in areas as follows: (1) 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; (2) 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; (3) the climatic change and its relevant extreme synoptic and climatic events; (4) new theories and methods for weather forecasting and climate prediction; (5) applied research on the data received by satellite remote sensing and other sources; (6) 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; (7) research on the principle and method for meteorological observation, data analysis and applications.

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 property rights, so as to achieve a higher level of scientific and technological development of China and improve its international impact in science and technology

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.

In 2014, the Department received 10,630 proposals (480 declined), reduced by 19.62% compared with that in 2013, and among them, 2,475 were supported with a total funding of 2,054.27 million Yuan. The average funding is 830,000 Yuan per project and the success rate is 23.28% (19.81% in 2013).

Funding for the General Program Projects in the Department of Engineering and

Materials Sciences in the Last Two Years

Unit: 10,000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Materials sciences I	Metallic materials	203	16,262	20.08	189	15,681	23.68
Materials sciences II	Inorganic and non-metallic materials	283	22,604	20.42	276	22,916	22.53
	Polymer materials	205	16,398	20.50	187	15,526	24.13
Engineering sciences I	Metallurgy and mining science	269	21,499	19.01	257	21,340	22.99
Engineering sciences II	Mechanical engineering	521	41,682	20.48	485	40,258	23.64
Engineering sciences III	Engineering thermo physics and energy utilization	204	16,300	19.98	190	15,758	23.63
Engineering sciences IV	Architecture, environmental and structural engineering	522	41,718	19.25	488	40,478	23.54
Engineering sciences V	Electrical science and engineering	188	15,072	19.79	184	15,311	22.44
	Hydrology and marine engineering	225	18,025	18.97	219	18,159	22.69
Total		2,620	209,560	19.81	2,475	205,427	23.28
Average funding per project		79.98			83.00		

Applicants should pay full attention to the following points in proposals:

(1) The Department will support preferentially basic research with significant 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 property rights. Proposals that meet the major needs of national economy and sustainable development of the society will be encouraged.

(2) Interdisciplinary researches will be encouraged, especially the cross-cutting researches in life science, information technology, energy engineering and environmental science. Applicants should put forward new conceptions and ideas as creative as possible with specific

scientific issues.

(3) The fundamentality and innovation of proposals are very important. Applicants should pay attention to proposing key scientific issues, concentrating research contents and highlighting research focus.

(4) The project principal should submit an abstract of the final report of completed projects and related outputs.

(5) Applicants should propose proper, reasonable budget in their proposals according to the funding intensity of different programs.

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, suitability of the methods to be employed. Proposals should target either to advance the materials science in cutting-edge areas or to promote developments 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 incorporating basic and applied basic researches of metallic materials.

In 2014, the Division received 798 proposals for the General Program, decreased by 21.1% in comparison with the previous year. Totally, 189 projects were granted with an average funding of 829,700 yuan per project and a success rate of 23.68%.

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.

By funding some clusters of general program projects, the division would give more financial support to the relevant areas that meet the national demands or in which some breakthroughs are expected to be achieved. In 2015, the following research orientations will be given preferential funding: (i) fundamental issues during life cycle of steel materials, including the preparation, machining, failure and application, etc.; (ii) key scientific issues of high performance and large size amorphous soft magnetic materials.

Division II of Materials Sciences

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

Inorganic Non-metallic Materials

The fundamental and applied basic researches on various inorganic non-metallic materials are supported by the Division. With the development of material design theories and the innovation in fabrication technologies, lots of new inorganic non-metallic materials have been discovered, including high-temperature superconducting ceramics, smart materials, bio-medical materials, energy materials and nano-materials etc., which have greatly stimulated the researches in related areas. At present, in the field of research 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 compounding, 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 2014, the Division received 1,225 applications for General Program, with a decrease of 11.62% compared with that in last year. 276 projects were funded with an average funding of 830,300 yuan per project and a success rate of 22.53%.

From the perspective of submitted proposals in the past three years, it is noted that, in addition to an increase in the number of applications, the researches related to inorganic non-metallic materials involves many areas with significant interdisciplinary nature. Among the applications in 2014, researches on functional materials accounted for 55.58% of the total, which is still an active field. These applications unfolded many innovative ideas and induced the hot-spots of research on 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 which applications from photoelectric information functional materials (about 21.42 % of the total in 2014) ranked above all the others in recent years. There were also many applications from new energy materials, display materials, bio-medical materials, in which the creativity needs to be improved continually. The applications regarding structural ceramics made up 5.19% of the total and were relatively concentrated among a few institutions, and relevant researches significantly went towards the direction of high-toughness, easy process ability, high reliability and low cost fabrication by new techniques. A comparatively large number of proposals for inorganic non-metallic composites were also received, and the number of proposals on functional composite materials was more than before. But in term of the quality, a significant number of them can be classified as follow-up, low level repetition, and lack of innovation and research basis on inorganic non-metallic materials. The Division will support the researches with creative and innovative ideas, and the substantial interdisciplinary researches on inorganic non-metallic materials with other related fields. The priorities will be given to young researchers who persist in researches in the traditional 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 applied-basic physical and chemical issues; materials with external field induced phase transition and

related applied-basic aspects; the surface, interface, connectivity and compatibility of composite materials; gradient functional materials and in-situ composite materials; basic research on "structure-function" integrated composite materials, synthetic techniques for high-performance, low-cost and high reliability materials; researches on the composition, structure, performance and characterization on smart materials, new energy materials, bio-medical materials and eco-environmental materials; basic theoretical research on the design and corresponding fabrication technique for inorganic non-metallic materials (in macro-, meso- and micro-scales, respectively); and applied-basic researches on the improvement and remolding of conventional inorganic non-metallic materials through new theories and techniques or new processes.

Organic Polymer Materials

In the field of organic & polymeric materials science, the Division mainly supports researches in the following areas: synthetic chemistry of polymeric materials; theories and methods 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; organic & polymeric functional materials and organic solid materials; biomedical polymer materials; organic & polymeric materials related to energy sources, environment and resource utilization; smart and biomimetic polymer materials; special polymer materials.

In 2014, the Division received 775 proposals for General Program, with a decrease of 22.5% compared with that in 2013. Finally 187 applications were granted with an average funding of 830,300 Yuan per project and a success rate of 24.13%. Quite a lot of applications were in the following areas: biomedical polymer materials, polymer blend and composite materials, opto-electronic functional materials, functional inorganic/organic composite materials, and eco-environmental polymer materials etc.

The Division encourages applicants to do interdisciplinary basic researches involved with chemistry, physics, life science, information science, energy and environment that lead to creativity and innovation. To be specific, the researches in the following areas are encouraged: preparation science of polymeric materials, including the synthetic methods with high efficiency and controllability of polymeric materials, new methods and theories in

polymer processing, the relationship between the aggregation structures and the properties of polymeric materials and polymer-based composite materials; methods and theories in the implementation of the high performance and functional properties of general polymer materials; structure-property relationships of functional organic & polymeric materials, the implementation of their high efficiency and stability, and their green methods in preparation; basic research on goal-orientated biomedical polymer materials; design theories and preparation methods of smart and biomimetic polymer materials; eco-environmental polymer materials, including the structures, properties and efficient utilization of natural polymers; the design theories and preparation methods of environment-friendly polymer materials, the recycling and utilization of polymeric materials, the stability and aging of polymeric materials.

Division I of Engineering Sciences

The Division supports fundamental researches in the metallurgy and mining sciences. It is mainly involved with 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 1,118 proposals for the General Program in 2014, with a decrease of 20.99%; 257 proposals were granted with the average funding of 830,400 yuan per project and the success rate of 22.99% .

Researches in the metallurgy and mining sciences have achieved significant progress in recent years. The current development trends of the discipline are as follows: (i) The more use of novel methods and techniques of neighboring disciplines has broaden and deepen the fundamental aspects of sciences from the primary minerals into secondary resources, or from materials to products, even to device and macroscopic resource optimization in precise control of full scale from micro, middle to macro scale. More and more attention is paid to unconventional, even extreme processes. (ii) With further development of interdisciplinary convergence new research fields emerge such as resources recycling, green process engineering, bio-metallurgy, bio-chemical mining, computing metallurgy and metallurgical physical-chemistry and electro-magnetic metallurgy, etc. (iii) Relationship between fundamental research and technology development is getting increasingly closer, such as mining and metallurgy equipment,

monitoring and controlling of system, metallurgical reaction engineering and systems engineering, and metallurgical ecological technology, etc. More and more new technologies and new development of the products derived from the further study of fundamental science, the updating and innovation of basic knowledge. (iv) Basic research, applied research, specific technology development and product development have been closely linked and integrated.

Petroleum and natural gas exploitation, safety science and engineering, preparation of metallic material processing, rock mechanics and ground control, mineral processing engineering, metallurgy, battery electrochemistry, drilling engineering and geothermal exploitation are the main research fields interests of the applicants for the Division.

Structure optimization, process intensification and enlargement similarity theory of engineered equipments will be emphasized. Focusing on the fundamental research, the Division will fund researches on process and engineering, and will continuously promote interdisciplinary research and the exploration of novel methods. More attention will be paid to the basic research with characteristics of specific resources that could enhance our competitiveness in mining and metallurgy industry. Researchers are encouraged to work systematically and consistently in their specific fields. 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.

Encouraged research fields of the Division are as follows：(1) Basic theory of the innovative ideas on drilling; (2) Basic seepage theory of the ultra low permeability reservoir; (3) Basic theory and methods of mine disaster prevention and control and industrial safety production; (4) Environmental protection theory and methods of resources exploitation; (5) Non-linear mechanic behavior and engineering response of rock under the influence of mining; (6) Interface scientific issues of the metallurgy and material preparation process; (7) Material preparation and processing; (8) Low emission and clean technology of metallurgy and comprehensive utilization of recycling resources; (9) Metal solidification and homogenization; (10) Material intelligent preparation and processing.

Division II of Engineering Sciences

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

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 to develop novel design theory and methodology. It covers 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 manufacturing with high efficiency, low cost, intelligent methods and high performance. It includes component machining, forming, manufacturing systems and automation, metrology and measurement instrument, MEMS/NEMS, green manufacturing, intelligent manufacturing, and so on.

In 2014, a total of 2,052 research proposals were received for the General Program, a 19.3% reduction compared with the previous year. Among them, 485 proposals were funded. The average funding per project was 830,100 yuan and the success rate was 23.64%.

The priority areas supported by the Division are as follows: (1) The fundamental research for national strategic requirements, the frontiers of disciplinary development, as well as potentials for industrial applications. (2) The research directed to environment-friendly, resource-saving, and high energy efficient integration of sustainable design and manufacturing. (3) 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. (4) 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. (5) The multi-disciplinary 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, encourage continuous in-depth researches in a specific field and support fundamental researches that have achieved innovative results and need further in-depth development. The Division will also encourage substantial and profound interdisciplinary researches, especially those involving multi-disciplinary areas such as electronics, information, biology, materials, and medical science, with the main objective to solve scientific problems in mechanical engineering field.

In 2015, high-intensity funding (no more than 2,000,000 yuan per project) within the General Program will be given in form of project clusters to researches focusing on the frontier areas with high potential breakthrough, such as integrated structural design and manufacturing of composite materials, machining database foundations of key materials.

The new applications from principal investigators with on-going research projects will be discouraged to ensure that they devote themselves to the approved projects. Young researchers are not expected 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 2014, the Division received 804 proposals for General Program, with a decrease of21.25%. Totally, 190 were supported with the average funding of 829,400 yuan per project and the success rate of 23.63%.

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 has 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 requests applicants to provide detailed information on their research achievements obtained in all previous NSFC projects and the list of papers published on international and domestic journals in recent years. All the information provided must be impersonal and true, which will directly affect the evaluation and approval of the applications.

It is noted that applications in the fields of energy saving and storage, renewable energy and alternative energy must be in connection with basic engineering thermo-physical principles.

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 2014, the Division received 2073 proposals for General Program, with a decrease of 23.53% in comparison with the previous year. Totally, 488 were supported，with the average funding of 829,500 yuan per project and the success rate of 23.54%.

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 includes 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 is mainly responsible for funding projects in 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) and its control, electric machine and its control, power system and its automation, 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 and electromagnetic compatibility, electric drive and motion control, communication and information for power system, 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 2014, totally 820 proposals were received for General Program and 184 proposals were finally funded with an average funding of 832,100 yuan per project and the success rate of 22.44%.

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 investigation based on electrical science for the interaction between electromagnetic field and bio-matter, 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 2014, totally 965 proposals were received for General Program, and 219 proposals were finally granted with an average funding of 829,200 yuan per project and a success rate of 22.69%.

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 inter-disciplinary and integrated researches are encouraged in the fields of water resources, hydro environment and water eco-system research. Researches in the area of river and coastal hydrodynamics and sediment dynamics should emphasize on the fundamental theory of sediment transport, river and estuarine evolutionary, and sediment problems related to large

hydraulic works. The key research frontier of hydraulics consists 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.

In 2015, encouraged research areas are urban flooding, aquatic ecology and eco-hydraulic engineering. If interested in these areas, applicants should focus their research on one of the above areas for the research proposals.

According to the statistics on proposals in recent years, the proposed themes have extended gradually and tended to be more interdisciplinary. In 2014, 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, 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 2014, the Department received 6,747 General Program applications, an decrease by 18.4% from that in 2013, and awarded 1,572 projects with a total funding of 1.2723 billion yuan. The average funding amount is 809,400 yuan per project, slightly higher than that in 2013, with the average success rate increasing to 23.3%.

In 2015, 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 Last Two Years

Unit: 10,000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding rate [++] (%)	Projects	Funding	Funding rate [++] (%)
Division I	Electronics and technology	152	12,158	19.51	144	11,781	24.49
	Information and communication system	138	10,618	19.83	146	11,930	23.47
	Information acquisition and Processing	140	10,819	19.89	122	9,703	23.97
Division II	Theoretical computer science, computer software and hardware	141	10,546	19.69	137	11,042	23.38
	Computer applications	217	15,731	19.10	207	16,711	23.44
	Network and information security	160	12,438	19.49	132	10,716	23.53
Division III	Control theory and control engineering	178	13,913	21.37	162	13,149	26.1
	Systems science and system engineering	45	3,453	16.48	50	3,894	17.87
	Artificial intelligence and intelligent systems	128	10,119	20.22	128	10,196	23.3
Division IV	Semiconductor science and information devices	135	11,108	20.64	145	11,773	23.46
	Information optics and photoelectric devices	115	9,400	20.65	99	8,185	23.08
	Laser technology and technical optics	96	7,717	20.73	100	8,150	23.36
Total		1645	128,020	19.72	1572	127,230	23.3
Average funding per project		77.78			80.94		

Interdisciplinary Research between Information Sciences and Mathematical Sciences

In 2015, 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 funding will be about 600,000 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 2014, 199 applications were received for the projects of interdisciplinary research between Information Sciences and Mathematical Sciences and funded 46 projects with average funding of 615,400 yuan per project and the funding rate of 23.12%. 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 supports 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.

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 technology, transient electromagnetic field theory and application, vacuum, surface, membrane, superconducting, quantum, plasma, 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 bio informatics, detection and identification of cell and bio molecular information, information network and analysis in bio systems, modeling and simulation of bio system functions, methods and technology of bionic information processing; sensitive electronics and physical, chemical, bio and bio chemical sensors, properties of new types of sensitive materials and sensors, and sensor theory and technology.

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 multidimensional 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 2014, the Division received 1,719 proposals for General Program, and funded 412 projects. The funding rate is 23.97% and the average funding intensity is 811,000 yuan per project.

In 2015, 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 multisource and multi spectrum data, bio-information 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, architecture and system software, software engineering and software methodology, computer network, information security, natural language interpretation, data engineering and knowledge engineering, computer graph and imaging processing, multimedia and virtual reality, man-machine environment, mobile computation, embedded computation, pattern recognition and machine learning, bio information processing, computation intelligence, etc. The Division also stress on funding of studies on theoretical method of new computation, big data, 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 and management sciences to make

joint explorations on new ideas, new theories, new technology and novel approaches 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 2014, the Division received 2,030 proposals for General Program, and funded 476 projects (including 16 interdisciplinary projects with mathematics). The success rate is 23.45% and the average funding is 808,200 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 still existed in proposals received in 2014. 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 covers basic theory and applications of pattern recognition, method and application of machine learning, method and application of the understanding of natural language, network information processing and utilization, artificial intelligence and knowledge engineering, robotics and robot technology, bionic sensing and bio-information processing, cognitive science and intelligent information processing, etc.

In 2014, the Division received 1,483 proposals for General Program and funded 340 projects. The success rate is 22.93% and the average funding intensity is 801,100 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, 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 safety assisted driving, theory and application of complex network analysis, analysis and application of bio molecular network, theory and application of the internet of things and intelligent power grid; 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; large scale knowledge processing and application; efficient processing and computation of big data; theory and application of poly-particle information computation; inter media analysis and searching; online machine learning methods of complex dynamic data, method and application of deep learning for big data; advanced robot and bionic robot; micro and nano controlled robot and micro nano robot; bio and biomedical information acquisition, processing and applications; brain-machine interface theory 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, and biomedical engineering and agricultural information technologies.

In 2015, 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 2014, the Division received 1,475 proposals, and funded 344 projects with a funding rate of 23.32% and an average funding intensity of 817,100 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, more applications come from 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 andapplied 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 few applications in areas of new types of information devices, space optics, atmospheric and marine optics, and optical problems in interdisciplinary areas, where funding will be strengthened by the Division.

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 hot spot 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 encourages and supports

scientists from diverse academic backgrounds to take an active part in management science research and contribute tothe development of management science, which is a comprehensive interdisciplinary science. 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.

The guideline of the Department of Management Sciences for discipline development during the 12th Five-Year Plan period was determined as "following the law of management science, lay emphasis on talented scientists in fundamental scientific fields, and persisting to support solid and sound scientific research which aims at significant science and social issues". Based on this guideline, the Department will continue to encourage innovative research, and welcome the research proposals to discover universal scientific issues from Chinese management practices and then to explore these issues, to enrich the knowledge of human management sciences. The Department also encourages the interdisciplinary research.

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 the 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 modelling, computation, induction and deduction. The Department will offer more funding than the average funding level to the experimental research projects that do need long-term large-scale data collection, data processing, and filed investigation, and high performance computing and experiments.

General requirements for applications in 2015:

1. No repetitive funding with the National Social Science Fund

To optimize the allocation of the National Natural Science Fund and to ensure that principle invsestigators invest adequate time and energy in their on-going national projects, the Department of Management Sciences will decline proposals submitted by the following applicants in 2015:

(1) Applicants who have already been supported by the National Social Science Fund as a project leader within the past 5 years (from Jan. 1st, 2010), but have not got the concluding certificaten awarded by the National Planning Office of Philosophy and Social Science until the deadline of application in 2015

Note: if an applicant has gained the concluding 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 2015.

2. Accuracy and integrality of information

Applicants are held responsible for the accuracy, integrality, and truthfulness of the contents of their applications, and their home institutions are obligated to undertake serious check on the relevant information. Besides other regulations, the following requirements should be abided by applicants during the application writing process:

(1) In the curriculum vitae column, detailed information regarding work experience, educational backgrounds (including institutes, degrees, and the names of supervisors), research projects undertaken and related assessments, and publications of the project leader and main participants should be provided. For each of the publications, the title of the journal, names of all authors, article title, year of publication, volume number, and page numbers are required to be listed.

(2) 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 the publications that have been accepted and waiting to be published, a copy of the acceptance notice should be provided in the proposal.

(3) One proposal is not allowed to be submitted 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 who have just started NSFC projects in recent two years

To ensure that project leaders invest adequate time and energy in their on-going projects, the applications from those who gained any kind of NSFC projects as a project leader in 2013 and 2014 (especially 2014) will be reviewed and assessed through stricter criteria.

4. Consideration of the performance of accomplished projects

The Department of Management Sciences conducts performance evaluation on all General Program projects, Young Scientists Fund projects, and Fund for Less Developed Regions projects one year after their accomplishment. The evaluation results will be released to the public on NSFC website. Researchers with good results of performance evaluation will be given priority for funding when they apply for new grants. However, researchers with bad results of performance evaluation will undergo stricter review procedures when they apply for new grants.

In 2015, the average funding intensity of General Program projects will be 500,000-650,000 yuan per project, and the funding period will be 4 years.

Funded General Program Projects of the Department of Management Sciences in the Last Two Years

Unit: 10,000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Management science and engineering	200	11 200	19.42	182	10 920	22.84
Division II	Business administration	215	12 040	17.95	192	11 520	21.43
Division III	Macro-management and policy	297	16 630	15.18	286	17 170	18.64
Total		712	39 870	17.02	660	39 610	20.45
Average funding per project (Unit: 10,000 yuan)		56.00			60.00		

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 sciences, 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 of Management Science and Engineering 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 2014, the Division of Management Science and Engineering received a total of 797 applications for General Program and funded 182 of them. The funding rate was 22.84%.

In recent years, the discipline of management science and engineering has been experiencing rapid development in China, meanwhile the number of high-quality papers published by Chinese scholars in international journals has been increasing. In particular, the academic abilities of a good number of young scholars under the age of 45 have been enhanced significantly. These young scholars are paying close attentions to global academic frontier. However, many applications in previous years still relied on western theories and methods. Applications with original and innovative insights were very rare, and very few applications were focused on exploring scientific issues brought up from management practices in China.

In 2015, the Division of Management Science and Engineering will continue to encourage applicants to aim at exploratory research on frontier issues, actively support the applicants to conduct research on management theories, techniques and methodologies with the consideration of the specific requirement and the status of management practices in China, and to conduct management science research with substantial international

scientific cooperation. The Division encourages the project leaders to publish their research work in reputable international journals.

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 2014, the Division of Business Administration received a total of 896 applications General Program and funded 192 of them. The funding rate was 21.43%.

In 2014, many applications were focused on marketing management, logistics and supply chain, corporate finance and finance management, accounting theory and method, strategy management, management innovation, and organizational behavior, and correspondingly, the number of funded projects in these fields was larger than in others. Although the number of applications in the fields of service management, production and quality management, and the non-profit organization management was small, the funding rate increased compared to that in 2013. In general, the proposals aiming at new methods and technologies have shown some innovative charateristics, and the number of applications focusing on new issues and practical needs in China has been increasing. From a perspective of funding areas, a balanced distribution of funding areas has been formed.

In 2015, the Division of Business Administration 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 brought up from China's management practices, which have potential social application values, and the research with substantial international cooperation. The Division promotes scientific spirits, encourage exploration, and support original fundamental research.

In order to promote the balanced development of discipline, the Division of Business Administration will continue to support frontier fundamental research in areas of corporation theory, corporation strategy, company finance, accounting, organization behavior, entrepreneurial and innovation management, marketing, e-commerce and business intelligence, logistics and supply chain management, etc. And 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. Meanwhile, the Division will strengthen the support in areas of new theory of integrating big data exploration and micro-management, new technology and method research, fundamental issues on China’s health operation and management, and theory innovation research based on Chinese management practices.

Division III of Management Sciences

The Division of Macro-management and Policy is a comprehensive discipline, which focuses on behavior laws of the government and related public administrations in formulating micro-policies and implementing comprehensive management to achieve the economic and social development goals. The Division supports the following research areas: macroeconomic management and strategies, financial management and policy, tax management and policy, industry policy and management, agriculture and forestry economics management, 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, regional development management, information resources management, etc., with the aim of promoting the discipline development, improving academic innovation, developing talented scientists and research groups. The Division encourages researchers to provide consultation, support and suggestions to the government for national macro decision-making while developing related theories and

methodologies.

In 2014, the Division of Macro-management and Policy received a total of 1,534 applications for General Program and funded 286 of them. The funding rate was 18.64%.

During last few years, many applications focused on resource and environment management, agriculture and forestry economy management, health management and policy, financial management, macroeconomic management. The funding rates of the areas of agriculture and forestry economy management and macroeconomic management were relatively higher. The number of applications inpublic security management and educational management has been increasing gradually, in particular, the applications in the areas related to urbanization and population aging increased more rapidly, indicating that researchers have paid closer attention to the key issues brought up from management practices.

In 2015, on the basis of disciplinary strategic priority areas, the Division of Macro-management and Policy will continue to focus on internet finance management, new-type urbanization development, social governance, health service management, social security and aging society, public security and crisis management (emergency management), etc.

The applicants should take China's practical management issues as the main research objects, and bring up scientific theoretical issues from the research objects accurately. Special attentions should be paid to the scientificity and normativeness of the research methods. Applicants should be able to differentiate between management science research and actual management work, and between a Natural Science Foundation project and a project in humanities and social sciencesin terms of research methods. The scope of the research topic should be appropriate, the research goal should be concentrated, the research content should be specific and concrete. The research method and technology roadmap, as well as how to address the key scientific issues bought up in the application, should be clearly clarified.

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 and population level by using new multi disciplinary 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) In-depth systematic research based on accumulated scientific data or collection of clinical samples.
(9) Cohort epidemiological research.
(10) 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 highlight research of rare diseases, and support weak research areas in an effort to keep the balance and coordinative development of various disciplines.

1. Specific instructions for applicants

(1) Applicants are encouraged to carry out in-depth basic research on 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 literature review of the relevant research. In case of extensive applications of previously funded project, the innovative ideas and further scientific problems of the research are expected to be elaborated in detail. Besides, all the relevant published papers are expected to be listed, and relevant unpublished results including experimental data, tables and graphics, pictures etc. are attached.

(5) Applicants are expected to provide true and accurate information in their applications, including the applicants' curriculum vitae, previous grant information and relevant publications. In the curriculum vitae, both education and working experience are expected to be included (in chronological order with exact months and years, keeping the timeline consistent). Besides, a list of the coding number of previous grant and the brief description of relevant research progress is required. 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, 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, 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 scanned 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 have good performance records in their previous grants and will be given priority funding if they have done so

in their previous grants.

(8) Applicants are expected to pay special attention to the following policy: the Department in 2015 will generally not give further funding to applicants who got relatively big funding in 2014 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 (such as the National Basic Research Program (973) projects, the National High-Tech R&D Program (863) projects, and the National Major Special Funding projects etc.).

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

(10) Applicants are expected to provide a formal appointment agreement by the research institution with a specific explanation of the appointed position, duration and the required working time if they are part-time workers in the research institution,.

(11) Applicants are expected to refer to 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 year 2010, 2011, 2012, 2013 and 2014, the number of applications was respectively 30,727 (from 810 research institutions), 40,179 (from 888 research institutions) and 46,570 (from 988 research institutions), 41,326 (from 948 research institutions), and 40,696 (from 961 research institutions), accounting respectively for 25.8%, 26.35%, 27.10%, 25.5% and 26.47% of the total applications in NSFC.

To reduce the great pressure resulting from the dramatic increased applications and to reduce the number of applications for low level repeated research, the policy of limiting the number of applications was adopted by the Department in 2013, which led to an obvious effect. In 2013, the total number of applications for General Program, Young Scientist Fund and Fund for Less Developed Regions, is 38,720, accounting for 26.72% of the total number of applications in NSFC, 12.69% lower compared to 2012. In 2014, the total number of applications for General Program, Young Scientist Fund and Fund for Less Developed Regions is 38,289, accounting for 27.90% of the total number of applications in NSFC, 1.11% lower compared to 2013

To sustain 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~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 in understanding mechanism of diseases, and identifying new drug targets, but also in 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, and 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. Applications for Young Scientist Fund and Fund for Less Developed Regions are not included. The funding intensity is averagely 1.5 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 applications are expected to focus on the development of new animal models for mimicking major common human diseases (including TCM symptoms), rather than on studies based on available animal models of diseases. Applications aimed at buying or developing animal models from companies or other institutions are not included.

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.

5. Funding overview of the last two years and the budget for General Program in 2015

The funding intensity of the General Program in the Department is expected to be basically the same as that in 2014, 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.

In 2014, the number of Divisions of the Department changed from eight to ten. An overview of the award number, funding, and success rate of the General Program in 2013 and 2014 in the Department is listed in the tables below.

Funding for General Program Projects in 2013

Unit: 10,000 yuan

Divisions		2013		
		Projects	funding	Funding rate++ (%)
Division I	Respiratory System, Circulatory System, Digestive System, Blood System, Gerontology	546+41*	38,493+656*	21.12
Division II	Urinary System , Reproductive System/ Perinatology/Neonatology, Endocrine System/ Metabolism and Nutrition Support, Ophthalmology, Otorhinolaryngology Head and Neck Science, Oral and Craniomaxillo-facial Science	491+44*	34,570+704*	21.13
Division III	Neurological and Psychiatric Diseases	301+26*	21,258+416*	22.14
	Medical Imaging and Biomedical Engineering	190+22*	13,347+352*	21.26
Division IV	Medical Pathogenic Microorganisms and Infection, Skin and Appendages, Orthopedics and Sports Medicine, Emergency and Intensive Care Medicine/Trauma/ Burns/Frostbite/plastic Surgery/Special Medicine/ Rehabilitation medicine	397+32*	27,962+512*	21.23
Division V	Oncology	736+70*	51,884+1,120*	20.05
Division VI	Preventive Medicine, Endemiology, Occupational Medicine, Radiology	181+18*	12,763+288*	25.25
	Medical Immunology, Forensic Sciences	130+15*	9,323+240*	30.15
Division VII	Materia Medica and Pharmacology	229+22*	16,109+352*	22.37
Division VIII	Chinese Medicine ,Chinese Materia Medica, integrated Chinese and Western Medicine	536+45*	37,601+720*	18.18
Total		3,737+335*	263,310+5,360*	20.98
Average funding per project		65.98 (70.46**)		

Notes:*One year program

** One year program not included

++ One year program included

Funding for General Program Projects in 2014

Unit: 10,000 yuan

Divisions		2014		
		Projects	funding	Funding rate++ (%)
Division I	Respiratory System, Circulatory System, Blood System	401+25*	29,557+750*	25.12
Division II	Digestive System, Urinary System ,Endocrine System/ Metabolism and Nutrition Support, Ophthalmology, Otorhinolaryngology Head and Neck Science, Oral and Craniomaxillo-facial Science	501+19*	36,582+570*	24.31
Division III	Neurological and Psychiatric Diseases, Gerontology	316+15*	23,296+450*	23.83
Division IV	Reproductive System/ Perinatology/Neonatology, Medical Immunology	211+11*	15,511+330*	28.76
Division V	Medical Imaging and Biomedical Engineering, Special Medicine, Forensic Sciences	205+13*	14,922+390*	24.20
Division VI	Medical Pathogenic Microorganisms and Infection, Orthopedics and Sports Medicine, Emergency and Intensive Care Medicine/Trauma/ Burns/laboratory medicine/plastic Surgery/ Rehabilitation medicine	341+17*	25,046+510*	21.23
Division VII	Oncology (leukemia not included)	694+34*	50,642+1020*	21.34
Division VIII	Skin and Appendages, Preventive Medicine, Endemiology, Occupational Medicine, Radiology	212+12*	15,421+360*	26.32
Division IX	Materia Medica and Pharmacology	223+13*	16,300+390*	24.87
Division X	Chinese Medicine, Chinese Materia Medica, integrated Chinese and Western Medicine	516+21*	37,483+630*	21.53
Total		3620+180*	264,760+5400*	23.33
Average funding per project		71.09 (73.14**)		

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 abnormalities, lung and airway immunity and transplantation, alveolar and blood barrier, lung fluid balance and pulmonary edema, respiratory infection and defense response, lung injury, repair and remodeling, airway inflammation and asthma, chronic obstructive pulmonary disease, pulmonary circulation and pulmonary vascular disease, interstitial lung disease, sleep apnea, respiratory regulation and disorders, pleural disease, and new techniques on 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 attention. 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. 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 years, proposals in the respiratory areas mainly focus on airway inflammation and 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.

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. The elucidation on the roles of epigenetic regulation in the development and intervention of cardiovascular diseases has become a new trend in recent years. Applicants are encouraged to carry out original and translational research, working together with clinicians, developmental biologists and genetic biologists, to study the mechanism 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 make great achievements with independent intellectual properties. The studies 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 received cover all scientific topics in circulatory system, and most proposals are related to atherosclerosis and coronary heart diseases. We will emphasize the studies in the field of cardiac/vascular injury and protection, arrhythmia, hypertension, and heart failure.

Hematological System (H08)

The division mainly supports original researches on hematopoietic stem cell, organ development and formation, hematopoietic stem/progenitor cell and hematopoiesis regulation, red cell and its diseases, leukocyte and its diseases, platelet and its 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, bone marrow/umbilical mesenchymal stem cell and blood disease treatment, blood typing and blood transfusion, hereditary hematologic disease, lymphoma, myeloma, diagnosis and treatment methods for hematological diseases, novel research methods for hematological diseases.

Special reminder: From the beginning of 2015, grant applications for hematologic lymphoma studies will be processed in Division I, and its application code will be changed to H0818 from H1616.

The current research hotspots in hematology field include: regulation of

hematopoiesis and hematopoietic cell reprograming; interaction between hematopoietic cell and leukemic cell and their microenvironment under the disease condition; drug resistance in malignant hematologic tumors and clonal evolution of malignant hematologic diseases; 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, in the hematological research field in China, well trained and active research teams have been formed and obtained series of original findings and achievements. Thus, the applicants are strongly encouraged to raise basic research questions from clinical perspective, propose basic research that are closely related to the challenges in clinical practice, especially for those translational research utilizing clinical resource. The applicants are also encouraged to establish hematological research platform and innovative disease research models by using the state-of-the-art technologies that can be shared by researchers in the field.

In the 2014 grant application cycle, the applications in leukemia category accounted for 36% of total applications in hematologic system, followed by 18% for myeloma and lymphoma, and 11% for hematopoietic 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.

Both the respiratory and circulation areas contain studies on pulmonary circulation and pulmonary vascular disease. Applicants can select the application code based on their specific scientific questions.

Applications focusing on respiratory oncology are required to select application code in Division VII of Health Sciences (H16). Applications focusing on the biological characteristics of pathogenic microorganisms are required to select corresponding application code in Division VI of Health Sciences (H19).

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-tumorous 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, amounting for 13.6% of all proposals last year. Other research interests in liver diseases were hepatic regeneration, liver protection, liver failure and artificial liver (10.2%), metabolic dysfunction of liver and related diseases (8.2%). Other proposals covered mechanisms of internal environment disturbance of GI tract, intestinal mucosal barrier impairment and related diseases (9.3%), immune-related diseases of digestive tract (6.8%), abnormal GI motility and functional GI disorders (6.6%), pancreatic exocrine dysfunction and pancreatitis (6.6%), digestive organ transplantation (6.5%). 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 internal environment disturbance, mucosal barrier abnormalities and related diseases, immune diseases of digestive system have increased significantly in recent years. Mechanism of gastrointestinal motility and functional GI disorders get lots of attention. Drugs, toxicants or alcohols-related digestive diseases are also hot issues in this field. Research on these important issues 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 functional disorders and abnormal development 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 2014 was slightly less than that in 2013. The submitted proposals mainly focused on kidney diseases, such as secondary renal diseases (19%), damage and repair of the urinary system (13.5%), renal failure and alternative therapy (12.0%), primary renal diseases (11.4%). The amount of proposals focusing on prostate, bladder diseases and urodynamic study was similar as that in 2013. 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 and abnormal development of endocrine system, including disease related research of endocrine system and endocrine abnormal of other non-traditional endocrine organs, and supports various dysfunctions of metabolism, malnutrition and nutrition support. The amount of proposals in 2014 decreased 11.1% compared with that in 2013. The majority of proposals were related to diabetes (51.8%). The percentages of proposals on energy metabolism/obesity and thyroid diseases were 15.8% and 5.3%, respectively. Few proposals were on abnormality 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 give preferential support to 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 2014, accounting for 31.1% of total proposals, followed by glaucoma (17.5%), corneal diseases (16.3%), optic nerve and visual pathway related diseases (9.6%). 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.

In the field of otorhinolaryngology, the proposals in 2014 mainly focused on auditory abnormality and balance disorders, amounting for 35.7% of total proposals. The next were olfactory, nose and anterior cranial base diseases (26.2%), which 6.8% higher compared with that in 2013. Significant increase was noticed in the proposals on throat and neck diseases. Hearing related researches were key issues in otology, including the genetic and molecular pathogenesis on various types of deafness, and signal pathways related with hear damages. The amount of proposals focusing on words and music recognition related studies after cochlear implantation was similar as that in 2013. Pathogenesis of rhinitis and sinusitis, allergic rhinitis and its immunotherapy were hot spots in the field of nosology. Proposals on the throat diseases were mainly focused on pararthria and functional repair. Pathogenesis and interventional treatments Tinnitus, acoustic sensitivity, circumgyration, and dysosmia will be the future direction. In areas of oral and craniomaxillo-facial science, more proposals are on the periodontal and oral mucosa diseases, accounting for 19.4% of total proposal, followed by tooth defect, anodontia, repair and correction of dentognathic deformity (15.8%), as well as dental pulp and periapical diseases (13.4%). The number of proposals on the development of teeth and periodontal tissues, dental-derived and other sources of stem cells reached 160. Destruction and reconstruction of jaw bones and alveolar bones were still hot fields. The researches on the implant materials and their peripheral tissue structure changes covered multiple disciplines, and the number of related proposals slightly decreased compared with that in 2013. More disciplines participated in the research of temporomandibular joints, orthodontic and repair materials. The Division will continue to support researches on the most severe, common, complicated diseases or functional disorders in the above field, support research on pathogenesis, diagnosis, novel treatment procedures and functional reconstruction, and support researches on areas related to general health of human body.

Division II will not support researches on cancer in the above areas. All applications on cancer research in those areas should be submitted to Division VII of Health Sciences (H16). The Division will not support researches on drug design and pharmacology either. Please submit the related proposals to Division IX of Health Sciences (H30, H31). Proposals on the male reproductive system and male sexual dysfunction is not

included in code H05, 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 III of Health Sciences

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

Neurological Diseases and Mental Disorder (H09)

The Division mainly supports basic and applied research regarding to 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 not only on common disorders in the nervous system such as cerebrovascular diseases, epilepsy, neurodegenerative diseases, and traumas and repair in brain and spinal cord, but also on rare nervous system diseases. Funding for researches on the pathogenesis of dementia after general anesthesia or mechanism of general anesthesia will be one of priorities in 2015. The etiological and relevant clinical studies of comorbidity in neurological and psychiatric diseases will be highly encouraged.

The modern disease spectrum is characterized by the rapid rise in the prevalence of psychological and psychiatric diseases. The efforts are mainly aimed to initiate studies regarding to early recognition, reliable diagnoses and treatments targeting at the etiologies and pathogenesis of these disorders based on unraveling biological mechanisms and etiologies. In 2014 most of applications focused on schizophrenia and depression, and studies on autism and attention deficit syndrome were much more than before. However there were still rare investigations on crisis intervention. In order to reduce the prevalence of psychological and psychiatric disorders in China, researches are encouraged to illustrate the mutual interaction between environment and genetics and their impact on the development of these diseases, unravel the potential etiologies, discover the practical biomarkers monitoring the development, progression and prognosis of the conditions, establish early diagnostic methods, and develop pharmaceutical and non-pharmaceutical methods for early intervention and treatment.

In the recent years, the applications in neurological diseases showed an obviously homogeneous trend, predominantly in stroke, epilepsy and neurodegenerative diseases. There was a significant increase in the applications on clinical practice studies of neural stem cells and epigenetic mechanisms in neurological diseases in the year 2014, which will be continuously supported in the future. The novel studies on rare neurological hereditary diseases with genetic approaches will be continuously funded in the future. Studies using animal models such as non-human primates, drosophila and zebrafish will be encouraged. Although the applications for clinical study on cerebrovascular diseases increased, the clinical data collection in involved studies commonly not met with criteria. It is needed to perform the clinical trials with a unified standard for data collection and strengthen basic and clinical studies in early intervention, revascularization and functional recovery in patients with stroke. Researches on the mechanisms underlying pain, especially the chronic pain, need to be strengthened by the collaboration of basic and clinical studies. Studies on postoperative cognitive dysfunction and mechanism of general anesthesia have attracted great attention by anesthesiologists. The basic research on this field is not strong enough in China and need to be improved by international academic exchange and collaboration with advanced research groups around the world. Two or three general program projects will be highly funded to encourage researchers in this field in the year 2015. The Division hopes to balance its support among applications from neurology, neurosurgery, psychiatric medicine and related clinical medicines such as pediatric medicine and anesthesiology. Clinicians and researchers in basic neurosciences are encouraged to jointly apply to perform scientifically significant investigation.

Gerontology (H25)

The funding scope mainly covers studies on pathophysiological mechanisms of aging and its related diseases. Studies on organismal pathophysiological changes, common mechanism of various diseases with respect to the aging process are encouraged and supported, including: molecular mechanism of (stem) cell senescence and its association with organ function and maintenance, as well as the aging-related diseases. The effect of inflammatory response and fibrosis on tissue/organismal senescence and the development of aging-related diseases. The mechanism and role of cellular stress, impaired signaling transduction, metabolic/autophagy disorder, (epi-)genetic dysregulation, protein translation and degradation in

aging-related diseases. The effect of cell membrane structural aberration, organelle damage, protein denaturation, nucleic acid (including mitochondrial DNA) injury on tissue/organ senescence and aging-related diseases. The anti-aging effect and mechanism of calorie restriction, exercise, health management and other approaches. The overall goal of gerontology is to provide fundamental experimental basis for 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 the diseases not related to aging mechanisms should be submitted to the appropriate systems.

Division IV of Health Sciences

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

Reproductive System/Perinatology/Neonatology (H04)

The Division mainly supports studies on abnormalities of the function and development of reproductive system , damage and repair, inflammation and infection, and reproductive endocrine disorder and related diseases, hereditary diseases, non-neoplastic diseases of reproductive system; and the oogenesis, spermatogenesis, fertilization, embryo implantation and fetal development, prenatal diagnosis, the structure and function of placenta and pregnancy related diseases; neonatal diseases; abnormalities of breast structure, function and development; contraception, birth control and termination of pregnancy; female infertility and assisted reproduction, reproductive medical engineering, and new technology for the reproductive system/perinatology/neonatal disease diagnosis and treatment. The Division received 1,113 proposals in 2014. The proposals mainly focus on pregnancy and pregnancy related diseases (165), neonatal diseases (138), female reproductive endocrine disorders (92), endometriosis and adenomyosis (81), female infertility and assisted reproduction (73), abnormal spermatogenesis and male infertility (71), embryo implantation and early embryonic developmental abnormalities (70), and prenatal diagnosis of fetal development (59) etc. Hot fields such as microRNA regulation, stem cell transplantation and stress were all involved. The study of male reproduction projects mainly focused on abnormality of spermatogenesis, male infertility

and male sexual dysfunction, and major scientific research covers the pathogenesis and targets for treatment. There was not much research on male contraception and male climacteric and relatively less research on abnormalities of breast structure, function and development. The Division will give special attention and support to the neglected research field mentioned above. In addition, the Division will actively support the basic and clinical research in close cooperation, and encourage the combined basic and applied research to solve new issues and new phenomena found in clinical practice.

Medical Immunology (H10)

The funding areas of this discipline cover basic and translational research in areas of morphological, structural, functional and developmental abnormalities of immune cells, tissues, organs and immune system, as well as the mechanism underlying immune pathological process, immune regulation and tolerance, immunization, immunodiagnostics and immunotherapy of various diseases. Key research directions and areas are as follows: new immune cells and their subsets, new immune molecules and signal transduction pathways, and their relevance to diseases. The effect of epigenetic modification on immune cell differentiation, and its relevance to diseases. The mechanism underlying the immune recognition-responses-effects by both innate and adaptive immune systems. Research involving infectious diseases, inflammatory diseases, hypersensitive diseases, autoimmune diseases, immunodeficiency diseases, transplantation immunology and organ transplantation, and the mechanism underlying vaccines, adjuvant, routes of vaccine inoculation and immunization strategy etc. This discipline received 780 General Program applications, most of these applications were focused on autoimmune diseases (281 applications), inflammation and infection immunology (155 applications), organ transplantation and transplantation immunology (75 applications), and immune response related factors and diseases (63 applications). The Division will highlight immunological studies in the above areas, especially studies aiming at taking advantages of the unique genetic or disease resources and establishing unique research systems or technical platforms (such as unique cell models or animal models, molecular targeting techniques, etc.), studies aiming at understanding the common mechanism underlying human immune-mediated diseases by creating or modifying appropriate animal models, systematic immunological studies that are intended to understand the immune-related features across various diseases spectrum by immunoinformatics, immunogenomics and computational immunological techniques, collaborative studies on scientific issues

emerging from clinical practices by both basic and clinic researchers, as well as visualized disease-related studies on immune systems and immune response processes by utilizing the newly developed real-time dynamic imaging techniques (MRI, PET, co-focal laser microscopy and living cells imaging etc.).

The application code H04 in this Division will not accept the applications on reproduction system tumor research. These applications should be submitted to Division VII (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 is 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 the application of image to solve scientific problems related to medicine is mainly funded, including magnetic resonance imaging (MRI), X-ray and computed tomography (CT), ultrasound in medicine, nuclear medicine, medical photonics and optical imaging, functional and molecular imaging, data processing and analysis of medical images. Meanwhile, the explorative interdisciplinary studies in the scientific forefront of this field, including the areas of molecular imaging and targeted therapy, functional imaging, interventional medicine, 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 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 and imaging, biomedical sensors, medical optics, 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 equipment, micro-nano-sensors and system, drug delivery materials and gene transfer systems, biomaterials, tissue engineering and regenerative medicine, artificial organ, and other scientific issues. Basic researches on brain imaging and intervention, implantable electromechanical system, bio-manufacturing 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 equipments, cell/stem cell therapy, bioreactor of tissue engineering/construction, and tissue regeneration inducing biomaterial are also encouraged in this field.

Medical Aspects of Specific Environments (H21)

Medical aspects of specific environments are a research area aims at the special health care needs of the population under special environment, to solve various special medical problems in practice, and to recognize the physiological and pathological phenomenon and patterns in special environments at molecular, cell and integral levels. In terms of special medicine, the Division mainly supports basic research aiming at the pathophysiological phenomena and their therapies under aeronautical, astronautic, nautical, submarine, plateau, alpine condition, high temperature, polar region and other extreme environmental conditions. The application of the medical, chemical, biological, and modern engineering technologies to systematical research of the medical aspects of special environments is also encouraged. Interdisciplinary studies within medical sciences in special medicine, interdisciplinary studies between special medicine and biomedical engineering or other natural sciences are supported. The issues of medical science, disease prevention and treatment under special environments such as aeronautical, astronautic, nautical, and submarine will be highly supported in general programs.

Forensic Medicine (H23)

Forensic medical funding covers the basic and applied basic research to resolve the biomedical identification problems in judicial practice. The

funding fields mainly include the identification of the 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 drugs; the forensic evidence associated with the evaluation of the degree of injury and damage; the objective evaluation of the legal capacity of people with mental disorders; the individual identification, the paternity identification, the tissue origin identification and ethnic origin identification. Profound and systematic research using the theories and techniques of physics, chemistry, biology, medicine, law and informatics, etc. in forensic medical field is strongly supported. The cross-disciplinary research within forensic medical field and the cross-disciplinary research with bioengineering, other scientific disciplines and sociology is also strongly supported. The cross-disciplinary research will provide the forensic evidence for the investigation, judgment and legislation in judicial practice.

The development of medical imaging and biomedical engineering has been accelerated by multidisciplinary studies. In 2014 there were 901 applications in medical imaging and biomedical engineering, of which 205 applications funded with a funding rate of 22.75%. The funding rate has increased compared with 2013. Meanwhile, the number of applications in biomedical engineering is stable. To further promote the rapid development of medical imaging and biomedical engineering disciplines, the division will continue to encourage multidisciplinary researches and cooperation among 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. In 2014, applications in the areas of medical aspects of specific environments and forensic medicine are still stable. To promote the developments of these two areas, the applications with different academic background are encouraged to engage in the scientific exploration.

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

Division VI of Health Sciences

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

Medical Pathogens and Infection（H19）

The Division VI 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, and related basic research on clinical diagnosis and therapeutics of infectious diseases. 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 is highly encouraged. The studies on all types of the clinical pathogenic organisms, especially on the emerging and rarely concerned pathogenic organisms, will be preferentially supported.

Laboratory Medicine（H20）

In laboratory medicine, the funding scope mainly covers research on new theory, new indicators, new methods and new technology aimed at exploring the disease risk prediction, diagnosis, disease-monitoring, as well as the evaluation of the efficacy of therapeutics and prognosis. Key funding scope is mainly focused on the discovery and identification of sensitive and specific markers, the new indicators and technique in personalized therapeutics, new techniques in immune labeling, rapid isolation and identification of clinical pathogens as well as rapid analysis on drug-resistance of clinical pathogens, the main quality issues of the important inspection items as well as the reference methods and the scientific questions and technology related to the reference materials. The projects based on the clinical practice and clinical samples are encouraged.

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

The Division mainly focuses on scientific issues including the pathophysiology, pathogenesis, influencing factors, prevention, diagnosis and treatment in the field of emergency and critical care medicine, trauma, burns and frostibite, etc. The Division also focuses on researches in plastic surgery which includes wound healing and scar treatment, repair/regeneration/transplantation and reconstruction of superficial tissues and organs, and related scientific issues in correction of congenital malformations and medical cosmetology. In addition, the Division encourages interdisciplinary research.

Locomotor System（H06）

The Division mainly supports the researches focusing on the basic scientific problems of the anomalies 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 also encouraged in the Division. 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 or nervous system or other relative organ/systems.

In view of research proposals received in recent years, the academic quality of proposed research in the Division VI improved rapidly. In the basic research field, more and more scientists devoted themselves to indigenous innovative issues for promoting their research with the international standard. They focus their work on the actual status and serious problems of health and safety of the country, and carry out studies in selective topics or fields that are in urgent needs but weak in actual research. However,

non-negligible problems still exist, mainly reflected in the insufficient cooperation between medical experts and biologists, clinical experts and basic research experts, which leads to emergence of superficial research without focusing on the key scientific problems. For example, in the field of pathogenic microbe and infection, due to the lack of efficient cooperation with biologists, research on the biological characteristics and the rule of heredity and variation of pathogen are superficial and unsystematic. In the field of locomotor system diseases, without proper understanding of the research literature, a number of scientists are not able to narrow down and focus on the key scientific issues. Regarding the issues above, Division VI will give moderate favor to studies on the weaker fields.

The applications in pathogenic microorganism should seriously comply with the "Pathogenic microbiology laboratory bio-safety regulations" issued by the State Council and rules of "Ethics and Bio-Safety" issued by related authorities. Those applications not complied with those regulations and rules will not be granted. At the same time, tumor related proposals in the field of locomotor system are not accepted in Division VI. These applications should be sent to Division VII (H16). In addition, researches 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. Please apply it in other appropriate Divisions. Researches on drug-resistant pathogens should choose the code of Variation of Pathogen and Drug-resistance (H1908).

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 scope of funding covers 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 our 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. Meanwhile, 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, tumor systemic biology. Recently, research on cancer epigenetics has emerged as a rapid moving field. For example, the molecular functions of long noncoding RNA have aroused the interest of many scientists. 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 role in tumorigenesis and cancer development have been appreciated, which is supported by results from evidence-based medicine. Some proposals have focused on the

association between specific metabolism of tumor cells and their biological behaviors. Some proposals have focused on the role of metabolism pathways in tumorigenesis and tumor development, as well as 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 tumor cell glycolipid metabolism 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.

In recent years, the quality of proposals in the field of oncology has been significantly improved, in terms of preliminary experimental data and scientific hypothesis. Proposals lacking preliminary data and deducing and tackling scientific issues merely through literature reviewing are declining each year, and are losing the support from reviewers.

Applicants are encouraged to discover and deduce 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 (applicaion 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. For example, proposals of nervous system tumor should choose the application code of nervous system tumor (including tumor of special receptors) (H1618). Proposals of thyroid tumor should choose the application code of endocrine system tumor (H1623). Proposals of

nasopharyngeal cancer should choose the application code of tumor of head, neck and maxillofacial region (H1625). Proposals submitted with wrong application codes would be rejected.

Division VIII of Health Sciences

Division VIII of Health Sciences provides funding to the basic researches 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 researches on the structure, function and development abnormalities of skin and its appendages, as well as hereditary skin diseases, immunological skin diseases and infectious skin diseases.
- Radiology (H22)
  Funding is given to basic researches including radiation damage, radiotoxicology and radiopathology, radiation hygiene and radiological protection, and radiotherapy for non-neoplastic diseases.
- Endemiology (H24)
  Funding is given to basic researches regarding the natural focus diseases, biogeochemical diseases and work-related or life style-related diseases.
- Occupational Medicine (H24)
  Funding is given to basic researches concerning diseases due to exposure to occupational hazards.
- Preventive Medicine (H26)
  Funding is given to basic researches including environmental health, occupational health, human nutrition, food hygiene, maternal and child health care, children and adolescent health, toxicology, sanitary chemistry, epidemiology of infectious disease, epidemiology of non-communicable disease, epidemiological methods and medical statistics.

With the dramatic increase of immune mediated skin diseases and infectious skin diseases in this field and their threats to the public health, scientists should pay more attention to the pathogenesis and prevention of related skin diseases.

Funding of radiology, endemiology, occupational medicine and preventive medicine will be mainly focused on researches 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 advanced technology. 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 and systematic study. The basic research on epidemiological cohort study and intervention strategy will be also encouraged.

Oncology projects in the field of skin and its appendages will not be accepted in Division Ⅷ. These applications should be sent to Division Ⅶ (H16). Division Ⅷ does not accept applications for cancer radiotherapy studies. Applicants may refer to categories under Division Ⅶ of Health Sciences (H16). Division Ⅷ does not accept applications for radiodiagnosis and iconography. Applicants may refer to categories under Division Ⅴ of Health Sciences (H18). Moreover, Division Ⅷ does not accept applications for studying gynecologic diseases and pediatric diseases. The former may refer to categories under Division Ⅳ of Health Sciences (H04), while the latter depends on its classification of system characterization. Application for clinical test was not accepted under the category of hygienical analytical chemistry. Applicants may refer to categories under Division Ⅵ of Health Sciences (H20). Division Ⅷ does not accept applications for pure laboratory research under the category of epidemiology. Application for hereditary disease without regional characters will not be accepted under the category of endemiology. The criterion for selecting the category depends on the classification of system characterization. In addition, Division Ⅷ does not accept applications for drug toxicology and applicants may refer to categories under Division Ⅸ of Health Sciences (H31). Other issues in preventive medicine (H2612) do not accept applications for hygienical economics or hospital management. Applicants may refer to categories under Department of Management Science. Division Ⅷ does not accept applications for pathogen biology approach to infectious disease, as well as the pathogenesis, diagnosis and treatment. Applicants may refer to categories under Division Ⅵ of Health Sciences (H19).

Division IX of Health Sciences

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

Funding granted in the discipline of Materia Medica (H30) covers 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 druggability researches. Funding granted in Medicinal Synthetic Chemistry, Natural Products Chemistry, Microbial Medicines and Marine Drugs mainly supports research 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 supports research on innovative biotechnologies or approaches to obtain therapeutic antibodies, vaccines, proteins, nucleic acid drugs, cells, etc., while exploratory research on new types of expression systems and large scale culture techniques will be supported reasonably. Funding granted in Special Medicines supports drug research related to aeronautics, astronautics, deep sea, radiations, militaries, special environments etc. Funding granted in Drug Design and Drug Informatics supports research 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 supports research on innovative theories, technologies and evaluation methods, which is associated with Physical Pharmacy, Biopharmaceutics, Molecular Pharmaceutics, Novel Drug Delivery Systems and Pharmaceutical Dosage Forms. Funding granted in Pharmaceutical Materials mainly supports basic research on establishment and safety evaluation of new pharmaceutical excipients and carriers, which should have own prominent features and can be distinguished from research in the area of Pharmaceutics. Funding granted in Pharmaceutical Analysis mainly supports basic research 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-disciplinary coordination, such as in the fields of "-omics", Drug Metabolism (ADME) and Pharmaceutical Analytical Informatics, should mainly focus on innovation of analytic approaches. Funding granted in Drug Resources mainly supports research on key scientific issues associated with discovery, exploration, sustainable utilization and protection of new pharmaceutical resources.

Funding granted in the discipline of Pharmacology (H31) supports researches on drug action mechanism or drug resistance mechanism (H3101-H3109), Drug Metabolism and Pharmacokinetics (H3110), Clinical Pharmacology (H3111) and Drug Toxicology (H3112) etc. The involved drugs should be therapeutic drugs or drug candidates or bioactive substances with some advantages in treatment of a disease. In the discipline of Pharmacology, projects mostly focus on further 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, further 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 of new types of bioactive compounds, 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 program, translational medicine, innovative pharmacological model 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. In the sub-discipline of drug toxicology, researches should be strengthened in the research fields as below: molecular toxicology, mechanism on genotoxicity and reproductive toxicity, mechanism on metabolite toxicity, new models and new approaches for drug safety evaluation.

In recent years, a large proportion of proposals in the discipline of Materia Medica were from subdisciplines of Pharmaceutics, Medicinal Synthetic Chemistry, Natural Product Chemistry, in which, many proposals were involved in antitumor drug research (in 2014, more than 50% proposals were involved in antitumor drug research in Pharmaceutics and Medicinal Synthetic Chemistry). It is necessary to expand research scope and change research directions to various diseases other than cancer. Meanwhile, the

research contents should be further in depth and researches on both druggability and delivery systems of compounds should be emphasized. In the discipline of Pharmacology, most proposals focus on drug action mechanism or drug resistance mechanism, some characteristic applications could be founded on the basis of long term accumulation, while most studies on mechanism were still limited to the description of biological activities on drug and fewer proposals were focused on the discovery of new targets and intensive study on molecular mechanism. Some proposals with good research direction and idea fail to be approved due to insufficient preliminary data and inadequate evidences, or oversized research plan, insufficient in-depth study, ambiguous research objects, etc. Quite a few proposals were not funded because their researches were short of innovation, or the applications were too simple without preliminary data.

Innovative basic research and continuous in-depth research will be given priority in grant decisions. Because translational medicine is of far reaching importance in improving clinical application value of basic research, laboratory basic research on discoveries of new drug, clinical therapeutics and diagnostics will be strengthened to unveil new targets for drug therapy, and new biomarkers for disease diagnostic in the course of exploring the mechanisms on occurrence and development of disease, which will lay theoretical and experimental foundation for developing innovative drugs and diagnostic reagents with independent intellectual property. The scope of funding does not cover conventional research and research on Pharmaceutical Process for new drug approval. Usually, chemical structures or backbone should be provided in application, but the applicants should pay special attention to the protection of intellectual property rights and carefully handle the relationship between application and confidentiality. Any confidential core contents or techniques such as chemical structures, which are inconvenient to illustrate in application, should be sent directly to the office of Division IX by confidential letters, and should be explained in application documents. If young applicants' applications are related with their advisor's research work (i.e. similar research or following research), it is necessary for them to provide letter of consent with signature by advisor(s).

Division X of Health Sciences

The Division X of Health Sciences identifies its role as advancing the theories of Traditional Chinese Medicine (TCM) 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: 1. 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; 2. 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; 3. Acupuncture and moxibustion, Tuina and massage: Meridians, Collaterals, and acupoints, acupuncture, moxibustion and Tuina and massage; 4. Other ethnomedicine.

Chinese Materia Medica (H28)

Funding areas: 1. 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; 2. 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; 3. Ethnopharmacology.

Integrated Chinese and Western Medicine (H29)

Funding areas: 1. Fundamental theories of IM; 2. Basic clinical research of IM; 3. Methodological or technical innovations in TCM research.

In recent years, funded projects in the field of TCM, CMM, and IM have the following features: 1. 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 on 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. 2. 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. 3. These projects also paid 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 the identification of its therapeutic mechanisms.

This division’s top priority is to support the best project proposal 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 in 2015 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; ethnomedicine.

A project proposal submitted to our division needs to focus on the seamless integration with TCM theory, avoid implementing a mechanism research that is not clinical efficiency-oriented, and 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 research disciplines 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 the 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-doc researchers and graduate 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 write 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 duration of a Key Program project is 5 years.

In 2014, NSFC funded 605 Key Program projects, with a total funding of 2.0462 billion yuan and an average funding of 3.3821 million yuan per project (please refer to the table below for details). In 2015, about 609 Key Program projects will be funded, and the average funding will be about the 3.28 million yuan per project.

Funding of the Key Program Projects in 2014

Unit: 10,000 yuan

Department	Applications	Funding and Projects Approved				Funding Rate (%)
		Projects	Funding	Average Funding per Project	Percentage of the total (%)	
Mathematical and Physical Sciences	281	72	25,350	352.08	12.39	25.62
Chemical Sciences	298	68	23,560	346.47	11.51	22.82
Life Sciences	544	95	31,000	326.32	15.15	17.46
Earth Sciences	481	79	27,770	351.52	13.57	16.42
Engineering and Materials Sciences	431	85	29,920	352.00	14.62	19.72
Information Sciences	311	80	28,000	350.00	13.68	25.72
Management Sciences	94	24	6,240	260.00	3.05	25.53
Health Sciences	585	102	32,780	321.37	16.02	17.44
Total	3 025	605	204,620	338.21	100	20.00

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 2014, the Department of Mathematical and Physical Sciences announced 84 areas for Key Programs, and received 281 applications. We funded 72 projects with amount of 253.5 million yuan and about 3.5208 million yuan per projects.

In 2015, the Department of Mathematical and Physical Sciences plans to fund 68-78, among them, about 13-16 in mathematics, 15-18 in mechanics, 9-12 in astronomy, 16-19 in physics I, and 15-17 in physics II. The average funding will be more than 2.8 million yuan per project for mathematics, and 3.6 million yuan for mechanics, astronomy, physicsI and physics II. The funding period will be 5 years. Please select 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 be sure to provide with the specific application code in the application.

In 2015, the main research directions are as follows:

1. Geometric method in coding and encryption (A0101, A0102)
2. Automorphic representation (A0101)
3. Quantum group and its application in mathematics and physics
4. Advanced problems in complex analytical clusters
5. Sub manifold and curvature flow
6. Theory and application of wavelet analysis
7. Theory and application of critical point
8. Theory and application of operator algebra
9. Dynamical systems with random phenomena
10. Non local dynamical systems
11. Mathematical theory of fluid boundary layer
12. Degraded elliptical partial differential equations and its applications
13. Random tree and random graph
14. Statistical deduction methods for big data in biomedical area
15. Combinational optical algorithm and theory driven by practical problems
16. Theory of infinite dimensional random control
17. Modeling and analysis the formation and movement of free interface in combustion and explosion of flammable gas
18. Mathematical theory and method in bio informatics
19. Mathematical method and theory in medical imaging diagnosis and treatment
20. Logical basis and quantitative modeling of complex deductions
21. Method of graph theory in network design
22. Mathematical theory and method for coordinated computation of complex multiple source hetero data
23. Numerical methods and theory of partial differential equations on manifold
24. Multi dimensional nonlinear and uncertainty system dynamics
25. Modeling, analysis and control of complex system dynamics
26. Deformation and damage mechanism of advanced materials and structures
27. Fatigue, fracture and structure reliability
28. Mechanical behaviors of material and structure in multi field conditions
29. Unsteady complex flow mechanism and control
30. Hydro dynamics of ships, marine and coastal engineering

31. Flow and propulsion mechanism of aircraft and space craft
32. Biomechanical problems in human health and medicine
33. Mechanical behavior of materials and structures in explosion and shock impact
34. Numerical methods and software for complex mechanical problems
35. New methods and technology in experimental mechanics
36. Key mechanical problems in environmental evolution and catastrophe
37. Key mechanical problems in high end equipment and advanced manufacturing
38. Key mechanical problems in extreme conditions
39. Key mechanical problems in new energy and resources areas
40. Theory and method of fluid solid coupling mechanics
41. Formation and evolution of first generation celestial body and large scale cosmic structure and measurement of its cosmic parameters
42. Formation, structure and evolution of galaxies, interstellar matter
43. Violent activities in active galaxy center and galaxy levels
44. Structure and evolution of very early Galaxy and different stellar populations
45. Star formation, structure and evolution, inter stellar matter
46. Star evolution in late period, compact stellar bodies and its related explosive phenomena and radiation mechanism
47. Celestial bodies in solar system and planetary systems outside the solar system
48. Fine structure, basic magnetic element diagnosis and property, magnetic field topology in active region and evolution of solar magnetic field
49. Origin, dynamical evolution, multi band electromagnetism and particle radiation of solar activity and solar earth physical property
50. Structure, heating and fluctuation of solar atmosphere
51. Basic theory and methods of astrometry and astro-mechanics
52. High precision astronomical parameter measurement and astronomical reference frame
53. Techniques and method for astronomical observation in space and extreme environment
54. Low noise and array receiving technology, digital signal processing and large aperture radio telescope technology
55. Autonomous optics, self-adaptive optics, optical interference and very large aperture telescope technology
56. Physical problems in new forms of energy

(1) Exploration and physical studies of new energy materials
(2) Physical mechanism of advanced energy saving materials and device
(3) Physical problems in efficient energy conversion and storage

57. Physical basis of quantum information
(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 solid quantum computation based on specific physical system
(4) Theory, scheme and experiment of quantum simulation
58. Physics of advanced functional materials
(1) Surface, interface and artificial micro structure physics
(2) New functional materials and device physics of self-spin information carrier
(3) Physical problems of smart materials
59. Physical problems in confined or relevant quantum systems
(1) Properties of electric transport, thermal transport and self-spinning transport in low dimensional system
(2) Dimension and topological physical properties in quantum system
(3) Ultra fast interference control of quantum state in micro nano structures
(4) Novel quantum state and quantum phase change in relevant electron systems
60. Physical problems in soft matter systems
(1) Structure, property and regulations of interface system
(2) Microstructure and interactions of soft matter
(3) Physical problems related to life sciences
61. Computation and simulation of matter structures and properties
(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
62. Atomic & molecular multi body interaction and physical process under extreme conditions
(1) Atomic and molecular property in high temperature and dense conditions
(2) Highly charged atom, high excitation state atomic & molecules and collision process
(3) High precision theoretical method and computation of atomic molecular multi body relevant effect
63. Quantum dynamic process of atomic molecular system
(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
64. New physics and new mechanism in photo electric conversion process
(1) New mechanism of photoelectric conversion in artificial micro nano structures
(2) Problems in efficient photoelectric conversion in solar energy applications
(3) Photo physical process in efficient energy conversion
65. Ultra fast, ultra strong light physics
(1) Ultra fast spectrum technology and its application in material science
(2) Ultra short laser pulse regulation and physics of wave carrier phase regulation
(3) Behaviors of atoms, molecules and clusters in ultra fast strong light field
66. New type of light source and new spectrum physics and technology
(1) THz radiation source, spectrum and their applications
(2) New mechanism, new method and applications of light filed spatial temporal regulation
(3) Highly efficient luminescence and spectrum regulation
67. Frontier problems in nonlinear optics
(1) Strong relativistic nonlinear optics
(2) New phenomena and new physics of ultra fast nonlinear optics
(3) Nonlinear optical process of weak light
68. New phenomena in quantum optics
(1) Confined photon-atomic interaction and cavity quantum electro dynamics
(2) Quantum optical problems in solid state and manmade structures
(3) Preparation, control and measurement in light field quantum state
(4) Quantum opto-mechanical effect
69. New types of acoustic energy converter and its arrays
(1) Acoustic energy converter, array and modeling of acoustic field
(2) New types of acoustic field and its imaging and controls
(3) New types of acoustic manmade structures and complex acoustic field
70. Spatial and temporal properties of marine acoustic field and its application
(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

71. Generation, propagation, measurement and interaction of sound wave in complex media
(1) Interaction and effect of acoustic wave and matter
(2) New theory and new methods for quantitative measurement and evaluation of acoustic waves
(3) Noise and vibration control in fluid solid coupled systems
(4) New physics and new mechanism of biomedical ultrasonic devices
72. Explorations on innovative experimental techniques
(1) Method of technology for advanced low dimensional sample preparations
(2) New principles and technology for material property measurement
73. Frontier problems in basic theory of quantum and classical physics
74. Frontier problems in basic theory of statistical physics and physical systems
75. Frontier problems in theory of gravitation and cosmology
76. Standard models and precision computation of new physics
77. Studies on τ charm physics
78. Studies on the properties of hadron and strong interactions
79. Studies on medium high energy heavy ion physics and new forms of matters
80. Studies on properties of nuclear clusters
81. Studies on radioactive nuclear beam physics
82. Advanced techniques and experimental methods of neutron physics, reactors and its applications
83. Basic research on nuclear technology applications in environment, material and health sciences
84. Studies on physical problems and key technology in nuclear radiation protection and environmental protection
85. Accelerator physics and its advanced technologies
86. Nuclear detection and advanced technology of nuclear electronics
87. Frontier problems in the physics of strong laser plasma and inertia confined fusion
88. Magnetic confined fusion plasma physics and new methods of diagnosis
89. Basic research on low temperature plasma physics and key technologies
90. Studies on advanced technologies and experimental methods for synchrotron

Department of Chemical Sciences

During the first four years of 12th Five-Year Plan period, the number and the

funding intensity of Key Program projects supported by the Department of Chemical Sciences have increased. In 2014, the Department funded 68 Key Program projects with 235.6 million yuan and the average funding intensity of 3.4647 million yuan of per project. The duration of each project is 5 years. In 2015, the Department will announce guidelines and accept proposals in 67 research areas, and the average funding intensity will be from 2.5 to 4.5 million yuan per project. In order to further improve the quality of projects, proposals from those groups and teams of enough scale with sound research basis are welcomed. 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 2015, the research areas for Key Program projects funded by the Department are listed as follows:

1. Porous compounds and their function
2. Molecule-base oriented functional materials
3. Inorganic solid functional materials
4. Metal coordinative compounds and their catalytic properties
5. Basis of bio-inorganic chemistry
6. Basis of applied inorganic chemistry
7. Function of inorganic nano-materials and their applications
8. Rare earth chemistry and functional materials
9. New reaction and new reagent in the organic synthesis
10. Control of selectivity in the organic reactions
11. Green, biomimetic and sustainable organic chemistry
12. Synthesis and properties of organometallic compounds
13. Elemento-organic chemistry
14. Intermediates in organic reaction and its reaction mechanism
15. Synthesis of natural products and application for probe
16. Discovery and function of molecule with new skeleton structure
17. Synthesis and modification of biological macromolecule as well as its functional application
18. Organic analytical chemistry
19. Functional materials chemistry of organic molecules
20. Experimental research of function-oriented structural chemistry
21. New methods in theoretical and computational chemistry and their applications

22. Physicochemical basis of catalytic materials and catalytic processes
23. Experimental research on molecular reaction dynamics
24. Physicochemical basis of colloid and interface
25. Electrochemical basis in the process of energy conversion and storage
26. Physicochemical basis of photochemistry and photoelectrical chemistry
27. Experimental and theoretical research of chemical thermodynamics
28. Experimental research of bio-physical chemistry
29. New spectrum methods used for studying physical chemistry
30. Physicochemical basis in optimized utilization of resource/energy
31. Physicochemical basis of solid and surface
32. Physicochemical basis of new materials and devices
33. Synthetic chemistry of polymers
34. New methods for multicomponent polymerization
35. On the relations of structure with properties of polymers
36. Composites of functional polymers with carbon-based molecules
37. Optical-electronic functional polymers
38. Biomedical polymers
39. Structure in condensed state polymers
40. Theories, computer simulation and calculation of polymers
41. Separation and analysis of complex samples
42. Imaging analysis
43. Micro-/Nano-analytical chemistry
44. Analytic chemistry of mono-molecule and mono-cell
45. In vivo and in situ analysis
46. Detection and determination of proteins and their functional study
47. New methods for detecting markers of major diseases
48. Analytic chemistry basis of the chemical sensors and bio-sensors
49. Scientific foundation for industrial biological catalysis and conversion processes
50. Key scientific issues in the biorefinery processes
51. Chemical engineering basis in the area of foods and medicines
52. Chemical engineering foundation for the high effective clean utilization of fossil energies
53. Chemical engineering foundation in the explore and utilization of new type energies
54. Key scientific issues related to chemical product engineering
55. Design of new materials for chemical engineering and their functional regulation
56. Chemical engineering basis related to the high effective utilization of resources
57. Scientific and engineering basis of typical chemical reaction and scale-up of reactor
58. Scientific foundation for environment and safety of chemical

engineering
59. Transfer process and separation process
60. Molecular transformation and bioavailability of pollutants in the environment
61. Environmental exposure, toxicological mechanisms and health risk of pollutants
62. Chemical principles of pollution control techniques
63. New methods and new principles for the analyses of pollutants in complex environmental matrix
64. Basic environmental chemistry problems of air pollutants
65. Application basis and biological effects of nanomaterials in real environment
66. Interaction mechanism and functions of the modified enzyme with substrate proteins
67. In-situ modification of therapeutic proteins in specific site by synthetic polymers

The 66th and 67th research areas listed above are frontier-oriented for the Key Program. The applicant may form his/her research team to apply 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, which is the majority of total applications, is guided by designated areas (ADA for short) and the other, as a complementary to ADA, is to freely select research areas (ANA for short). In 2014，the Department of Life Sciences received 544 applications, among which, 322 applications were for ADA and 310 were accepted, with 64 projects being funded at a funding rate of 20.65%, and the rest 222 applications were for ANA, with 205 projects accepted and 31 of them being funded at a funding rate of 15.12% (counting by accepted applications).

In the fiscal year 2015, the Department of Life Sciences will continue to accept applications for ANA. The Department strongly suggests applicants to read the type of application which is accepted carefully in each discipline described in this Guide to Program. Disciplines that accept projects in both

patterns ADA and ANA are the following 9 disciplines: microbiology, botany, ecology, immunology, neuroscience, genetics and bioinformatics, cell biology, plant protection, and horticulture and plant nutrition. The other twelve disciplines, which will only accept ADA projects (application for ANA will be rejected), include forest science, biophysics, biochemistry and molecular biology, biomechanics and tissue engineering, cognitive science and psychology, physiology and integrative biology, developmental biology and reproductive biology, basic agriculture and crops, food sciences, animal husbandry and grassland science, veterinary medicine, 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 covers 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 Programs.

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. The requirements for application to the Key Program projects of the Department of Life Sciences 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, applicants 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 anurgent need of supporting for further investigation, while their research areas are not included in the ADA of the Department of Life Sciences. Studies that are cutting-edge to the fields, or are shedding lights to new orientations of the area, are not yet covered in ADA in this year. For either case, applicants should have profound basis of research work in the field, and are in urgent need of 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 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. In 2015, based on the overall arrangement for the Key Program of NSFC, the Department of Life Sciences will arrange a total budget of 320 million yuan, to support 95 Key Program projects. The funding intensity is roughly between 3 to 4 million yuan per project. Applicants should put forward reasonable budget according to the actual financial needs of their research. Besides, while filling in the budget in the application, applicants are required to provide a detailed justification for the budget in the proposal for peer review, as well as the final approval of funding. Applications will not be approved for funding without budget justifications or with obviously unreasonable budget. The duration of the Key Program project is 5 years.

The designated areas of each Division in the Department of Life Sciences in 2015 are as follows:

1. System and evolution of fungi and lichens
2. Mechanisms of microbial resistance
3. The origin and evolution mechanism of major plant taxa

4. Mechanisms of plant responses and adaptation to non-biotic stress
5. The interaction between species
6. Mechanism of biological restoration to ecological system pollution
7. Basic research of forest cultivation
8. The formation and utilization of wood fiber
9. Analysis and evaluation of breed resources of forest trees
10. The structure, modification and regulation of protein/protein complex
11. Nucleic acid metabolism and genome stability (excluding non-coding 12. RNA)
12. Mechanism of cell differentiation and regulation in immune system
13. Regulation mechanisms of inflammation
14. Regeneration and construction of major tissues
15. Biomechanics and coupling between cells and tissues
16. The biological effect of nano-material carrier
17. The differentiation and regulation mechanisms if neuronal stem cell
18. Neural coding mechanisms of information sensory
19. Effects and mechanisms of cytoplasmic organelles malfunction in loss-of-homeostasis cells
20. Effects and mechanisms of nutrition response in homeostasis regulation
21. Regulatory mechanism of circadian rhythm to major physiological functions
22. Psychological and brain mechanisms of cognitive processing
23. Regulatory role of Chromatin structure on gene expression
24. Formation and function of plasma membrane and intracellular membranes
25. Cell autophagy and necrosis
26. Molecular and cellular mechanisms of tissue/organ formation and homeostasis
27. The molecular basis of gametogenesis, fertilization and embryo development
28. Molecular analysis of intricate crop traits
29. The physiological and biochemical mechanisms and regulation of major crop organ formation
30. The biological basis of crop water utilization in arid or semi arid areas
31. Formation and control of harmful substances during food processing
32. Effects of food components and transformation during biological process on food quality and nutrition
33. Physiological and biochemical basis of food storage and preservation
34. The mechanism of interaction between major pests and crops
35. Mechanism and regulation of horticultural plant organ development
36. Mechanism and regulation of horticultural crop quality formation

37. Genetic basis of quality traits in livestock and poultry
38. Basic research on evaluation and utilization of forage germ plasm resources
39. Genetic studies of special economic animal breeding such as bees, silkworms
40. Mechanisms of innate immune responses to pathogen infection of livestock and poultry
41. The interaction mechanism of drug - pathogen- livestock interaction
42. Mechanism of collaborative diseases of livestock and poultry pathogenic infection
43. Basic research of aquatic animal reproduction and development
44. Mechanism of major aquatic animal disease
45. Genetic analysis of important economic traits of aquatic organisms
46. Evolution and systematic development of animal
47. Mechanism of invertebrate immune adaptation

Moreover, considering common problems existed in applications in the past years, the Department of Life Sciences particularly reminds applicants to avoid the following listed mistakes in 2015. Otherwise, proposals may be rejected during the preliminary checking stage:

(1) Applications for ADA fail to 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 fail to fill in the corresponding application code claimed by this Guide.
(3) Applications for ANA fail to specify “ANA” in the column of “Annotations” on the basic information table in the mail body of the application text.
(4) Applications for ANA fail toprovide a description of 800-Chinese-character on the major innovative progresses already achieved claimed by this Guide.
(5) Applicants for Key Program projects (including both ADA and ANA) fail to 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 Program on Key Basic Research Project (973 Program), National High-Tech R&D Program of China (863 Program) etc., and National Science Fund for Distinguished Young Scholars.
(8) Applications indicating the designated areas in the “Annotation” column, while the actual research contents not matching the scope of funding.

(9) Applications submitted by applicants who are still holding a full-time position abroad, or 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 researches concerned, and to take in account of the inherit 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, 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 impacts 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 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.

Application code of the proposal is filled out by applicant's self-selection.

In 2015, 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 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/).

In 2014, the Department of Earth Sciences received 481 proposals for the Key Program, and 79 were funded with a total of 277.77 million yuan. In 2015, about 80 projects will be funded, with a preferred range of 3 to 5 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 and 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 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 2015:

(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 be affected by geodynamic processes are challenging issues faced by Earth sciences. The challenges for scientific innovation includes: 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:
(1) 3D crust-mantle structure, composition and interaction
(2) Origin and evolution of the continents and intra-continent processes
(3) Continental collision and geodynamics of the orogenic belts
(4) Interaction between the oceanic plate and continental margins
(5) The coupling of the deep Earth and surficial process

Research orientations in 2015:
(1) 3-D structure of the crust-mantle and deep-Earth dynamic process
(2) 3-D structure of mantle velocity discontinuity, lithosphere-asthenosphere interaction and inter-layer material exchange
(3) Early Earth evolution, and forming, growth and rebuilding of the continents
(4) Dispersion of the continent and the role of mantle plume
(5) Rheological property of the continent and its effect on the continental deformation
(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 fundamentaland innovative of this theme

About 6 to 8 projects will be funded.

3. The formation mechanism and the detection principle of mineral resources and fossil energy

The scientific objectives of this field are to achieve the break through in the metallogenic theory utilizing shallow crustal structures and ore field tectonic analyses, regional ore-forming fluid tracers, unique metallogenic systems and continental geodynamics; to carry out research on large-scale basin dynamics associated with oil and gas accumulation theory and non-conventional natural oil-gas reservoir forming dynamics; to improve oil and gas geological system theory under complex geological conditions in China; to establish and improve the detection method and principle 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 the chemical field.

Key scientific issues:
(1) Continental geology and mineralization
(2) Metallogenic models
(3) Metallogenic system and mineralization mechanisms
(4) Dynamics of sedimentary basins and the hydrocarbon accumulation
(5) The process of regional groundwater hydrology and the evolution of environmental geology
(6) The ore-bearing information detection and extraction of large deep deposits (pool)

Research orientations in 2015:
(1) The enrichment mechanism of massive ore-forming materials in sedimentary basins and magma systems
(2) Mineralization and metallogenic principles of unique metallogenic units
(3) The metallogenic uniqueness in different continental geo-dynamic

settings

(4) Regional fluid systematics 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 systems
(6) Regional geo-dynamics of the large basin evolution and hydrocarbon accumulation
(7) The systematic evolution of the Earth and the sedimentary environment of geological basins with hydrocarbon bearing materials and reservoirs
(8) The formation, evolution mechanism, geophysical response and characterization of concealed mine and deep, non-conventional oil-gas reservoirs
(9) The principle and method of the ore bearing information detection and extraction for large, deep ore deposits
(10) The regional groundwater flow system and the spatial distribution law and detection theory of the groundwater
(11) 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 2015:
(1) Theories and methods for critical atmospheric variables detection
(2) Data integration among the atmospheric and other observations of the earth system and data application
(3) Key processes and technologies research on weather and climate numerical model
(4) Evolution and mechanism of weather and climate systems
(5) Processes within the planetary boundary layer over the heterogenous underlying surface
(6) Mechanism of the regional air pollution and the relevant numerical simulation
(7) Research on the processes of the middle or upper atmospheric levels, and their interactions
(8) Dynamics of the Asian summer monsoon system
(9) Impacts of the regional climate change on the ecology, hydrology and cryosphere, etc.

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 2015:
(1) Mechanism of the Asian monsoon system evolution in the past, present and future
(2) Characteristic and mechanism of the typical climate events in warm periods in Asia
(3) Characteristic, influence and mechanism of the climate change in critical areas
(4) Regulations of regional water cycle and the linkage to climate change
(5) Regulation and mechanism of precipitation and dry-wet transform in westerly areas
(6) Mechanism of the marine environment change and its interactions with the climate system
(7) Key processes of the biosphere under the background of global change
(8) Characteristics of the biogeochemical cycle, and its role in the climate change
(9) Causes of the global change induced by natural and anthropogenic activities
(10) Causes and mechanism of global warming within the recently 15 years
(11) Development in the Earth system model and simulations of the significant climate events
(12) 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 combination and crossing, to study the mechanisms of human activities effect on environment that 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, 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 2015:
(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, such as water, soil, air and organisms, in the terrestrial surface system, to enhance the understanding of relations 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 regional sustainable development.

Key scientific issues:
(1) The interaction and interfacial processes of key natural components on the terrestrial surface
(2) Migration and transformation processes of terrestrial surface materials
(3) The coupling processes of natural and human components
(4) Theory and methodology of integrated researches about the terrestrial surface system

Comparative studies will be encouraged across the regions and the geographic units (types) and summarize the knowledge of the differential disciplines on the terrestrial surface.

Research orientations in 2015:
(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 and landform, and the 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 befunded.

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 using approaches and conservation patterns of water and soil resources.

Key scientific issues:
(1) soil processes and evolution
(2) soil quality and resource effect
(3) watershed hydrological processes and their ecological effects
(4) formation mechanisms of regional water cycle and resource
(5) coupling of regional water and soil resources and their sustainable utilization

Research orientations in 2015:
(1) Tempo-spatial variation of soil properties and informatization of soil resource
(2) Interaction mechanisms and effects of soil processes
(3) Soil biodiversity and its function
(4) Nutrient elements cycle and fertility evolution of soil
(5) Mechanisms of soil degradation and soil remediation
(6) Soil quality and safety and regulation of agricultural products

(7) Regional soil erosion and conservation of water and soil
(8) Surface water cycle and prediction of watershed
(9) Watershed eco-hydrological processes and their simulation
(10) Natural and social water cycle and their interactions
(11) Hydrological changes and effects under extreme environment
(12) Environmental effects and regulations of water and soil under the intensive land use
(13) Carrying capacity and safety of regional water and soil resources
(14) Safety and regulations of regional water resources
(15) Coupling mechanisms and regulations of water and soil processes

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 2015:

(1) Multi-scale air-sea interactions and their impact on the regional climate
(2) Mass transport and exchange between ocean and marginal seas
(3) Environmental effect and ecosystem disaster 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) Biogeochemical cycle of carbon, nitrogen, sulphur and phosphorus from microbiology
(9) Ocean physical-biogeochemical interaction
(10) Process and mechanism of coastal ocean environmental evolution and ecosystem disaster
(11) Adaptation mechanism of marine biology to environmental changes
(12) Change of ocean, ice sheet and ecosystem in the polar regions
(13) Mechanism and prediction of the Arctic ocean and sea ice

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 of the data from the 120o E Meridian Project observations; to encourage the related basic researches on space geodesy.

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 2015:

(1) Solar driving source of space weather, related physical mechanisms and activities during the solar cycle 24

(2) Fundamental physical process in space weatherand 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 researches about the scientific issues in fields of the Earth observation, GIS and GPS, develop the basic theory and methodology of the data acquisition, processing and analysis originated from the Earth system elements observation, construct parameter set of geometric and physical boundary conditions in the Earth system analysis and simulation, and 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 issues:

(1) Surface effects and transmission mechanisms of electromagnetic wave
(2) Distributed and reconfigurable Earth observation and synthetical Earth observation system
(3) Confirmation and maintenance of high precision time benchmark and space datum

(4) Geo-spatial cognition, tempo-spatial information model and theory of digital earth construction
(5) Multi-source Earth observation data fusion and synergistic inversion and assimilation of the Earth system parameters
(6) Multi-dimensional tempo-spatial processes analysis and synthetic simulation and prediction and warning of the Earth surface system.

Research orientations in 2015:
(1) Theory and methodology of determination of high precision time benchmark and space datum
(2) Methodology of the assessment 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 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

About 4 to 6 projects will be funded.

Department of Engineering and Materials Sciences

In 2014, the Department received 431 proposals for the Key Program, and among them, 85 proposals in 82 fields were supported with a success rate of 19.72%. The total funding was 299.2 million Yuan and the average funding was 3.52 million Yuan per project.

In 2015 up to 90 projects will be supported in 81 fields with an average funding of 3 to 4 million Yuan per project for 5 years. The 81 fields are as

follows:

1. Fundamental issues on the design, preparation and application of steel materials
2. Fundamental issues on the design, preparation and application of light alloys
3. Basic research on new phases and properties of alloy
4. Research on the design, preparation and mechanical behavior of new structural metal materials
5. Functional performance of metallic materials in nano-scales
6. Key scientific issues of metal-matrix composites
7. Key scientific issues of the design, preparation and application of metallic magnetic materials
8. Micro-structure and property manipulation of amorphous metallic materials
9. Micro-structure evolution and property manipulation during the preparation of metallic materials by high energy density beam
10. High-throughput design, preparation and characterization of metallic materials
11. The fundamental issues of inorganic amorphous materials in micro/nano-scales
12. Design, fabrication and properties of new layer-structured electromagnetic functional materials
13. Impurities and defects in casting crystalline silicon
14. Macro-fabrication of semiconducting single-walled carbon nanotubes and thin film devices
15. Design, fabrication, and energy storage applications of mesoporous/microporous composite materials
16. Key materials for all-solid-state lithium battery
17. Inorganic dielectric materials for high-energy density capacitors
18. New materials, technologies and principles in ceramics (support 2-4 projects in this broader field)
19. Structure and property orientated synthetic chemistry of polymeric materials
20. Regulation of the aggregation structure of polymeric materials and its influence on the properties
21. Theories and methods for the processing (including micro-nano processing) of polymeric materials
22. Basic issues on biomedical polymer materials
23. Fundamental research on optoelectronic organic polymer materials and devices with high efficiency and stability

24. Basic research on polymer materials related to energy, environment and resources utilization
25. Structure regulation and properties of polymer composites
26. Theory of oil reservoir seepage and reducing channel resistance
27. Basic theory of waxy crude oil pipeline transportation
28. Fundamentals of geological and mining dynamic disaster by rock burst
29. Mining induced rock fracture and avalanche
30. Theory and application of safety science
31. Physical separation theory and method of secondary resources
32. Efficient extraction of rare earth and associated resources
33. Phenomenological theory of physical chemistry properties of metallurgical melt
34. Physical chemistry of efficient utilization of resources
35. Fundamentals in preparation of high performance materials by powder metallurgy
36. Innovative principle and comprehensive performance of modern mechanisms and machines
37. New principle and methodology for efficient and precise motion actuation and transmission
38. Design criteria of mechanical dynamics for performances and qualities
39. Failure mechanism of typical components/structures
40. Mechanical/biological behaviors and control mechanism of mechanical surface/interface
41. Innovative design theory and methodology for electromechanical system
42. New principle and method for bio-manufacturing and bionic manufacturing
43. Novel principle, method, process and equipment for integrated high-performance precision manufacturing
44. Novel principle and method for high energy-density beam and nontraditional energy field based manufacturing
45. Theory/technology/method for high efficiency and precision machining of parts/components
46. New process, equipment, and mode for digital and intelligent manufacturing systems
47. Novel principle and methodology for mechanical measurement and sensing systems
48. Thermodynamic system analysis, control and optimization for energy conservation
49. Turbulent flow mechanism and flow control in fluid machinery

50. Fundamentals on multi-phase flow, mass and heat transfer in power systems
51. Mechanism of combustion, pollution and emission reduction of solid fuel
52. Key thermo-physical issues on the utilization of renewable energy
53. Interdisciplinary research on thermo-physical issues in mechanics, materials, environment and life sciences
54. Fundamental research on high efficient conversion and large scale storage of electric power
55. Key issues on the pulse power and discharge plasma (generation and application)
56. Fundamental research on the advanced power transmission equipment and related electric materials
57. Key issues on the Smart Grid and its facilities
58. Fundamental research on electromagnetic-biological effects
59. Key issues on the efficiency and reliability of power electronic devices and its system
60. The methodology of digital architecture designing
61. The energy efficiency design theory of the public buildings in different climate zone
62. The Human thermal response and the dynamic thermal environment conditioning in hot climate zone
63. The interaction and coupling mechanism of the city spatial form and the urban climate
64. Principles of new processes for the removal of micro-pollutants in reclaimed water
65. Investigations into the microbial extracellular electron transfer for biological waste water treatment
66. Advanced oxidation process and control principle for refractory organic pollutants in water
67. Matter conversion principle of new technology during sludge anaerobic digestion
68. High-performance and innovative structures
69. Hazard and risk control for urban underground engineering
70. Advanced and innovative methods and techniques for structural hazard prevention
71. Improvement and control of life-cycle performance of engineering structures
72. Theory and method of integrated multimodal urban transportation planning
73. Wandering channel evolution process and river regime stability control

74. Bed load motion and development of reservoir delta
75. Bearing capacity evolution and reliability of RC structure system on soft soil foundations in marine environment
76. Dynamic performance of floating offshore structures in comprehensive wind-wave-current environments
77. Marine power plant control and shafting vibration
78. Hydrology and water resources
79. Irrigation and drainage
80. Aquatic ecology and eco-hydraulic engineering
81. Soil mechanics and geotechnical engineering

Department of Information Sciences

In 2014, the Department of Information Sciences announced 68 areas and 4 priority funding areas for the application of Key Programs, and received 311 applications, of which 80 projects were funded with a total of 280 million yuan, and average funding intensity of 3.5 million yuan per project. The success rate was 25.72%. Most of the Key Program projects with much potential applications in big data received higher funding.

In 2015, the Department announces 79 areas for application, of which 3 areas are the departmental key funding areas. About 80 Key Program projects will be funded with average funding of about 3.6 million yuan per project for 5 years. Applicants should follow the guidelines for research directions in relevant areas, in accordance with the trend of academic development and basis of their research teams and the actual research objects, identify the 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. Funding priority will be managed according to the management method of Major Program projects. Projects with strong research strength may allot 1.5 million yuan as the cooperation fund for management and coordination among the research groups.

Please provide proper application code in the application form. Please see NSFC's website: http://www.nsfc.gov.cn/ for details.

The deadline for proposing areas of Key Program for 2016 is April 30, 2015; please see the department website http://www.nsfc.gov.cn/cen/oo/kxb/xx/tztg.htm.

Key Priority Funding Areas

1. Basic research on hydro acousticnetwork positioning and detection

Marine environment monitoring and marine right maintenance all require development of under water sensor network positioning and target detection technology. This project group plans to study basic scientific problems such as precise positioning of under water dynamic grid points, multi grid point coordination detection and marine environmental information for important applications in the monitoring of underwater dynamic sensor network. On the basis of the key project group "Basic research on hydro acoustic sensor network for mobile node" funded in 2014, make further improvement in open research environment and the development of marine information science in China.

Main research directions include:

(1) Node positioning of dynamic underwater sensor network
(2) Coordinated detection of mobile target based on underwater sensor network
(3) Acquisition and processing of marine environmental parameters based on sensor network

2. Basic research on intelligent searching in network space

Network space is the sum of computer network, communication network that make information exchanges, covering infrastructures like internet, internet of logistic and sensor network. Intelligent searching is a search for information, people, objects and their relations based on accurate understanding of the client intention, thus provides the client with searching results. Basic scientific problems are focusing on understanding of user intention, large scale real objects and modeling of their relations, searching intention and accurate and quick matching of searching objects, security of searching and privacy protection. This key project group consists of the following research directions. Applicant may choose one to study with a stress on practical needs.

(1) Understanding, representation and matching of user intention
(2) Modeling of large scale real objectives and their relations
(3) Secure searching of the internet of things and privacy protection
(4) Searching of on line social network with spatial and temporal properties
(5) Analysis and search of video-audio correlation between networks

3. Method of designing automatic system for process industrial knowledge and verification by application

Process industry is one of the pillar industries in China, and is leading the world in many areas in terms of production. Except large differences in raw material composition, loose controls in low level equipment, lack of analysis of knowledge in various sears in upper level planning and dispatching proves to be the bottle neck problems in the innovative development of Chinese industries. Recent development suggests that the solution to such problems may come from automation of knowledge based on big data, industrial internet and cloud computing.

This key project group requires that applicant make in-depth studies on the design method and application verifications of knowledge automation system for intelligent decision making, planning and dispatching based on big data, cloud computing and knowledge correlations in multi level and multi areas; design and verification of automation system integrating optimal control, diagnosis and operation safety of the production equipment; and industrial cognition network having self sensing, self computation, self adjustment, self organization and self execution, based on a certain process company, so as to promote process industrial upgrading and disciplinary development.

Main research directions are:

(1) Architecture, design method and application verification of industrial cognition system for intelligent company
(2) Design method and application verification of knowledge auto decision making system based on big data and cloud computing
(3) Design method and application verification of knowledge auto system for complex and multi task production planning
(4) Design method and application verification of production dispatching knowledge auto system for complex planning and equipment
(5) Design method and application verification of integrated knowledge auto system for optimal control and safe operation of equipment

Key areas funded by Divisions are as follows:

1. Mechanism of generation and detection of sub static electromagnetic information in marine environment and target
2. Small wide band multi frequency antenna of plane anisotropichexagonal ferro oxides
3. Theory and key technology of small THz gyrotron for medical

applications
4. Basic theory and key technology of radial electron injection devices
5. Efficient energy extraction circuit in piezoelectric power generation system and its key technology
6. Theory and key technology of continuous variable quantum key distribution
7. Real time positioning of wide band and multi target geostationary satellite interference source
8. Programmable control and resources dispatching in software defined network in applications
9. Theory and key technology in simultaneous, same frequency and total two-way channel communication
10. Theory and key technology of non-fixed patterned wireless network
11. Theory and technology of mobile video distribution
12. Remote wireless autonomous positioning and identification for ships
13. Studies on repeated reusable principles and its applications
14. Information integration of marine weak and small-sized target detection
15. Theory and key technology of multi-visual light field computation
16. Theory and coordinated verification of marine status detection based on short wave communication network
17. High fidelity acoustic sensing and reconstruction
18. Integrated detection of space, land and multi-source coordinated cloud and its application
19. Theory and key technology of environmental layout for road illumination
20. Theoretical modeling and verifications of large scale concurrent system
21. Programming and translation technology sensitive to the utility of data center resources
22. Theory and method of large scale complex related data management
23. Design, verification and realization optimization of multi core embedded software
24. New computer architecture for big data memory computation
25. Theory and method of safety check for integrated circuit
26. Usual modeling and environmental construction and dynamic simulation based on multi resources information
27. Theory and method of high flux computation of video and image
28. Basic theory and method of high flux bio data model mining
29. Theory and method of editing and generation of interactive contents of sensing materials
30. Mechanism and method of large scale on-line learning group coordination and personalized intelligent guidance

31. Theory and method of large scale on-line education resources collection and organization
32. Theory and method of pattern recognition of mixed data and mining of sensitive contents
33. Theory and method of deep learning for image sequence
34. Theory and key technology of fragmented knowledge integration
35. Theory and application of chaotic codes
36. Theory and key technology of green energy for internet of things
37. Modeling and control of large-sized electron level silicon crystal growth
38. Estimation of active power grid status and optimal coordination based on data and mechanism analysis
39. Modeling and analysis of ecology of marine species and control of regional pollution
40. Theory and experimental verification of self treatment of malfunctions in nonlinear systems
41. Integrated modeling and optimal dispatching of distributive energy resources for building clusters
42. Energy efficiency evaluation and system optimization of complex chemical petroleum process based on big data and domain knowledge
43. Online assessment and system optimization of thermo energy transfer efficiency for large coal-based power plants
44. Online detection method and applications verification of multi metal ion density for metallurgical solutions
45. Theory and method of navigation in inertia guidance systems
46. Autonomous navigation and control of unmanned helicopters in strong air turbulence
47. Method of computation and verification of application for large scale knowledge relation and text syntax
48. Computation model and optimal method of robot groups in generalized information manufacturing environment
49. Basic theory and key technology of efficient flexible feet robots
50. Basic theory and key technology of intelligent artificial limb based on flexible nerves
51. Basic theory and key technology of micro interventional robot for blood vessel operations
52. Multi state computational model and experimental verification based on cognition mechanism of the brain
53. Thermoelectric properties and devices of nano materials
54. High resolution measurement and positioning for medium and long range large scenarios
55. Light frequency standard for atomic excited double photon shift based

on femto second light
56. Basic theory and key technology for near threshold IC
57. Preparation and device integration for new micro structure optical fibers
58. New characterization detection method for LSPR/SERS and chip technology
59. SI based GaN strengthened power and electronic devices
60. Blue liquid crystal materials, devices and display technology
61. Key technology of isotropic optical liquid crystal materials and new types of display devices
62. Basic research on high performance near inferred single photon detectors
63. Ultra high speed, high precision optical analog digital conversion technology
64. Mechanism of light and fluid interaction in liquid optical fiber micro flow control devices and applications in online testing
65. High performance, non cryogenic inferred detector
66. Studies on high mass light ray photon crystal laser and high power beam merging
67. Phase and frequency control of spatial single frequency laser
68. Key technology of embedded neural connection devices
69. Detection technology of multi functional biomedical sensors integrated on chips
70. Deep ultraviolet femto second pulse laser sources based on Kagome photon crystal fiber
71. High shift CMOS devices on insulators based on silicon base platform and its reliability
72. Studies on integrated high speed and large capacity optical buffer
73. Single optical fiber lens-free imaging technology and devices
74. Efficient solar cells with radiation resistance and entire spectrum
75. Ultra high capacity optical communication technology based on silicon chips
76. Studies on cell response to near inferred light and method of dynamic monitoring without markers

Department of Management Sciences

In 2014, the Department of Management Sciences received a total of 94 Key Program applications, and funded 24 of them. The total funding was 62.40 million yuan and the average funding was 2.6 million yuan per project.

According to the 12th Five-Year development Plan and its priority areas, the Department will release the research areas of the Key Programs on a yearly basis, and release the research areas of the Key Programs cluster and data base 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, societal development, reform and opening to the outside world, and 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 requirements of research work. Applicants are required to possess solid research experiences and abilities in the areas in which they are applying for grants. 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 practices, 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 the application of scientific approaches, take real data and actual cases as the fundamental information of their research, and be 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.

Please note that the requirements given in the general description section of the General Program of the Department of Management Sciences in this Guide to Programs are also applied to the Key Programs, therefore, please read these items carefully.

Key Priority Areas of Key Programs

In 2015, the Department of Management Sciences proposes 23 priority areas for Key Programs, and plans to fund around 24 projects with an average

funding of 2.4-3.2 million yuan per project, and 8 projects for each of three divisions (including Key Program Cluster of Division). The funding period of the Key Program projects is 5 years.

1. Smart health information services management (G0109, G0112)

Multi-agent intelligent collection and management methods for information of health management service, as well as big data analysis methods to support intelligent health information services management; intelligent health management and monitoring modes, and knowledge management methods of intelligent health assessment and warning; and cluster models of intelligent health information service resources and multi-agent coordination models of intelligent health services management, and applied research in which the above models are put into practices.

2. Service value measurement based on customers' psychology and behaviors (G0108)

Customers' awareness and preference for service value and corresponding behavior characteristics, based on the above the explorationof the relationship and logic structure framework between various dimensions; research on detecting and assessing the dynamic variation and rules of customer experiencevalue through internet or other traditional service modes and from inter-disciplinary perspectives, including Psychology, Cognition, Consumption, Marketing Science, etc., and development of service value measurement model and associated method system. The research findings can be applied to promote service innovation and products innovation of enterprises, and to improve the service values.

3. Organization patterns of intelligent manufacturing and operation management in the context of big data (G0110)

Construction technologies of multi-enterprise cloud manufacturing platform (e.g. collection, analysis, display, and management of big data); manufacturing and service mode innovation based on cloud manufacturing platform; enterprise alliance organization structure and evolution mechanism based on integrated analysis of big data; and, enterprise operation management, and collaborative optimization theory and methods in the context of big data.

4. Theory and methods of public opinion management by enterprises in the social internet (G0112)

Influence mechanism of on-line public opinions on enterprise performance in the emerging social internet, and theory and methods of internet public

opinion management by enterprises, including the influence mechanism of internet public opinions on enterprise performances and share prices of listed companies; theory and methods of open credit management towards on-line public opinions; methods of public opinion management by enterprises and the associated influences on on-line public opinions; optimization methods of public opinion management by enterprises; and, the influence mechanism of the management measures, such as service recovery in response to on-line public opinions, on enterprise performance.

5. **Experimental research and complexity analysis of individual and group choice behaviors (G0104, G0109)**

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; evaluation method and application research on the realizability of group choices.

6. **Research on enterprise sales promotion, pricing, and inventory management towards the social internet (G0103)**

Research on consumer interaction, mechanism of information transmission, and customer psychology and behavior variation, and the associated impacts on traditional sales promotion, pricing, and inventory management theories; modelling and optimization of product promotion, product pricing, and inventory management based on the social internet; and, modelling and empirical research on dynamic promotion, pricing, and inventory management in the dynamically changing social internet.

7. **Targeted advertising model and application strategies in e-commerce (G0103, G0112)**

Methods and approaches to detect the targeted user group of targeted advertising in the e-commerce environment; targeted advertising strategies based on various modes including search engines, social internet, location, and contents; combination strategy and optimization methods of various types of targeted advertising, and exhibition strategy and price formation mechanism of targeted advertising; research on evaluation methods of the marketing effects of targeted advertising, and exploration of relations between targeted advertising and the media-market.

8. **Comprehensive transportation management issues under the trend of new-type urbanization (G0103, G0109)**

Analysis of travel demand characteristics and dynamic evolution under the

trend of new-type urbanization; choice behavior of various transport modes; green travel, land use, and transportation comprehensive development model; comprehensive transportation network structure optimization theory and methods; evaluation framework and methods of the unified transportation system; based on empirical studies, proposing new theories and methods for construction, evaluation and management of the comprehensive transportation system under the trend of new-type urbanization.

9. Enterprise innovation ecosystem and organizational innovation study (G0203)

Research on China's enterprise innovation ecosystem environment and the associated impacts on organizational innovation, as well as establishment of new theoretical enterprise innovation ecosystem and organization innovation models which are suitable for China's situations, including characteristics and evolution of China's enterprise innovation ecosystem; organizational structure and institutional change of enterprise innovation ecosystem; relations between various innovation modes and the core enterprise innovation ecosystem; coordinative innovation mechanism between organizations; and, reaction mechanism and process models between enterprise innovation ecosystem and enterprises, industries, and national competitive advantage.

10. Impacts of financial policies on enterprise behaviors of investment and financing (G0206)

Research on mutual influence mechanism between China's financial policies (currency, credit, and exchange rate) and enterprise behaviors of investment and financing, including enterprise decision behaviors in response to various financial policies (e.g. currency, credit, and exchange rate); influence of financial marketization on enterprise behavior; mutual mechanism of the influence of anticipated research of currency, credit, and exchange rate policies on micro enterprise behaviors, as well as the influence of micro enterprise behavior on macro policy making and implementation; and, evaluation of the effects of micro enterprises' financial data on macro financial policies.

11. Financial risk contagion and prevention in the context of big data (G0206)

Research on the causes, impact scope, contagion mechanism, and prevention mechanism of financial risks in the context of big data, including the original sources of financial risks and contagion mechanism in the context of big data; causes and contagion of bank risks; influences of behaviors of

individual and group investors on risk contagion; experiences of international supervision system, and coordination mechanism of separate supervision; and, financial innovation and financial supervision.

12. Marketing strategies for internationalization of China's enterprise brands (G0208)

Research on new marketing theories, modes, and methods for internationalization of China's enterprising brands in the environment of globalization and networking, including the development pattern and evolution rule of the internationalization of China's enterprise brands; brands images in the international market and the formation mechanism; international marketing and communication strategies of brands in the new-media environment; construction of online and offline marketing channel network; establishment of national culture and international brands; and, interactions and market competition mechanism between national brands, local brands, and enterprise brands.

13. User behaviors and business model innovation in the mobile internet environment (G0208)

Research on user behaviors and business model innovation in the mobile internet environment, including behavior rules and market opportunities of mobile internet users; costumer interaction and behavior communication mechanism based on mobile social internet; costumer channel migration and interactive use behaviors of online and offline channels; products, services, and business model innovation for the mobile internet.

14. Product quality assurance strategies and quality security warning (G0209)

Research on theories and methods of product quality assurance strategies and quality security warning in China's product liability system, including quality data analysis and modelling methods; quality assurance strategy analysis and design; product quality and reliability improvement based on quality assurance data; quality claim monitoring and quality security warning; operation optimization of after-sale service based on quality assurance data; and, research and development of forecasting and early-warning supporting prototype.

15. Pricing strategies of retailers' own brands and coordinating mechanism of supply chains (G0212)

Research on pricing strategies of retailers' own brands, and the coordinating mechanism and strategies between retailers with own brands and suppliers,

including product strategies, pricing strategies, and channel strategies of retailers' own brands, and the conflict and resolution mechanism between retailers and suppliers; competition and cooperation relations between retailers and suppliers when retailers possess their own brands, and associated coordinating mechanism and game theory-based theoretical analysis.

16. Entrepreneurial behavior and strategy mechanism in the context of internet (G0215)

Aiming at the entrepreneurial behaviors in the emerging economic fields such as internet and high-technologies, conduct research on entrepreneurial behaviors and strategy mechanism of China's enterprises and entrepreneurs/entrepreneurial teams in the transformation and upgrading, and the uncertain entrepreneurial environment, including strategy mechanism and effectiveness of entrepreneurs/entrepreneurial teams in an uncertain environment; internal mechanism between entrepreneurial strategy and behaviors; strategy logic and cognitive processes of the unique behaviors of entrepreneurs; and, formation and evolution rules of new enterprise mechanism during the entrepreneurial process.

17. Regional inequality measurement and equalizing transfer payment institution (G0303)

Summarize and develop the theoretical system of regional inequality and transfer payment; develop comprehensive regional inequality measurement models covering geography, finance, economyand society, develop an analysis and performance evaluation system for transfer payment institution, conduct research on regional multi-dimensional inequality, transfer payment institution design and evolution processes, and the associated equalization effects; design a equalizing transfer payment reform framework and policy recommendation that is adaptable to China's situations. The research is required to be based on large-scale panel data of multi-government levels and multi-fields.

18. Grassland ecological evaluation, development, and protection of China's pastoral areas (G030501)

Research on effects of urban and rural food consumption change on the demand for grassland agriculture development in pastoral areas, and its variation trends; develop evaluation methods and indicator systems for pastoral grassland resources utilization, ecological values, and economical values; empirical analysis on utilization status, bearing capacity, and major impact factors of pastoral grassland resources, and ecological and

economical values of grassland resources; provide sustainable development strategies and policy recommendations for China's grassland agriculture, and theoretical support for policy making.

19. Modern society governance organization and modes (G030604)

Based on a large amount of data provided by modern information and the social internet, conduct research on basic theories of society governance, micro-base of inter-relation between multi-subject behaviors in society governance, and grassroots community governance mechanism and government management mode transformation; analyze social organization operation rules and develop the agent interactive operation mechanism; and, discuss the framework and structural system of government-dominated, multi-agent shared, and grassroots self-governed modern society governance.

20. Risk analysis and mechanism of emergency medical rescue for catastrophic accidents (G0310)

Conduct research on risk analysis method and mechanism of emergency medical rescue for catastrophic accidents based in case studies; analyze the features of casualties and the risk factors of emergency medical rescue, develop risk evaluation criterionsfor emergency medical rescue; conduct research on coordination and integration of different periods of prevention and preparation, response and treatment, and rehabilitation and reconstruction, explore the evolution mechanism and laws of emergency medical rescue; conduct research on the emergency rescue demand, emergency rescue system constitution and operation mechanism, and provide risk-counter measures for emergency medical rescue under various risk conditions.

21. Key factors and reform of new-type urbanization (G0313)

Aiming at the people and capital elements associated with new-type urbanization, conduct research on approaches that can address the issues such as the urbanization of peasants, the financial needs, and the total amount measurement; analyze institution innovation to overcome the challenges from household register, social security, investment and financing, and finance; and, on the basis of empirical and quantitative analysis, develop theoretical methods for scientifically choosing the development pathway of new-type urbanization, improving the overall urbanization quality, and promoting new-type urbanization, and provide policy recommendations.

22. Knowledge fusion theory, methods, and realization paths in the context of big data

Conduct research on the impact of the big data environment on knowledge services and its demand for knowledge fusion; conduct research on general knowledge fusion system, construct knowledge fusion function modules, develop the technical structure of knowledge fusion; conduct research on knowledge fusion methods, generate new available knowledge and optimize the existing knowledge elements; conduct research on process models and realization paths for knowledge fusion; and, provide multi-level, personalized, and innovative knowledge service strategy for various types of user demand.

23. Urban ecological management in the context of new-type urbanization (Key Program Cluster of Division)

Targeting the opportunities and challenges that China is facing in the urbanization development during the new period, the Key Program Cluster of the Macro-Management and Policy Division will fund prospective research and strategic research on the people-nature integration mechanism within the urban complex ecological system, ecological relations and coordinative development between cities and regions, urban ecological risk management and regulations, ecological community construction and management, and comprehensive urban ecological management. This Key Program Cluster will explore the green development paths and economical management mechanism of China's cities, and provide scientific support and policy recommendations for new-type urbanization development and management.

To achieve the overall scientific goal 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: Urban ecological management in the context of new-type urbanization (Key Program Cluster of Division)

In 2015, the Key Program Cluster in the Macro-Management and Policy Division will fund the following 4 research topics:

(1) People-nature integration mechanism within the urban complex ecological system (G0312)

Conduct research on the impact of socio-economic activities on urban environmental and ecological pattern, processes, and function, and the

supporting role that the urban ecological function is playing in socio-economic development; reveal the interactions and feedback mechanism between urban socio-economic activities and ecological environment, propose regulation and controlling mechanism and adaptive management strategies, and provide theoretical basis and scientific methods for urban ecological management.

(2) Ecological relations and coordinative development between cities and regions (G0312)

Based on the selected typical urban clusters, conduct research on the stress and refeeding effects of core cities on the ecological environment and resources of surrounding regions, and the supporting role that regions are playing in urban development, analyze the social, economic, and ecological relations and interaction mechanism between core cities and surrounding regions, discuss management methods and modes for coordinative development of cities and surrounding regions, and provide scientific evidences for sustainable development of cities and regions.

(3) Urban ecological risk management methods (G0312)

Aiming at the issues of the deteriorating city-region environment quality, diminishing ecological functions, and increasing citizen health risk under the human activity stress, detect the characteristics of urban ecological risk stress, develop urban ecological risk evaluation method system, establish urban ecological risk simulation and projection methods, propound prevention mechanism, management methods and regulation strategies for urban ecological risk, and provide scientific evidences for improving urban inhabited environment.

(4) Ecological community construction and urban comprehensive ecological management mechanism (G0312)

Examine characteristics of citizen life styles and consumption patterns at community level, as well as their associated ecological and environmental impacts, develop evaluation methods to evaluate the effects of community resident activities on the ecological environment, develop ecological community management methods and measures, construct comprehensive management and service supporting platform for ecological communities. Conduct research on various domestic and international urban ecological management modes, analyze the resources utilization efficiency of various management modes and their impacts on urban ecological environment, establish urban ecological adaptive management method systems and modes from the perspectives of urban planning, industry structure, resources

policies, and measures and standards for ecological environment protection, and provide scientific methods for urban comprehensive ecological management.

Key Program Clusters

Key program clusters is a funding type within Key Programs. Guided by the Division's Disciplinary Development Strategy and priority funding areas during the 12th Five-Year Plan period, and following the laws and features of fundamental research of management sciences, the Division of Management Sciences provides long-term support for key program clusters, which consist of several key programs that target the same core scientific issues or have the same academic directions, in the research fields in which sound basis have been laid down with prospective of important breakthrough. The purpose of key program clusters is to encourage innovation and achieve the leap-forward development in a certain research area. The key program clusters could be as a link and the complementarity for other types of NSFC projects.

In 2015, the Division of Management Science plans to fund two key program clusters, "Management theories and methods in the context of internet of things" in the discipline of Management Science and Engineering, and "Fundamental management and decision issues driven by big data" in the discipline of Business Administration. When applying for a project of the key program clusters, applicants need to select "Key Program" from the "Project type" list in the application form, and state "Key program cluster of Management Science and Engineering" or "Key program cluster of Business Administration" in the note.

To achieve the overall scientific goal 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.

Key Program Cluster: Management Theories and Methods in the Context of Internet of Things (G0103, G0109, G0112)

Conduct research on management theory and methods in the context of internet of things, focusing on the organizational architecture, big data mining and business intelligence, scheduling optimization decision, product status monitoring and quality management, and business models. The

purpose of this key program cluster is to promote the development of management sciences in the context of internet of things, improve the abilities of fundamental research and original innovation in the Management Sciences discipline in China, and provide important theoretical and practical guide for industry transformation and upgrading, and enterprise management improvement in China.

In 2015, the Division will fund 5 key programs under this key program cluster, with the average funding of 2,500,000-3,800,000 yuan per project. The funding period will be 5 years. This key program cluster includes the following five fields.

1. Organizational architecture modelling, behavior analysis and optimization design in the context of internet of things

Based on the dynamic interactions between people, goods, and information, conduct research on the impacts of internet of things architecture on organizational architecture and the interactional mechanism between them; standardized description of organizational architecture and networking modelling approaches within the context of internet of things; organization behavior modelling and analysis; and, theory and methods of organization architecture optimization design. Applicants are required to conduct research based on modern logistics enterprises.

2. Big data mining and business intelligence in the context of internet of things

Conduct research on context awareness and intelligent recommendation method based on temporal relation data; user behavior mechanism and active service strategies based on crowd sensing; information fusion of multi-source heterogeneous data and knowledge coordination theory and methods; and, symbiotic intelligence, knowledge evolution mechanism, and on-line learning method of the “people-machines-goods” system in the context of internet of things.

3. Scenario-based on-line intelligent dispatching optimization methods in the context of internet of things

Conduct research on on-line real-time analysis based on the scenario situation of internet of things dispatching system; knowledge representation of typical scenarios and scenario-based modelling knowledge representation methods; on-line intelligent scenario modelling methods and deduction methods for solving problems; scenario-based on-line intelligent dispatching system; and, scenario-derived optimization strategies, decision methods, and

decision mechanism design.

4. Product status monitoring and quality management based on the internet of things

Conduct research on network layout and data collection methods of real-time product status monitoring; multi-dimensional analysis, data dimension reduction, and robust evaluation methods of the vast amount of sequence data of product quality; life-cycle quality perception, evaluation, prediction/warning, and intelligent control methods of products driven by data; and, life-cycle product quality and service mode, as well as coordinative management methods.

5. Business model and operation management innovation based on internet of the things

Conduct research on basic characteristics and innovation modes of co-creation value based on internet of things application; product/service innovation mechanism based on internet of things application, and its value analysis; participative behaviors of participants in the value network and the associated cooperation and trust mechanism and profit allocation mechanism design; information premium and pricing methods based on information sharing; and, multi-participants involved coordinative business model design method in the context of internet of things.

Key Program Cluster: Fundamental Management and Decision Issues Driven by Big Data (G02)

Conduct pioneering research on several fundamental management and decision issues driven by big data, by focusing on the rules of financial service, health service management, and decision-making model change driven by big data, big data value-finding theory towards finance and health management and decision, important fundamental issues such as big data resources sharing and management strategy and big data-driven management decision analysis models and algorithms. The purpose of this key program cluster is to support finance and health service innovation, resources optimization, and scientific decision innovation management theory and methods in China, and to explore fundamental theories and methods for the big data and management decision science in China, and to develops interdisciplinary research teams.

In 2015, the Division will fund 6 key programs under this key program cluster, with the average funding of 2,300,000-3,500,000 yuan per project.

The funding period is 5 years. This key program cluster includes the following six fields.

1. Big data resource management and administration mechanism
Based on the features of finance and health big data, conduct research on big data resources sharing and administration mechanism, and institutions and technologies to protect privacy and break information islands under China's practical situations, mainly including sharing and administration mechanism, ownership and responsibility of big data, privacy protection of financial service and health big data.

2. Big data-driven management decision analysis model and algorithm
Based on financial and health big data, conduct research on modelling theory and methods for various types of big data to support management decision, mainly including big data statistical inference; computational complexity of big data mining methods; integration analysis algorithm of various types of data; real-time analysis, modelling, and computational methods of financial and health big data.

3. Financial innovation and its risk analysis theory based on big data
Conduct research on financial innovation and its risk management theory and method, mainly including financial innovation modes and associated principle analysis; business data analysis, service innovation, and the risk management of large-scale financial organizations; innovation rules and risk analysis of internet finance; behavior rules of market participants (supplier and consumers) in the context of financial big data and complex design network; and, new capital pricing theory and methods based on financial big data.

4. Key technologies and platform construction in the financial big data environment
Conduct research on financial big data information management and associated key information technologies to support policies, mainly including new principles of commercial and individual financial information security technologies; perception, measurement, and evolution trend analysis of multi-source heterogeneous financial big data; modelling theories and methods of high-dimension sparse financial big data; and, virtual integration platform technologies of multi-source financial big data.

5. Big data-driven smart health management innovation
Conduct research on the data analysis, service innovation, and management

mechanism towards smart health, mainly including health big data management, mining, and fusion; data management for emerging health data sources (e.g. smart wearable devices, social media); personalized health condition monitoring and diagnosis decision support, and deep analysis of electronic medical records; value creation mechanism, value network structure, and associated value transmission paths based on health big data.

6. Emerging public health management based on health big data
Conduct research on emerging epidemiologic forecasting, spread analysis, and public health crisis management with unstructured big data integrated; public health data resource sharing mechanism and service value chain modelling and analysis.

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 2015*, which were set by the panel scientists according to the Department's priority areas of the 12th Five Year plan. Applicants are expected to give their own specific project title, research contents and research plans according to the listed areas.

In 2014, 585 applications for the Key Program in responsive to 39 thematic areas were accepted, 102 of them were finally funded, with a total funding of 327.80 million yuan and an average funding intensity of 3.2137 million yuan.

In 2015, approximately 100 applications for the Key Program will be awarded by the Department of Health Sciences; the funding intensity is expected to be 3 to 4 million yuan per project, and the duration is 5 years.

For detailed information about applications for the Key Program, please refer to the requirements for General Program in the Department of Health Sciences in this guide. Special attention should be given to the following requirements:

(i) The relevant application code corresponding to the given thematic area should be filled in the application form, and the title of the selected thematic area should be written in the "annotated column" of the application form.
(ii) PDF copies of 5 relevant representative papers of the applicant should be

attached to the electronic proposal.

(iii) 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 2015 are listed as following:

1. Basic research in the pathogenesis of lung fibrosis and intervention
2. The pathogenesis and intervention of myocardial fibrosis
3. Basic research on pathogenesis and intervention of liver fibrosis
4. Basic research on pathogenesis and intervention of renal fibrosis
5. The etiology, mechanism, and the intervention of myelofibrosis
6. Studies on action mechanisms and new target of Anti-fibrosis drug
7. Basic research on preventing and treating organ fibrosis by TCM
8. Study on candidate gene identification and related gene function of hereditary Otorhinolaryngology diseases
9. The related gene and protein function of hereditary diseases in nervous system
10. Sleep-disorder, sleep apnea and target organ interactions
11. The pathogenesis and intervention of arrhythmia
12. Developmental regulation of hematopoietic system and its related diseases
13. The role of reciprocal interaction among genetic, environmental factors and immune regulation in type 1 diabetes
14. Study on pathogenesis and intervention of inflammatory/autoimmune ophthalmopathy
15. Study on pathogenesis and prevention of craniomaxilla/joint dysfunction or diseases (tumors not included)
16. Recanalization and revascularization after ischemic cerebrovascular disease
17. Aging mechanism of epithelial tissue (exclude tumor)
18. The pathogenesis and intervention strategy of the fetal original disease
19. The interaction between stem cells and immune microenvironment
20. The pathogenesis, regression and intervention strategy of endometriosis
21. Basic research on transplantation immunology and tissue/organ transplantation
22. Study of functional biomaterial and the mechanism of induction of tissue regeneration
23. Basic research of high resolution imaging and its application in disease diagnosis and treatment
24. Forensic basic research of the spiritual injury

25. The basic research on the pathogenicity of pathogens (bacteria or fungi) and immunogenicity related factors
26. The mechanism of virus persistent infection
27. Mechanisms of system and organ dysfunction due to severe trauma (burns) and relevant interventions
28. Aging and development of bone and cartilage
29. The impact of anti-cancer therapies on tumor microenvironment changes and its biological significance
30. Basic research on therapeutic strategies targeting immune modulating cells in cancer
31. Exosomes and intercellular signaling in cancer
32. Chromatin modification and metabolic reprogramming of cancer cells
33. The effects of radioactive damage on health and their mechanisms
34. Effects on health during early life stage by environmental hazardous factors and their mechanisms
35. Studies on disease risk assessment and predictive methodology based on biomedical big data
36. Drug discovery and innovation based on Synthetic biology
37. Studies on the structure of biomacromolecular drugs and their relationship with mechanism on adverse drug reactions
38. Research on principles and methods of preventing and treating diabetic vasculopathy by TCM
39. Correlation research on metabolites *in vivo* of CMM ingredients and its pharmacodynamic efficacy

Major Program

Major program serves the major needs of the national economy and sustainable development of the society and S&T development. By selecting scientific issues with strategic significance, it integrates innovative human resources, conducts multidisciplinary research, and plays the leading and guiding role of further improving the capability of indigenous innovation in China's basic research.

Major Program projects will be implemented by unified planning and research projects will be supported in batches. Research areas for Major Program will be proposed on the basis of in-depth discussion and opinion solicitation among scientists according to NSFC priority areas. It focuses on the growth points resulting from long term funding of NSFC projects, and aims at achieving important breakthroughs in key scientific issues through high level funding.

In the 12th five-year plan period, NSFC only accepts integrated applications for each Major Program, which should include both the overall application for the Program and proposals for research projects. Please pay attention to the relationship among various projects. Proposals involving only part of the research areas or one of the research projects indicated in the Guide of Major Program will not be accepted.

Each application can contain no more than 5 projects. In general one project should be carried out by one unit, with no more than 2 collaborative research units. Collaborative units may not exceed 5 for one application, and the applicant must be one of the PIs of the projects proposed.

Applicants should have the following qualifications:
(1) Have experience of undertaking basic research projects;
(2) Have senior academic position (title).

Post-docs, graduate students and those without home institutions are not qualified to apply.

Applicants should follow the guidelines when writing proposals, focus on key scientific issues with strategic and fundamental significance, put

forward clear, concentrated and interdisciplinary scientific targets, and pay attention to coordination and links with other national S&T programs. The research team should have good accumulation of research work, sufficient research conditions, the ability to do innovative work and a number of high level academic leaders.

Occurrences and Effects of Water in the Earth's Interior

Water is not only the fundamental resource for survival and development of human beings, but also one of the most distinguishable characteristics of the Earth from other planets. Besides water on the surface and at shallow depths (underground water), water can occur in the minerals of the crust and mantle, in melts and fluids at high temperature and high pressure. Consequently, it makes significant influence on the physico-chemical properties of crustal and mantle rocks. Water near the surface can be brought into the Earth's interior by plate subduction, and then be transported and recycled by metamorphic dehydration and partial melting. Knowledge about the occurrence of water and its physic-chemical effects at different temporal and spatial scales is critical to our understanding of the Earth's composition and geodynamical evolution.

Water in the Earth's interior has become a multidisciplinary and cooperative field of geochemistry, geology and geophysics. To reveal the distribution, transportation and partition of water in the Earth's interior, we need to distinguish different species of water at different depths, and to investigate its role in physical and chemical processes. Clearly, an integrated study by means of geochemical analyses, geophysical observations, high-pressure and high-temperature experiments, and first principle calculations will enable to establish self-consistent models about the occurrences and effects of water in the Earth's interior, and then estimate the influence of plate tectonics to the Earth's evolution.

1. Scientific objectives

This project aims to improve our understanding of distribution and transport of water in the Earth's interior, and provides new insights into its influence on physical and chemical processes. It will contain the following objectives: (1) first-order estimation of the contents, species and H-O isotope compositions of water in minerals and rocks from the crust and mantle; (2)

partition behavior of water between coexisting minerals, and between minerals and melt; (3) the effects of water on the phase transition of minerals and the metamorphism and anatexis of rocks, as well as on physical properties and deformation of minerals and rocks. The results will shed new light on subduction-induced dehydration of crustal rocks, phase transition of minerals, rock deformation, earthquake mechanisms at great depths, partial melting of subducted slabs, mantle metasomatism and partial melting, volcano eruption and so on.

2. Research contents

To address the above objectives, this project will be composed of the following subprojects: (1) the partition of water between minerals, fluids and melts and its effect on electrical conductivity; (2) the influence of water on the physical properties and rheology of minerals and rocks and the genesis of subduction-zone earthquake; (3) the occurrences of water in the continental lithosphere and its physical and chemical influence.

The results will be used to answer the following questions: (1) the distribution of water in crust, upper mantle and transition; (2) the partition behavior of water between coexisting phases in the Earth's interior; (3) the process and mechanism of water transport and evolution in the Earth's interior; (4) the influence of water on the phase change and boundary undulation of the mantle; (5) the influence of water on the density, velocity and conductivity structures of the crust and mantle; (6) the influence of water on the rheology of rocks and the relationship between continental stability and deep earthquake at subduction zones; (7) the contents, species and H-O isotope compositions of water in continental subduction zones; (8) the origin of continental subduction-zone fluids and their geochemical effects.

3. Funding period

Five years (from January 1, 2016 to December 31, 2020).

4. Funding intensity

Total funding is 20 million yuan.

Major Research Plan

Following the principle of definite objective, stable support, integration and refinement and leap-forward development, Major Research Plan focuses on key basic scientific issues with strategic importance to the nation and major frontier areas and give high priority identified on the basis of the capability and advantages of the country. Rather than individual project, 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 break-through in the identified areas.

Applicants should meet the following eligibility criteria:
(1) experience of undertaking basic research projects;
(2) a senior academic position.

Post-docs and graduate students and those without home institutions are not eligible to apply.

A Major Research Plan consists of three types of programs, namely, the Fostering Program, Key Program and Integrated Program, of which each one is open to applications. Proposals shall be prepared in accordance with the requirement for Major Research Plan and the outlines for proposal preparation, featuring interdisciplinary research, emphasizing on the contributions to 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, and Fostering Program, Key Program, or Integrated Program for the column of sub-type, and the titles of the Major Research Plan in the annotation. Proposal is not accepted in case of incorrect selections or without any selections.

Funding for Fostering Program project, Key Program project of the Major Research Plan is equivalent to the average level of General Program and Key Program respectively. Generally, duration of funding for Fostering Program project is 3 years, for Key Program project 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 Integrated Program project will not be counted in limitations of total number of projects applied and undertaken for senior academic title holder, and the collaborative organizations involved may not exceed 5. Meanwhile, main participants must be the actual contributor to the Integrated Program project, and the total number of main participants may not exceed 9.

Regulations on sharing of data and information should be observed in order to achieve the overall scieitific objectives and multi disciplinary integration of the major research plan.

Each major research plan shall hold a academic workshop and seminars on related areas so as to strengthen academic exchange and achiev the overall scientific objectives and integration of disciplinaes. The Prinicplal Inviestigator of the granted projects is required to participate in these activities.

For details of each major research plan, please refer to the relevant sections in the specific major research plan.

Basic Algorithms for High Performance Scientific Computation and Computable Modeling

This Major Research Plan is to strengthen the research on important and basic scientific issues in scientific computation, design efficient basic algorithm and develop computable model with practical demand on precision so as to improve the capability of using computer to solve scientific and engineering problems and meet the increasing demand from applications. This plan will provide further support for scientific research on scientific computation in frontier areas and major national needs, promote coordinated development of hardware and software for scientific computation, leverage intercrossing and merging of mathematics with other disciplines, and achieve leapfrog development of scientific computation as well as scientific and technological development.

I. Scientific goals

Focusing basic algorithm and computable modeling, conduct researches on common efficient algorithm of scientific computation, computational modeling based on mechanism and data, and evaluation of problem driven

high performance computation and algorithm, promote the development of high performance scientific computation in China, and provide key support of numerical simulation approach and method for solving bottle neck problems in scientific frontiers and national needs.

II. Key scientific issues

1. High efficiency common algorithm of numerical computation

(1) Construction and analysis of high efficiency high precision schemes for differential equations
(2) Fast method for complex data processing
(3) Optimizing method for uncertain and complex object functions

2. Mechanism and data based computable modeling

(1) Coupling and analysis of typical physical models
(2) Sparse representation of super high dimensional data
(3) Mixed modeling of mechanism and data

3. Problem-driven high performance computation and algorithm evaluation

(1) Numerical simulation and algorithm evaluation in multi physical process coupling
(2) Computation and algorithm evaluation based on data extraction and analysis
(3) Computation and algorithm evaluation by model and data complementation

III. Key funding direction of research project in 2015

It will be the 5th year of this Major Research Plan to accept applications. According to the overall planning, we shall support mainly projects in the form of the “Integrated Program project” and small number of “Key Program project”. “Integrated Program project” will be selected from excellent projects funded previously in the “Fostering Program project”and “Key Program project”, so as to provide good foundation for integration when the research plan comes to its final phase. Applications not closely related to the following directions will not be accepted. The total budget for 2015 is about 20 million yuan.

Key Program project (about 3 million yuan per project for 3 years)

Mathematical methods for similar information in climate prediction

Main research contents are:
Addressing initial value problems such as climate prediction, develop efficient mathematical optimization method for similar information, new schemes, and solve typical problems such as high dimension and large computation amount or samples, and problems such as low estimation of background error deviation and flow dependence, so that similar data can be observed efficiently. Use new similarity scheme to verify in actual climate prediction.

Key directions of research for integrated projects
1. Super large scale computation and verification of complete flow regions for spacecraft reentry

Main research contents are:
By making use of research results in computable modeling and fast algorithm in the whole flow region (rarefied gas, transition and continuum), to solve problems in complex dynamic process of spacecraft reentry, integrate large scale efficient computation technology at 100P level, develop large scale numerical simulation of total flow field for reentry process of spacecraft using unified model and algorithm, and verify the reliability of the modeling, algorithm and simulation with experimental data.

2. Integration and dimension reduction of high dimensional multi level big bio data

Main research contents are:
Based on research results in computable modeling, dimension reduction selection of characteristics and network construction for complex biomedical problems, integrate theory and algorithm of discovery based on small sampling, high dimensional multi level bio system characteristics, study the laws of dynamic changes of bio network, reveal complex life phenomena and verify the credibility of the modeling and algorithm with experimental data.

Extended funding

The Fostering projects ending in 2014 with good research results may receive extended funding if the PIs apply. Applications will be accepted in the form of free application and recommendation.

IV. Basic selection criteria

To achieve the overall objectives of this Major Research Plan, it is required that researchers in different areas form research team for application (research team formed with members in the areas of algorithm, problem and software is encouraged), and give priorities to applications with the following features:

(1) Exploratory studies with innovative ideas and special features.
(2) Studies merging modeling, algorithm and numerical simulation.
(3) Practice of mathematics in interdisciplinary research and difference from existing methods.

V. Notes to Applications

(1) Please read this guide carefully before writing the application. Research topic must be selected within the directions to be funded in 2015, and within the key scientific problems, and emphasize on contributions to the overall objectives and the key scientific issues of this research plan, especially the integration of algorithm and practical problems. The specialties and unique features about the proposed research should be identified in the application. No acceptance will be made for applications which fail to conform to this guide. Differences and connections between the proposed research and any other national science & technology program(s) which the PI has been supported by should be addressed in the proposal.

(2). Select “Research Plan” in funding category, and “Key Program” or “Integrated Program” in sub description. The selection “Basic Algorithms for High Performance Scientific Computation and Computable Modeling” should be made for annotation. Incorrect selection will lead to rejection. Please select the proper application code in consistency with the research contents, for instance, applications in bio should go with the code of the Department of Biology, and the like.

(3) Applications will be accepted by the Department of Mathematical and Physical Sciences.

Precision measurement physics

Precision measurement physics is the basis and frontier areas of modern

physics, and the result of integrating scientific exploration and precision measurement techniques, and the basis for national needs on relevant precision measurement. This major research plan, with research objects of atom, molecule and photon, and a target of precision measurement physics, aims at constructing new system of highly stable precision measurement, exploring new concept and new principles of precision measurement physics, developing higher precision measurement method and technology, improving precision of measuring basic physical parameters and testing the range of application of basic physical principles at higher precision level.

I. Scientific targets

Overall Scientific Goal

To further improve research capability in precision measurement area in the country, promote development of precision measurement physics, increase international impact of disciplines in precision measurement physics, and reach leading level in some areas, and strengthen the domination of Chinese scientists in the world in basic physical constant measurement and basic physical quantities. Develop key concept, method and technological basis for national needs such as navigation and positioning, time keeping, resources exploration, national defense, etc. Build a research team in this area with stronger research capability for China.

Specific Scientific Goals

Improve existing experimental system by increasing measurement precision; construct new system of atomic and molecular cooling to propose new principles and new method for atomic and molecular cooling for precision measurement; break the standard quantum limit in measurement to reach the international leading level in noise compression; make the uncertainty in time frequency measurement reach to the level of 10^{-18}, time frequency comparison and transfer precision higher than 10^{-19}; make more physical constant smeasurement data into 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, etc.

II. Key scientific problems

1. Principles, method and technologies of measurement to break the standard quantum limit

2. New principles and method beyond the existing atomic frequency standard precision
3. New mechanism and technology breaking the atomic precision control and molecular cooling

III. Application and funding in 2014

In 2014, we received 29 applications, among them, 7 were for Key Program project, 22 for Fostering Program project. After expert review, NSFC funded 4 Key Program projects, 8 Fostering Program projects. Total funding was 25.99 million yuan.

IV. Key funding research areas in 2015

In 2015, this Major Research Plan will focus on key scientific problems and support projects in the form of “Fostering Program” and “Key Program”. Research with explorative and new ideas in the form of “Fostering Program” and research with original ideas, good research accumulation and prospects of making breakthroughs in the form of “Key Program” will be taken into consideration. 25 million yuan will be used for integrated program and extended projects. This Major Research Planwill last for 8 years, and the project selection and funding will be completed in the first 5 years. In 2015 the department plans to allocate total funding of 55 million yuan. The average funding will be 4-5 million yuan for 4 yearsfor Key Program, and 1-1.5 million yuan 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:

1. **Studies on quantum correlation measurement beyond 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 spin compression or entanglement. Use quantum correlation or non linear interactions between particles to demonstrate measurement precision beyond standard quantum limit on phase change, reach or break Heisenberg limit.

(2) New principles and new method of quantum precision measurement: explore other new principles and method 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 goal 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: by means of quantum correlation system such as photon and atomand principles to develop relevant precision measurement technologies with high precision, high sensitivity and high resolution, which includs 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 ionized molecules) system and principles and methods for precision measurement; methods of applications of special energy level properties peculiar to molecules (chiral, polarization and near degeneracy doublet) 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, calibration of relevant low energy collision properties.

(3) Computation and experimental studies on the atomic and molecular structures related to precision measurement.

3. High precision test of basic physical laws

Main research content

(1) High precision experimental testing of Newton’s reverse square law and equivalent principle;

(2) High precision testing of quantum electro dynamics (such as experiment of hydrogen or hydrogen-like atomic spectrums, measurement of hydrogen or hydrogen-like atomic spectrum and computation of

quantum electro dynamics, Lamb shift experiment and computation for correlative systems);

(3) 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 content

(1) High precision measurement of basic physical constants (such as Gravitational constant G, fine structure constant α, Planck constant h, Rydberg constant R, Boltzmann constant k_B 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 generation and transfer

Main research content

(1) Generation of high precision time and frequency. Study beyond quantum projection noise, the technology and method of ultra low phase noise microwave signal generation to improve stability of spring atomic clock; solve the physical and technical problems affecting the uncertainty and stability of atomic frequency generator; develop a complete system of high performance optical atomic clock by focusing on other atomic and ion systems than calcium, strontium and aluminum; and method and technology for high precision measurement based on UTI.

(2) High precision frequency comparison and transfer. Study technology and method of high performance optical frequency source, optical frequency signal transfer path and relay, construct remote optical fiber or space optical frequency signal transfer and comparison system with better stability than the existing optical frequency atomic clock; new method and new technology of ultra-high precision microwave frequency transfer; and technology for high performance transfer clock frequency comparison and measurement.

Fostering Programs

Addressing issues in precision measurement physics, this kind of programs

aims at studies in frontier areas of new physical system, new principles, new methods and new technologies for special problems in precision measurement physics. Applications should clearly identify the scientific problems, indicate new physical ideas and specific ways of solving the problem. Projects with good research results and clear and important scientific issues to be further studied will be given considerations for 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 generation
3. High precision transfer and comparison of time frequency
4. Atomic molecular structures and their fine spectrum
5. New principles and methods of quantum measurement
6. Principle and method of ultra cold atomic molecular precision measurement
7. New method of high precision testing of basic physical laws
8. New method of high precision measurement of physical constants and physical parameters
9. Key unit technology of precision measurement physics

V. Evaluation criteria

1. Research contents should meet the requirements of this guide, and research and experiments should be creative, focusing 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 combinations of theory and experiments, centering on the goal of higher measurement precision
4. We encourage interdisciplinary research, especially between mathematical physics and information, geosciences.
5. International cooperation for goal reaching is encouraged.

VI. Notes to Applications

(1) Please read this guide carefully before preparing the application. This research plan aims at forming a research project cluster through

strategic guidance and merits integration. Applications should have clear key scientific problems, and close relations with the problems identified in this guide, and emphasize on contributions to the overall goal and the key scientific issues of this research plan.

(2) 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 Precision measurement physics in the "Explanatory Note" column. Any applications with incorrect or blank will not be considered.

(3) The Department of Earth Sciences is responsible to accept applications.

The Change of the Tibetan Plateau Land-Atmosphere Coupled System and Its Effects on Global Climate

The Tibetan Plateau (TP), as an important factor controlling atmospheric circulation, provides a profound impact on global climate change through global momentum, energy/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. The 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 is designed to reveal the mechanism of the TP's impacts on the global climate and climate change, to improve the regional and global weather/climate prediction capability, move the atmospheric research in China on the Tibetan Plateau into the world arena, forester a group of leading scientists and stand in the advanced research teams, and to make greater contribution to the sustainable socio-economic development.

The overall target of this Major Research Plan is to understand the TP's land-atmosphere coupling 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 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 Major Research Plan 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-air 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-air coupled system on 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-air coupled processes on monsoons, energy/water cycles; collaborative influences of the TP and oceans on regional and global climate changes; and interactions of troposphere and stratosphere over the TP.

3. Mechanism of influences of the TP's land-air 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-air 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 re-analysis and data assimilation.

III. Key research directions and priorities in 2015

The total budget for this Major Research Plan in 2015 is approximately 40 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 with the average

funding level of about 1 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 with the average funding of approximately 4 million yuan per project.

Key research directions include:

(1) Multi-source information (especially the observations from the third Tibetan Plateau Experiment of Atmospheric Sciences) fusion, land-atmosphere system data assimilation and data reanalysis over the TP
(2) Studies on numerical model of TP's land-atmosphere coupled system (treatment for complex topography and parameterization of land surface processes, boundary layer, cloud-precipitation physics, radiation and the stratospheric physical and chemical processes)
(3) Applied research on the land surface and boundary layer observations over the TP, and the mechanism of the land-atmosphere interactions.
(4) Application of the cloud-precipitation physics observations, and the theory for the cloud microphysical model
(5) Mechanism of impacts of TP's land-atmosphere coupled process on global and regional energy/water cycles
(6) Observational data application of the troposphere-stratosphere interaction over the TP, and relevant mechanism research
(7) Collaborative effects of the TP's land-atmosphere coupled system and oceans on the global climate change
(8) Impacts of the TP's Mechanical and thermal forcing on the disastrous weather/climate in China

The Priorities for funding in 2015:

(1) The research projects solving the core scientific issues
(2) Encouraging the explorative research with innovative concepts
(3) A special attention to the substantive interdisciplinary studies and the international collaboration projects

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 to the key scientific issues of this Major Research Plan, highlight the limited goal and emphasize 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 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 to 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-Air Coupling System and Its Effects on Global Climate" in the "Explanatory Note" column. Any applications with incorrect or blank will not be considered.

(4) 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) experience of doing basic research.
(2) senior professional position (title) or Ph.D. degree, or recommendations by 2 researchers in the same research area with senior professional position (title).
(3) less than 35 by January 1 of the year of application (born on or after January 1, 1980). Female applicants could still apply if they are less than 40 by January 1 of the year of application (born on or after January 1, 1975).

Full time Ph.D. 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, could 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 the main criteria for evaluation. Applicants should follow the outlines of proposal for Young Scientists Fund when making applications. They may have up to 2 collaborating units within one proposal and the research period is 3 years in general.

In 2014, we supported 16,421 projects of Young Scientists Fund. The total funding was 3.98943 billion yuan and the average funding was 242,900 yuan per project, which was 2,100 yuan more than the previous year. The average success rate was 25.26%, which was 0.06% higher than that of 2013 (Please refer to the following table for details).

In 2015, the average funding will be 250,000 yuan per project. Please refer to actual funding scale in each department when submitting proposals.

Funding for the Young Scientists Fund in 2014

Unit: 10,000 yuan

Department	Applications	Approved funding				Funding rate (%)
		Projects	Funding	Average per project	Percentage of the total (%)	
Mathematical and Physical Sciences	5361	1728	43190	24.99	10.83	32.23
Chemical Sciences	5246	1534	38390	25.03	9.62	29.24
Life Sciences	9488	2353	57070	24.25	14.31	24.80
Earth Sciences	5337	1623	40560	24.99	10.17	30.41
Engineering and Materials Sciences	10792	3036	75873	24.99	19.02	28.13
Information Sciences	7566	1940	48490	24.99	12.15	25.64
Management Sciences	3267	705	14810	21.01	3.71	21.58
Health Sciences	17959	3502	80560	23.00	20.19	19.50
Total	65016	16421	398943	24.29	100	25.26

Please refer to sections of each department for funding scope, funding statistics in recent years and relevant requirements.

Department of Mathematical and Physical Sciences

Building up a talent pool of young scientists is of particularly importance 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 2015, the Department will maintain a higher funding rate for the Young Scientists Fund so as to give more young people the opportunity to conduct research independently, 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 the Last Two Years

Unit: 10,000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Mathematics	Basic mathematics	269	5,976	32.96	280	6,207	32.63
	Applied and computational mathematics	306	6,774	32.42	328	7,272	31.57
Mechanics	Basic issues and methods in mechanics	3	81	33.33			
	Dynamics and control	55	1,402	31.98	62	1,587	32.29
	Solid mechanics	106	2,795	31.93	124	3,274	31.88
	Fluid mechanics	66	1,731	31.88	77	2,006	31.69
	Bio-mechanics	18	463	32.73	19	520	31.67
	Explosive and impact dynamics	24	665	31.58	31	826	31.96
Astronomy	Astrophysics	59	1,632	41.84	41	1,143	33.33
	Astrometry and celestial mechanics	48	1,311	31.37	71	1,915	33.18
Physics I	Condensed matter physics	215	5,746	33.18	213	5,671	32.27
	Atomic and molecular physics	44	1,168	33.59	44	1,148	32.35
	Optics	120	3,252	33.15	129	3,502	32.41
	Acoustics	31	863	34.07	29	801	32.95
Physics II	Fundamental physics and particle physics	69	1,518	35.38	65	1,522	33.51
	Nuclear physics, nuclear technology and its application	76	2,021	32.20	88	2,332	33.85
	Particle physics and nuclear physics experimental facilities	71	2,049	34.63	69	1,876	30.80
	Plasma physics	58	1,583	33.14	58	1,588	32.04
Total		1 638	41,030	32.99	1 728	43,190	32.23
Average funding per project		25.05			24.99		

Department of Chemical Sciences

The Department of Chemical Sciences follows 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 according to 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. In 2015, the average funding intensity will be 250,000 yuan per project.

Funding for Projects of the Young Scientists Fund in the Department of Chemical Sciences in the Last Two Years

Unit: 10,000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding rate（%）	Projects	Funding	Funding rate（%）
Division I	Inorganic chemistry	201	5,030	29.30	218	5,455	29.66
	Analytical chemistry	165	4,130	29.26	183	4,579	29.80
Division Ⅱ	Organic chemistry	237	5,932	29.30	244	6,105	29.76
Division Ⅲ	Physical chemistry	273	6,833	29.26	306	7,665	29.71
Division Ⅳ	Polymers	110	2,755	29.49	124	3,102	29.81
	Environmental chemistry	169	4,230	29.19	185	4,629	29.70
Division Ⅴ	Chemical Engineering	235	5,880	27.07	274	6,855	27.18
Total		1,390	34,790	28.89	1,534	38,390	29.24
Average funding per project		25.03			25.03		

Department of Life Sciences

In 2014, the Department of Life Sciences received a total of 9,488 applications for the Young Scientists Fund. 9,290 applications were

accepted and 2,353 projects were funded with a funding rate of 24.08%. The average funding is 242,500 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 2015, 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 the Last Two Years

Unit:10,000 yuan

Scientific Divisions		2013			2014		
		Projects	Funding	Funding Rate (%) ++	Projects	Funding	Funding Rate (%) ++
Division I	Microbiology	156	3,582	23.89	165	4,012	24.41
	Botany	145	3,340	27.36	152	3,681	26.25
Division II	Ecology	167	3,846	26.51	170	4,119	30.14
	Forestry	128	2,950	23.32	136	3,309	24.24
Division III	Biophysics/Biochemistry /Molecular Biology	110	2,532	26.57	112	2,709	30.27
	Immunology	62	1,436	32.98	61	1,522	30.96
	Biomechanics and tissue engineering	61	1,402	24.21	67	1,579	24.63
Division IV	Neurosciences	52	1,251	27.96	52	1,289	26.80
	Psychology	58	1,281	23.97	62	1,488	26.61
	Physiology & Integrative Biology	46	1,062	22.89	48	1,160	27.43
Division V	Genetics and Bioinformatics	118	2,710	28.71	120	2,913	29.48
	Cell Biology	74	1,700	27.21	77	1,869	26.46
	Developmental Biology and Reproductive Biology	51	1,183	26.84	54	1,306	26.09
Division VI	Agriculture and Crop Sciences	175	4,024	22.73	196	4,742	22.82
	Food Science	200	4,585	23.01	210	5,097	22.41

Scientific Divisions		2013			2014		
		Projects	Funding	Funding Rate (%) ++	Projects	Funding	Funding Rate (%) ++
Division VII	Plant Protection	128	2,944	25.15	134	3,254	25.87
	Horticulture and Plant Nutrition	127	2,924	23.26	136	3,293	23.99
Division VIII	Zoology	75	1,728	26.04	78	1,883	27.76
	Animal Husbandry and Grassland Science	108	2,491	21.73	118	2,873	21.81
	Veterinary Medicine	117	2,690	25.71	122	2,956	26.58
	Aquaculture	75	1,719	21.13	83	2,016	20.65
Total		2 233	51,380	24.79	2,353	57,070	25.33
Average Funding Per Project		23.01			24.25		

Department of Earth Sciences

In 2014, the Department of Earth Sciences received 5,337 applications for the Young Scientists Fund from 789 research institutions. Among them, 2,965 were from universities, accounting for 55.6%, and 2,200 from research institutes, accounting for 41.2%. Totally, 1,623 projects were funded with a fund of 405.6 million yuan. The average fund was 250,000 yuan per project and the funding rate was 30.4%. Among the projects funded in 2014, 834 were obtained by universities, accounting for 51.4%, and 750 by research institutes, accounting for 46.2%. In 2015, the average fund will be about 250,000 yuan per project.

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 Ph.D. degrees and started their basic research.

In 2015, 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 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 the Last Two Years

Unit:10,000 yuan

Divisions		2013			2014		
		Projects	Fund (10,000 Yuan)	Funding rate (%)	Projects	Fund (10,000 Yuan)	Funding rate (%)
I	Geography (including soil science and remote sensing)	655	16,366	30.68	664	16,598	30.40
II	Geology	289	7,190	30.81	326	8,155	30.38
	Geochemistry	99	2,483	30.56	115	2,865	30.50
III	Geophysics and space physics	150	3,749	30.67	150	3,762	30.30
IV	Marine science	208	5,236	30.45	222	5,540	30.45
V	Atmospheric science	140	3,496	30.70	146	3,640	30.48
Total		1,541	38,520	30.67	1623	40,560	30.41
Average funding per project(10,000 Yuant)		25.00			24.99		

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 2014, the Department received 10,792 applications (declined 272 applications) for the Fund with an increase of 3.91%. 3,036 projects were funded with a total funding of 758.73 million Yuan an average funding of 249,900 yuan per project and a success rate of 28.13% (26.42% in 2013).

Please refer to the General Program and other related parts of 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 the Last Two Years

Unit: 10,000 Yuan

Divisions		2013			2014		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Materials Sciences Ⅰ	Metallic materials	215	5,374	25.84	243	6,080	27.49
Materials Sciences Ⅱ	Inorganic non metallic materials	330	8,242	26.7	366	9,142	28.07
	Organic polymer materials	218	5,444	26.11	245	6,115	27.75
Engineering Sciences Ⅰ	Metallurgy and mining science	260	6,507	24.64	309	7,715	26.39
Engineering Sciences Ⅱ	Mechanical engineering	478	11,950	26.32	524	13,095	28.40
Engineering Sciences Ⅲ	Engineering thermo physics and energy use	216	5,395	26.97	241	6,025	27.86
Engineering Sciences Ⅳ	Architecture, environment and structural engineering	576	14,410	27.08	621	15,528	28.88
Engineering Sciences Ⅴ	Electrical science and engineering	187	4,681	27.02	200	5,000	29.15
	Hydrology and marine engineering	264	6,587	26.61	287	7,173	28.59
Total		2,744	68,590	26.42	3,036	75,873	28.13
Average funding per project		25.00			24.99		

Department of Information Sciences

In 2014, the Department of Information Sciences received 7,566 applications for the Young Scientists Fund, which was increased by 3.37% compared with that in previous year, exceeding that of the General Program projects for the first time. 1,940 projects were funded with an average funding rate of 25.64%. The total funding was 484.9 million yuan and the average funding intensity was 249,900 yuan per project. In 2015, the Department will continue to pay attention to applications for the Young Scientist Fund, and try to maintain an appropriate funding rate. The funding intensity will be 250,000 yuan per project.

Funding for Projects of the Young Scientists Fund in the Department of Information Sciences in the Last Two Years

Unit: 10,000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding Rate (%)	Projects	Funding	Funding rate (%)
Division I	Electronics and technology	152	3,962	26.71	177	4,553	27.36
	Information and communication system	173	4,326	26.49	186	4,564	27.11
	Information acquisition and processing	170	4,232	26.56	163	4,073	26.50
Division II	Theoretical computer science, computer software and hardware	135	3,269	24.55	139	3,475	25.27
	Computer application	240	5,743	24.54	247	6,168	25.20
	Network and information security	168	3,973	24.89	161	4,040	25.31
Division III	Control theory and control engineering	188	4,608	23.71	199	4,938	24.8
	Systems science and system engineering	76	1,817	26.39	62	1,514	22.8
	AI and intelligent system	150	3,679	24.12	169	4,198	24.1
Division IV	Semiconductor science and information devices	152	3,893	26.21	177	4,434	26.86
	Information optics and photoelectric devices	130	3,370	25.9	128	3,211	26.72
	Laser technology and technical optics	121	3,148	25.8	132	3,322	26.51
Total		1855	46,020	25.34	1940	48,490	25.64
Average funding per project		24.81			24.99		

Department of Management Sciences

Recently, the application quality and research level of the Young Scientists Fund in the Department of Management Sciences had scored significant improvement. Most applicants paid attention 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 could not be accomplished with the limited budget and the proposed time period,

or repeated their Ph.D. or postdoctoral research work, or failed to provide information as required by NSFC.

In 2014, the Department received 3,267 applications for the Young Scientists Fund, equivalent to the level in 2013. 705 projects were funded with a funding rate of 21.58%, and the average funding was 210,100 yuan per project. Both the number of funded projects and the average funding intensity per project were increased compared to the levels in 2013.

In 2015, the Department will continue to follow the principle of "expandingthe funding scope properly and limiting the funding intensity" for the Young Scientists Fund. The average funding in 2015 will be 210,000 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 Guide to Progrmas are also applied to the Young Scientists Fund, so please read carefully before submitting proposals.

Funded Projects of the Young Scientists Fund of the Department ofManagement Sciences in the Last Two Years

Unit: 10,000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rates (%)
Division I	Management science and engineering	182	3,745	20.18	195	4,100	22.41
Division II	Business administration	196	4,035	19.90	200	4,200	22.12
Division III	Macro-management and policy	272	5,600	18.44	310	6,510	20.76
Total		650	13,380	19.33	705	14,810	21.58
Average funding per project (10,000 yuan/project)		20.58			21.01		

Department of Health Sciences

The Department of Health Sciences supports mainly basic research on the occurrence, development, outcome, diagnosis, therapy and prevention of diseases.

Young scientists are welcomed to carry out basic research on diseases and submit proposals to the Department for funding. Applicants should have the ability to undertake and complete research project independently, and the ability to propose creative scientific problems and research schemes. Applicants should attach to the proposal the PDF copies of no more than 5 representative papers relevant to the application. Please refer to sections in the Young Scientists Fund and General Program in this guide for detailed information.

Along with the continued increase of national investment in basic research, the approval rate has been increased and the funding intensity will be maintained for the Young Scientists Fund. In 2015, the funding for the Young Scientists Fund will be around 250,000 yuan per project.

In 2014, the number of Divisions of the Department changed from eight to ten. An overview of the award number, funding, and success rate of the Young Scientists Fund in 2013 and 2014 by the Department is listed in the tables below.

Funding for Projects of the Young Scientists Fund in the Department of Health Sciences in 2013

Unit: 10,000 yuan

Divisions		2013		
		Projects	Funding	Funding rate(%)
Division I	Respiratory System, Circulatory System, Digestive System, Blood System, Gerontology	452	10,391	20.68
Division II	Urinary System ,Reproductive System/Perinatology/Neonatology, Endocrine System/Metabolism and Nutrition Support, Ophthalmology, Otorhinolaryngology Head and Neck Science, Oral and Craniomaxillo-facial Science	469	10,792	20.03
Division III	Neurological and Psychiatric Diseases	266	6,119.5	22.39
	Medical Imaging and Biomedical Engineering	161	3,716	25.24
Division IV	Medical Pathogenic Microorganism and Infection, Skin and Appendages, Orthopedics and Sports Medicine, Emergency and Intensive Care/Trauma/burns/cold Injury/plastic Surgery/Special Medicine/Rehabilitation,	338	7,773.5	21.05

Divisions		2013		
		Projects	Funding	Funding rate(%)
Division V	Oncology I	692	15,910	20.52
Division VI	Oncology II	140	3,220	24.18
	Medical Immunology, Forensic Sciences	107	2,476	26.42
Division VII	Preventive Medicine, Endemiology, Occupational Medicine, Radiology	245	5,641	24.26
Division VIII	MateriaMedica and Pharmacology.	446	10,251	17.56
Total		3,316	76,290	20.90
Average funding per project		23.01		

Funding for Projects of the Young Scientists Fund in the Department of Health Sciences in 2014

Unit: 10,000 yuan

Divisions		2014		
		Projects	funding	Funding rate（%）
Division I	Respiratory System, Circulatory System, Blood System	369	8,495	20.26
Division II	Digestive System, Urinary System , Endocrine System/ Metabolism and Nutrition Support, Ophthalmology, Otorhinolaryngology Head and Neck Science, Oral and Craniomaxillo-facial Science	495	11,395	19.62
Division III	Neurological and Psychiatric Diseases, Gerontology	298	6,849	20.62
Division IV	Reproductive System/ Perinatology/Neonatology,Medical Immunology	210	4,819	22.48
Division V	Medical Imaging and Biomedical Engineering, Special Medicine, Forensic Sciences	192	4,406	20.98
Division VI	Medical Pathogenic Microorganisms and Infection, Orthopedics and Sports Medicine, Emergency and Intensive Care Medicine/Trauma/ Burns/laboratory medicine/plastic Surgery/ Rehabilitation medicine	308	7,094	19.13

Divisions		2014		
		Projects	funding	Funding rate（%）
Division VII	Oncology (leukemia not included)	711	16,346	18.31
Division VIII	Skin and Appendages,Preventive Medicine,Endemiology,Occupational Medicine, Radiology	190	4,368	23.09
Division IX	Materia Medica and Pharmacology	258	5,951	23.60
Division X	Chinese Medicine, Chinese Materia Medica, integrated Chinese and Western Medicine	471	10,837	16.18
Total		3,502	80,560	19.50
Average funding per project		23.00		

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, and stabilize and gather outstanding talents to facilitate the construction of the regional innovation system as well as the social and economical development of the region.

Applicants for the Fund for Less Developed Regions should meet the following qualifications:

(1) Experience of undertaking basic research project or doing other basic research;
(2) Senior academic rank (title) or doctoral degree, or recommendations by 2 researchers with senior academic rank (title) in the same research area.

Researchers, who meet the above qualifications and work 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, XiangxiTujia and Miao Prefecture in Hunan Province, Liangshan Yi Prefecture in Sichuan Province, Ganzi Tibetan Prefecture and Aba Tibetan and Qiang Prefecture in Sichuan Province, may apply for the Fund for Less Developed Regions.

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 can not 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. Scientists listed in Item 2, Article 10 of the *Regulations of the National Natural Science Fund* can not apply for the Fund for Less Developed

Regions.

The application, evaluation and management mechanism of the Fund for Less Developed Regions are almost the same as those for General Program projects. Its feature is the promotion of talent training and development by using the management model for General Program. Please refer to the Outlines of Applications for the Fund for Less Developed Regions and fill out your application form accordingly. The number of collaborative units can not exceed 2, and the research period is 4 years.

In 2014, the Fund for Less Developed Regions funded 2,751 projects with a total funding of 1.3075 billion yuan. The average funding was 475,300 yuan per project, which is 5,300 yuan less than the previous year. The funding rate was 21.11%, which is 0.02% higher than that in 2013 (please refer to the table below for the funding statistics). In 2015, the average funding per project will be 500,000 yuan. Please refer to sections in relevant departments for actual funding level.

Funding for Projects of the Fund for Less Developed Regions in 2014

Unit: 10 000 yuan

Department	Applications	Projects and funding approved				Funding rate(%)
		Projects	Funding	Average funding per project	Percentage of the total (%)	
	13,030	2,751	130,750	47.53	100	21.11
Mathematical and Physical Sciences	612	185	8,350	45.14	6.39	30.23
Chemical Sciences	1,030	228	11,410	50.04	8.73	22.14
Life Sciences	3,048	700	34,840	49.77	26.65	22.97
Earth Sciences	795	169	8,480	50.18	6.49	21.26
Engineering and Materials Sciences	1,656	338	16,220	47.99	12.41	20.41
Information Sciences	1,075	231	10,390	44.98	7.95	21.49
Management Sciences	681	130	4,500	34.62	3.44	19.09
Health Sciences	4,133	770	36,560	47.48	27.96	18.63
Total	13,030	2,751	130,750	47.53	100	21.11

Please refer to sections of the General Program of various departments for the funding scope of the Fund, funding statistics in recent years and relevant

requirements.

Department of Mathematical and Physical Sciences

The Fund for Less Developed Regions in mathematical and physical sciences aims at creating a good research environment for these regions, fostering and stabilizing an appropriate amount of researchers, training talents in basic research for regional 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 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 the Last Two Years

Unit: 10 000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding Rate (%)	Projects	Funding	Funding Rate (%)
Mathematics	Basic mathematics	41	1,637	32.53	37	1,347	28.91
	Applied and computational mathematics	37	1,443	26.62	46	1,689	31.51
Mechanics	Basic issues and methods in mechanics	2	90	66.67	1	42	33.33
	Dynamics and control	3	139	42.86	6	317	33.33
	Solid mechanics	9	425	21.43	10	547	27.78
	Fluid mechanics	5	233	38.46	3	150	25.00
	Bio-mechanics	3	138	37.50	1	52	33.33
	Explosive and impact dynamics				1	52	100.00
Astronomy	Astrophysics	7	310	41.18	5	272	29.41
	Astrometry and celestial mechanics				2	118	66.67

Divisions		2013			2014		
		Projects	Funding	Funding Rate (%)	Projects	Funding	Funding Rate (%)
Physics I	Condensed matter physics	24	1,188	29.27	28	1,438	29.79
	Atomic and molecular physics	7	332	30.43	8	382	29.63
	Optics	12	580	31.58	12	618	29.27
	Acoustics	2	105	22.22	4	212	33.33
Physics II	Fundamental physics and particle physics	18	858	34.62	12	636	38.71
	Nuclear physics, nuclear technology and its application	2	96	12.50	4	213	21.05
	Particle physics and nuclear physics experimental facilities	1	48	20.00	2	103	20.00
	Plasma physics	2	98	40.00	3	162	27.27
Total		175	7,720	29.07	185	8,350	30.23
Average funding per project		44.11			45.14		

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 work related to the local resources so as to promote the economic development of the regions. The average funding will be around 500,000 yuan per project in 2015.

Funding for Projects of the Fund for Less Developed Regions in the Department of Chemical Sciences in the Last Two Years

Unit: 10 000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding rate（%）	Projects	Funding	Funding rate（%）
Division Ⅰ	Inorganic chemistry	28	1,400	22.58	30	1,501	22.06
	Analytical chemistry	26	1,300	22.22	26	1,301	22.03
Division Ⅱ	Organic chemistry	47	2,360	22.07	57	2,853	22.18
Division Ⅲ	Physical chemistry	29	1,450	22.14	30	1,501	22.56
Division Ⅳ	Polymers	17	850	22.67	17	851	22.67
	Environmental chemistry	26	1,300	22.41	31	1,551	22.30
Division Ⅴ	Chemical Engineering	33	1,650	22.30	37	1,852	21.51
Total		206	10,310	22.29	228	11,410	22.14
Average funding per project		50.05			50.04		

Department of Life Sciences

In 2014, the Department received 3,048 applications for the Fund for Less Developed Regions (accepted 2,937 applications), and funded 700 projects. The funding rate was 22.97% with the average funding of 497,700 yuan per project. The average funding for 2015 will be 500,000 yuan per project. In the future, the Department will continue to follow the principle of “fostering regionaltalents, supporting sustained exploration, gathering outstanding talents and promoting regional development” for the Fund, provide steady support tolocal talents and encourage and fund research applications related to local resources and natural conditions. For details, please refer to the sections inthe General Program of the Department in this Guide.

Funding for Projects of the Fund for Less Developed Regions in the Department of Life Sciences in the Last Two Years

Unit:10,000 yuan

Scientific divisions		2013			2014		
		Projects	Funding	Funding Rate (%) ++	Projects	Funding	Funding Rate (%) ++
Division I	Microbiology	34	1,683	23.29	39	1,945	23.78
	Botany	51	2,537	23.18	50	2,479	23.92
Division II	Ecology	69	3,435	23.63	77	3,832	23.84
	Forestry	51	2,571	23.29	59	2,930	23.89
Division III	Biophysics/Biochemistry/Molecular Biology	15	728	24.59	13	664	23.21
	Immunology	6	284	26.09	5	261	22.73
	Biomechanics and tissue engineering	6	284	24.00	6	285	25.00
Division IV	Neurosciences	10	533	30.30	8	400	24.24
	Psychology	6	263	19.35	6	300	23.08
	Physiology & Integrative Biology	11	535	23.91	12	581	24.49
Division V	Genetics and Bioinformatics	18	910	22.78	22	1,115	23.40
	Cell Biology	5	262	21.74	9	427	25.00
	Developmental Biology and Reproductive Biology	6	318	22.22	8	391	24.24
Division VI	Agriculture and Crop sciences	78	3,913	23.15	74	3,654	24.03
	Food Science	53	2,650	23.77	61	3,037	23.83
Division VII	Plant Protection	43	2,150	22.87	45	2,254	23.68
	Horticulture and Plant Nutrition	45	2,264	23.20	58	2,894	23.77
Division VIII	Zoology	21	1,046	23.08	27	1,329	24.11
	Animal husbandry and Grassland science	59	2,957	22.96	62	3,096	23.75
	Veterinary medicine	43	2,173	24.16	45	2,254	23.68
	Aquaculture	14	694	23.33	14	712	23.33
Total		644	32,190	23.38	700	34,840	22.97
Average Funding Per Project		49.98			49.77		

Department of Earth Sciences

In 2014, the Department of Earth Sciences received 795 applications for the Fund for Less Developed Regions from 142 research institutions. Among them, 667 were from universities, accounting for 83.9%, and 116 from research institutes, accounting for 14.6%. Totally, 169 projects were funded with a fund of 84.8 million yuan. The average fundwas 502,000 yuan per project and the funding rate was 21.3%. Among the projects funded in 2014, 145 were obtained by universities, accounting for 85.8%, and 23 by research institutes, accounting for 13.6%. In 2015, the average fund will be about 500,000 yuan per project.

In 2015, 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 choose “application code 1 (D01 and subordinate codes)” ,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 Fund for Less Developed Regions in the Department of Earth Sciences in the Last Two Years

Unit: 10,000 yuan

Divisions		2013			2014		
		Projects	Fund	Funding rate (%)	Projects	Fund	Funding rate (%)
I	Geography (including soil science and remote sensing)	112	5,635	21.58	119	5,962	21.29
II	Geology	16	829	20.78	16	832	20.51
	Geochemistry	9	474	20.45	14	683	21.88
III	Geophysics and space physics	6	302	21.43	7	331	22.58
IV	Marine science	3	129	25.00	3	149	21.43
V	Atmospheric science	10	461	21.28	10	523	20.41
Total		156	7,830	21.46	169	8,480	21.26
Average funding per project(10,000 Yuan)		50.19			50.18		

Department of Engineering and Materials Sciences

According to the policy of NSFC on the Fund for Less Developed Regions, the Department will provide steady support to foster researchers in these regions, and encourage applicants to do basic researches in considering local resources advantage and economic development. In 2014, the Department received 1,656 applications (declined 75) for the Fund with an increase of 6.50%. 338 projects were funded with a total funding of 162.2 million yuan. The average funding per project was 479,900 yuan with a funding rate of 20.41% (19.23% in 2013).

Please refer to the General Program and other related parts of Guide to Programs for the funding scope of Fund.

Funding for Projects of the Fund for Less Developed Regions in the Department of Engineering and Materials Sciences in the Last Two Years

Unit: 10,000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Materials sciences I	Metallic materials	28	1,400	19.58	35	1,674	18.72
Materials sciences II	Inorganic and non-metallic materials	31	1,573	19.25	37	1,754	20.11
	Polymer materials	20	1,004	20.00	23	1,117	19.66
Engineering sciences I	Metallurgy and mining science	40	1,982	19.14	44	2,112	20.75
Engineering sciences II	Mechanical engineering	54	2,684	18.49	59	2,830	21.00
Engineering sciences III	Engineering thermo physics and energy utilization	15	773	19.48	17	815	20.99
Engineering sciences IV	Architecture, environmental and structural engineering	61	3,042	18.60	66	3,181	21.09
Engineering sciences V	Electrical science and engineering	19	941	21.59	22	1,058	19.64
	Hydrology and marine engineering	31	1,571	19.75	35	1,679	20.71
Total		299	14,970	19.23	338	16,220	20.41
Average funding per project		50.07			47.99		

Department of Information Sciences

In 2014, the Department of Information Sciences received 1,075 applications for the Fund and funded 231 projects with a total funding of 103.9 million yuan (of which 5 million yuan came from the General Program as a preferential way to incline to the Fund for Less Developed Regions). The funding rate was 21.49% and the average funding was 449,800 yuan per project. In 2015, the Department will continue to give more support to the Fund for Less Developed Regions, and properly increase the funding rate. The average funding will be 500,000 yuan per project.

Funding for Projects of the Fund for Less Developed Regions in the Department of Information Sciences in the Last Two Years

Unit: 10 000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Electronic science and technology	18	764	20.22	11	492	19.64
	Information and communication system	15	649	18.52	19	843	21.84
	Information acquisition and processing	22	937	19.82	26	1,122	22.41
Division II	Theoretical computer science and computer software and hardware	22	972	18.64	26	1,168	21.31
	Computer application	44	1,953	18.97	50	2,268	21.65
	Network and information security	19	839	19.00	21	940	21.21
Division III	Control theory and control engineering	12	544	14.46	21	935	23.6
	Systems science and system engineering	14	630	24.14	11	500	19.0
	AI and intelligent systems	17	767	19.10	21	956	21.63
Division IV	Semiconductor science and information devices	9	397	20.45	10	466	22.73
	Information optics and photoelectric devices	8	352	20.51	8	373	21.62
	Laser technology and technical optics	7	316	20.00	7	327	20.59
Total		207	9,120	19.18	231	10,390	21.49
Average funding per project		44.06			44.98		

Department of Management Sciences

In 2014, the Department of Management Sciences received 681 applications for the Fund for Less Developed Regions, equivalent to the level in 2013. 130 projects were funded with the funding rate of 19.09%, and the average funding of 346,200 yuan per project.

In 2015, the average funding intensity will be 320,000-380,000 yuan per project, and the funding period is 4 years.

Please note that the requirements given in the general description section of the General Program of the Department of Management Sciences in this Guide to Programs 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 of the Department ofManagement Sciences in the Last Two Years

Unit: 10,000 yuan

Divisions		2013			2014		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate(%)
Division I	Management science and engineering	23	793.5	18.70	27	936	19.85
Division II	Business administration	33	1,138.5	18.23	36	1,248	19.67
Division III	Macro management and policy	64	2,208	17.11	67	2,316	18.50
Total		120	4,140	17.70	130	4,500	19.09
Average funding per project (10,000 yuan/project)		34.50			34.62		

Department of Health Sciences

The Department of Health Sciences supports mainly basic research on the occurrence, development, outcome, diagnosis, therapy and prevention of diseases.

Eligible scientists are welcome to carry out basic research on diseases and submit proposals to the Department for the Fund for Less Developed Regions. The Fund for Less Developed Regions aims to stabilize and foster research teams in less developed regions, promote S&T development and

serve regional economy and society. Applicants are encouraged to propose creative research ideas, and conduct basic research on diseases with local features by using modern medical research means. It is also encouraged to carry out the joint research together with research institutes and labs in developed regions in order to fully utilize their various advanced research facilities. Applicant should attach to the proposal the PDF copies of no more than 5 representative papers relevant to the application. Please refer to sections in the Fund for Less Developed Regions and General Program in this guidance for detailed information.

In 2014, the number of Divisions of the Department changed from eight to ten. An overview of the award number, funding, and success rate of the Fundfor Less Developed Regions in 2013 and 2014 by the Department is listed in the tables below.

In 2015, the funding for the Fund for Less Developed Regions will be 500,000 yuan per project. Please make a reasonable research budget according to the actual need, and provide budget explanations in addition to the budget form.

Funding for Projects of the Fund for Less Developed Regions in the Department of Health Sciences in 2013

Unit: 10,000 yuan

Divisions		2013		
		Projects	Funding	Funding rate(%)
Division I	Respiratory System,Circulatory System, Digestive System, Blood System, Gerontology	93	4,539	21.28
Division II	Urinary System ,Reproductive System/Perinatology/Neonatology, Endocrine System/Metabolism and Nutrition Support,Ophthalmology, torhinolaryngology Head and Neck Science, Oral and Craniomaxillo-facial Science	80	3,892	18.48
Division III	Neurological and Psychiatric Diseases	40	1,975	22.73
	Medical Imaging and Biomedical Engineering	20	966	22.47
Division IV	Medical Pathogenic Microorganism and Infection, Skin and Appendages, Orthopedics and Sports Medicine, Emergency and Intensive Care/Trauma/burns/cold Injury/plastic Surgery/Special Medicine/Rehabilitation,	68	3,342	19.21

Divisions		2013		
		Projects	Funding	Funding rate(%)
Division V	Oncology I	106	5,193	16.77
Division VI	Oncology II	43	2,118	21.08
	Medical Immunology, Forensic Sciences	17	818	26.56
Division VII	Preventive Medicine, Endemiology, Occupational Medicine, Radiology	45	2,201	21.53
Division VIII	Materia Medica and Pharmacology.	178	8,676	21.07
Total		690	33,720	20.04
Average funding per project		48.87		

Funding for Projects of the Fund for Less Developed Regions in the Department of Health Sciences in 2014

Unit: 10,000 yuan

Divisions		2014		
		Projects	funding	Funding Rate （%）
Division I	Respiratory System, Circulatory System, Blood System	84	4,022	21.00
Division II	Digestive System, Urinary System , Endocrine System/ Metabolism and Nutrition Support, Ophthalmology, Otorhinolaryngology Head and Neck Science, Oral and Craniomaxillo-facial Science	89	4,217	18.39
Division III	Neurological and Psychiatric Diseases, Gerontology	51	2,402	18.28
Division IV	Reproductive System/ Perinatology/Neonatology,Medical Immunology	34	1,629	17.53
Division V	Medical Imaging and Biomedical Engineering, Special Medicine, Forensic Sciences	28	1,312	17.39

Divisions		2014		
		Projects	funding	Funding Rate （%）
Division VI	Medical Pathogenic Microorganisms and Infection, Orthopedics and Sports Medicine, Emergency and Intensive Care Medicine/Trauma/ Burns/laboratory medicine/plastic Surgery/ Rehabilitation medicine	67	3,196	17.82
Division VII	Oncology (leukemia not included)	115	5,436	14.65
Division VIII	Skin and Appendages,Preventive Medicine,Endemiology,Occupational Medicine, Radiology	54	2,562	21.95
Division IX	Materia Medica and Pharmacology	50	2,384	21.10
Division X	Chinese Medicine, Chinese Materia Medica, integrated Chinese and Western Medicine	198	9,400	20.39
Total		770	36,560	18.63
Average funding per project		47.48		

Excellent Young Scientists Fund

The Excellent Young Scientists Fund supports young scientists having good research 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 in frontier areas of science in the world. It mainly supports applicants who meet the following qualifications:

(1) Chinese citizenship;
(2) Less than 38 years old (man) by January 1 of the year of application (born on or after January 1 of 1977), and less than 40 years old (woman) by January 1 of the year of application (born on or after January 1 of 1975);
(3) Have good research ethics;
(4) Senior professional position (title) or Ph.D. degree;
(5) Experience of undertaking research projects or experience in basic research;
(6) No official employment relations with foreign institutions;
(7) Guarantee to work at home institutions for at least 9 months every year.

Young overseas Chinese scientists without Chinese citizenship may apply if meeting conditions of (2)-(7) listed above.

The following people may not apply:

(1) Who do not have an employer or the employer is not home institution;
(2) Awardees of the National Science Fund for Distinguished Young Scholars, or Excellent Young Scientists Fund;
(3) Applicants for the National Science Fund for Distinguished Young Scholars this year;
(4) Postdocs or graduate students.

In 2015, the Excellent Young Scientists Fund plans to support 400 projects, each for 3 years, with funding of 1.5 million yuan per project.

Funding of Excellent Young Scientists Fund in 2014

Department	Applications	Approved projects	Funding rate (%)
Mathematical and Physical Sciences	356	48	13.48
Chemical Sciences	492	58	11.79
Life Sciences	481	57	11.85
Earth Sciences	297	38	12.79
Engineering and Materials Sciences	603	73	12.11
Information Sciences	517	57	11.03
Management Sciences	128	15	11.72
Health Sciences	440	54	12.27
Total	3,314	400	12.07

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, encourage overseas talents and foster a group of prominent academic pacemakers in the forefront of world science and technology.

Applicants should meet the following requirement:

(1) Chinese citizenship;
(2) Less than 45 years old by January 1 of the year of application (born on or after January 1 of 1970);
(3) Have good scientific integrity;
(4) Senior professional position (title) or have Ph.D. degrees;
(5) Experience of conducting basic research projects or other basic research;
(6) No official employment relations with foreign institutions;
(7) Guarantee to work in home institutions for at least 9 months every year.

Young Chinese scholars without Chinese citizenship may apply if meeting conditions of (2) to (7) listed above.

The following people may not apply:

(1) Post docs doing researchor graduate students;
(2) Applicants for the Excellent Young Scientists Fund this year;
(3) Awardees of Excellent Young Scientists Fund (project ending this year excepted);
(4) Awardees of the National Science Fund for Distinguished Young Scholars.

In 2014, the National Science Fund for Distinguished Young Scholars received 2,032 applications, and funded 198 projects, with total funding of 777.6 million yuan.

In 2015, this Fund plans to award 200 projects, each for 5 years and eachwith funding of 4 million yuan (the amount of funding is 2.8 million yuan per project for those in mathematics and management sciences).

Funding of National Science Fund for Distinguished Young Scholars in 2014

Department	Applications	Approved projects	Funding rate (%)
Mathematical and Physical Sciences	228	25	10.96
Chemical Sciences	309	31	10.03
Life Sciences	241	25	10.37
Earth Sciences	215	21	9.77
Engineering and Materials Sciences	397	38	9.57
Information Sciences	298	27	9.06
Management Sciences	69	6	8.70
Health Sciences	275	25	9.09
Total	2,032	198	9.74

Science Fund for Creative Research Groups

Since its establishment in 2000, the Science Fund for Creative Research Groups has supported 381 groups.

Approved by the Council Meeting of NSFC, the revised "Management Regulations for the Science Fund for Creative Research Groups" has been implemented since February 1, 2014. This revised management regulations set some new rules. The main contents are:

1. The objectives

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.

2. Applications and funding

(1) Starting from 2014, applications will be accepted directly from home institutions, and relevant government departments will stop making recommendations.
(2) The funding for each approved Group is 12 million yuan for 6 years (8.4 million yuan for mathematics and management science).
(3) PI may request further funding to continue research for another 3 years when the current project finishes.

3. Eligibility

Applicants should meet the following requirements:
(1) Experience of conducting basic research projects or other basic research;
(2) Guarantee to work in home institutions for at least 6 months every year within the funding period;
(3) Have a research team based on long time joint work, 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 of 1960);
(5) Back bone researchers or group members should hold senior professional position (title) or have Ph.D. degrees;
(6) Applicants and participants should be at the same home institution.

PI who has 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 of Science Fund for Creative Research Groups may not apply or participate in the application. Those who have senior academic title may only apply for one project of Science Fund for Creative Research Groups each year; and participants who quit from a project of Science Fund for Creative Research Groups may not apply in 2 years.

4. Criteria of evaluation

Evaluation of Science Fund for Creative Research Groups focuses on the following aspects:
(1) Significance of research direction and scientific issues of the joint research;
(2) Creativity and scientific value of research results achieved;
(3) Ideas and feasibility of proposed research;
(4) Academic influence and ability of steering the research direction and proposing major scientific problems of the applicant, and his/her organizational skills and attractiveness in the research group;
(5) Academic level and research ability of the participants, disciplinary balance and age structure of the team;
(6) Basis of cooperation among the group members.

5. Notes to applicants

Candidates should read carefully the new management regulations and this guide, and write proposals accordingly;

The academic committees or expert panels of the home institutions should make rigorous selection according to the requirements, and sign the recommendation.

In 2014, the Science Fund for Creative Research Groups received 262 applications, and funded 38 groups, total funding amounting to 445.2 million yuan.

In 2015, this Fund plans to award 38 groups, each for 6 years, and each with

funding of 12 million yuan (the amount of funding is 8.4 million yuan per group for those in mathematics and management sciences).

Science Fund for Creative Research Groups in 2014

Unit:10,000 yuan

Department	Applications	Approved groups		Funding rate (%)
		groups	funding	
Mathematical and Physical Sciences	28	5	5,640	17.86
Chemical Sciences	28	5	6,000	17.86
Life Sciences	43	5	6,000	11.63
Earth Sciences	25	5	6,000	20.00
Engineering and Materials Sciences	41	6	7,200	14.63
Information Sciences	37	5	6,000	13.51
Management Sciences	8	2	1,680	25.00
Health Sciences	52	5	6,000	9.62
Total	262	38	44,520	14.50

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 the country, NSFC sets up the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao to support overseas including Hong Kong and Macao excellent scholars under the age of 50 to conduct high-level joint research with researchers in mainland China.

The Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao adopts a "2+4" funding model, and extended funding may be requested at the end of the two year project.

Two-Year Funding Projects

Eligibility of Applicants

(1) Be under the age of 50 by January 1 of the year of application (born on or after January 1 of 1965).
(2) Have good scientific integrity.
(3) Hold professional title of associate professor (or above) in that country (or region).
(4) Be engaged in scientific research abroad, in Hong Kong or in 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 signed the collaborative

agreement with the home institution of the collaborator, the content of which includes the title, research direction and proposed goals of the joint research project, the home institution'scommitment to provide main experimental facilities, human resources and other materials necessary for the joint research.

(6) Have collaboration with their collaborators in mainland Chinaand the proposed work should be in the area of international frontier sciences.

(7) Guarantee to work in the home institution for more than 2 months every year.

Notes to Applicants

(1) The two year funding projects of the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao mainly evaluates the academic ability of the applicants and the background of the cooperation with their collaborators.

(2) Please prepare applications in accordance with the outlines for the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao, and submit with relevant supplementary documents, including: (i) valid and proved documents for his/her professional position and research work; (ii) agreement.

In 2014, the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao received 405 applications and funded 122, with total funding of 24.4 million yuan, and average funding per project 200,000 yuan.

In 2015, this Fund is planning to award 120 projects. Each project will be awarded for a period of 2 years with a funding of 200,000 yuan per project.

Extended Funding Projects

Eligibility

(1) Grantees of the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao project of two year funding. The approved projects shall have made substantial progress, and been completed on time in 2012. Or grantees of the two year project awarded in 2011. The approved projects shall have been completed on time but the applicants did not apply for extended funding or did apply but failed to get the extension funding.

(2) Applicant has spent enough time in the home institution during the implementation of the two-year project.
(3) Applicant has signed extended agreement of cooperation with home institution. The agreement should include the following content: the title, research direction and proposed goals of the joint research project, the home institution's promise to provide main experimental facilities, human resources and other materials necessary for the joint research.
(4) Proposed extended cooperation should be in the area of international frontier science with important scientific significance, and facilitate the disciplinary development and talent fostering.
(5) The applicant promises to work in the home institution for more than 2 months every year.

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 frontier areas of research internationally, and the importance to disciplinary development and talent fostering.
(2) Please prepare applications 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 with relevant supplementary documents, including: (i) valid and proved documents for professional position and research work; (ii) agreement.

In 2014, the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao received 56 applications for extension funding and funded 21 with funding of 42 million yuan.

In 2015, this Fund is planning to award 20 extension funding projects. Each extension funding project will be supported for 4 years with a funding of 2 million yuan per project.

International (Regional) Cooperation and Exchange Programs

In order to improve the quality of China's scientific research and its international competitiveness, the International (Regional) Cooperation and Exchange Programs aim at funding Chinese scientists to conduct substantial cooperation with their international collaborators in focused frontier research areas 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 system of the International (Regional) Cooperation and Exchange Programs is currently comprised of Key International (Regional) Joint Research Program (known as Major International (Regional) Joint Research Program before the year of 2013), International (Regional) Cooperation and Exchange Programs funded under the Agreements/MOUs between NSFC and its foreign partners, Research Fund for International Young Scientists, and International (Regional) Academic Conferences held in China.

Key International (Regional) Joint Research Program

The Key International (Regional) Joint Research Program (hereafter referred to as Key Joint Research Program), gives priority to research in the following areas: 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 Chinese

and foreign partners shall have long-term steady collaboration (e.g. coauthored publications and continued personnel exchanges and communication) and the foreign partners shall have matching fund for this research. In the process of cooperation, attention shall be given to the protection of intellectual property rights.

In 2014, altogether 105 out of the total 689 applications under the Key International (Regional) Joint Research Program were funded with a total funding of 300 million yuan, with an average funding amount of 2.86 million yuan per project and a success rate of 15.2%.

In 2015, NSFC plans to fund 100 projects under the Key International (Regional) Joint Research Program with an average funding amount of around 3 million yuan per project, and each project usually lasts for 5 years.

Eligibility of Applicants

In order to be eligible for this program, applicants should be:

(1) Granted 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

In order to be eligible for this program, the foreign partners should be:

(1) Independent researchers in charge of research laboratories or key research projects abroad; and
(2) Granted 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 English Application Form can be downloaded in the Internet-based Science Information System (ISIS) of NSFC and should be uploaded online when filled in.
(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:
    (i) Research contents and objectives;
    (ii) Collaborating PIs and participants;
    (iii) Period, mechanism and plan of joint research;
    (iv) Ownership, use and transfer of IP rights;

(v) Relevant budgetary arrangements.

The applicant could 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' holding of or participation inresearch 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 of confirmation should be typed on the institution's official letter paper including the title, logo and contact information of the foreign collaborator's employer. In addition, the letter of confirmation should contain detailed information 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 English Application Form.

Priority Funding Areas of the International (Regional) Joint Research Program in 2015:

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 largetelescopes
(5) Super fast 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) Researchon 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

(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

(1) Modification, identification and control of proteins
(2) Structure and function of nucleic acid
(3) Self-renewal and directed differentiation of stem cells
(4) Regulation of tissue organ development
(5) Cellular and molecular mechanisms of immune response
(6) Biodiversity and its maintenance mechanisms
(7) Genetic network and genetic regularity of complex traits
(8) Phylogeny and molecular evolution
(9) Metabolism, secondary metabolism and regulation
(10) Excavation and biological evaluation of germplasm resources
(11) Analysis of important traits of major agro-biological genetic networks
(12) Water, nutrient needs of major agricultural plants and mechanisms for efficient use
(13) Occurrence of major agricultural plant pests and mechanisms for prevention and control
(14) Occurrence of major agricultural animal diseases and its prevention andcontrol
(15) Formation of nerve cells and the loops and signal processing mechanisms
(16) Biochemical basis of food storage and manufacturing

Department of Earth Sciences

(1) Global change and surface process
(2) Environmental pollution and its impacts
(3) Eco-environment effect of human activities
(4) System and mechanism of metallogenic accumulation
(5) Process of plate boundary
(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 ecosystem and ecological security

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) Data acquisition and modeling of the mechanisms of the human brain and body
(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 photodetectors

(11) Integrated circuit design
(12) Optical fiber sensing network
(13) Biological photoelectric sensing and imaging
(14) Micro-nano structure optoelectronic devices
(15) Higher energy efficiency real-time image and video processing technology
(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 safety management
(9) Financial risk management
(10) Management of urbanization

Department of Health Sciences
(1) Cardiovascular and cerebrovascular diseases
(2) Diseases of respiratory system
(3) Tumor
(4) Nutrition, metabolicand diseases
(5) Diseases of the liver and gastrointestinal system
(6) Urinary system diseases
(7) Neuropsychiatric disorders
(8) Infectious diseases
(9) Eye, ENT and oral diseases
(10) Injury and repair
(11) Reproductive health
(12) Health of women and children
(13) Immunization and disease
(14) Aging and diseases
(15) Stem cells and diseases
(16) Regenerative medicine
(17) Medical imaging and biomedical engineering
(18) New technologies and methods for disease diagnosis and treatment

(19) Epidemiologic and preventive strategies for major diseases and injuries
(20) Environmental and genetic factors and major diseases
(21) Food hygiene
(22) New drugs
(23) Pharmacogenomics and metabolomics
(24) Traditional Chinese medicine and Chinese material medica

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 signed 72 cooperation agreements/MOUs with science funding agencies and research institutions in 36 countries/regions. By negotiation, NSFC reaches agreements with its foreign funding partners on cooperation and exchange pattern, funding area, amount of awards, funding amount and review mechanism. Based on mutual agreement, NSFC will launch joint call for proposals with its foreign funding partners on their websites and then organize applicants to submit and peer experts to review applications. 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 ormultilateral joint research projects funded by NSFC and its international funding partners under the frame work of cooperation agreements/MOUs signed between them with the aim 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. Meanwhile, it encourages scientists to maintain sound bi/multilateral relations with foreign 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 hots pots 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 should refer to the following introductions and the calls for proposals irregularly launched on NSFC website for application eligibility, priority funding areas, funding duration, and application requirements. Besides, applicants should also refer to the International Cooperation columnon NSFC's website for relevant information about these programs in 2015. An introduction of the funding opportunities under this category in 2015 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 workshops will propose concrete research topics for joint funding. Since 2015, the priority area for both sides is changed into biological genetic resources.

In 2015, the joint call for proposals will be launched by NSFC and JST on their websites respectively, and no more than 5 projects with a duration of three years would be funded per year, with NSFC investing 2 million yuan 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 application deadline is on Friday of the first complete week in

September.

(1) Exchange Project
NSFC and JSPS jointly support no more than 10 three-year exchange projects (the exchange volume shall not exceed 60-person days per year for each side) each year.

(2) Bilateral Workshop
NSFC and JSPS jointly 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 the bilateral workshops from each side must come from at least three institutions.

South Korea

NSFC and National Research Foundation of Korea (NRF) would jointly support joint research project, exchange project and bilateral workshop in 2015.

The call for proposals would be issued twice in 2015 by both organizations on their websites respectively for joint research project, and exchange project & bilateral workshop. The joint funding for exchange project and bilateral workshop will be decided at the China-Korea Joint Committee for Basic Scientific Research after deliberation and discussion of participating experts.

(1) Joint Research Project
Around 2 three-year joint research projects are planned to be funded by NSFC and NRF in 2015 with NSFC investing 2 million yuan for each project.

(2) Exchange Project
Around 20 two-year exchange projects are planned to be funded by NSFC and NRF in 2015.

(3) Bilateral Workshop
Around 10 bilateral workshops are planned to be funded by NSFC and NRF in 2015. 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 a joint call annually for proposals on their respective websites. The priority areas are mathematics, earth sciences, nanotechnology and computer sciences in 2015. No more than 25 three-year projects are planned for joint funding with NSFC investing 2 million yuan 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 Program for 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 priority funding area in 2015 is Autophagy: From Basic to Medicine.

The call for proposal 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 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 will launch a joint call annually for proposals on their respective websites. The duration for joint research project is 3 years with NSFC investing 0.8 million RMB for each project. The priority areas in 2014 were physics and life sciences with 9 projects jointly funded. The priority areas and the number of projects to be funded in 2015 are subject to negotiation by both sides.

(2) Bilateral workshop
NSFC and NRF support bilateral workshops every year. The themes of workshop and the number 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 National Research Council of Thailand (NRCT), Thailand Research Fund (TRF), 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. Bilateral projects are jointly decided on a case by case basis through mutual agreement.

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 www.iiasa.ac.at. Besides, NSFC also supports workshop, 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.

Based on mutual consultation, the call for proposals will be launched by NSFC on its website in due time.

4. Consultative Group on International Agricultural Research (CGIAR)

NSFC has reached agreements with 10 CGIAR institutes/centers (i.e., Bioversity, CIAT, CIMMYT, CIP, ICARDA, ICRAF, ICRISAT, IFPRI, ILRI, and IRRI) to fund joint research projects conducted by scientists from both sides. The funding period for each project is 5 years. In 2014, a total of 13 joint research projects were jointly funded.

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 13 projects are planned for funding in 2015 with an average funding amount of 2-3 million yuan 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.

Based on discussion of experts, the 17 priority funding areas are 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. Up to 3 projects are planned for funding in 2015 (one project in each field), with an average funding amount of 3 million yuan 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 U.S. 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 in 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. Specific funding areas, number of projects to be funded, funding intensity and implementation period of each project are to be released in the call for proposal in 2015on website.

7. Multilateral Collaboration under Belmont Forum (BF/IGFA)

According to the agreement between NSFC and Belmont Forum, since 2014 NSFC would support Chinese scientists to participate in the multilateral cooperation under the framework of Belmont Forum. Specific funding areas, number of projects to be funded, funding intensity and implementation period of each project are to be released in the call for proposal in 2015 on 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 energy, biodiversity, etc., with irregular schedules through out the year. Both parties provide funds for scientists from their respective countries to cover research, international travel and local accommodation in the other country.

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 2014.

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 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 U.S. National Institutes of Health (NIH) signed an MOU on Oct. 14, 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. The funding results will be released in mid 2015. For future funding opportunity, 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 (CIHR)

NSFC and CIHR jointly support research projects and bilateral workshops.

（1）Joint Research Project

In 2015, NSFC and CIHR will jointly support research projects in the area of depression. For specific information on funding areas, number of projects and application procedure, 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.

National Sciences and Engineering Research Council of Canada (NSERC)

Exchange of Postdoctoral Fellows

Based on the agreement between NSFC and NSERC, from 2015 the two parties will jointly support Canadian postdoctoral fellows to do basic research in China for two years. NSERC will cover the salaries and living costs of the Canadian postdoctoral fellows and NSFC will cover relevant research costs of the Canadian postdoctoral fellows. For specific application requirements, please refer to the 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) will launch a call for proposals in areas of global change and photonics. For specific information on funding areas, number of projects and application procedure, please refer to the 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 of scientific cooperation in January, 2013 to jointly support research projects and bilateral workshops.

（1）Joint Research Project
Based on mutual agreement, NSFC and NHMRC will launch a joint call for research proposals in the field of type-2 diabetes in February 2015. For information about the funding areas, amount of awards and applications requirements, 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)
On May 27, 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 information on application procedure, 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)

On August 26, 2014, NSFC and CONICYT signed a MOU to jointly support research projects and bilateral workshops. Astrophysics and seismic study were identified as priority areas of collaboration.

For specific information on application procedure, please refer to the call for proposals to be released on NSFC's website.

Europe

UK

Royal Society (RS)

Exchange Program

NSFC and the Royal Society of UK (RS) provide support for exchange visits between Chinese and UK researchers with a 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 up to 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, 2015, 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, 2016. Projects approved will start on April 1, 2016 and end on March 31, 2018.

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 up to 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 2015. Chinese scientists should submit proposals directly to NSFC and Scottish scientists to RSE, and the result will come out at the start of 2016. Projects approved will start on May 1, 2016 and end on April 30, 2018.

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 exchange of personnel. 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 EPSRC, BBSRC, NERC, MRC and ESRC to fund small-scaled bilateral workshops co-organized by Chinese and British scientists.

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 program projects.

(1) Joint Research Program

NSFC and DFG encourage substantial joint research between scientists of both countries. Funding for the projects includes research expenditure, international travel costs and living expenses for exchange visit. For detailed requirements, please refer to the call for proposals launched on NSFC's website.

(2) Exchange Program

Chinese and German scientists shall submit their applications to their own

funding organizations 3 months in advance. The final decision for funding will be jointly made after evaluation and consultation. Applicants may submit their applications anytime throughout the year.

(3) Bilateral Workshop
Chinese and German scientists shall submit their applications for workshops to their own funding organizations 3 months in advance. The final decision for funding will be jointly made after evaluation and consultation. Applicants may submit their applications anytime throughout the year.

(4) Major Interdisciplinary Joint Research Program
According to the agreement on cooperation between NSFC and DFG, Chinese and German research teams are encouraged to conduct major interdisciplinary joint research projects. Researchers from 3-5 research institutions on each side are encouraged to combine their research capacity and, based on mutual agreement on research topics and objectives, submit joint applications to NSFC and DFG respectively for long-term bilateral collaboration, interdisciplinary research and training of young scientists. Sound track record of long-term bilateral substantial cooperation and high-level principal investigators are required for application. The joint research should focus on major interdisciplinary issues through well design with a view to bringing about seminal research results, and the sub-topics should be closely interlinked and complementary so as to promote the development of disciplinary frontiers and interdisciplinary research. Complementariness and sustainability of bilateral collaboration are required and promotion of long-term cooperation in relevant fields is encouraged.

The collaborating research teams on both sides should submit corresponding pre-applications to NSFC and DFG respectively. For jointly accepted applications, NSFC and DFG will organize a workshop in either China or Germany. In line with the conclusions of the workshop, NSFC and DFG will consult each other and decide together on whether to invite full applications from the applicants. The co-PIs on both sides will be notified of the joint decision. Chinese applicant should meet the requirements listed in the NSFC Regulations on the Management of International (Regional) Joint Research Programs as well as those listed in the joint call for proposals. Based on mutual agreement between NSFC and DFG on inviting full applications, applicants should submit full applications to NSFC and DFG respectively according to relevant requirements and procedures. Both NSFC and DFG will invite peer experts to conduct panel review for the applications. As per the recommendations of the panel, NSFC and DFG will make the final

decision on funding according to each other's regulations and decision making procedures. Only those applications jointly approved by NSFC and DFG are qualified for joint funding. It will take 18-24 months from the submission of pre-applications to the final funding of the projects. The funding period of the major interdisciplinary joint research project is 4 years, and it could be renewed for two times based on application and review.

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 of both countries. For detailed application requirements, please refer to the call for proposals launched on NSFC's website.

Others

Under its respective agreements with CEA, INRA, and IFREMER, NSFC provides funding for joint research and bilateral academic workshops between Chinese and French scientists in the areas of basic research.

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. The call for proposals will 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.

Belgium

National Fund for Scientific Research (FWO)

According to the MOU between NSFC and FWO, both sides support short-term academic studies, personnel exchange (usually less than 3 months) and bilateral academic workshops between Chinese and Belgian researchers.

(1) Exchange Program

Chinese and Belgian 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.

(2) Bilateral Workshop

Chinese and Belgian 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.

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 2015.

(2) Exchange Program

NSFC and RFBR jointly support exchange activities between Chinese and Russian researchers for a duration of 2 years. Projects approved receive a

two-year funding of 90,000 yuan RMB 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 2015.

Czech Republic

Academy of Science of the Czech Republic (ASCR)
In 2015, NSFC and ASCR will together fund exchange program under the framework of agreement, and applicants may submit applications anytime throughout the year.

Hong Kong and Macao 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, Macao Foundation, Macao Foundation for the Development of Science and Technology, and K. T. Li Foundation for the Development of Science and Technology in Taiwan, funding academic workshops and joint research projects in areas of mutual interests.

Hong Kong

NSFC and the Research Grant Council of Hong Kong (RGC) will continue to fund join research in areas of natural sciences in 2015. Priority funding areas include information sciences, biological sciences, new materials, marine and environmental sciences, medical sciences, and management sciences.

Macao

NSFC will continue to support various activities of scientific cooperation and exchange between inland and Macao scientists. Emphasis will be put on research projects related to environmental protection, urban development, and modernization of traditional Chinese medicine.

Taiwan

NSFC has been dedicating to encouraging and promoting scientific cooperation and exchange between scientists on both sides of the Taiwan Straits. In 2015, NSFC will continue to support cross-Straits academic

workshops held by scientists from mainland China and Taiwan. 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.

In view of the fact that some universities in Hong Kong and Macao have established branches of 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 2015 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 of 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 Ph.D. 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 projects. 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 identical. 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 copies in written form 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. Joint Research Project

The Center supports Chinese and German scientists to conduct joint research in areas of common interest. In principle, applicants of such projects shall have been funded by the Center in the past, usually through bilateral academic workshops sponsored by the Center and should be grantees of NSFC or DFG funded research projects. The areas of cooperation shall be the priority areas of NSFC's funding. The fund for joint research project covers consumables, publishing and travel costs, as well as expenses related to the organization of meetings. The Center does not fund personnel salaries, for which German applicant may apply to DFG unilaterally. Funding for each project approved is usually 1-2 million yuan (or equivalent Euros) for both Chinese and German scientists. The duration of the projects shall not exceed 3 years.

2. 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, nor multilateral or international workshops. 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 side.

3. Sino-German Joint Research Group

The Center adopts flexible modules to fund 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 platforms. 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 grantees of projects funded by the Center so as to ensure a solid foundation for cooperation and good communications and coordination between collaborators. The funding period is 3 years and should not be prolonged. Funding for each project approved is usually 2-4 million yuan (or equivalent Euros) for both Chinese and German scientists.

4. 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 is able to 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 Ph.D. Students Program and Post-Lindau Program

The Center, together with Lindau Nobel Laureates Foundation, funds 30 (including 15 in the field of economics) excellent Ph.D. students or postdocs 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 Ph.D. 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, covers up to 3 cities, and is 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 up to 15 Chinese and 15 German 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.

5. Publication
The Center funds publication of proceedings, joint publications and special journals for scientific results of Chinese and German cooperation. Funding will be up to 5,000 Euros or 50,000 yuan. The Center does not fund publication of textbooks, translated works, etc.

6. Pre-activity Planning
The Center invites application from qualified applicants who would like to pay a visit to make preparation and plan 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 could be funded.

Research Fund for International Young Scientists

The Research Fund for International Young Scientists (the Fund) supports foreign young scientists to conduct basic research in mainland China in all areas of science, engineering and health research which are covered by NSFC with the aim to promote sustainable academic collaboration and exchanges among Chinese and foreign young scientists. Grantees are also

eligible for renewing the Fund once based on review and selection. The young scientists should have excellent educational background, Ph.D. degrees and great potential to carry out their basic research in mainland China-based universities and academic institutes. Eligible applicants should have certain research experience and host institutions in China.

Applicants with foreign citizenship should meet the following qualifications:

(1) Less than 40 years old by January 1, 2015 (born on or after January 1, 1980).
(2) Have a Ph.D. degree.
(3) Have experience of conducting basic research projects or postdoctoral research.
(4) Guarantee full-time work at the host institutions during the project implementation.
(5) Abide by Chinese laws and relevant rules and regulations of the NSFC while doing research in China.

Host institutions should meet the following qualifications:

(1) The host institution should designate a contact to be responsible for providing consultation to the institution's applicants and assist project management such as the use of budget.
(2) The host institution should sign an agreement with the applicant.The agreement should include the following items:
    1) The title of the research project and the expected outcomes.
    2) The host institution should provide subsistence cost that covers the funding period, and provide the applicant with necessary working conditions.
    3) The attribution of the intellectual property.

Previous awardees of the Fund with sound progress and in need of further funding may apply for renewal.

In 2014, 107 grants were made with a total funding of 19.96 million yuan, among which 12 grantees got renewal funding. In 2015, it is expected 80 grants and 20 renewal grants will be made with a budget of 20 million yuan.

Project Duration: One year or two years starting from January 1, 2016 with a funding of 10,000 yuan or 20,000 yuan.

Funding Coverage: Research and international exchanges costs

Proposal Submission:

1. The Fund

Proposals should be submitted via the Internet-based Science Information System (ISIS) after January 15, 2015. Applicants should complete the proposal forms following the online instructions and outlines for the Fund. After submission online, applicants should print and sign a PDF version of the final application form and timely submit it to the host institution along with the supplement documents.

Supplementary Documents

1. Copy of agreement signed by the applicant and the host institution. The agreement should include the following items:
   1) Signed between the applicant and the host institution and include subsistence cost provision.
   2) The host institution should provide subsistence cost that covers the funding period, or the agreement should include terms guaranteeing the applicant will work full-time in China during the funding period.
   3) The agreement should be signed and sealed by the legal person of the host institution.

2. Copy of the applicant's Ph.D. degree certificate: The Ph.D. degree certificate is not replaceable by other forms of documents or certificates.

3. Two letters of recommendation: At least one of the letters should be written by a foreign scientist and at least one letter is closely related to the application.

4. Copies of the front pages of no more than five representative papers.

2. Renewal of the Fund

Eligibility: The applicant to the Fund should be the actual principal investigator of the project.

Supplementary Documents

1. Copy of agreement signed by the applicant and the host institution. The agreement should include the following items:
   (1) Signed between the applicant and the host institution and include subsistence cost provision.
   (2) The host institution should provide subsistence cost that covers the funding period, or the agreement should include terms guaranteeing

the applicant will work full-time in China during the funding period.

(3) The agreement should be signed and sealed by the legal person of the host institution.

2. The applicant's entry and exit record to China during the research period of the previous funding: Copies of the passport stamps and a list with the dates of entry and exit should be provided.

3. Copies of the front pages of no more than five representative papers.

For detailed information about the application and renewal application requirements in 2015, please refer to the special webpage of the Research Fund for International Young Scientists on NSFC's website (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 playing a better guiding role of the National Natural Science Fund to attract resources from different sectors to support basic research in specific areas and directions.

The joint funds focus on national interests and key directions of scientific developments, attract nationwide researchers to conduct basic research in relevant areas, solve key scientific problems, promote cooperation among industrial sectors, universities and research institutes, foster scientific and technological talents, and enhance Chinese indigenous innovation capabilities in relevant areas, industries or regions.

In 2015, the joint funds in the *Guide to Programs* include NSAF Joint Fund, Joint 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-Guangdong Joint Fund, NSFC-Yunnan Joint Fund, NSFC-Xinjiang Joint Fund, NSFC-Henan Joint Fund, and Joint Fund for Promoting S&T Cooperation across the Taiwan Strait.

The joint funds form a part of the National Natural Science Fund system. The joint funds are managed according to NSFC's regulations and project selection procedures. When, at any time during or after completion of a project, the researcher or any other party publishes or produces materials such as papers, books, reports, software, patents and awards which are related to the research project, NSFC's contribution and support of the project should be acknowledged in a prominent place and in an appropriate form, with the name of the joint fund, the project number or relevant statements.

Applications 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 "Fostering Local Talents" for sub categories, and select the name of the joint fund in the notes section. Applications 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 at encouraging 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 2015, this joint fund plans to fund two types of projects, namely, "Key Program Project" and "Fostering Program Project". Key Program Project has 9 research directions, with average funding of 3-4 million yuan per project for 4 years. There are 11 encouraged research directions for Fostering Program Project, and 78 projects with defined targets are planned for funding with an average funding of 800,000 yuan per project for 3 years. The budget for this fund in 2015 is 61.5 million yuan. For more detailed information, please refer to the NSFC website (http://www.nsfc.gov.cn) or contact the administration office of the NSAF Joint Fund.

Ⅰ. Directions for Key Program Project

ZD1. Research on injection and mixing process of metal-gas interface under strong shock
ZD2. Research on chemical property change and mechanical property couplings of silicon foam in composite environment including gamma radiation
ZD3. Research on computational method for high temperature, high pressure and multi physical coupling fluid dynamics
ZD4. Highly efficient computation method for problems in partial differential equations with extreme physical properties
ZD5. Research on material phase change dynamical properties in high pressure conditions driven by strong laser
ZD6. High spatial resolution wide band THz spectrum technology for studies of in vivo living cells
ZD7. Multi scale flow and mass transfer in multi emulsion systems
ZD8. Research on problems related to mental materials multiphase equation
ZD9. Explorations on structure and performance of new types of high energy explosives

Note: CAEP Researchers may 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. Encouraged research directions

GL1. Theoretical computation of crystal phase change and thermo decomposition of HMX explosives in high temperature and high pressure conditions

GL2. Studies on energy transport properties of strong laser in strong magnetic plasma

GL3. Simulation of molecular dynamics of U, Am absorption and diffusion on mineral water interface

GL4. Studies on scandium silicate laser at sub energy level 4 with low threshold

GL5. Studies on polarization and discharge mechanism of micro crystal glass dielectric medium interface

GL6. Studies on key problems of data system modeling for multi disciplinary coordination

GL7. Studies on the method of security evaluation of measurement and control system software with high security level

GL8. Research on the impact of meso state of surface processing on dynamic fracture behavior of metal cylindrical shells

GL9. Studies on computation method of physical properties of multi media magneto hydrodynamic equations

GL10. Parallel computation method of energy equation on mixed grid

GL11. Simulation of multi scale coupling in metal material fractures

Note: CAEP researchers may not apply for this program, but may be a participant.

2. Projects with defined targets

(1) Studies on formation of ejection beams and erosion of tungsten copper covers

(2) Studies on fast solution of large scale explosion based on image source method

(3) Studies on combustion properties of metal particles in high temperature environment

(4) Experimental studies on RM instability induced by laser shocks

(5) Simulation of molecular dynamics of phase shift properties of transition metals in high temperature

(6) Studies on soft control of automatic assembly of energy parts

(7) Studies on quantitative method for model uncertainty in the prediction of random vibration response

(8) Studies on the cavity phenomena when structure entering water
(9) Studies on the method of load coupling characterization and design technology in acceleration field with multiple changes
(10) Diagnosis of nonlinear connectivity of structures based on multi scale dynamical separations
(11) Studies on nonlinear random vibration analysis of structures in high temperature
(12) Studies on microscopic damage of polymers with particle inclusions during low speed impact
(13) Studies on robust control and optimal end guidance for small portable aircrafts
(14) Theoretical studies on liquid to liquid phase change of typical lanthanum metals in high pressure
(15) Explorations on experimental technology for X-ray imaging and X-ray diffraction driven by high energy laser
(16) Molecular dynamics of material mixing at extreme conditions
(17) Plasticity of iron under dynamics loading and its coupling with phase change at microscopic level
(18) Temporal identification of X-ray diffraction based on DAC loading
(19) Reliability evaluation of ignition system based on statistic changing theory
(20) High precision Euler's numerical simulation of condensed explosives
(21) Studies on mechanism of SPDT defect formation in KDP crystals based on in situ measurement
(22) Mechanism of impact on static and dynamic properties of multi porous gas bearings
(23) Behavior of flexible precision assembly surface for complex optical mechanical structures and method of controls
(24) Surface damage mechanism in processing of surface with cerium polycrystalline diamond tools
(25) Method of measuring multi degree of freedom for assembly parameters of ICF target
(26) Electronic reading for large photon scattering detection technology
(27) Hard X-ray single energy imaging technology based on spherical lens crystal
(28) KBA micro imaging technology based on X-ray crystal
(29) Studies on the ionization properties of multi compositional dense materials
(30) Braking radiation in thermo dense plasma and Compton scattering process theory
(31) Studies on radiation effect of semiconductor super lattice 2-D electron

gas materials
(32) Full dynamic measurement of internal temperature distribution of semiconductor materials
(33) Ultra fast dynamics of semiconductor carrier based on nonlinear effect
(34) Dark mechanism and devices of high power Ytterbium doped optical fiber
(35) Multi photon effect mechanism and devices of femto second laser induced photon crystal grate
(36) Studies on super wide angle ASE absorption laser membrane
(37) Simulation of formation and diffusion of electrode surface plasma in particles
(38) Studies on preparation and properties of high volume breakdown strength linear medium ceramics
(39) Studies on the improvement of penetration capacity on high voltage electrode surface
(40) Studies on the method of high efficiency generation of THz radiation sources based on p-type indium nitride nano linear arrays
(41) Conformal array manifold modeling and dimension reduction techniques based on wave field models
(42) Analysis of chance radar signals based on sparse representation
(43) Theoretical studies on communication signal processing based on compression cognition
(44) Multi bit reverse effect mechanism in ultra deep sub micro CMOS IC
(45) Analysis and application of high frequency field line coupling in system electromagnetism environmental effects
(46) Low complexity multi system LDPC coding algorithm based on bit credibility
(47) Key technology of safety control of virtual machine
(48) Key technology of safety service on demand for multi-domain network
(49) Theoretical studies on wide region multi phase properties of metal uranium
(50) Preparation and application of new types of optical membrane based on organic silicon polymers
(51) Bio chemical mechanism of producing deuterium from microalgae
(52) Studies on mechanism of abrasions by micro twisting of surfaces in complex environment
(53) Studies on physical and chemical properties of plutonium aerosol and laws of evolution and movement
(54) Studies on micro flow controlled multi phase mass transfer and high efficiency phase separation
(55) Electromagnetic effect in vacuum melting process of uranium alloy

(56) Studies on structural effect relation of the structure and energy release for new types of aluminum based rare earth alloy
(57) Design and preparation of nano colloid array used in fast checking of explosives
(58) Physical and chemical reconfiguration of heat resisting polymer porous materials
(59) Epoxy group self layer separation coating design and construction based on short fluorine carbon chain
(60) Studies on evolution behavior of rubber filled network structures and its relation with mechanical properties
(61) Studies on composition and stable mechanism of high energy explosives
(62) Method of resolving nitride using ultra sonic cavity and studies on related theoretical models
(63) Studies on mechanism of impact of minor element on the strength of chrome molybdenum alloy
(64) Studies on impact and heat transfer property of heat conducting enhanced composite material
(65) Studies on high energy ration lithium ion cell anode materials and interface electrochemical behaviors
(66) Studies on growth of crystal state carbon tungsten alloy and technology of gradual change of component at room temperature
(67) Studies on 3-D atomic probe detection of nitrogen bubbles in aluminum
(68) Mechanism of poly condensation and experimental studies of Benzene and nitrogen heterocyclic
(69) Studies on the laws of expansion and hysteresis flow field of under water explosion products by non ideal explosives
(70) Development of high plasticity large size X-ray aluminum crystals
(71) 3-D reconstruction of non uniform nuclear waste package by γ scanning imaging
(72) Studies on optical acoustic interactions in high power laser optical materials
(73) Studies on synthesis of quasi light beam of millimeter/sub-millimeter wave and properties of beam transmission
(74) Studies on Physical properties and preparation technology of photonic band gap millimeter wave cavity resonator
(75) Studies on basic problems of the impact of package effect on stability of micro accelerometer
(76) Technology of processing non matching signals based on pressure sensor
(77) Studies on the mechanism of interference of high repetition super wide

band electromagnetic pulse on pulse pressure receiver
(78) Studies on new types of non cubic phase laser ceramic materials

Note: CAEP researchers may not apply for this program, 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), to 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 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 budget according to the following 1-5 important scientific issues. The sixth issue is not within the funding scope of the Key Program Project. In 2015, 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 2015, the funding will be 40 million yuan in total. There will be a moderate increase in the funding intensity. For the Fostering Program Project, the average funding will be 700,000 yuan per project for 3 years, and for Key

Program Project, the average funding will be 3 million yuan per project for 4 years.

Funding Areas in 2015

(1) Observation and theoretical research on cosmology, galaxies, stars, the sun and solar systems and other basic astronomical areas conducted by scientists from research institutions and universities outside CAS astronomical observatory system, using observation facilities of all wave bands and data (researchers from the 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) Research on observation techniques in space, 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 weak 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 and key scientific issues originated from national strategic needs.

(6) Analysis research on frontier scientific areas in large astronomic observation facilities, which are under construction or planned, for providing scientific knowledge on the facilities. Specific contents include the selection and verification of frontier scientific problems and scientific goals, selection and optimization of observation model and strategy, selection of specific observation objects, processing of observation data and information acquisition, error analysis and control, and the development of observation experimental simulation and theoretical models (only Fostering Projects are accepted in this area).

Joint Fund of Research on Major Science Facilities

NSFC and the Chinese Academy of Sciences (CAS) 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 China's 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 Beijing Electron Position Collider (BEPC) and Beijing Synchrotron Radiation Facility (BSRF) in Beijing, HIRFL-CSR in Lanzhou, Shanghai Synchrotron Radiation Facility (SSRF) in Shanghai (including protein facilities), and The National Synchrotron Radiation Laboratory (NSRL) and the Steady High Magnetic Facilities (SHMFF) in Hefei.

The Joint Fund of Research on Major Science Facilities includes "Fostering Program Project" and "Key Program Project. In 2015, the total funding of 80 million yuan will be arranged with 40 million yuan for Key Program Projects and 40 million yuan for Fostering Program Projects. The average funding for a Key Program Project is 3 million yuan per project for 4 years and that for Fostering Program Project is 700,000 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, energy 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 2015

Fostering Program Project

Multidisciplinary research on synchrotron radiation in physics, chemistry, life sciences, medical sciences, environmental sciences, material sciences, energy, 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 for Key Program projects are more than funded projects in number, applicants may decide the project title, research content and research scheme according to their own situation. Applicants are encouraged to collaborate with researchers working in labs of facilities.

1. Research on scientific problems based on Synchrotron Radiation Facility

(1) Transit and transfer process and biological effect of environmental pollutants
(2) Structure and property of advanced energy materials
(3) Electronic structure and magnetism of complex materials
(4) Structure and functions of biomacromolecular complexes
(5) Electron transfer mechanism of metal protein
(6) Fine analysis of important minerals

2. Research on scientific problems based on Steady State Strong Magnetic Field Facilities

(1) Correlated materials in strong magnetic field conditions(≥20T）

(2) Studies on mechanisms related to life activities based on strong magnetic field resonant spectroscopy and imaging
(3) Chemical synthesis, material preparation and properties under high magnetic field (≥20T）

3. Frontier physics and expanded studies based on BEPCII and HIRFL
(1) New resonant state in Tau-charmonium energy region
(2) Hadron spectroscopy in Tau-charmonium energy region
(3) Exotic nuclei reaction and structure
(4) Highly ionized ion and fine spectroscopy
(5) Heavy ion radiation effects

4. New principles, new methods and key technology for the facilities
(1) New method and new technology of HIRFL experiments
(2) Experimental method, key technology and devices for beamline station
(3) New theory and methods of imaging
(4) New principles, new methods and new technology and key components for accelerator
(5) Key technology of detector and electronics
(6) Method and software of experimental data analysis and processing
(7) Spin resonance (ferro magnetic) method in strong magnetic field
(8) New theory and key technology of advanced light sources

Joint Fund of Iron and Steel Research

The Joint Fund of Iron and Steel Research were set up by NSFC and Baosteel Group Corporation. The Joint Fund closely aims at major issues and strategic development of Chinese iron and steel industry. The Joint Fund supports foresight and innovative research, promotes the integration of knowledge innovation and technological innovation, through scientific and technological innovation, speeds up the research and development of new technologies and products in metallurgy and materials, so as to improve traditional industry and increase the competitiveness of Chinese iron and steel industry. The year 2015 is the first year of the implementation of the “fifth term agreement”. The budget for this year will be 30 million yuan, where in the funding amount for “Fostering Program” is 500,000 to 800,000 yuan per project for 3 years, and the funding amount for “Key Program” is 2 to 3.5 million yuan per project for 4 years.

The Joint Fund is open to scientists all over China, with the key funding

areas ranging from new metallurgical technologies and relevant techniques, materials, energy, environment, equipment, to information sciences etc., which are of great significance to the iron and steel industry in China.

The application, evaluation and management of the Joint Fund will follow the Regulations of NSFC for relevant programs. Proposals are accepted and processed by the Department of Engineering and Materials Sciences of NSFC, and administered jointly by NSFC and Baosteel Group Corporation.

The Joint Fund advocates the synergy of industry, university and research, gives priorities to young talents, encourages applications from non-metallurgic universities and research institutes, and encourages further joint funding from other sources.

I. Research Orientations for Fostering Program in 2015

1. Theory of unified cleaning of sintering gas
2. Mechanism of excitation of pickling iron oxide as raw material of lithium iron phosphate
3. Theory related to protection residue of new types of fluorine-less aluminum continuous casting crystallizer
4. Laws and mechanism of surface damage of cold rolling plate in high chlorine and high humidity and temperature environment
5. Technology basis of high strength thermo formed steels
6. Tissue control and plastic deformation mechanism of super fine bainite with TRIP effect
7. New technology of connecting super high strength steel and light metals and key problems related connector service
8. Scientific basis related to nano particles enhanced steels
9. Re-melting and tissue control of high titanium aluminum ratio high temperature alloy residues
10. Technical basis of high speed rolling based on spray sediment and laser re-melting forming
11. In situ reaction generated dense metal surface nano structure ceramic meso tissue and its properties
12. Preparation and mechanism of irregular steel wires for flexible transportation of deep sea oil and gas
13. Computer simulation of fine casting of titanium aluminum tools
14. Coordinated model and optimal dispatching of steel manufacturing and energy based on big data and knowledge integration

II. Research Orientations for Key Program in 2015

1. Mechanism of transfer of toxic elements during iron ore firing and control of pollutions

Addressing the problems in non traditional and low grade iron ore, study the characteristics of toxic element in iron ores and laws of evolution and transition mechanism during firing process, and develop basic theory and new technology for removal of toxic elements. Study the interactions among various pollutants in the smoke of firing, and explore coordinated control technology of toxic element pollutions.

2. Purification and smelting mechanism of high-speed rail bearing steel

Study the quantitative relation of the purity (inclusions) and the using performance of the high-speed rail bearing steel smelting, the inclusion formation influence mechanism study on aluminum, calcium, magnesium, oxygen content and vacuum level during the smelting process, inclusions effect mechanism study on flow condition and bubble of the molten steel, inclusions and carbonates separation mechanism and control principles in the smelting process.

3. Low density, high elastic modulus, high strength and toughness steel theory and technology basis

This study focuses on how to produce the advanced high strength automobile steel based on steel plant traditional processes, and its performance include high elastic modulus (more than 20%-50%), high specific strength plastic modulus performance and etc. Relationship of the material composition, process and structure studied could be established for commercialization.

4. Mechanism and key performance of high temperature resistant ferro steel alloy for new generation of vehicles

Mechanism of new generation resources saving ferro steel alloy for services in 1,000 to 1,100 degree centigrade; high temperature oxidation, high temperature fatigue, thermo fatigue and weld ability of new generation high temperature resistant ferro steel alloy; and studies on rolling technology of new generation high performance ferro steel alloy and simulation of failure of vehicles in high temperature service environment.

5. Basic research on product cleanness and surface quality control of special alloy plate based on arc furnace fine refinery and vertical

continuous casting lines

Control of cleanness of nickel based alloy plate products; basic research on control of melting residue in refinery of special alloy; control of inclusions in very thin plates and control of surface quality; basic research on high aluminum, high titanium alloy condensation technology.

6. **New process and technology for iron and steel industry, and related energy and environmental protection field can be applied freely as key support project**

Around 5-8 projects will be funded under the category of the Key Program.

Joint Fund of General Technology

NSFC and China Academy of General Technology have jointly set up the Joint Fund of General Technology since 2015. This joint fund aims at gathering scientists and research teams in China to solve major scientific problems and key technical problems for China Institute of General Technology in serving the country and fulfilling its mission, and promote research and team building in related disciplines.

In 2015, the budget for this joint fund will be 40 million yuan, supporting "Fostering Program Project" and "Key Program Project". Average funding for "Key Program Project" will be 3 million per project for 4 years, and this amount could be increased for projects that are very innovative and systematic. The average funding for "Fostering Program Project" will be 800,000 yuan per projects for 3 years.

I. Directions for "Key Program Project"

1. Studies on technology of mobile communication security
2. Theory and technology of common key code for anti quantum computation
3. Studies on information hiding without carrier
4. Theory, modeling system realization and security evaluation of information hiding based on natural image content
5. Sensing, indexing, identification and analysis of multi media content in network big data environment
6. Theory and technology of vertical searching and data analysis
7. High performance multi media sensor
8. Mobile internet security mechanism and countermeasure technology

II. Directions for "Fostering Program Project"

1. Information processing

(1) Theory and technology of information hiding

Including new theory, new method new technology of information hiding and countermeasure, such as information hiding and countermeasure in main stream media, non conventional carrier, information hiding and countermeasure for information channel, restoration of hidden information, robust secret communication, fast technology for information hiding and countermeasure and cloud detection, performance evaluation and test of information hiding technology, new types of super high capacity secured information hiding, etc.

(2) Theory and technology of "voice map" construction

Including voice processing for multi-language "voice map", such as speaker, language and voice identification, etc.

2. Internet security

(1) Communication technology based on instantaneous communication

Including method and protocol of data transmission of text, voice, video and file, hiding channel, information hiding, secured instantaneous transmission of P2P network media, performance evaluation, test standard test technology of instantaneous communication technology, etc.

(2) Vulnerability analysis and detection technology

Such as new types of network connection technology, analysis of special protocol in industrial system network and vulnerability mining technology, invasion detection in industrial network, evaluation of vulnerability technology, standard of detection, method and tools of detection, etc.

(3) Network big data security analysis

Including big data based data merging, relevance analysis, warning analysis, anti discovery technology, visualization technology, software definition, abnormal flow detection, network resources management and sharing technology, etc.

3. Mobile communication security

(1) Technology related to small communication terminals

Including security enhanced Android platform, hardware structure and software for main stream communication terminals, special equipment for communication station and transmission, various forms of batteries, auto analysis for indexing information of S chip modules, low energy consumption security processing chips, and performance evaluation and detection of mobile communication terminals.

4. Encryption technology
(1) Strong encryption algorithms
(2) Studies on key security of coordinated application using multi coding algorithm
(3) Theoretical studies on code analysis

NSFC-Guangdong Joint Fund

NSFC and the Guangdong Provincial Government jointly implement the second phase of Joint Fund of Natural Science (NSFC-Guangdong Joint Fund for short) from 2011 to 2015, trying to attract outstanding scientists in Guangdong Province and other areas in the country to solve common and major scientific and key technical issues in the future development of economy, society, science and technology in Guangdong and surrounding areas, and promote the scientific and technological development and the fostering of talent teams in the region.

The NSFC-Guangdong Joint Fund is open to scientists all over China, and is part of the National Natural Science Fund. NSFC is responsible for receiving applications. The application, evaluation and management comply with the regulations of NSFC and the detailed procedures of the Joint Fund.

In 2015, the Joint Fund is planning to arrange a total funding of 77.25 million yuan, accepting applications for Key Program project in 5 areas listed below, with funding of 2.8 million per project for 4 years. Eligible researchers all over the country are welcome to apply for this Fund according to the scope and requirement in the Guide.

I. Agriculture

1. Basic research on important livestock and control of disease in South China

Focusing on key objectives such as healthy breeding and product safety, conduct research on molecular mechanism of interactions among important diseases of important livestock in South China, reveal mechanism of pathogenesis, host immunity and genetic resistance, so as to provide theoretical basis for control of important diseases of livestock in South China.

Main research orientations:
(1) Genetic basis of important traits of economic livestock
(2) Important pathogens and pathogenic mechanism of livestock
(3) Laws of epidemics and pathogenic mechanism of important livestock diseases

2. Special land bases bio resources and sustained utilization in South China

Focusing on important special land based bio resources (including plants, animal and microorganisms) in South China, conduct relevant basic research on important traits and utilization of important products and related genetics.

Main research orientations:
(1) Basic research on genetic resources and utilization of special land based bio resources in South China
(2) Biodiversity and sustained utilization of land based bio resources
(3) Biological basis of modification of important traits of main horticultural plants

3. Food processing and food safety

Focusing on problems related to important special agricultural products, including heavy metal, antibiotics, organic pollutant, bio toxic materials in South China, conduct relevant basic research on the transition, pathology and efficient and fast analysis of harmful substances in food or farm products.

Main research orientations:
(1) Laws of transfer and mechanism of nutrients during food processing
(2) Generation, migration, detection and elimination of heavy metals, bio toxins and organic pollutants

4. Basic research on biology and utilization of special fruits in South China

Focusing on special fruits (including lichee, longan, loquat, etc.), conduct relevant research on important traits and utilization of important products and related genetics, so as to provide theoretical basis for sustainable development of and improvement of fruit industry in South China.

Main research orientations:
(1) Formation and modification of fruit quality for special fruit resources in South China

(2) Basic research on disease control of Liberobacter asiaticum of oranges

II. Population and Health

1. Control of special diseases in South China

Focusing on special disease in South China, conduct basic research on disease prevention and control based on previous research.

Main research orientations:

(1) Origin, variation of bird flu virus and pathogenic mechanism

(2) Radiation treatment of nasopharyngeal carcinoma and mechanism of complications

(3) Basic research on liver cancer related to hepatitis B

2. TCM and new drugs in South China

Select major disease and common and high incidence and special diseases in South China, making full use of herbal medicine and special prescriptions in South China, conduct basic research on physical basis and functions of herbal medicine in South China, and promote development and clinical application of herbal medicine in South China, and at the same time promote development of innovative drugs.

Main research orientations:

(1) Basic research on treatment of cardiovascular disease using herbal medicine in South China

(2) Research on new types of anti infection drugs using marine bio resources in South China Sea

III. Resources and Environment

1. Mechanism and control of environmental pollution in city groups in Pearl River Delta

Conduct theoretical studies on mechanism and control of pollutions of air, water and soil in city groups in the Pearl River Delta, and promote environmental protection and sustainable development for cities in the Pearl River Delta.

Main research directions are:

(1) Mechanism of complex air pollution and health impact in city groups of Pearl River Delta

(2) Mechanism and restoration of water pollution in Pearl River Delta

(3) Principles of restoration and risk assessment of soil pollution in Pearl River Delta

2. Formation, utilization and environmental impact of special mineral resources in South China

Focusing on the formation and evolution of important and special mineral resources in South China, conduct relevant research on the development and impact on the environment, and serve the sustainable development of local economy and society.

Main research orientations:

(1) Accumulation process and mineralization of important and special mineral resources in Nanling region
(2) Theoretical studies on integrated utilization of tailing resources in Nanling mine region
(3) Generation and control of heavy metal and radioactive pollution in Nanling mine region

3. Mechanism of variation of typical ecosystems in South China Sea and resources and environmental effect

Focusing on marine ecology and environmental protection in South China Sea, conduct relevant basic research and provide scientific basis for sustainable utilization of marine resources in South China Sea.

Main research orientations:

(1) Dynamic process and response mechanism of tidal waves in the Pearl River estuary
(2) Evolution process, driving mechanism and effects of near sea eco system in South China
(3) Long term evolution of the dynamic environment of South China sea and its impact on extreme marine climatic events in South China

IV. New Materials and Manufacturing

1. New materials

Conduct relevant basic research focusing on advanced materials, efficient, energy saving and re-usable building materials and new types of bio medical materials.

Main research orientations:

(1) Basic research on advanced energy materials and devices

(2) Efficient and energy saving building materials for sub tropical region and green and recycling utilization
(3) New types of bio medical materials and method of preparation

2. Advanced manufacturing

Conduct basic research focusing on precision processing and smart manufacturing, energy saving and key new energy components and equipment.

Main research orientations:
(1) New principles and new methods of precision and smart manufacturing
(2) Basic research on energy saving and design and manufacturing of new energy equipment or key component
(3) Basic research on key technology of material manufacturing

V. Electronic and Information Technology

1. Basic theory and key technology of information technology for smart city

Focusing on major need for smart city development in Guangdong, and characteristics of urban information such as vast amount, dynamic, multi granularity, sparse, multi dimensional, multi channel and complex perception, developing smart city management, smart service, smart medicine and smart life, conduct research on basic information theory and key technology for areas such as digital administration, public security, health, environmental monitoring, intelligent traffic and smart tourism.

Main research orientations:
(1) Large scale information processing and smart computation for smart city
(2) Key technology in communication network, internet of things and multi network integration for smart city
(3) Method of multi data merging and modeling for smart city
(4) Theory and technology of coordinated management of distributive power systems for smart city

2. New types of electronic devices

Focusing on the need of IT industry of Guangdong Province, and the need for key basic theory and core technology in key devices such as new types of X-ray, large scale IC, information storage devices, large power electronic devices, radio frequency devices, and display devices, conduct research related to device physics, materials, structure, design and processing

technologies, etc.

Main research orientations:
(1) Applied basic research on next generation chips
(2) Key technology on core devices of medical imaging
(3) Key technology on new types of IC, high frequency and high power devices

NSFC-Yunnan Joint Fund

NSFC and the Yunnan Provincial Government jointly set up the Joint Fund of Natural Science (NSFC-Yunnan Joint Fund for short) in order to implement the Outline of the National Medium- and Long-Term Program for Scientific and Technological Development (2006-2020), to practice "Science and Technology Plan for the Innovative Yunnan", to attract more talented professionals, and to carry out basic research on important and key scientific and technical issues of the economy, society, science and technology in Yunnan and surrounding regions, to booster the development of science and technology and the construction of talent resources, to facilitate the indigenous innovation and international competition, and to promote the sustainable development of regional economy and society.

The Joint Fund is open to scientists all over China, and is part of the National Natural Science Fund. NSFC is responsible for receiving applications. The application, evaluation and management will be performed in accord with the Regulation on the National Natural Science Fund and related administrative measures as well as the detailed procedures of the NSFC-Yunnan Joint Fund.

In 2015, the Joint Fund is planning to arrange a total funding of 48.75 million yuan, mainly for 4 Key Program projects in areas listed below, with an average funding of 2.4 million yuan per project for 4 years. Eligible researchers all over the country are welcomed to apply for this fund according to the research scope and requirements in the Guide.

I. Protection of Biodiversity

1. Biodiversity

Focusing important species in the plateau regions in Yunnan, it is to conduct biodiversity studies on species, genetics and ecosystem.
Main research orientations:

(1) Studies on the mining and protection of specialized bio germplasm resources in Yunnan
(2) Bio diversity and functions of typical ecosystem in Yunnan
(3) Evolution of special animal and plant adaptability in Yunnan
(4) Analysis of important herbs and important fugus genome and metabolome

2. Agricultural and forest resources

Main research orientations:

(1) Genetic analysis of good traits of important economic plants in Yunnan
(2) Important pests and damage mechanism of main crops in Yunnan
(3) Research on specialized livestock and fish germplasma resources in Yunnan
(4) Applied basic research on specialized woody oil plants in Yunnan
(5) Studies on barrier mechanism for continuous cultivation of important pharmaceutical plant germplasm
(6) Structure and function of composite ecosystem of rubber mixture in Yunnan
(7) Basic research on efficient use of Simao pine tree and Yunnan pine tree

II. Population and Health

1. Basic research on drug discovery aiming at major human diseases by using typical resources in Yunnan

Main research orientations:

(1) Discovery, synthesis, structural optimization, druggability and functional mechanism of new natural active materials based on specialized resources in Yunnan
(2) Research on the effective component, material basis and functional mechanism of ethnic medicine in Yunnan
(3) Basic research on the protection and sustainable utilization of herbs in Yunnan

2. Basic study on the pathogenic mechanism and control of regional high incidence diseases and major diseases in Yunnan

Main research orientations:

(1) Basic research on high incidence and regional diseases in Yunnan
(2) Basic research on drug addiction and rehabilitation, and treatment of AIDS
(3) Basic research on laws of trans-regional spreading, pathogenesis mechanism and control of epidemic disease in Yunnan and surrounding

regions
(4) Studies on modeling and pathogenesis of specialized animal diseases in Yunnan

III. Resources and Environment

1. Environmental changes and eco environmental effect in Yunnan and surrounding areas

Main research orientations:
(1) Geo environmental changes and impact on biodiversity in Yunnan
(2) Degrading of pollution and eco restoration of soil in highlands in Yunnan
(3) Climatic response of water systems in highlands
(4) Environmental evolution and eco environmental effect in plateau lakes in Yunnan

2. Research on mechanisms of formation and warning of typical natural disasters in Yunnan

Main research orientations:
(1) Mechanism of geological disasters and risk warning in highland regions in Yunnan
(2) Climate change and formation of disastrous weather in low altitude highlands
(3) Mechanism of strong earthquake and secondary disasters in Yunnan and surrounding regions

3. Mineral deposit formation, survey and exploration in Yunnan and surrounding regions

Main research orientations:
(1) Mechanism of mineral deposit and exploration technology in typical mineral deposit regions in Yunnan and surrounding regions
(2) Control and utilization of heavy metal pollution
(3) Environmental impacts and restoration of large mining sites

IV. Utilization of Mineral Resources and New Materials

Focusing on efficient and integrated utilization of mineral resources and scientific issues of new materials, conduct basic research.

1. Basic research on new technologies of metallurgy of non-ferrous metal

Main research orientations:
(1) Efficient extraction of low grade non ferrous metal minerals
(2) New technology of enrichment and extraction of nonferrous metals
(3) Technology of efficient recycling of secondary resources of nonferrous metals

2. Basic theoretical research on precious metal materials
Main research orientations:
(1) Phase diagram of multi component alloy of precious metals
(2) Freezing and forming control of rare and precious metals
(3) Structure and performance of magnetic target materials and functional coating of rare and precious metals

3. Basic research on the development of new materials
Main research orientations:
(1) Preparation science of high performance nonferrous metal bases composite materials
(2) Preparation of nonferrous metal electrode

4. Basis of photoelectric materials and devices preparation
Main research orientations:
Efficient and low cost photoelectric transferring materials and devices

NSFC-Xinjiang Joint Fund

NSFC and the Government of the Xinjiang Uygur Autonomous Region jointly set up the Joint Fund (NSFC-Xinjiang Joint Fund for short) on March 21, 2011 in response to make full use of the guiding role of NSFC and attract a number of outstanding scientists to work in Xinjiang, booster the development of science and technology and the construction of talent teams, increase innovative capability of universities and research institutes in Xinjiang and promote the sustainable development of regional economy and society in Xinjiang.

The Joint Fund is open to scientists all over China. It is part of the National Natural Science Fund, and a platform of proving scientific and technological aid to Xinjiang. NSFC is responsible for receiving applications. The application, evaluation and management will be performed in accord with the Regulation on the National Natural Science Fund and related administrative measures as well as the detailed procedures of the

NSFC-Yunnan Joint Fund.

In 2015, the Joint Fund is planning to arrange a total funding of 48.75 million yuan, mainly for Fostering Program Project, Key Program Project and Special Grant for Local Young Talents in 4 areas listed below. For Fostering Program Project, the average funding is 600,000 yuan per project for 3 years, and for Key Program Project, the average funding is 2.8 million yuan per project for 4 years. The Special Grant for Local Young Talents supports researchers with good research achievements in Xinjiang to conduct innovative research within the funding scope outlined in the Guide. It supports up to 2 outstanding local young researchers under 45 with funding of 1 million yuan per project for 4 years. Eligible researchers all over the country are welcomed to apply for this fund according to requirements in this Guide though home institutions.

I. Water Resources and Agriculture

Focusing on water security in Xinjiang, and issues of water shortage, uneven water distribution, high demand on irrigation, and increased water pollution, conduct basic applied research on water resources and environment, sustainable development of agricultural, and livestock husbandry, conduct basic and applied basic research on molecular breeding and farming modes.

Main research orientations:
(1) Mechanism of surface runoff formation and warming in highlands of Xinjiang
(2) Mechanism of ground water compensation and discharge in arid regions
(3) Formation, transformation and utilization of salty water and condensed water resources
(4) Water management for agricultural use, water saving in agriculture and ecological use
(5) Mechanism of pollution control and principles of control in arid regions
(6) Studies on the laws of water demand for crops in Xinjiang
(7) Optimization and functions of composite system models of agriculture and forestry in Xinjiang
(8) Mechanism of formation and improvement of traits of important crops such as corns and cotton
(9) Basic research on biology of growth and breeding of important livestock
(10) Studies on pathogenic ecology and epidemics of zoonosis

II. Mineral Resources

1. Basic research on geology of mineral deposit

Focusing on demands on the security of national resources and construction of mineral resources base in Northwest China, and rich mineral resources in Xinjiang and neighboring areas, conduct basic research on geology of mineral deposit, so as to provide scientific support for mineral exploration.

Main research orientations:

(1) Tectonic evolution and formation of important mineral deposit in Xinjiang in neopaleozoic period
(2) Laws of mineralization and indicators of rare metal minerals in Xinjiang
(3) Mechanism of chemical halo formation and indicators of large thermo liquid mineral deposit in Xinjiang
(4) Basic research on new technology and new method of remote sensing for mineral exploration in shallow covered regions in Xinjiang
(5) Deep structures in large mining sites and its constraints on deposits location in Xinjiang
(6) Laws of formation of special non metallic and precious stone deposits in Xinjiang

2. Integrated use of mineral resources

Taking advantages of mineral resources and the needs of industrial development in Xinjiang, conduct basic research on integrated use of mineral resources.

Main research orientations:

(1) Basic research on clean use of low grade coal
(2) Basic research related to new materials based on special mineral resources in Xinjiang
(3) New technology and new method for nonferrous metal metallurgy

III. Biodiversity and Bio-resources

Focusing on important specialized bio resources in arid and semiarid desert oasis in Xinjiang, it is to conduct studies on biodiversity and development and utilization of resources.

Main research orientations:

1. Impact on bio diversity in desert by climate change
2. Biodiversity and assessment on risk of alien species invasion in Talimu Basin and oasis and desert mixed regions

3. Genetic diversity of wild fruit trees in west Tianshan Mountains and assessment on resources
4. Studies on mechanism of draught resistance and salt resistance of desert plants and new traits of crops

IV. Population and Health

Research on pathogenic mechanism and control of high incidence diseases in Xinjiang; basic research on ethnic medical prescriptions based on ethnic medical resources in Xinjiang,

Main research orientations:

1. Epidemics, pathogenesis and control of aids, drug resistant tuberculosis and zoonosis
2. Interactions and mechanism of environmental and genetic factors in high incidence non infectious diseases in Xinjiang
3. Epidemic studies on high incidence (special) diseases in south Xinjiang
4. Basic research on Uighur medicine and prescriptions

NSFC-Henan Joint Fund

The Joint Fund of Talent Fostering (NSFC-Henan Joint Fund for short) is jointly established by NSFC and the Henan Provincial Government to make full use of the guiding role of NSFC, increase the innovative capability of universities and research institutes in Henan Province, promote the sustainable development of regional economy and society, and foster young talent teams for Henan Province. With the incorporation of the national strategy for central China economic region, the Joint Fund supports researchers conduct basic research to meets the needs of talent team development and regional economic and societal development.

As part of the National Natural Science Fund, NSFC is responsible for receiving applications. The application, evaluation and management will be performed in accord with the Regulation on the National Natural Science Fund and related administrative measures.

In 2015, the Joint Fund is planning to arrange a total funding of 49.2 million yuan. The average funding is 300,000 yuan per project for 3 years.

I. Eligibility

1. Applicants should meet the following requirements

(1) Experience of conducting basic research;
(2) Senior academic title or Ph.D., or recommendations from 2 researchers in the same research area and with senior academic title;
(3) Under the age of 40 by January 1 of the year of application (born after January 1, 1975);
(4) Home institution is in Henan Province.

2. The following people may not apply

(1) Having no work or the employer is not a registered home institution;
(2) PI of on-going or having undertaken 3 or more NSFC's projects;
(3) Graduate students, but those taking graduate courses part time may apply through home institution with consent of supervisor.
(4) Having already been funded by this joint fund.

II. Evaluation

Evaluation procedure is the same as the procedure for the Young Scientist Fund.

Joint Fund for Promoting S&T Cooperation between Both Sides of the Taiwan Strait

The Joint Fund for Promoting S&T Cooperation between Both Sides of the Taiwan Straits is jointly established by NSFC and Fujian Provincial Government. This joint fund aims at making effective use of the guiding role of NSFC to guide social S&T resources into basic research and further attract and gather scientists on both sides of the Strait to conduct S&T cooperation, solving major scientific problems and key technical problems of mutually concerned by Fujian and Taiwan regions, promote talent fostering, improve S&T innovation capability of economic regions on both sides of the Strait, and promote sustainable development of regional economy and society.

The Joint Fund is open to scientists all over China on fair and competitive basis, and is part of the National Natural Science Fund. NSFC is responsible for receiving applications. The application, evaluation and management will be performed in accord with the Regulation on the National Natural Science Fund and related administrative measures.

In 2015, the Joint Fund is planning to arrange a total funding of 48.75 million yuan, mainly for applications for Key Program in 4 areas listed below, with the average funding of 2.8 million yuan per project for 4 years. Eligible researchers all over the country are welcomed to apply for this fund according to the research scope and requirements in this Guide.

I. Population and Health

Main research orientations:

1. Pathogenesis and early diagnosis and new measures for treating high incidence cancer in Fujian and Taiwan
2. Studies on common neural system diseases in Fujian and Taiwan
3. Basic research on bio medical materials
4. Material basis, functions and druggability of special herbs in Fujian and Taiwan
5. Control, diagnosis and treatment of important infectious diseases and metabolic diseases in Fujian and Taiwan

II. New Materials and Advanced Manufacturing

Main research orientations:

1. Applied basic research on new types of lithium batteries and solar cells
2. Preparation, performance control and noninvasive detection of new carbon based materials, composite materials or media
3. Preparation and applications of catalyst materials and environmental adsorption, cleaning materials in new energy applications
4. Technical basis of micro nano structural design and 3D printing
5. Molecular design and structural control of organic photoelectric materials and organic/inorganic composite materials
6. Improvement of natural cellulose and preparation of new fiber composite materials
7. New method of pollutant detection and environmental restoration on both sides of the Taiwan Straits

III. Resources and Environment

Main research orientations:

1. “Source-sink” and sediment system changes in the Tainwan Strait
2. Key process of bio cycling and in the Taiwan Strait and valley, estuary and near sea ecosystems
3. Mechanism of typical disaster formation and warning on both sides of

the Taiwan Strait
4. Basic research on oil and gas geology in the Taiwan Strait and neighboring regions

IV. Electronics and Information Sciences

Main research orientations:
1. Big data analysis and ubiquitous network applications for IT industry in the west side of the Taiwan Strait
2. Visual sensing and target understanding
3. Applied basic research on bio medical photoelectric technology
4. Studies on electromagnetic filtering and high frequency emission devices
5. Basic research on large energy gap semiconductor photoelectric devices

Tianyuan Fund for Mathematics

Tianyuan Fund for Mathematics is a special fund to integrate collective wisdom of mathematicians, explore funding method that suits mathematics unique features, and make China a strong country in mathematics. This fund supports researchers to conduct research according to the features and needs of mathematics, foster young talents, promote academic exchange, optimizing research environment, spread mathematical culture and thus strengthen creativity of China in mathematics. The fund in 2015 provides funding mainly for the following six types of funding:

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, applicants should be under the age of 33 for man and 35 for woman by January 1 of the year of application and bear Ph.D. degrees for less than three 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 cooperation projects). Post-doctors working at the post-doctor station are not qualified to apply for this grant. The funding for Tianyuan youth grants project is 30,000 to 50,000 yuan 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 mathematical basis of postgraduate students and young teachers. Summer school has three types in terms of theme, namely, basic mathematics, applied mathematics and statistics. One or two summer schools will be funded in each theme.

The training workshops are for young teachers in the western and northeastern regions of China for improving their capability in mathematical research and teaching. Training workshops will focus on two themes, one for teachers with mathematical major and another for teachers with non mathematical major. Either of teachers training workshops may be organized in the west or the northeast, but may not exceed two.

The training workshop isconducted in a contract-bonded way and the selection of host is decided by the Academic Steering Committee of the Tianyuan Fund in consultations 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 caninclude 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 be 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 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 consultations 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 supports for the following 4 types of activities:

(1) Publications: the publication of popular mathematical books, including domestic and translated foreign books, so as to raise the interests of primary and middle school students on learning mathematics and understanding of mathematics by the public. Applications should be proposed by book editors.

(2) Journals: the publication of national influential journal related to

mathematical culture, dissemination of mathematics, mathematical education and mathematical modeling, so as to improve journal quality and impact on the public. Applications should be proposed by journal editors.

(3) Activities of mathematical dissemination: the important 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 website of disseminating mathematics and mathematical culture to the public. Fund is given 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. Funding will be up to 200,000 yuan per year.

Timing and requirement: application to the Tianyuan youth grants is the same as Young Scientists Fund in timing. Applications to other types of project may be submitted to the Department of Mathematical and Physical Sciences 3 month before projects commence, but not later than the 31st of July 2015.

Special Fund for Research on National Major Research Instruments (Free Application)

The Special Fund for Research on National Major Research Instruments (formerly The Special Fund for Research on National Major Research Instruments and Facilities) 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 of China.

In 2014, the Special Fund for Research on National Major Research Instruments accepted 630 proposals and funded 64, with a total funding of 450 million yuan, and anaverage funding of 7.03 million yuan per project.

In 2015, Special Fund for Research on National Major Research Instruments plans to arrange 550 million yuan for funding. Each application could apply for no more than 10 million yuan for 5 years research work.

1. Funding scope

(1) Research and development on indigenous scientific instruments and equipment with original creation and important roles for exploring research frontier.
(2) Research and development on scientific instruments for discovering new phenomena, revealing new laws, verifying new principles and acquiring new dataon the basis of breakthroughs in core technology and integrated innovation.
(3) Development of new scientific instruments with potentials of application in broad areas.

2. Eligibility

Applicants should meet the following requirements:
(1) Have the experience of conducting basic research;
(2) Have senior professional position (title).