National Natural Science Fund

Guide to Programs

Fiscal Year 2014

National Natural Science

Foundation of China

Brief introduction on this book

The Guide to Programs of the National Natural Science Fund 2014, 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 2014. 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

2013 is a fully implementing year for the spirit of the 18th Party Congress and the 3rd Plenary Session of the 18th Party Congress, and the 3rd year for implementation of the 12th Five-Year Plan. In view of the new requirement on basic research for building China into an innovative country and S&T power, the National Natural Science Foundation of China (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 its working guideline of "respecting science, enhancing democracy, expediting competition, encouraging cooperation, nurturing innovation and leading the future", as well as adhered to its evaluation principle of "relying on experts, promoting democracy, funding excellent research, and advocating fairness and justness" to nurture creative ideas and foster talents, further strengthen support to the development of research tools, and has made positive contributions to the maturity of the national innovation system and 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, with a view to improving the level of basic research. 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 and boost the sharing of resources, to guide social resources to invest in basic research, and to optimize favorable environments 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 157,986 research proposals were received during that period in 2013, which meant a year-on-year reduction of 7.50% (12,806 applications) over that in 2012. The applications for the General Program reduced by 16.19% (13,932 applications) from that in 2012.The applications for the Young Scientists Fund reduced by 17.56% (630 applications) from that in 2012. Applications to the Special Fund for Research on Major S & T Instrument (free applications) reduced by 21.34% (67 applications), and International (Regional) Cooperation and Exchange Programs increased 28.48% (137 applications). Compared with 2012, applications for the Young Scientists Fund and the Fund for Less Developed Regions had a slight increase, 1,184 and 580 applications or 1.98% and 5.15% respectively. The number of applications for the Key Program, the National Science Fund for Distinguished Young Scholars and the Special Funds for Basic Research on Scientific Instruments were remained stable.

After preliminary evaluation, NSFC notified in public that 4,461 applications were declined, accounting for 2.8% of the total applications received, a little lower than 3.0% of 2012. A total of 574 appeals for re-evaluation were received before the deadline for appeal, and 431 of them were accepted and the other 143 appeals were rejected because of the lack of required documents and other reasons. After serious checking and verification, the previous decisions of rejection, both well-founded and justified in nature, were maintained for 394 appeals, and the other 37 appeals were approved in that the previous decisions of rejection were wrongly made, accounting for 0.8% of all the declined.

After compulsory review procedures, in 2013, 16,194 projects in the General Program including Young Scientists Fund Program extended for funding under the category of General Program, 564 projects in the Key Program, 368 projects in the Major Research Plan Program, 109 projects in the Major International (Regional) Joint Research Program, 198 projects in the National Science Fund for Distinguished Young Scholars, 399 projects in the Excellent Young Scientists Fund, 15,367 projects in the Young Scientists Fund, 2,497 projects in the Fund for Less Developed Regions, 29 projects in the Science Fund for Creative Research Groups, 140 projects in the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao, 52 projects in the National Science Fund for Talent Training in Basic Research, 50 projects in the Special Fund for Basic Research on Scientific Instruments, 40 projects in the Special Fund for Research on Major S&T Instrument, 9 recommended projects in the Special Fund for Research on Major S&T Instrument, 495 projects for Joint Funds, 27 projects in the Fund for Promoting Public Understanding of S&T, 101 projects in the Research Fund for International Young Scientists, and 25 projects in the Special Fund for Teenage Participation in S&T Activities, and 16 projects to the Fund for Excellent State Key Labs were funded. 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 2014, based on the overall layout of the 12th Five-Year Plan, NSFC will adhere to its strategic orientation of “more emphasis on basic research, frontier research and talent training” and make greater efforts to optimize the funding mechanism and integrate the funding structure. To achieve the vision of “deepening the pool of exploration, widening the source of innovation, furthering the depth of intercrossing, and fulfilling the dreams of the talents”, NSFC will strive to develop a more dynamic, more efficient and more open science funding system with Chinese characteristics, thereby facilitating a balanced, coordinated and sustainable development of scientific disciplines, promoting the country into the world’s best in some mainstream scientific disciplines, nurturing high-caliber scientists and

innovation teams with international reputation, enhancing excellence of basic research, amplifying the international visibility of basic research, and strengthening the capacity for indigenous innovation in a number of key areas for laying a sound S&T foundation for achieving a sustainable social and economic development and accelerating China into an innovation-oriented country.

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:* 2014 (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 2014. Notes on application and regulations on the limits of the total number of applications for one applicant are introduced in detail. The overall funding facts and priority areas of the General Program, Key Program, the Young Scientists Fund, and the Fund for Less Developed Regions are introduced in the section of each scientific department. For the General Program, the overall funding principles and specified requirements as well as notes on applications are provided in addition to the introduction of the overall funding statistics of each scientific department. Apart from that, the trend of development, funding scopes and requirements in diverse disciplines are described by respective divisions of the scientific departments. Other types of programs are introduced in general terms. Special requirements for each of them are introduced in the main text of this *Guide to Programs*.

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

advised to pay due attention to the updating of related information.

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

Editorial Board of the *Guide to Programs of the National Natural Science Fund: 2014*

December 22nd, 2013

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General Program

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

Applicants should meet the following qualifications:

(1) Experience of undertaking basic research projects or doing basic research.

(2) Senior professional title or Ph.D. degree, or recommended by two senior professionals.

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

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

In 2013, NSFC funded 16,194 General Program projects with total funding of 12 billion yuan and average funding of 741,000 yuan per project, which is 2,100 yuan more than that in 2012. The average funding rate was 22.46%, 3.22% higher than previous year (please see table below for detail). In 2014, NSFC will maintain the funding scale and average funding for the General Program. NSFC will focus on funding innovative proposals, and encourage researchers to carry out 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 2013

Unit: 10,000 yuan

Departments	Applications	Approved				Success rate (%)
		Projects	Funding	Average funding per project	Percentage of the total (%)	
Mathematical and Physical Sciences	4,991	1,485	114,130	76.86	9.51	29.75
Chemical Sciences	5,707	1,483	118,670	80.02	9.89	25.99
Life Sciences	10,767	2,573	192,870	74.96	16.07	23.90
Earth Sciences	5,565	1,603	128,210	79.98	10.68	28.81
Engineering and Materials Sciences	13,224	2,620	209,560	79.98	17.46	19.81
Information Sciences	8,264	1,646	128,020	77.78	10.67	19.92
Management Sciences	4,184	712	39,870	56.00	3.32	17.02
Health Sciences	19,412	4,072	268,670	65.98	22.39	20.98
Total	72,114	16,194	1,200,000	74.10	100.00	22.46

Department of Mathematical and Physical Sciences

Focusing on deep level 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. At the same time of 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 the framework of mathematical and physical sciences are peculiar and independence in characteristics, including pure theoretical research (such as mathematics, theoretical physics, etc.) and experimental studies. Many disciplines are featured with “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, mathematic 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. A series of interdisciplinary and cross-boundary disciplines, as well as new research areas have been emerged through the interactions, and research objects and areas are also expandedin mathematical and physical sciences at the same time.

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 funding plan, the Department has taken some measures in project funding performance and strengthened macro guidance. In 2014, the Department will continue to pay attention to the following aspects:

(1) Emphasize on fostering outstanding young talents. In 2013, the principal investigators under the age of 40 in General Program projects reached 42.36%. In 2014, the Department will further increase its funding for young researchers and expand funding scale for young applicants, so as to encourage more young scientists to conduct research independently.
(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.
(3) Strengthen macro planning, and give preferential support to special areas so as to promote sustainable development in these areas. In 2014, 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 national mega-science projects;

(ⅴ) Problems driven research in applied mathematics;
(ⅵ) Radiation protection and radiation physics;
(ⅶ) Integration and standardization of computational mechanic software.

Funding for General Program Projects in the Last Two Years

Unit: 10,000 yuan

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Mathematics	Math. I	199	11,566	30.06	199	11,233	31.78
	Math. II	192	11,113	26.48	187	10,621	28.25
Mechanics	Basic problems and methods in mechanics	9	667	25.71	6	492	30.00
	Dynamics and control	64	5,249	26.45	61	5,014	30.05
	Solid mechanics	163	13,854	25.59	150	12,715	29.70
	Fluid mechanics	75	6,128	24.75	89	7,334	29.87
	Bio-mechanics	26	2,265	25.49	27	2,294	29.35
	Explosive and impact dynamics	31	2,651	26.50	33	2,697	27.97
Astronomy	Astrophysics	41	3,715	33.33	44	3,827	36.07
	Astrometry and celestial mechanics	31	2,754	24.41	31	2,643	24.80
Physics I	Condensed matter physics	204	16,995	26.46	197	16,483	29.32
	Atomic and molecular physics	43	3,414	28.67	36	2,882	30.00
	Optics	116	9,818	26.48	109	9,214	29.54
	Acoustics	41	3,502	27.70	37	3,110	29.60
Physics II	Fundamental physics and particle physics	76	6,048	28.46	73	5,471	30.29
	Nuclear physics, nuclear technology and its applications	90	7,678	29.70	78	6,736	28.89
	Particle physics and nuclear physics experimental facilities	69	6,075	28.75	82	7,406	32.03
	Plasma physics	45	3,828	27.44	46	3,958	29.87
Total		1,515	117,320	26.89	1,485	114,130	29.75
Average funding per project		77.44			76.86		

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 and research teams 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 approaches to be introduced. 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 2014, the average funding will be 600,000 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, global differential geometry and low dimensional topology, multi complex variable functional theory and complex geometry, non-communicative geometry and operator algebra, and mathematical physics.

For the funding of applied mathematics and computational mathematics, the Division will gives more emphasis on basic theory and new methods with strong practical background and 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 and algorithm complexity, discrete probability modeling, optimal algorithm, combinational algorithm and scientific computing. 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.

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.

Interdisciplinary Research between Information and Mathematics

In order to promote interdisciplinary research between mathematics and information sciences, in 2014, 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
Research onthe 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 architecturesbased on the analysis and design of typical software systems (system software or application software),.

4. Theoretical studies on new types of software system architecture
Research, by addressing the contemporary features and needs of software

application, the structure, on the 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
Research on 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, as well as projects closely related to the sustainable development of economy, society and national security, and the development of engineering technology. 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 2014, the average funding will reach 850,000 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. Research in the following areas will be encouraged: 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 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 will continue to support studies on instruments, new experimental methods and techniques with innovative ideas. Applicants for this type of application should mark “Experimental Techniques and Instruments” in the application form. The Department will keep supporting projects in computational software development, giving stress on the integration and standardization research on the development of the computational mechanics software which may produce independent or shared IPR. Applicants for this type are requested to mark “Computational Mechanics Software” in the application form. Applicants of

above two types of projects should have relevant research background.

Division of Astronomy

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

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 backbone in astronomical research and more than half of the awardees are under the age of 40.

In 2014, in addition to strengthen the extended 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 will encourages researches 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 2014, the average funding will be 900,000 yuan per project.

In the next few years, the Division plans to give special support to pre-research around the investigation on available or to-be-built equipment, and conceptual studies on new technologies that are urgently needed for large-scale telescope and space exploration.

Division I of Physics

The funding spectrum in the Division I of Physics covers 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 will pay its attention to study on experimental methods and techniques motivated by creative ideas, encourages researches on new computational methods and simulation software closely related to experimental physics and explorative types, physical problems in the field of new energy, key basic physical issues serving national needs, and physical concepts, physical methods and physical properties in new disciplinary areas. In 2014, the average funding level will be 850,000 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, advanced technologies and methods of device physics 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 atomic and molecular physics and optics, the Division will encourage 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 the ultrafast and extremely strong light conditions, the 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

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 originated from social needs 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 researches on fundamental physics, particle physics, nuclear physics, nuclear technology and its applications, accelerator physics and detectors, plasma physics, and synchronized radiation methods. In 2014, the average funding will be 850,000 yuan per project.

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

For particle physics and nuclear physics, the Division will support creative theoretical and experimental research, in particular, the combination of theoretical and experimental studies related to selected large-scale experimental facilities that are in operation, upgrading or to be completed soon both in China and abroad. Researchers are expected to explore new physical rules related to the latest experimental results, such as the theory and experiments of phenomenology in particle physics and interdisciplinary research of nuclear physics under extreme conditions with nuclear astrophysics and other disciplines.

For support to nuclear technology, accelerator and detector, low-temperature plasma and synchronized radiation, it is hoped that fundamental issues should be drawn from the disciplinary development, national demands and intercrossing with other disciplines, which may facilitate a deeper understanding of physical laws underlying the development of the disciplines and important applications at the same time. Emphasis will be

laid on key technologies and innovative ideas in methodology and intercrossing with other disciplines. In addition, the exploration of mechanisms and rules governing the interaction of matter with instantaneous, high energy, high power and strong field radiation (such as charged particles, 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 featuring 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 on 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.

In 2014, the Department of Mathematical and Physical Sciences will make special allocation in General Program to fund special areas with continued support on the innovative development and improvement of instrument, advanced experimental techniques and methods, 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 2013, 5,707 proposals for free application from 625 research institutions were received by the Department accounting for 19.9% less than those in 2012, and 1,483 proposals were funded with the success rate of 25.99% and the average funding intensity of 800,200 yuan per project.

Since 2014, the Department will readjust relevant disciplinal codes to meet the needs of development of frontier and newly emerged intercrossing areas.

In 2014 , 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 2014, the funding for the General Program will be between 0.6 and 1.0 million yuan per project, and the average funding intensity per project will be the same level as that in the previous year.

Funding for General Program Projects in the Last Two Years

Unit: 10,000 yuan

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Chemistry I	Inorganic chemistry	192	14,984	22.33	184	14,725	26.78
	Analytical chemistry	169	13,186	23.06	156	12,485	26.90
Chemistry II	Organic chemistry	293	22,867	22.16	268	21,445	26.75
Chemistry III	Physical chemistry	293	22,867	23.78	281	22,485	27.18
Chemistry IV	Polymer science	178	13,186	25.07	137	10,965	27.68
	Environmental chemistry	178	13,888	21.81	172	13,765	25.94
Chemistry V	Chemical engineering	291	22,712	19.56	285	22,800	22.87
Total		1,585	123,690	22.25	1,483	118,670	25.99
Average funding per project		78.04			80.02		

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 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 applied 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 2014, applicants should focus their proposals on the development of inorganic synthetic chemistry and assembly methods, pay more attention to

the combination of theory with experiment, and emphasize research on correlated regulations of structure and property of inorganic matters, as well as avoid similar focuses with those on-going Major Research Plan projects on crystal-state functional materials and controllable self-assembly and its functionality. Finally, proposals with creative ideas in the areas of solid chemistry, bio-inorganic chemistry and radiochemistry will be encouraged.

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, instrument development and its combining-use technique, etc. as well as newly emerged micro-/nano-analysis, analytical chemistry of chips, omics-analysis, image formation 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 the field of 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 discovery and application of new technologies are also 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 metal-organic chemistry, asymmetrical catalysis, organic synthesis methodology, element organic chemistry and natural organic 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 natural organic chemistry, the discovery, the synthesis and the reformation of natural products with unique structure and important bio-activity found in China for strengthening the intercross with life and medical sciences; (iii) 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; (iv) 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; (v) 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.

Chemical Biology

Chemical biology is a science to accurately modify, regulate and explain biological system at the molecular level by means of exogenous chemical substance, method and route. As a new intercrossing discipline, it not only develop some new reactive technologies and molecular means, 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 synthesis of bio-macromolecules, such as protein, nucleic acid, polysaccharide etc., and bio-micro-molecules, such as lipid compounds, coenzyme factor, living nature products etc.; (ⅳ) to detect the biological process in cell by interference of micro-molecular organic compounds, thereby to appraise the bio-macromolecules attended 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 complete 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 been developed approximately with the same pathof international works and has excellent research basis. 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 are continuously increased and some important results have been achieved in China. 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 use in living process; (ⅱ) new method and new technique of analytical detection for important substance and process in living system; and (ⅲ) study of molecular mechanism in key biological events, in order to strengthen basic research of solving biological issues 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 foundation 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 experiment means and theoretic methods of physical chemistry, the information could be acquired in terms of molecular structure and dynamic change 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 has become a new trend. The development of theoretic chemical method has been emphasized. It has become a new growth point that theories and experiment 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 must be further strengthened.

The research accomplishment of physic-chemistry and theoretic chemistry in China has been drawn more and more attention from the international academic community. The Division encourages applicants give play to the discipline's strengths, focus on scientific frontiers, meet the national needs, and emphasize creative, systematic and prospective studies for developing new concepts, new theories and methods. The intercrossing research with other disciplines and the basic research with important theoretical significance and potential for application in the areas of energy, information, environment, materials and biomedicine will be advocated. Meanwhile, the Division invites researchers of other disciplines to apply for interdisciplinary projects, and applications concerned 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, aggregation structure, properties and functions of polymers as well as their processing and utilization, and takes the soft-substance system, including synthetic polymers, bio-macromolecules and super-molecular polymers, as its objects of study.

In the field of polymer chemistry, it needs to carry out further the synthesizing methodologies of various polymers, polymerizing reaction with controllable structure, molecular mass and distribution of products, bio-synthesizing methodologies and the chemical reaction process involving polymers; to emphasize the polymers synthesized by non-oil resource, and polymers with new structure, such as super-molecular polymers, hyper-branched polymers or dendrimer and their stereo-chemistry; to explore the new system of catalytic and trigger in polymerization reaction; and to develop the mild polymer reaction with high efficiency and high selectivity.

In the field of polymer physics, important directions are as follows: (i) to deepen the understanding of condensed state physics of soft-substances; (ii) to stress the transforming process of polymers in deferent states, such as crystal phenomena, liquid crystals and glassy states and so on, the structure

of aggregation state with multi-level and the pathways of its dynamic evolution; (iii) to pay attention to studies on surface and interface, nano microstructure and size effect of polymer; (iv) to enhance studies on the polymer solution and rheology; and (v) to develop the characterizing technique and new theory of polymer, as well as simulated methods by the multi-scale coupling simulation.

In the field of functional polymers, major research directions are: (i) to further understand and develop functional materials and functional system of polymers, e.g. polymers with electric, optic and magnetic properties, polymers correlated with biology, medicine and pharmacology, as well as polymers used in the fields of adsorption, separation, agents, catalysis, transduction and molecular recognition; (ii) to promote the functional polymer as advance soft-substance used in the fields of new energy, information technology, biomedicine and environmental sciences; (iii) to be good at finding novel emerging points from studies of natural polymers & biopolymers, so as to develop the research on intercross areas between synthesized polymers and biopolymers; and (iv) to stress the studies on environment echo and bionic polymers.

In the field of applied polymer chemistry and physics, major research directions include: (i) to develop the method of polymerization of some core polymer products and synthetic reaction process controlled; (ii) to explore new principle and new technology in polymer processing; (iii) to be good at extracting important fundamental scientific problems derived from industrial practice of polymers; (iv) to pay attention to the basic research on high performance polymer; multi-phase & multi-component system of polymer; chemical fiber, elastomeric polymer, flame retardant polymer, natural polymer, hybrid polymer& reactive oligomer, etc.

In recent years, few proposals are received in methodologies of polymeric reaction and structural characterization. Meanwhile, few of proposals are received for the Fund for Less Developed Regions. It is encouraged that young scientists should explore new field, which is beyond their original research direction, in the proposal.

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 by the aid of 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 existence, moving & conversion, effects and trends & control of chemical substances, especially pollutants, in various environmental media. Recently, the number of proposals has been increasing year by year. 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-media 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) influence of chemical pollutants on ecological environment and human health, and (vii) relations of structure/efficacy and dose/efficacy 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 existence, behavior, efficacy 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 fundamental research of two disciplines of 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; and (iii) the chemical product engineering, beside chemical processing engineering. Nevertheless, there are still some problems that proposals with original creative idea and works with breakthrough are not enough, and especially those proposals combined with key scientific issues based on national needs are even rare. The Division encourages that researchers in basic 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.

In 2014, 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 include biology, agricultural sciences and basic medicine, which covers studies in areas of resources, environment, ecology, population and health, etc. In recent years, with the support from NSFC and other funding sources and unremitting efforts made by Chinese scientists, research in life science has witnessed rapid progress in China. The number of research papers published by Chinese scientists in international authoritative journals is increasing and the quality of research is improved rapidly.

Funding for General Program Projects in the Last Two Years

Unit: 10,000 yuan

Divisions		2012			2013		
		Projects	Funding	Funding rate[++] (%)	Projects	Funding	Funding rate[++] (%)
Division I	Microbiology	163+11*	13,177+165*	20.00	152+11*	12,149+165*	24.85
	Botany	188+11*	15,060+165*	23.61	173+11*	1, 832+165*	27.34
Division II	Ecology	163+11*	13,064+165*	21.30	154+11*	12,321+165*	23.74
	Forest science	163+12*	13,035+180*	19.04	152+12*	12,172+180*	22.50

Divisions		2012			2013		
		Projects	Funding	Funding rate++ (%)	Projects	Funding	Funding rate++ (%)
Division III	Biophysics, biochemistry and molecular biology	146+10*	11,716+150*	22.41	135+10*	10,817+150*	27.99
	Immunology	72+8*	5,797+120*	25.00	76+8*	6,087+120*	30.55
	Biomechanics and issue engineering	84+8*	6,836+120*	22.49	72+8*	5,798+120*	25.16
Division IV	Neuroscience, cognitive science，and psychology	122+10*	9,789+150*	22.22	117+10*	9,346+150*	27.73
	Physiology, and integrative Biology	79+8*	6,301+120*	23.84	72+8*	5,731+120*	31.25
Division V	Genetics and Bioinformatics	124+10*	9,957+150*	23.55	121+10*	9,701+150*	28.48
	Cell biology	100+9*	7,993+135*	24.33	92+9*	7,367+135*	31.08
	Developmental biology, and Reproductive Biology	72+8*	5,776+120*	26.49	72+8*	5,766+120*	29.96
Division VI	Basic agriculture and crops	191+13*	15,313+195*	17.89	183+13*	14,636+195*	21.44
	Food Science	164+13*	13,095+195*	16.15	155+13*	12,415+195*	18.90
Division VII	Plant protection	124+10*	9,920+150*	19.25	117+10*	9,334+150*	22.88
	Horticulture and plant nutrition	132+11*	10,536+165*	19.40	127+11*	10,175+165*	21.66
Division VIII	Zoology	133+8*	10,693+120*	27.54	124+9*	9,917+135*	29.36
	Animal husbandry and grassland science	107+10*	8,545+150*	18.14	104+10*	8,345+150*	20.88
	Veterinary science	110+10*	8,805+150*	18.29	107+10*	8,570+150*	20.21
	Aquatic science	69+8*	5,487+120*	20.92	68+8*	5,391+120*	23.82
Total		2,507+199*	200,895+2 985*	20.82	2,373+200*	189,870+3,000*	24.45
Average funding per project		75.34（80.13 **）			74.96（80.02**）		

Note: The funding rate in this table contains Extension Program for Young Scientists.

* Projects of Small Fund for Exploratory Studies.

** Average intensity of General Program projects in four years.

++ Funding rate includes the projects of Small fund for Exploratory Studies.

The Department of Life Sciences received 10,767 proposals (including Extension Program for Young Scientists), of which, 10,522 were accepted for General Program in 2013, and 2,573 projects were funded, including projects of Small Fund for Exploratory Studies, with a funding rate of 24.45% (accounted by the accepted proposals, and all the data bellows are also calculated by the number of accepted proposals), and the average funding intensity is 749,600 yuan per project. Among which, there are 2,323 projects of 4-year General Program, the funding rate is 22.17% and the average funding intensity is 800,200 yuan per project. The Department will emphasize on funding decision according to the research quality and actual need rather than funding in equal intensity in the future. The Department also hope 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 2014, 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 let peer reviewer and panel expert evaluate. For proposed research having more exploratory nature but with weak research basis, we suggest applicants apply for lower funding. For those having solid research basis and good progress in previous work and requiring more funding to carry out further research, it is suggested that applicants may apply for higher intensity of funding according to the actual need. It should be noted in particular that the budget in proposals will be evaluated by peer reviewer and the panel, so the applicants should seriously fill in the budget table.

In order to promote the fast growing of young scientists in basic research, and to encourage PIs of Young Scientists Fund projects to carry out long term, systematic and in-depth research around one important scientific issue, NSFC begun to give extension funding in General Program from 2012 to PIs who achieved significant progress and shown creative potential in the finished Young Scientists Fund project of the same year.

The Department has been actively encouraging researches with innovative academic thoughts, new techniques and approaches, particularly those with original innovative ideas and having the role of prompting the development of related disciplines, and giving high emphasis on proposals of new theories, hypotheses and the intercrossing of subjects based on previous

research over a long period of time. The Department will pay due attention to important frontiers and new emerging subjects in life sciences in the future, and emphasize balanced and harmonious development of various disciplines; and continue to encourage studies concerning basic research of 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 common and basic issues of life sciences using model of diseases.

The Department encourages scientists to carry out systematic and innovative work focusing on key issues over a long-term period, attaches great importance to project management at later stage, implements the funding policy depending on the performance of funded project, and gives preferential consideration to applicants with good performance in their previous projects under equivalent conditions. Moreover, considering the problems 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 and the Division, it has emphasized the funding scope of the Division and the categories not to be funded. 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* may apply 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 needed, such as employment, education from university or college, period from the start to the end, name of the tutors, etc., and also any previous projects funded by NSFC, results achieved and related papers. Papers published and to be published should be listed separately. As for the papers published, all authors, theme of the paper, name of the journals, year, periodical and page numbers should be provided, and they should also 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 only submitted. If the first author or correspondence author is concurrent, please list them by the actual publishing order and language used. If the order of authors is changed, or unpublished papers are listed in the resume, it will be

regarded as academic immorality and academic misconduct.

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

(4) The research schemes, technique paths and methods are the important basis for the reviewers to evaluate the feasibilities of the project. The experiment plan should be complete and accurate, technical paths should be clear and brief. To avoid ambiguity by all means, please prepare optional scheme in case of some key technique scheme failed, and the alternative can be used as a reference by the reviewers.

(5) For new proposals based on previous funded projects, applicants should describe the progress in detail, and the difference and connection between their proposals and the former projects. If there is some conjunction with other projects funded, the similarities and differences between them should also be explained. 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 the operation with highly pathogenic microbe, applicants should abide by national regulations concerned, and qualified biosafety conditions.

(8) For applications involving international cooperation or with team members living abroad, applicants should give the agreement or protocol for international cooperation, or the certificate for the affirmation of the members concerned.

(9) The home institution and the applicants should assure the accuracy and trustfulness of the information of every item in the applications.

(10) The signature of the applicant and the participants should be in regular script, and the signature should be the same as the one in printed form in the application, and do not admit “personal signature” which is not inconsistent with the printed form, please note specially that the signature and the name in printed form may not be in different languages, like Chinese and English, otherwise, the proposal may be

declined due to determination difficulty.

(11) 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.

(12) The applicants should note that the fund be filled in unit of ten thousand yuan, misfiling will cause errors in the budget, which may not be supported.

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

Division I of Life Sciences

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

Microbiology

The Division 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 and physiological biochemistry of microbes, microbe genetics and evolution, microbe epigenetics, the morphological differentiation and its structure and function of microbes, synthetic biology of microbe, the interaction of microbes with its host, the relationship of microbes and their environment, the pathogenesis and resistance of pathogen, etc.. Systematic studies aiming at basic biology of microbes, basic and frontier research of life sciences by using model microbes are encouraged.

It can be seen from the applications accepted and funded in recent years in this Division, there is a clear imbalance in the development of different branches in microbiology. There are fewer proposals in the study on mycoplasma, rickettsia, chlamydia, spiroplasma, phage, prion, etc., and the research team needs to be augmented and intensified. The Division encourages researches around fields mentioned above, and preferential support will be given.

In 2014, the Division will give preference to areas in the taxonomy of microbes, so as to enhance the cultivation of taxonomists. The Division will

give 5 million yuan in preferential support to such field based on the average funding rate (among them, 1.5 million yuan for Young Scientists Fund), and encourage taxonomic researches on bacteria, actinomyces, and virus.

The Division encourages the exploration of new techniques and methods used in basic research of microbiology, and especially hopes scientists in physics, chemistry, and information sciences to carry out studies on microbiology; encourages research on single microbe cell, functional research of microbe in complex system, and related research on marine microbiology.

Botany

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

It can be seen from the applications accepted and funded in recent years in the area of botany that the development of each discipline has been unbalanced. There are relatively more applications in areas of plant phylogeny, plant incretion, growth and development, and resistance physiology, and therefore the research quality is relatively high. Systematic and creative research should be further strengthened henceforth, and we need to stress on interdisciplinary study, and on the application of new techniques on such fields above. There are less applications in some subjects 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 above-mentioned subjects will be encouraged. Applicants are also encouraged to carry out their studies in areas and direction of plant systems biology, plant tropism biology, invasive plant biology, the totipotency in plant cell, molecular basis

of plant important property, response of plant to environment change, and data processing technology of "-omics" research, etc.

The Division will continue to give preferential support to plant taxonomy in 2014, especially to strengthen the support to young taxonomists. The Division will give 5 million yuan preferential support to such areas based on the average funding rate (among them, 1.5 million yuan will support projects for the Young Scientists Fund), and encourage applicants to carry out research on species revision of certain families and genus on the world wide range and plant resources research in key areas and special environment. Meanwhile, since research on plant resources is relatively weak in China, the Division will encourage multidisciplinary and integrated research, which should pay attention to key scientific issues during the process of introduction and plant germplasm protection for promoting effective protection and utilization of domestic plant resources of China.

The intercrossing study of botany with other disciplines will be strongly encouraged, especially with mathematics, physics, chemistry, geosciences, and ecology, genetics, genomics, proteomics, metabonomics, bioinformatics and computer science etc. Studies are also encouraged on the discovery and development of new instruments, techniques and means 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 Division will intensify its support for projects with obvious creative ideas. In order to make full use of local advantages and resources advantages, and talent training, the Division will encourage collaboration of applicants with institutions or groups having advantages concerned.

Division II of Life Sciences

The Division supports researches in areas of ecology and forest science.

Ecology

Ecology studies the interaction between organisms or between organisms and the environment. It plays an important role in solving the national ecological problems that are increasingly serious. The subject 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 Division will strengthen its support to applications with strong innovative ideas, multidisciplinary research and new growing subjects, support 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 method, and strengthen basic research with long-term observation and experiment of field work, and researches on landscape and regional scale.

In 2013, 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, molecular and evolution ecology, etc., but comparatively less applications were received in areas of microbe ecology, landscape and regional ecology. In the future, the Division will strengthen its support to microbe ecology; encourage studies on population dynamics of microbes, interrelationships between microbe, animals and plants, and the function of microbe in ecosystems as well as global change and regional ecology.

The Division reminds applicants to pay attention to the following points in 2014:

(1) The content of research proposal should focus on key points, give clear definition of scientific issues, and pay attention to scientific aspect and feasibility of the research route and approach.
(2) Proposals regarding to the multidisciplinary and combination studies of the macro and micro ecology should put forward clear ecological issues, and regional research should give emphasis on the combination of the theoretical study with the national need.
(3) The utilization of new techniques like molecular biology should combine with scientific issues that may not be resolved by traditional ecological methods.

Forest Science

Forest science is to reveal the essence and rules of the biological phenomena by taking forest and xylophyta as its research objects, and carry out the cultivation, protection, management, and utilization of forest resources. Forest science 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 techniques and methods in forest studies.

In recent years, there is a tendency of good growth of basic research on forest, but unbalanced in sub-disciplines. It can be seen from the applications in recent years that many proposals were submitted on topics around wood physics, the chemistry of forest products, and less applications in some traditional branch like silviculture, forest soil science and forest management, showing a tendency of shrinking. The proposals could not be formulated on important basic scientific issues in some important fields like silviculture and nonwood product forestry. Most of the proposals about gene homologous cloning and transformation in forest genetic breeding belongs to tracking projects, and lack of close connection with forestryindustry.

There are two obvious characters in basic research of forest. The first one is to meet the national needs. Therefore applicants should pay more attention to formulate the important and key scientific issues from the forestry industry. The other is to carry out continuous and in-depth studies regarding to perennial woody plants for a long period of time. In the future, the Division will continue to give priority to support basic research in such core fields like silviculture, the health care, the efficient utilization of forest resources, etc. The Division will encourage scientists to carry out their researches 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 and development mechanisms of trees by using -omics research, which can meet the national needs and work at the international frontier or hot area of research. The Division will strengthen its support to shrinking research fields such as silviculture, forest soil science, forest management, and newly established areas such as garden planning and landscape architecture. The Division will not accept proposals on pharmaceutical functional verification of effective components.

In 2014, applicants should pay attention to the following points:

(1) To formulate scientific issues on targeted purpose and set the research contents based on important national science and technology requirements for forest science.

(2) To make the theme simple, specific and clear, and avoid vague and empty wording by all means.

(3) According to objects and contents of research, fill in the specific application code, and to provide detailed and specific research planning for judging the feasibility of the project.

(4) The research basis should represent the existed accumulation of knowledge concerned.

(5) To give explanation for the relationship and difference on scientific issues and study contents with other funded projects.

(6) Research achievements, especially books, papers (corresponding author should be marked), patents and awards, detailed order of authors for these achievements should be presented.

(7) The applicants should be responsible for the truthfulness of the documents. The Division will refuse to accept any application which provide untruth information.

Division III of Life Sciences

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

Biophysics, Biochemistry and Molecular Biology

The Division mainly supports studies on the structure and function of biological macromolecules, the interaction between macromolecules (including small molecules), the effect and role of the physical environment to organisms, and so forth. The subject of biological macromolecules, especially the structure and function of protein, is a key field of this discipline. Judging from the contents of applications received in recent years, it can be seen that there are more proposals on the structure and function of protein complexes, which have in-depth researches with sound background and accumulation. 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, the structure and function of

biomembrane, and transmembrane signal transduction, etc. Proposals in areas of structure computing and theoretical forecasting of large biological molecules and bioinformatics have well reflected the character of the intercrossing of disciplines. Researches on bio-effect and functional mechanisms of ionization and the electromagnetic radiation to organisms, and proteomics are inadequate in the quality of proposals. Applications for structure and function research on glycoconjugates and environmental biophysics showed slightly weak basis on the whole. 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 methods, new techniques and means in recent years, which will be encouraged by the Division.

The funding priorities for following proposals in the future will be given:

(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) Studies on the interaction between macromolecules during signal transductions of cells, for instance, the interactions of proteins of important linkage on the core signal pathway and route, new component appraisal and discovery in signal transduction network, exploration of the function of signal transduction pathway, etc.

(3) Researches on the protein stability and function of post-translational modification.

(4) Studies on the multi-function and regulation mechanisms of non-coding RNA and interaction with proteins in various life processes of activity.

(5) Molecular mechanism studies of the regulation of glucose, lipid metabolism, and nucleic acid metabolism.

(6) Applications with new methods and ideas from mathematics, information sciences, and Interdisciplinary subjects, to carry out researches on bioinformatics, systems biology or integrative biology.

(7) Applications for polysaccharide and glycoconjugates will be moderately encouraged.

(8) 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.

(9) Researches on the exploration of new techniques and methods in biophysics, biochemistry and molecular biology studies.

Immunology

Immunology is a frontier subject of basic, leading and mainstay discipline in life sciences and basic medicine. The funding area of the Division include immunobiology, immunogenetics, reproductive immunology, mucosal immunology, vaccine, antibody engineering, and new techniques and methods of immunology, etc. The Division 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.
(2) The differentiation, develop, migrate，tissue distribution of immune cells and sub-cells and their functional modulation.
(3) Identification, response and regulation of innate and adaptive immune.
(4) Cell and molecular mechanisms of immune tolerance.
(5) Abnormal immune response and immunodeficiency.
(6) Immune heredity, evolution and comparative immunity.
(7) Immunological mechanisms of reproduction and pregnancy.
(8) The function and mechanisms of mucosal immunity and local immunity.
(9) Nerve-endocrine-immune network.
(10) Basic immunology problems during the manufacture of vaccine.
(11) Studies of antibody engineering.
(12) Scientific problems on theestablishment of new techniques and methods and new research system of immunity.

It can be seen from the applications in 2013 that there is a rapid progress of immunological research in China, the proposals covered a wide range of subject, and the quality of research contents improved obviously. But some problems still be exists, such as

(1) Fewer applications have formed creative hypothesis based on their former research results.
(2) Fewer researches have their own typical features based on the long-term accumulation of the same research direction for years.
(3) There are fewer proposals in the study and application of new techniques,

methods and new system of immunological research.
(4) Lack of substantial subject intercrossing, etc.

In 2014, the Division will mainly 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 around specific scientific target; encourage the establishment of typical research system and techniques platform, and high light the setting up and application of various new methods and techniques in immunological studies; encourage study in areas of systems immunology, immunomics and computational immunology; encourage the substantive intercross study with other basic disciplines such as neurobiology, cell metabolism, and microbiology; encourage basic research relating to the structure of immune system and function abnormal, and encourage close cooperation of scientists working in basic and clinic immuneto carry out basic immunological study based on practice.

Biomechanics and Tissue Engineering

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

In areas of biomechanics and biorheology, researches mainly focus on the coupling of mechanics-biology with mechanics-chemistry on cell-subcell-molecular level, the mechanical property and its mechanisms on system-organ-tissues aspects, etc., as well as mechanical simulation and modeling. In 2013, there are a great number of applications in areas of biomechanics and biorheology, cell and molecular biomechanics, and biomechanics in bone, joint and movement system. The applications in the area of soft tissue biomechanics is increased compared with last year, but fewer applications in cardio (brain) vascular biomechanics and biorheology. Most of the proposals funded have good research basis and creativeness.

In the area of biomaterials, it 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. Studies on functional design and multi-functions of biomaterials, the interaction of biomaterial with cells and

tissues, new techniques on modification and surface treatment of materials, and its surface-interface study of biological characteristics, active molecular vehicle and controlled release, have been gradually mature with own features. In the future, the Division will continue to encourage applications on biomaterials study of new function, and new effect of biomaterials etc.

The funding scope of tissue engineering mainly covers: tissue engineering studies of skin, bone and cartilage, mouth; nerve, blood and myocardium, muscle and tendon, liver and cholecyst, pancreas, kidney, urocyst, etc. In 2013, there are a great number of applications in areas of tissue engineering, cartilage, transplantation of stem cells and tissue regeneration; applications for researches on bio-artificial organ tend to increase year by year, but there are fewer applications in the area of tissue engineering of vital organs, therefore the Division will value and encourage actively applications for researches on the new techniques and methods of tissue engineering, such as three-dimensional printing, and biomanufacturing, etc.

Bioelectronics mainly covers bio-signal detection and recognition, biosensor, biomedical imaging and image processing, appropriators and systems of bio-system detection. In 2013, there are fewer applications in the area of biomedical electronics. The Division will encourage scientists to put forward their applications in such fields with well basis of research accumulation.

In nanobiology, applications mainly cover studies in areas of nano-biodetection, nanocarriers and delivery,nano biological effect and its safety. There are a great number of applications in the area of nano-biology in 2013, among them, many of the proposals with well basis of accumulation and specific scientific problemshave been funded. The self-assembled and modulation of nano structure based on organism systems, targeted and multifunctional nano-delivery systems, and biological effect and safety of nano materials are the major funding areas of the Division. The Division encourages research proposals to resolve basic scientific issues of bio-systems by using advanced physical and chemical methods, such as studies related to imaging of ultrahigh resolution imaging.

The Division will continue to encourage scientists to carry out basic research of systematic and disciplinary intercrossing in fields of biomechanics and biomaterials, tissue engineering, biomedical electronics and nano-biology, and researches aiming 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.

Division IV of Life Sciences

The funding scope of the Division covers two subjects: neuroscience, cognitive science and psychology, physiology and integrative biology.

Neuroscience, Cognitive Science and Psychology

This discipline is to study the structure and functions of nerve system, investigates the essence and rules of human cognition and mental activity. The goal of this discipline is to explain the structure and function of human brain at its different levels, mind mechanisms of recognition activity, and the material basis of human behavior and psychological activities.

The funding scope of neuroscience covers molecular neurobiology, cellular neurobiology, developmental neurobiology, sensory neurobiology, system neurobiology, behavioral neurobiology, computational neurobiology, and other researches concerning techniques and approaches of neuroscience. The main subjects supported in the area of psychology include cognitive psychology, developmental and educational psychology, social and personality psychology, physiological and medical psychology, and applied psychology (including engineering psychology, forensic psychology). Cognitive neuroscience covers the nerve basis of cognition, nerve basis of social behavior, emotions and feelings, learning and memory, attention and consciousness, language and thinking, and techniques and methods of cognitive science etc. In 2013, the Division accepted 976 applications of every type in areas of neuro science, cognitive science and psychology, the average funding rate was 25.92%.

Most of the proposals submitted and projects funded in 2013 cover molecules, cells, development, and sensory neurobiology and the research direction include as follows:

(1) The occurrence, differentiation, regeneration, and death of neurons.
(2) The development, function of neuroglia cells, and its relationship with diseases of nerve system.
(3) Neural mechanisms of fear, dysphoria and depressive.
(4) The molecular, cellular and physiological mechanism and behavior of the function abnormal of nerve system.

(5) The function and mechanisms of sensory system like vision, hearing, pain etc.

The Division will continue to encourage basic research in the areas above, and meanwhile, to encourage researches in aspects as below:

(1) The development, improvement and application of new techniques relating to optogenetics, nerve transsynapfic tracing, biomolecular imaging, etc.
(2) The function of Ion channels of nerve cells and its relation to disease.
(3) The aging, damaging, repair and protection of nerve system.
(4) The intercross study of neuroscience with chemistry, physics, and materials, etc.
(5) Invite applications of computing neurobiology and system neurobiology combined with neuron physiology and analysis of computing theory.

The applications of psychology in 2013 is quite the same as that in 2012, the overall research quality have obviously improved as a whole. On research methodology, they stressed the combination of behavior study with cognitive neuroscience. On the topic selection, it was incarnated the international frontier of psychology and the combination with the requirement of social development of China. But the quality of applications is unbalanced in subjects, with fewer creativeness in areas of developmental and educational psychology, physiology and medical psychology, and scientific issues were not enough well formulated, and the number of application and research basis of applied psychology need to be improved.

In 2014, the Division will pay more attention in the area of psychologyto the following three aspects:

(1) The implementation of new research techniques and methods, and 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 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 creativeness

academic thoughts.

Cognitive science studies the biological basis of cognitive process, values the nerve mechanisms of mental activity, and is one of the interdisciplinary subjects on neuroscience with psychology. In 2013, proposals supported in the area of brain structure and its nerve basis have good basis of research, but there are few applications concerning the high grade function of brain (such as consciousness, reasoning, and decision making etc.), and the quality of research are far behind the international level, and lack of substantive subject intercross study, the theoretical model and related experimental study which could make greater influence internationally. The research ability of applicants in new techniques and methods related should be further improved. In the future, the Division will continue to encourage intercross study on cognitive-related issues; study to reveal the mechanisms of advanced function of brain; the exploration of various cognitive functional change of brain from the angle of cognitive development; and the neuro-feedback cognitive study based on the understanding of brain advanced functions.

The Division will continue to stress synthesized study of multi subject, multi-level on basic and frontier issues of neuroscience from the angle of molecules, cells, brain, behavior, cognition and psychology.

Physiology and Integrative Biology

Physiology is a subject to study the phenomena of normal life activities, principles and regulation. The funding scope covers the physiological function and its mechanisms of homeostasis control under normal conditions, and the change of structure, 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 Division support studies in the area of integrative biology from molecules to the body level.

Among the applications for General Program, Young Scientists Fund and Fund for Less Developed Regions in 2013, there are a great number of proposals in areas of system physiology, exercise physiology, integrative physiology, nutrition and metabolizes physiology. Proposals for circulation physiology were funded mainly for researches onmyocardial remodeling, reperfusion injury and protection, diabetes cardiomyopathy, vascular

endothelial injury, transformation of vascular smooth muscle, central and peripheral mechanisms adjustment of blood pressure; respiratory regulation of function and disorder mechanism.

Proposals funded in the area of urinary physiology covers researches on the regulation and control mechanisms of water-salt metabolize of kidney, renal fibrosis， functional regulation of ladder; and in the area of digestive physiology，it covers researches on the function of stomach; intestinal，liver, gallbladder, pancreas and their protection mechanisms of damage. 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 cover researches on the occurrence and fertilize of germ cells, implantation of embryo, and the regulation and control mechanism of the placenta function. Moreover, endocrine, and glucose metabolism, lipid metabolism, insulin resistance, trace elements (include calcium and phosphorus metabolism)nutrition, senescence, and biological rhizym are the key funding areas as well.

Most of the applications in the area of human anatomy concerns about basic research of applied anatomy. The embryology, which covers researches on the tissue metabolism, insulin resistance, trace elements including calcium and phosphorus metabolism, nutrition, senescence, and biological rhizym, is the major funding areas as well. Most of the applications in the area of exercise physiology mainly focus their researches on the physiology mechanisms of the health by exercise, and the prevention and treatment of diseases.

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. The division will also encourage the application of research results in fields of mathematics, physics, chemistry and information science into the study of physiology, so as to make new breakthrough in the development of theory and techniques.

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

Division V of Life Sciences

The funding scope of the Division covers three subjects as follows: genetics, bioinformatics, cell biology, and developmental biology and reproductive biology.

Genetics and Bioinformatics

Genetics is to study the inheritance and variation of organisms. In pace with the development of molecular biology and related techniques, modern genetics mainly carry out studies in different levels of molecular, cells, individuals and populations. Bioinformatics is an interdisciplinary subject 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 this subject mainly covers human genetics, plant genetics, animal genetics, microbe genetics, genomics, molecular genetics, epigenetics, cell genetics, population and evolution genetics, bioinformatics, biostatistics, behavioral genetics, synthetic genetics, molecular network and systems biology, etc.

In the area of genetics, the Division will provide its support with emphasis on 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 relationship of phenotype and genotype, the genotype in analyze 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 techniques of phenomics and genetic breeding; basic researches on the genetic law of typical resources, as well as the molecular basis of genetics and variation of organisms under extreme or special environment.

In 2013, few of applications were received in areas of animal genetics, microbe genetics, quantitative trait genetics, and lack of exploration and creativeness in method, which need to be further enhanced.

In the area of bioinformatics, the Division 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 analyze, design and synthesize of molecular module and network, interaction between gene and gene, between gene and the environment. It is encouraged the combination between bioinformatics analysis and experiment verification of organisms.

The Division will continue to support new theory and method and the interdisciplinary research of genetics.

Cell Biology

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

Research areas supported by the Division in the area of cell biology mainly include cellular and organelles structure, components and their assemblage mechanisms, regulation mechanisms of cell growth, division, and cell cycle, differentiation and polarity of cells, cell homeostasis maintaining, aging, death of cells, autophagy, movement of cells, cell signal transduction, extra cellular matrix, vesicle transportation (including endocytosis and exocytosis), material and energy metabolize of cell, materials and energy metabolism of cells, interaction between cell and cell, cell and environment, cell and microbes, cell with virus, new materials , new techniques and methods used in cytology, and other cytological issues relating to medicine and agriculture.

Researches on the structure and function of cells have been the main aspects to be supported by the Division. Applicants are encouraged to carry out integrated studies on the mechanisms of synthesis, modification, degradation, localization, and translocation of protein with the aggregation, dissociation, location of its components, and the activity diversification with time and space of protein complex during the process of cell signal transduction with dynamic change mechanisms of life activities of cells. Highlight will be given to study important problems on basic cytobiology by using cell models and new systems or combine with model organisms, and incorporate with techniques and methods of genetics, developmental biology, chemical

biology, and biophotonics, etc.

Among the applications accepted in 2013, there were fewer applications in areas of cell growth and multiplication, extra cellular matrix, cell substance transportation, cell metabolism, and research of new methods in plant and microbe cytobiology. Since those areas are important in cell biology and have certain foundations in related researches in China, the Division will give preference to applicants who present their proposals with scientific issues from their previous research background on these aspects.

In 2014, the Division will continue to stress researches on functional and mechanism issues, highlight the utilization of various new research techniques and methods in the study of cell biology, actively promote the development of cell in situ and real time, dynamic and high resolution analysis techniques and methods, 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 network control.

Developmental Biology and Reproductive Biology

The funding scope of this discipline covers 3 research fields including developmental biology, reproductive biology and stem-cell biology, in order to explore the basic rules of gametogenesis, fertilization, embryo development, the occurrence and growth of various organism tissues and organs.

The key biological issues in the area of animal (include human) developmental biology concern 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; 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 the area of reproductive biology concern sex determination and gonad differentiation; the fate determination, migration, multiplication of primordial germ cells; the occurrence and maturation of gamete; the interaction of germ cells and somatic cells; the sperm-egg reorganization and fertilization; early embryo development and implantation; and apomixes; genetics, epigenetics, environment and the reproductive health; the occurrence mechanisms of diseases relevant to reproduction; the security of assisted reproductive techniques; and the regulating role of reproduction, and the regulation function of reproductive endocrinology.

Key scientific issues in the area of stem cell biology include: stem cells of embryo, cell reprogramming and induced pluripotent stem cells; nuclear transfer of somatic cells; the multiplication of stem cells and maintaining of pluripotence; the directional differentiation 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 funding areas of the Division cover basic agriculture and crops, and food sciences.

Basic Agriculture and Crops

The Division mainly supports basic researches targeted at crops and the

systems of their environment. The research emphasizes on the laws of crop growth and development, the interaction of crops with environment, the genetic improvement of crops, and the production and related issues which cover the subjects 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 today 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 Division encourages scientists to carry out their researches driven by scientific issues based on crop production and sustainable development of agriculture, focusing on basic study around fields above. The Division 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, and as well as the high efficient utilization of resources will be encouraged. The cultivation, physiological and genetic system research 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 be also encouraged.

It can be seen from the applications in recent years that there was an increase in number of proposals with basic issues on topics meeting the nation demand of agriculture, an obvious increase in interdisciplinary studies around basic agricultural issues, and a diversified distribution of home institutions of applications. However, problems still exist as the following: (i) Researches on crop genome are generally concerned, but not enough on further exploration of mechanisms of physiology and genetics; (ii) Attention is paid to work in the international frontier, but not enough on close combination with practical issues of national agricultural production; and without potent support of basic research to applied research; (iii) Systematic and sustainable studies are weak in most of the applications; (iv) there are more applications in agricultural information, by using physical

method(such as spectrum, infrared, remote sensing, 3D photography, etc.) to acquire agricultural information, but without in-depth theoretical study, and exist difficulty of actual utilization comparatively; (v) Some of the applications are not rigorous, not standardized, such as untruth or incorrect contents in the resume part, especially in the order of authors for published papers, the list cannot be presented the real contribution of the applicant and others.

Applications accepted by this Division should take crops and crop products as their research objects, and the intercrossing with other subjects should not depart from the principal object, otherwise proposals will not be accepted. The Division will encourage the close combination of new theory, techniques with traditional methods, laboratory work with field experiments, and give preferential support to continuous and systematic work.

The Division does not fund applications with research objects like agricultural animals, animal products, microbe, forest and woods, and model plants of Arabidopsis thaliana, etc.

Food Science

Food science, which is an interdisciplinary subject with close combination of theory and application, is to essentially study the physics, chemistry, biology, nutrition and safety properties of food and food materials, and principles of food storage processing, as well as the theory and methods enhancing the nutrition value of food and security. Food science includes food material science, food biochemistry, food fermentation and brewing, food nutrition, food processing, food storage, transport, and fresh keeping, food safety, etc., integrating theory and method of biology, chemistry, physics, nutrition, microbiology, and agriculture etc.

Food science mainly supports basic researches by the Division based on food and its stuff as research objects of this discipline. The main scope of funding covers 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. Health products is not in the supporting scope of this Division.

Main problems in proposals accepted in 2013 include: (i) Few 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 stress studies related to diseases treatment in food nutrition and food health; (iii) Some of the application were not rigorous and specific; especially with untruth or incorrect resume; (iv) Lack of continuity for some of the applicants; (v) Loose research contents, scope is too wide, or not enough concise on basic key scientific issues, etc.; (vi) Some proposals were lack of creativeness, or with more tracking study, 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 emphasized much on the same suppleness method applied in various fields.

In 2014, the Division will give its priority to important scientific issues concerning the national nutrition and health, and restricting the development of Chinese food production. The proposal with higher creativeness, and continuous and systematic work, as well as the substantive multidisciplinary study will be encouraged. In food nutrition and health, the Division will support with priority the basic study of interaction between 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 Division will give its priority to support theoretical research on the establishment of new techniques and methods of food inspection, and the formation and control of hazardous during the processing and storage. The Division will not accept applications mainly referring to food technology, processing technology, food development, chemical modification and studies related to the prevention and cure of diseases, and drug development, and not accept proposals mainly referring to growth, development and metabolic physiological studies of plant and animals; and preclinical experimental research directly using human body will be not funded.

Division VII of Life Sciences

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

Plant Protection

The funding area of the Division VII covers plant pathology, agricultural entomology, agricultural weeds, agricultural rats and other pest, plant chemical protection, biological prevention and cure, quarantine of

agricultural pests, invasion biology, and biological techniques of plant protection etc.

In recent years, the theory and techniques of genomics, proteomics, metabolic and molecular genetics are wildly used in the innovation of theory and techniques of pest control. The whole genome sequence assay of some important crop, pathogenic microbe, and crop insects have been completed, a number of pathogenic genes of important pathogen and crop disease-resistant genes have been identified in the interaction of pests to crops. Great development have been made on the cultivation of disease-resistant, pest-resistant and herbicide resistance crops, and gene engineering microbial-resistance (pesticide), important progress has been acquired in the control of pest drug resistance and production of new pesticides, and information system of forecast and prediction of plant pests has played important role in crop 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 can be seen from the applications in 2013, many applicants could grasp the research progress at home and abroad, and pay more attention to concrete scientific problems from the practice of agricultural production, and to the scientific significance and application potential in topic selection. The creativeness of academic thoughts and research methods have also been improved, the research basis is more solid, the academic level and condition of research team is obviously improved, and the composition of proposals is morenormalized. But following problems still exists: (ⅰ) quite a number of applications just critically trace or imitate researches concerned at home and abroad, or grafting one research method (or material) to another material (or method), and lack of creativeness; (ⅱ) for some of the researches, it only give their emphasis on the simulation of conditions in laboratory, and overemphasize the research in molecular levels, but less focuses on the field research and verification; (ⅲ) some of the applications, the research topic are too broad, not enough concrete of scientific problems, and the research contents is not distinct, lack of in-depth studies and substantive subject intercrossing; (ⅳ) research work proposed in some applications are not systematic and lack consistency.

In 2014, the Division will continue to encourage researches focusing on the national security of agricultural production, quality safety of agricultural products, and eco-environmental safety, and researches on scientific issues concreted from practice of agricultural production, and give more emphasis on the innovation of new theory and method in plant conservation, and on the original creativeness of research. For research contents, it is encouraged the explorations of the reciprocity mechanisms of crop-pest-environment (biotic and abiotic) at microscopic or macroscopic level, as well as rules of disaster of hazardous organisms, monitoring and forecast, prevention and control of pests, and the basic and applied basic research of pesticide toxicology and its safely 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, emphasize should be on the combination of new theory and new techniques with traditional methods, and close combination of laboratory work with field experiment. Preferential support will be given to continuous and systematic research. Excellent proposals will be funded in the field of agriculture weed, farm rats and diseases and pest forecasting of agricultural crops etc. to promote the balanced development of different branches in plant conversation.

The Division supports applications which focus their study on crop pests as its object, and the prevention and control of pests as its scientific purposes. Applications taking woods and model organisms like Arabidopsis, Drosophila as main research objects will not accepted.

Horticulture and Plant Nutrition

The funding scope of this discipline covers two research subjects in 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 is a rapid development of basic research in horticulture in China; the research objects have broadened and diversified, and research approach have been gradually transferred from traditional individual and cell level to molecular level; studies based on –omics have been actively carried out and whole genome sequencing of cucumber, wild cabbage, sweet orange, watermelon, pear and other garden crops have been indigenously accomplished, as well as

international cooperation has been promoted. Great development has been made in the study on basis of trait formation of horticulture crops, and 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 ripening and senescence, biological basis and regulation of color, pattern, scent, florescence of ornamental crops, etc. The quality and activity of research work have been much improved in the field of horticulture,

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 subject and the national needs on agricultural resource environment, plant nutrition has been focused its research on the interdisciplinary study of the interaction of plant-soil-microbe, the coupling mechanism study of high efficiency use of plant nutrition elements and water resources; studies on the functional genomic, 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 method in the area of manure and fertilizer science, and the exploration and sublimation of modern plant nutrition theory from practice of traditional agricultural production.

In 2013, problems in the application for horticulture were mainly as follows:

(1) There are a large number of proposals pertaining copying and tracing researches, not enough original creativeness and systematic study. Some applications concentrate their researches on practical problems of horticulture, but lack of sufficient scientific issues**.**

(2) The research content in some of the applications is too broad and lack of the clear understand of basic technique requirement for research approach and method, which is not practicable in their realistic route for the proposed research goals.

(3) Some of the application use garden crop as research stuff to study the interaction mechanisms of plant and pathogen, and mechanisms of plant nutrition, even few proposals base on medical category or industrial microbe areas, those applications should put forward to other discipline concerned.

(4) There are fewer applications focusing their researches on scientific

issues from the practice of national horticultural production, and real requirements of the industrial development.

(5) Some of the application for 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 stressed their studies on molecular biology of plant nutrition, but not enough in-depth study on mechanisms of physiology and genetics of plant nutrition.

(2) More emphases on the mechanism of crop activating and utilizing of soil nutrient on individual level under nutrient stressing conditions, but not in-depth study on the efficient nutrient utilization under intensification conditions.

(3) Lack of basic researches on nutrient resources and fertilizing science.

In 2014, the Division will continue to encourage research on scientific issues based on national agricultural practice and agricultural industry development, the close combination of new approach with traditional methods, and give preference to original, continuous and systematic and distinctive research. In this field, the Division will support proposals which take horticultural crops as their research objects, put forward the scientific problems by the features of horticulture crops, and production yield, quality, fastness, and constancy as their research goals. Following proposals will be actively encouraged as studies originated from the assessment, extravagant and utilize of germplasm resources of the nation or wild garden crops. Applications in facility horticultural should be stressed on the organically 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 encouraged. It is actively encouraged the proposal for the experimental testify 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 be also encouraged for promoting the equivalent development of every discipline in plant nutrition.

Applications using forest and model plant Arabidopsis as its research objects will be not accepted by this Division.

Division VIII of Life Sciences

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

Zoology

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

Applications accepted by the Division in recent years showed that researches in some subjects have been formed their own features and acquired significant international impact. It can be also observed that the formulation of scientific problems, rationality of designs, and even the creativeness of academic thoughts of the proposals are all greatly improved. But 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. The less of experimental accumulation was provided by some of applications, or the insufficient description of detailed research progress and contents. Some of applications are lack of scientific problem or hypothesis with explicit definition, or over high and size of 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 area by the Division in the field of taxonomy.

Taxonomy of ocean animals should also be high valued. Key research areas today are focused on the animal phylogeny and zoogeography, as well as the life history around the evolution.

The Division 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.

The Division 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 techniques. Interdisciplinary studies will be encouraged.

Animal Husbandry and Grassland Science

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

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

Applications accepted and funded in 2013 cover every area of this discipline, among which, majority of applications focused their studies on mining excellent genes of typical excellent domestic animals of the country and their functional genome, molecular genetic 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. Studies concerned have formed their characteristics in some aspects. More and more scientists paid their attention to international and domestic cooperation and exchange, and

much attention were paid 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 live stocks, and the genetic breeding of grazing; and the high efficiency utilization of feedstuff and forage resources. The Division 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 2014, applicants should pay attention to the following points: (i) The applications should take livestock, poultry, grass, silkworm, and bee as their research object, and interdisciplinary studies with other subjects should not depart from the main research aspect above, otherwise the proposal will be not funded in this discipline; (ii) For themes selection, please choose key scientific issues, not only grasp the new research progress at home and abroad, but combine the previous research work as well, sightless research of pure technology is not encouraged.

Veterinary Science

Veterinary science is to study the occurrence, development, diagnosis, prevention and cure of animal diseases. The research covers animal diseases, zoonoses, public hygiene, laboratory animals, veterinary medicinal industry, etc., and many new interdisciplinary research areas.

The Division supports basic researches on animal infectious diseases, zoonoses, most common diseases and comparative medicine, which take animal diseases as its chief objects of research. 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 2013 covered all subjects of this discipline. Among them, majority of applications were focused on veterinary epidemiology, basic veterinary, clinical veterinary and veterinary immunology. Some of them could aim at the international frontiers, and

highlight the creativeness in the selection of their research themes, actively prompt to the international standard of research work, but problems still exist in the application. Some applications kept their researches only on the international hotspot, but not enough concentration of scientific issues, and lack of enough attention to basic research on traditional Chinese veterinary, animal (veterinary) pathology, etc.

The Division 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 on 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 2014, the Division requests applicants to take animal diseases as their main research objects and should not deviate from the research objects in the interdisciplinary studies with other disciplines. Otherwise the applications will be not funded in the area of veterinary science. The Division reminds applicants specially that the application for experimental studies of highly pathogenic bacteria should be strictly abided by related decrees and regulations concerned in China, and meet the basic safety requirements.

Aquatic Science

Aquatic science is to study basic rules of the development, growth, breeding, genetics, physiology and immunology of aquatic organisms and their breeding ecology, breeding engineering, nutrition and foodstuff, control of diseases and pests, and the protection and utilization of aquatic resources, etc.

The main funding scope in this discipline covers basic aquatic biology, the genetic breeding of aquatic organisms, aquatic resources and 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 2013, most of proposals were accepted and funded by the Division 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 characters 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, few applications proposed original research on the important scientific issues of aquiculture and the concentration of specific scientific issues needs to be improved.

In 2014, the Division will request applicants to focus their studies on research fields of aquatic science, and aim at the frontier and important needs of production. The interdisciplinary study on aquaculture subjectively with other disciplines will be encouraged. It will be strengthened to support proposals with obvious academic thoughts. 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 stressing on R&D for technology but ignoring key scientific issues. Research on model organisms should be based on aquaculture science. The Division will encourage cooperation of applicants with superior units and teams, so as to fully exert regional and resource priority, and enforce cultivation of talents. The Division will encourages applications in the following areas such as 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 cure, molecular basis and regulating mechanisms of breeding and development of important aquatic organisms, mechanisms regulation of the utilization and metabolism of nutrient stuffs of aquatic animals. Moderately support will be provided in the following areas as 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 expend the frontier of research, and hence to build up a robust basis for the development of the earth science.

In 2013, the Department received 5,447 proposals for the General Program submitted from 662 institutions. Among them, 1,560 were funded with a total budget of 1.25 billion yuan, with a success rate of 28.6% and an average budget of 799,000 yuan for individual project. Among the funded projects from the General Program, 895 (57.4%) are from universities and 644 (42.3%) from research institutes. The PIs of 962 projects (61.7%) are younger than 45 years old. There are 118 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, 11 proposals were approved as the Small Fund for Exploratory Studies projects in 2013 and 2.7 million yuan were allocated.

The criteria for the selection of General Program projects in 2014 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 2014. 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		2012			2013		
		Projects	Funding	Funding rate++ (%)	Projects	Funding	Funding rate++ (%)
Division I	Geography (including soil science and remote sensing)	538+3*	40,158	21.11	518+3*	38,963	23.43
Division II	Geology	385+4*	33,118	30.30	365+4*	31,159	33.30
	Geochemistry	148+1*	12,433	32.11	139+1*	11,660	36.18
Division III	Geophysics and space physics	190+1*	15,670	27.80	183+1*	14,984	30.72
Division IV	Marine science	197+1*	15,999	27.42	188+1*	15,292	30.78
Division V	Atmospheric science	164+2*	13,332	29.59	156+1*	12,629	30.49
Total		1,622+12*	130,710	26.01	1,549+11*	124,687	28.64
Average funding per project		79.99 (80.4**)			79.93 (80.32**)		

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.

In 2013, the Department of Earth Science received 118 proposals from 70 institutions for Extended Funding for Young Scientists Fund Program, applying for a total budget of 106 million yuan. During the reviewing process, the progress of the last grant and the rationale for the continued

grant were considered. After the panel discussion, 43 proposals were supported with total budget of 35.23 million yuan. The largest individual grant was 1.10 million and lowest was 640,000 yuan. Among these projects, 1 were interdisciplinary grant among different departments and 6 were interdisciplinary grant within the department.

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 research 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 expansion of deep-space explorations in our country, 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 2013, the Division I received 2,224 applications for General Program projects, among which 521 projects including 3 projects of the Small Funds for Exploratory Studies were supported with a total funding of 389.63 million yuan, of which 0.75 million yuan were for the Small Funds for Exploratory Studies. The funding rate including projects both of General Program and Small Funds for Exploratory Studies was 23.43%, and the average funding was 750,700 yuan for each project excluding projects of the Small Funds for Exploratory Studies and 747,900 yuan for each project including projects of the Small Funds for Exploratory Studies. The research fields of these funded projects were categories into geography (including physical geography, human geography, landscape geography and environmental change) with 202 projects, soil science with 99 projects, RS, GIS, geodesy and cartography with 119 projects, processes and effects of pollutants, regional environmental quality and safety with 74 projects, and natural resources, regional sustainable development with 27 projects.

In 2013, the Division I received 61 applications for General Program (including the Extended Funding Program for Young Scientist Fund with General Program Projects) projects, among which 19 projects were supported with a total funding of 15.38 million yuan and the average funding was 809,500 yuan for each project.

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, in-situ and real-time analysis of the terrestrial materials has enhanced the ability to determine the composition and evolution for the earth’s specimen. The utilization of seismological technology, remote sensing technology and satellite observation of the Earth has deepened the understanding of the structure of the Earth. GIS, GPS and RS technologies have improved the

quality of geological mapping and are realizing the real time monitoring of plate motion, earthquake and volcanic activities. Computer simulation has made possible for the analysis, simulation and predication of important geological processes. Crusts drilling techniques, deep-earth detection and high-temperature-pressure experimental technologies have also greatly promoted the development of geology.

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

The geological 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 2013, 1,127 proposals for General Program projects were received and 376 were funded with a success rate of 33.4% and an average funding intensity of 845, 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 16.6% of the total funds, projects in areas of mineralogy, petrology, volcanology, economic geology and geo-mathematics for 20.9%, projects in areas of petroleum geology and coal geology for 10.8%, projects in areas of structural geology, Precambrian geology and regional geology for 11.1%, projects in areas of Quaternary geology and environmental geology for 13.5%, and projects in areas of hydrogeology and geo-engineering for about 27.1%.

The predominant defects in the applications in 2013 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 Earth as well as that of other planets. It applies primarily to radiometric dating theory and methods of examining elements, molecules and isotopes. Geochemistry focuses mainly on the distribution and partitioning, enrichment and dispersion, migration and transformation rules of chemical elements and substances in the earth surface system and how these are influenced by human activities and affect the multi-layer interactions in the Earth's history. The objectives of modern geochemical studies include:

(1) The research goals have developed from the material composition and chemical reactions of the interior Earth as it applies to the interactions of different Earth layers or spheres and their boundaries. It pays more attention to the integration of macro-research of the geochemical processes and structure of the interior Earth with high-resolution and high-sensitivity research on geochemical properties and spatial-temporal evolution. It emphasizes the integration of plate tectonics evolution and chemical geodynamics research.

(2) The environmental geochemical and biogeochemical processes of the Earth's surface system have become an important geochemical research

field due to the uniqueness of this subject in understanding the mechanisms of the chemical evolution in the Earth system.

(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 past time scales, but also to geological processes on short time scales and prediction of the future.

(5) The superposition of natural processes and human activities, as well as the integration of chemical reactions and biological effects, has been emphasized in the research of supergene processes and environmental changes of the Earth.

The funding policy of this field is: (i) to promote coordinated development of different branches of geochemistry; (ii) to encourage the studies on the fundamental theory and the development of model of geochemistry; (iii) to broadly support the frontier fields of geosciences such as the evolution of the Earth and other planets, the changes of ecological environment, the evolution and origins of life; and (iv) to concentrate on the application of basic research concerning energy, water, and mineral resources, as well as natural disasters; (v) to encourage interdisciplinary research of environmental sciences, ecology, biosciences and other disciplines of geosciences, guided by geochemistry.

In 2013, the average annual funding rate of general project (including the Small Fund for Exploratory Study, excluding the Extended Funding for Young Scientists Fund Program) is 36.18% calculated according to numbers of application, and 36.62% calculated according to numbers of accepted application. The average monetary funding level (excluding the Small Fund for Exploratory Study projects) is 837,000 yuan per project. One project of the Extended Funding for Young Scientists Fund Program was financed at 800, 000 yuan.

For General Program project, accepted applications of environmental geochemistry, biogeochemistry and isotope geochemistry accounted for 70.9% of total accepted applications (44.4%, 14.8% and 11.7% respectively). Petrological geochemistry, ore deposit geochemistry & organic geochemistry accounted for 8.1% and 9.9%, respectively. Other four sub-disciplines accounted for 11.1%. Funded projects are concentrated on the five fields noted above. The funding rates of environmental geochemistry, isotope geochemistry, biogeochemistry, petrological

geochemistry, and ore deposit geochemistry & organic geochemistry are 38.3%, 17.0%, 13.5%, 10.6% and 6.4% respectively. There is a large difference in the funding rate of the sub-disciplines. For isotope geochemistry, the funding rate is 53.3%. For petrological geochemistry, whereas for biogeochemistry, environmental geochemistry, and ore deposit geochemistry & organic geochemistry the funding rates are 33.3%, 31.6%, 23.7%.

The main deficiencies of submitted project applications in the past are: (i) it is emphasized only on the importance of research to the field, but fail to clarify innovative research ideas and the scientific value of the research project; (ii) the long-term goal are applied as the feasible short-term goal of the project; (iii) it is unable to refine the creative scientific issues to be going to resolve in spite of a well-chosen research objective or content; (iv) the research scheme is not specific and failed to integrate closely with the research objectives; (v) the scientific issues are unclear due to the pursuit of the application of some new technologies and methods; (vi) the exhaustive pursuit of research methods and means leading to the lack of an individualized approach to a targeted problem; and (vi) the lack of the demonstrated feasibility of the key technology concerned.

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, for instance, seismic, gravity, magnetic field, heat flow, etc., is not only essential for effectively understanding and further protecting the Earth, but also the foundation for scientific breakthroughs of earth sciences. Moreover, explorative study on geophysics theory has important significance for the understanding of internal structure of the Earth and its dynamic process, resources exploration 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 observation system, model and theory of data-processing, are encouraged through the General Program.

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 2013，611 proposals for General Program in geophysics and space physics were received and 189 of them were funded with a success rate of 31% and an average funding of 815,000 yuan per project. In addition, 1 project of the Small Fund for Exploratory Study was funded with funding of 250,000 yuan. The funding is distributed in the following major research areas: geodesy (25.4%), solid-earth geophysics (29.6%), exploration geophysics (24.9%), space physics (17.0%) and experiment and facilities (3.1%). 12 proposals for the Extended Funding Program for Young Scientists Fund and 5 were funded with a success rate of 42% and an average funding of 740,000 yuan.

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 science, 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 2014.

In 2013, 1,322 proposals for marine science were received and 405 proposals were funded. The total funding amounts to 211.27 million yuan. Among the awards, 189 projects are the General Program with a success rate of 30.78% and the average support of 809,000 yuan per project, 5 projects are the General Program that is the Extended Funding for Young Scientists Fund Program projects with a success rate of 38.46% and the average support of 942,000 yuan per project, 208 projects are the Young Scientists Fund with a success rate of 30.45% and the average support of 251,700 yuan per project, and 3 projects are Fund for Less Developed Regions, with a success rate of 25.00% and the average support of 430,000 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.

Compared with previous years, the average quality of proposals submitted in 2013 was improved, especially in terms of the topic selection and design. The main deficiencies of the submitted proposals are reflected in vague description of what specific questions to be investigated and how to solve the questions, and the proposals are lack of clear-cut scientific questions although the importance and relevance to the national needs are relatively

well described. Some proposals are remained at old problems and old methods without creativity.

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 2013, 61 proposals on polar science were received and 25 were funded, with a success rate of 40.98%. Among the awards, there are 10 projects for the General Program, 1 project for the Extended Funding Program for Young Scientists Fund with General Project and 14 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, beside the study of dynamical-physical-chemical process within the atmosphere, atmospheric science currently focuses on the comprehensive researches on the essence of the atmospheric change in terms of the interaction among hydrosphere, lithosphere, cryosphere, biosphere, human activities and global climate, the regulation of climate system and theories and methods of climate change prediction, the regulating technology and measures affecting local weather, 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 human impact and the sustainable development of society.

In 2013, the Division received 515 proposals for the General Program and 157 projects were funded with the success rate of 30.49% and the average funding intensity of 797,000 yuan per project including 1 project for the Small Fund for Exploratory Study with 250,000 yuan per project.

In 2014, the Division will continually encourage proposals for exploratory and original basic studies in areas as follows: (i) the various phenomena, processes and mechanism in atmosphere, and the physical-chemical-biological processes of the substance and energy interaction between the atmosphere and other spheres by applying new ideas, methods, advanced equipment and technologies in fields of mathematics, physics, chemistry, biology and information science; （ii） applications regarding to disastrous weather, atmospheric dynamics, atmospheric physics, atmospheric chemistry, atmospheric environment, atmospheric detection and remote sensing and stratosphere, mesosphere, geophysical fluid dynamics and boundary layer turbulence; (iii) the climatic change and its relevant extreme synoptic and climatic events; (iv) new theories and methods for weather forecasting and climate prediction; (v) applied research on the data received by satellite

remote sensing and other sources; (vi) analysis and applied research on the data received from the large scientific experiments and science plans being initiated, conducted or already completed, as well as large observation network established in China and aboard; (vii) basic research on the utilization of water, wind and solar resources in the air; (viii) research on the principle and method for meteorological observation and data analysis.

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 field frontiers 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 raise China's international competitiveness in science and technology and achieve a higher level of sustainable development of the society.

The Department will continue to strengthen its support to interdisciplinary researches and the explorative studies in frontiers and encourage original innovation, with considering the fundamental issues in the research. At the same time, the Department will pay attention to key scientific issues resulting from engineering application, especially the research with such great significance that new knowledge could be formed, the industrial development could be promoted and international competitiveness could be raised.

Funding for the General Program Projects in 2013

Unit: 10,000 yuan

Divisions		Projects	Funding	Funding rate (%)
Division I of Materials Sciences	Metallic materials	203	16,262	20.08
Division II of Materials Sciences	Inorganic materials	283	22,604	20.42
	Polymer materials	205	16,398	20.50
Division I of Engineering Sciences	Metallurgy and mining science	269	21,499	19.01

Divisions		Projects	Funding	Funding rate (%)
Division II of Engineering Sciences	Mechanical engineering	521	41,682	20.48
Division III of Engineering Sciences	Engineering thermo-physics	204	16,300	19.98
Division IV of Engineering Sciences	Civil engineering and environment	522	41,718	19.25
Division V of Engineering Sciences	Water research and ocean engineering	225	18,025	18.97
	Electrical engineering	188	15,072	19.79
Total		2,620	209,560	19.81
Average funding per project		79.98		

In 2013, the Department received 13,224 proposals (605 declined), reduced by15.89% compared with that in 2012, and among them, 2,620 were supported with a total funding of 2,095.6 million yuan. The average funding is 799,800 yuan per project and the success rate is 19.81% （17.36% in 2012）.

For application in 2014, attention should be paid to the following issues:

(1) Proposals that meet the major needs of national economy and sustainable development of the society will be encouraged. 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.

(2) Interdisciplinary research will be encouraged at different levels, especially cross-cutting research 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.

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 meets 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 2013, the Division received 1,011 proposals for the General Program, including 19 proposals for the Extended Funding Program for the Young Scientist Fund, 14.6% less than a year earlier. Totally, 203 projects were granted, including 5 under the Extended Funding Program for the Young Scientist Fund, with an average funding of 801,100 yuan per project and a success rate of 20.08%.

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 classic issues in basic materials. Applications in the field of composites and surface engineering should focus on scientific problems and proposing unique ideas. Applications with a cross-disciplinary background should focus on issues within the funding spectrum of the Division.

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 2013, the Division received 1,386 applications for General Program, including 24 applications for the Extended Funding Program for the Young Scientists Fund, with a decrease of 19.6% compared with that in last year. 283 projects including 2 within the Extended Funding Program for the Young Scientists Fund were funded with an average funding of 798,700 yuan per project, reaching a funding rate of 20.42%.

Through a review of all submitted proposals in the past three years, it is noted that, in addition to an annual increase in the number of applications, the researches related to inorganic non-metallic materials cover a wide range with significant interdisciplinary nature. Among the applications in 2013, researches on functional materials accounted for 52.08% of the total. 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 21.66 % of the total in 2013) 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 enhanced. The applicant institutions for structural ceramics were relatively concentrated and accounted for 6.17% of the total,

with in-depth developments in 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 base on inorganic non-metallic materials. The Division will support the researches with creative and innovative ideas, and the substantial interdisciplinary research 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 variation 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; research 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 (at 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 polymer materials science, the Division mainly supports researches on following areas:

(1) For general polymer materials, the focus is on the implementation of high performance, functional properties and low cost.
(2) The relationship between machine forming and congregation state textures.
(3) Functional polymer materials and organic solid functional materials.
(4) Biomedical polymer materials.

(5) For polymer-based composites, the stress is on high performance and interface control, etc.
(6) Special polymer materials and engineering plastics.
(7) Polymer materials related to environment, energy resource and resource utilization.

In 2013, the Division received 1,000 proposals for General Program, with an increase of -17.70% compared with that in 2012, among them, 9 proposals were within the Extended Funding Program for the Young Scientists Fund. 205 applications were granted with a success rate of 20.50% on average and an average funding of 799,900 yuan per project, wherein 2 projects were within the Extended Funding Program for the Young Scientists Fund. The relatively more proposals were concentrated in the following research fields: opto-electronic functional materials, biomedical polymer materials, polymer blend and composite materials, functional inorganic/organic composites, and eco-environmental polymer materials, etc.

Basic researches are encouraged by the Division in the following fields: general polymer materials with high performance or functional properties or low cost, functional polymer materials and organic solid functional materials, preparation science and technical processes for polymer materials, biomedical polymer materials, organic nano-materials, intelligent materials and bionic polymer materials, eco-environmental polymer materials including natural polymer materials, environmental-friendly polymer materials, renewable polymer materials.

The Division highly encourages indigenous innovation and interdisciplinary research.

Division I of Engineering Sciences

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

The Division received 1,415 proposals for the General Program in 2013, including 19 proposals within the Extended Funding Program for the Young Scientists Fund, with a decrease of 10.89%; wherein, 269 proposals were

granted, with the average of 799,200 yuan per project and the success rate of 19.01% on average.

The current development trends of the discipline funded by the Division are as follows: (i) With the continuous development of basic research and modern technological advances vigorously, the discipline theory is unceasingly thorough, accurate, quantitative and multi-scale because the novel methods and techniques of other disciplines have been used constantly for reference. The accurate control of full scale from microscope, middle scope to macro scope is becoming the research trends whether from the raw mineral to the recycling of resources, or from materials to products, even to equipment and macroscopic resource optimization. (ii) With specific research content of each discipline is been detailed division, interdisciplinary combination is more and more closely and interdisciplinary amalgamation have been strengthened, emerging new research fields such as resource recycling science, green process engineering, bio-metallurgy, bio-chemical mining, computing metallurgy and physical-chemical metallurgy and electro-magnetic metallurgy, etc. (iii) Relationship between fundamental research and technology development is getting increasingly closer, such as the meta-synthesis of equipment for mining and metallurgy, monitoring and controlling of system, metallurgical reaction engineering science 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 and the updating and innovation of basic knowledge. (iv) Basic research, applied research, specific technology development and product development have been closely linked and integrated. They have formed the overall system engineering and become the major feature of research and development at present.

Petroleum and natural gas exploitation, safety science and Engineering, preparation of metal material processing, rock mechanics, mineral processing engineering, metallurgy, coal mining, chemical metallurgy, electrochemical battery, drilling engineering and geothermal exploitation are the main hot fields in the division.

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 resource that could enhance our competitiveness in mining and metallurgy industry. Researchers

are encouraged to work systematically and consistently in their specific fields to form their own research features. 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.

Division II of Engineering Sciences

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

Mechanics is a fundamental technological discipline to study the functional synthesis, quantitative description, and performance control of various mechanical products and to apply relative 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, and so on.

Manufacturing science mainly is to study on the manufacturing theory, method, technology, process, equipment, and system for manufacturing products with higher efficiency, lower cost, more intelligent methods and high performance. Its scope includes components machining, forming, manufacturing system and automation, mechanical metrology and measurement instrument, MEMS/NEMS, green manufacturing, intelligent manufacturing, and so on.

In 2013, a total of 2,544 research proposals were received for the General Program including 33 proposals within the Extended Funding Program for the Young Scientist Fund which is 21.02% less than the previous year. Among them, 521 proposals were funded including 12 projects within Extended Funding Program for the Young Scientists Fund. The average funding per project was 800,000 yuan and the success rate was 20.48%.

The major areas supported by the Division are listed as follows:

(1) The fundamental research oriented to national strategic requirements,

the frontiers of disciplinary development, as well as potentials for industrial applications.

(2) The research oriented 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 instrument, including processing mechanism, prototyping theory and technology.

(4) The development on the methodology of design and manufacturing for the extreme working conditions, for instance, from macro to meso, micro, nano, and even multi-scale sizes, and from conventional to extraordinary or extreme parameters.

(5) The multi-disciplinary research, multi-physics 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 research in a specific field, and support fundamental research that has achieved innovative results and needs further in-depth work. The Division will also encourages substantial and profound interdisciplinary research, 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 field.

In 2014, 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 break-through potentials, such as the novel design about the grabbing/operating/locating mechanism of soft living tissue, the design and manufacturing of high efficient or energy saving actuation or energy transformation systems, precise manufacturing of material-structural integration, and so on.

The new applications from the principal investigators with ongoing research projects will be discouraged to ensure that they devote themselves to the approved projects. And 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.

Proposals in recent years demonstrate that research in fields of engineering thermo-physics and energy utilization is very active. The research contents have gone deeper, research objectives more extensive and research achievements with wider applications. In 2013, the Division received 1,021 proposals for General Program including 14 within Extended Funding Program for the Young Scientists Fund with the decrease rate of 15.7%. Totally, 204 were supported including 6 within Extended Funding Program for the Young Scientists Fund，with the success rate of 19.98% and the average funding intensity of 799,000 yuan per project. .

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 2013, the Division received 2711 proposals for General Program including 52 Extended Funding Program for the Young Scientists Fund with the increase rate of -13.3%. Totally, 522 were supported including 16 Extended Funding Program for the Young Scientists Fund，with the success

rate of 19.3% and the average funding intensity of 800,000 yuan per project.

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 hydro-science and water research, hydraulic engineering and ocean engineering, and electrical science and engineering.

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

The Division supports researches in three areas of hydro-science and hydraulic engineering, geotechnical engineering and hydro-power engineering, as well as 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.

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 research are encouraged in fields of water resources, hydro environment and water eco-system research. Researches in the area of river and coastal hydrodynamics and sediment dynamics give their focuses on the fundamental theory of sediment transport, river and estuarine evolutionary, and sediment problems related to large hydraulic works. The key frontiers of hydraulics 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 the year of 2013, 1186 proposals were received for General Program including 27 for Extended Funding Program for Young Scientists Fund, with a decrease of 7.1% comparing with that of last year. 225 proposals including 8 for Extended Funding Program for Young Scientists Fund were granted with an average funding of 801,100yuan per project and a success rate of

18.97%. According to the statistics on proposals in recent years, the proposed themes have extended gradually and tended to be more interdisciplinary, and the proposals have been increasing year by year in this discipline. In 2013, 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 and hydro-informatics, hydraulic machinery and coastal engineering.

Electrical Engineering

The subject of electrical engineering includes two areas of electric (magnetic) energy science and 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, and so on. 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 2013, 950 proposals were received for General Program including 6 for the Extended Funding Program for the Young Scientists Fund, and 188proposals were funded. The average funding was 801,700yuan per project and the success rate was 19.79%.

With the requirements of national energy security and sustainable development, the original innovation is encouraged. Priorities will be given to proposals on the research of principles, methodology and approaches in the field of electrical engineering, as well as those attaching importance to the experimental verification and the scientific aspect and quantification of experimental research.

In the domain of electric energy science, priority is given to new theories and new technologies apparatus of high efficiency, flexibility, safety and reliability, and environmental friendly for 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, priority is given to new phenomena, exploration of new principles, and the establishment of new models and discovery of new applications, as well as the safety and reliability of 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, interaction between electromagnetic field and bio-matter, processing and utilization of biologic electromagnetic signals, and complicated transient electromagnetic fields.

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, 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, brain information cognition, bionic sensing and advanced sensors, navigation in polar regions, 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, high

end imaging sensor, advanced laser technology, biomedical optics, next generation network and applications, quantitative analysis of medical images and application, cognitive science and intelligent information processing, etc. Preferential support will be given to basic researches that meet social demands and have far-reaching impact on 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 on 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. Considering the disciplinary features of electromagnetic field microwave, optical and photo electronics and microelectronics that are supported by the department, please pay attention to research on basic instruments and major facilities that play an important role in promoting research.

In 2013, the Department received 18,545 applications in total, in which 8,264 applications are for General Program, an increase of 16.36% over that in 2012, and funded 1,646 projects with a total funding of 1.2802 billion yuan. The average funding is 777,800 yuan per project (770,400 yuan per project in 2012). The average funding rate is 19.92% (17.45% in 2012). Some projects involve interdisciplinary research with mathematics and health. The Extended Funding for Young Scientists Fund with General Program started in 2013, and funded 42 projects with a funding rate of 33.87%. In 2014, the average funding per project for General Program will be about the same as 2013, and the funding period will be 4 years.

In 2014, 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		2012			2013		
		Projects	Funding	Funding rate ++ (%)	Projects	Funding	Funding rate ++ (%)
Division I	Electronics and technology	154	12,153	17.38	152	12,158	19.51
	Information and communication system	129	9,720	17.71	138	10,618	19.83
	Information acquisition and Processing	170	12,728	17.69	140	10,819	19.89
Division II	Theoretical computer science, computer software and hardware	137+11*	10,875	17.35	141	10,546	19.69
	Computer applications	214+16*	16,856	17.07	217	15,731	19.10
	Network and information security	154+14*	12,368	17.54	160	12,438	19.49
Division III	Control theory and control engineering	173	13,599	17.51	178	13,913	21.37
	Systems science and system engineering	58	4,498	15.72	45	3,453	16.48
	Artificial intelligence and intelligent systems	137	10,742	16.95	128	10,119	20.22
Division IV	Semiconductor science and information devices	141	11,715	17.71	135	11,108	20.64
	Information optics and photoelectric devices	109	8,918	17.87	115	9,400	20.65
	Laser technology and technical optics	107	8,648	18.58	96	7,717	20.73
Total		1,683+41*	132,820	17.45	1,646	128,020	19.92
Average funding per project		77.04			77.78		

Notes: * Projects of the Small Fund for Exploratory Studies.

++ Success rate includes projects of the Small Fund for Exploratory Studies.

Interdisciplinary Research between Information Sciences and Mathematical Sciences

In 2014, 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 2013, 274 applications were received for the projects of interdisciplinary research between Information Sciences and Mathematical Sciences and 58 projects were funded with average funding of 600,000 yuan per project and the funding rate of 21.17%. It should be noted that previous proposals were lacked of fundamental nature and challenge, and did not show complementary role of information science and mathematics. This type of project will only support 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, low power consumption communication electronics, 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 information detection, 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.

Refer to 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, 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.

Regarding to 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, etc.

In 2013, the Division received 2,179 proposals for General Program, and funded 430 projects. The funding rate is 19.73% and the average funding intensity is 781,300 yuan per project.

In 2014, 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, green communication, under water 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 also be given to the projects which could open and share their research results, and to research on the design of software and hardware on the opening data base. It is encouraged to combine 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, large data, high performance, high reliability, easy interaction, networking, intelligent and universal applicability. Applicants are recommended to pay attention to these new features in this Division.

In 2014, the Division encourages proposals to focus on key scientific issues and technologies in computer science, and original, fundamental and far-sighted research. It also 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 stresses on funding of new computation theory and algorithm, information and physics integrated system, and man-machine coordinated computation, etc.

In 2014, 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 supports 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 in China.

In 2013, the Division received 2,673 proposals for General Program, and funded 518 projects (including 11 Extended Funding for Young Scientist Fund and 23 interdisciplinary projects with mathematics). The success rate is 19.38% and the average funding is 747,400 yuan per project

It should be noted that such problems as lack of basic science problems, clear scientific topics, originality in research ideas, clear application background or clear research goals still existed in proposals received in 2013. It is suggested that applicants should aim at the national needs and research frontiers in the discipline, select fundamental, explorative and key scientific issues, and strive for innovations and breakthroughs.

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.

Researches will be encouraged and 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 fusion, etc.

Researches will be encouraged and 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, system reliability and applications, engineering system design and optimization, engineering system scheduling and decision making, internet of things and supply chain, etc.

Researches will be encouraged and funded in areas of artificial intelligence and intelligent systems covers pattern recognition and machine learning, 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 2013, the Division received 1,738 proposals for General Program and funded 351 projects. The success rate is 20.25% and the average funding intensity is 780,800 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, unified production process control of energy saving, pollution reduction, low consumption and safety, intelligent traffic and save driving aid, coordinated control of multi autonomous system, genetic network analysis and regulation, quantum system analysis and regulation, control and finite dimensional approximation of infinite dimensional system, data and knowledge based system analysis and control, data and knowledge based diagnosis and system maintenance; network system analysis and control, advanced navigation and guidance theory and techniques, new types of transducers and bionic sensing, optimal dispatching management of large engineering systems, analysis and optimal design of complex supply chain system, basic theory and applications in intelligent power grid and internet of things, new theory and methods of pattern recognition, object identification and tracking in complex background and interference, natural language understanding and syntax computation, oral language identification and understanding in complex scenarios, new theory of computer vision and realization of high performance system, sparse representation and compress cognition, online machine learning methods of complex dynamic data, poly-particle information computation theory and applications, application oriented large data analysis and processing method; web information detection, searching, processing and application, advanced robot system and unmanned autonomous system, robot modular theory and technology, bio information acquisition, processing and applications; brain-machine interface theory and application, cognitive science and computation models. In addition, the Division gives due support to far-sighted 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 agricultural information technologies, etc.

In 2014, the Division will continue to encourage and support interdisciplinary research with mathematics, mechanics, mechanical engineering, semiconductors, optics, energy, environmental science, management, 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 2013, the Division received 1,674 proposals, and funded 346 projects with a funding rate of 20.67% and an average funding intensity of 815,800 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, laser, etc. There is still room for improving applications 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, applied optics, biomedical photonics, nonlinear optics and quantum optics, 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, which 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 research 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 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 in order to optimize the utilization of limited resources with the help of modern science and technology. There are three divisions in the Department of Management Sciences, namely management science and engineering, business administration, and macro-management and policy. Research proposals should be submitted to one of these divisions according to the relevant contents.

Scientists from diverse academic backgrounds are encouraged to take an active part in management science research and advance the development of management science, a comprehensive intercrossing scientific discipline. However, applications centering on social science and humanities, together with applications on topics funded by 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.

Based on NSFC's position and basic tasks the Department of Management Sciences formulates its guideline in the 12th Five-Year Plan period as "following the law of management science, focusing on the excellence of talent and sticking to the policy of supporting all." The Department will encourage innovative research, and welcome the research proposals abstracted from the basic issue of Chinese management practice and a certain general significance for enriching the knowledge system of management science. Besides, the interdisciplinary research will also be encouraged.

The Department supports management research emphasizing on exploring laws of management sciences based on scientific methods, while ordinary research on management practice are not supported. The Department supports both experimental research projects which depend on experiment, observation, measurement, etc., for data collection, and theoretical research projects that aim at offering solutions to management issues based on the analysis and interpretation of management phenomena through modeling, computation, induction and deduction. For those experimental research projects featuring long-term large-scale data collection and processing, field investigation and high performance computing and experiments, applicants are advised to propose a higher budget than the average funding intensity in accordance with their specific cases.

Specific requirements for application in 2014:

1. No repetition of funding

To optimize the allocation of the National Natural Science Fund and to ensure that project leaders invest adequate time and energy in conducting their on-going national projects, the Department of Management Sciences will decline proposals by the following applicants in 2014:

(1) Project leader has already been supported by the National Social Science Fund in the past 5 years (from Jan. 1st, 2009), but has not gained the concluding certificate awarded by the National Planning Office of Philosophy and Social Science until the deadline of current year's fund application.

The applicant who has gained the concluding certificate from the National Planning Office of Philosophy and Social Science as well as working to apply for the National Natural Science Fund needs to provide the copy of concluding certificate with official seal.

(2) Applicants submitting proposals to both the Department of Management Sciences of NSFC and the National Planning Office of Philosophy and Social Science in 2014.

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 obliged to give serious check on the relevant information. Among other related regulations, the following requirement should be abided by applicants during application writing process:

(1) Detailed information about working experience, educational backgrounds, research projects undertaken and related assessments, and publications of project leader and main participants should be provided in the CV column. With respect to publications, the title of the journal, names of all authors, article title，the year of publication, volume number and page numbers are required to be listed.

(2) Applicants are required to give a detailed account on their preliminary research outputs (including relevant publications) pertaining to the proposals submitted. And those have been accepted and waiting to be published should be copied to get proved.

(3) One proposal is not allowed to be submitted to more than one science funding agency. For those applicants who propose new research topics based on their projects formerly supported by NSFC, they are supposed to clarify the relation and differences between the newly submitted proposals and the projects formerly supported by NSFC. For applicants undertaking projects funded by other agencies such as MOST, MOE, NSSF or local science funding organizations, they are required to state

the similarities and differences between their on-going projects and the newly submitted proposals to NSFC.

3. Special requirement for project leaders of newly started NSFC projects

To ensure that project leaders invest adequate time and energy in conducting their on-going projects, new proposals by these project leaders that have gained all kinds of support from National Natural Science Fund in 2012 and 2013 (especially 2013) will be assessed through especially strict procedures.

4. Consideration of performance evaluation of projects completed

The Department of Management Sciences periodically organizes experts to conduct performance evaluation of all General Program projects, Young Scientists Fund projects and Fund for Less Developed Regions projects one year after their completion and the evaluation results will be published on NSFC's website. Researchers with good performance evaluation results will be given priority for funding when they apply for new projects. However, researchers with bad performance evaluation results will undergo stricter reviewing procedures when they apply for new projects.

In 2014, the average funding intensity of General Program projects will stay the same as last year, and the funding period will be 4 years.

Funding for General Program Projects in the Last Two Years

Unit: 10,000 yuan

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Management science and engineering	227	12,253	18.39	200	11,200	19.42
Division II	Business administration	247	13,333	16.69	215	12,040	17.95
Division III	Macro-management and policy	290	15,654	13.83	297	16,630	15.18
Total		764	41,240	15.88	712	39,870	17.02
Average funding per project		53.98			56.00		

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 science, which include the history of management science, general management theory, operations management, decision-making and game theory, organization theory, management psychology and behavior, management system engineering, industrial engineering, information technology management, technology and theory of internet management, forecast, prediction and evaluation methods, quantitative economic analysis, technology and approach of risk management, financial engineering, complexity science, knowledge management, engineering management, etc.

The Division gives priority to and support studies on basic theories and frontier areas, which were mentioned above, and encourages innovative research combined with China's management practices, management philosophy and cultural characteristics of management theory and methods.

A total of 2,054 research proposals were received in the Division of Management Science and Engineering in 2013. Among of, 1,030 research proposals in General Program (including Extended Funding Program for Young Scientists Fund), 50.15% of the total; 901 research proposals in Young Scientists Fund, 43.87% of the total; and 123 research proposals in the Fund for Less Developed Regions, 5.98% of the total.

Among of, the largest proportion of applications is still in the area of operations research and management, information system and management, financial engineering, and industrial engineering and management.

After compulsory review procedures in 2013, the Division funded 200 projects in General Program, the funding rate was 19.42% (compared with that of 18.39% in 2012), 182 projects in Young Scientists Fund, the funding rate was 20.18% (that of 18.77% in 2012), and 23 projects in Fund for Less Developed Regions, the funding rate was 18.70% (that of 20.16% in 2012). The average funding rate of this division was 19.71% in 2013 slightly over that in 2012.

The past few years have witnessed rapid development of management science and engineering and increasing high-quality papers published by Chinese scholars in international journals, especially the great enhancement of research capacities of a group of young scholars under the age of 45. However, most applications were still during the learning stage of western theories and methods; the number of original and innovative applications was still quite small and very few applications focused on issues of the

management practices in China were proposed. Therefore, young scholars are encouraged by the Division to undertake explorations on frontier issues and conduct research on management theories, techniques and methodologies with the consideration of the specific requirement and the status of management practices in China, to conduct management science research with substantial international scientific cooperation; the project managers are encouraged to publish more research papers in the international core journals; and the priority will be given to innovative projects with consideration of China's realities.

Division II of Management Sciences

The Division of Business Administration mainly supports basic research and some applied basic research on management theories and new management techniques and methodologies targeted at micro-level organizations and nonprofit organizations. 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 2013, the Division received a total of 1,198 research proposals for General Program (including the Extended Funding Program for the Young Scientists Fund), and 215 projects were funded, the funding rate was 17.95%.

During 2013, more applications were received in the area of marketing management, corporate finance and finance management, accounting theory and method, logistics and supply chain management, strategy management, management innovation, human resource management and organizational behavior, and correspondingly more projects were funded. Proposals were slightly increased for service management, production and quality management, and the non-profit organization management, showing some innovation in exploring methods and new techniques researching, thus the portion of being supported grows faster. A balance distribution of funding

areas has been formulated.

In 2014, the Division will continue to value and actively support the original theory innovation and research on knowledge discovery and creation, attach importance to the research of scientific accumulation and discovery through the combination of the empirical analysis, case studies and observational experiments, the research on concise scientific problems from China's management practice which has potential social application value, and the research with substantial international cooperation. The study on fundamental theory, technology, and method of management science combined with the management practice of China’s enterprise/organization is encouraged.

In order to promote the development of management sciences, improve research capability of management science, and reduce the gap with international research, the Division will keep on supporting frontier basic research in the area of corporation theory and strategy, finance management, organized behavior, entrepreneurial and innovation management, human resource management, marketing, e-commerce and business intelligence, logistics and supply chain management. And more funding will be provided in the area of SME management, service management, logistics management, quality management, enterprise information and resource management, risk in big project with safety management, non-profit organization management. More funding will be also given to proposals on issues about Chinese healthcare management system, and the explorative studies on new theory, new technology and methodology on the interaction of big data and micromanagement, as well as the theory innovation based on Chinese management practice.

Division III of Management Sciences

The Division of Macro-management and Policy mainly supports basic research in such fields as macro-economy management and policy, financial management and policy, tax management and policy, industry management and policy, 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. Meanwhile, the Division attaches great importance to the promotion of scientific

development and academic innovation on the one hand and the nurturing of talents and research teams on the other. While developing related theories and methodologies, researchers are encouraged to provide consultation, support and suggestions to the government in its national macro decision-making.

In 2013, the Division received a total of 1,956 research proposals for General Program (including the Extended Funding Program for the Young Scientists Fund), and 297 projects among them were funded, the funding rate was 15.18%.

In 2013, more applications and funding of such areas as resource environmental management, agriculture and forestry economy management, health management and policy, financial management, macroeconomic management were respectively received. The funding rate of agriculture and forestry economy management and macroeconomic management were relatively higher. Applications of security management and educational management were also increased gradually, especially areas related to climate change and energy strategy. It reflects that scholars in the fields of macro management and policies have paid their close attention to scientific issues from the national macro management practice.

In 2014, on the basis of disciplinary strategic priority areas, the Division will continue to encourage researches on the public management theory and method, green development and growth, demographic change and response of the aged society, public security management, education management, etc.

The Division will encourage researches with strong innovation and long-term accumulation, and focusing on theoretical research achievements for international academic exchanges and publishing their research results in the international academic journals. Applications should take China's actual management problems as the research object, extract scientific issues from the research object accurately and pay attention to the scientific and normative significance of research methods. The applicant should distinguish the difference between management science research and practical management, the difference of research methodologies for the project of the National Natural Science Fund and the project of the humanities and social sciences. Notice that the subject of topic selection should be appropriate, the research goal should be concentrated, and the research content is specific and concerted. The key scientific issues should

be put forward clearly and the research methods and route map to solve scientific issues should be 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, progression, regression, diagnosis, treatment and prevention of diseases. Proposals for research on normal structure，function and development of organisms may be submitted to the Department of Life Sciences. Applicants concerned may refer to the section of the Department of Life Sciences in this *Guide to the Program 2014*.

The Department encourages researches 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 by way of combining basic research with 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 use of new multidisciplinary and comprehensive techniques or methods.
(5) In-depth systematic and innovative study based on existing accumulative 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.

In addition, 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 while emphasizing research of rare diseases. Besides, to keep the balance and coordinative development of various disciplines and research institutions, priority support will also be given to weak research areas.

1. Brief analysis of previous applications and specific instructions for applicants

(1) Applicants are encouraged to carry out competitive mechanistic studies underlying the scientific issues emerging from clinical practices, rather than descriptive studies or studies tracking others. Furthermore, applications with unique academic ideas or solid previously accumulated research work are more encouraged than those blindly chasing high tech or hot spots of research.

(2) Applicants are required to propose a defined scientific issue or a specific hypothesis based on analysis of the relevant latest publication and research progress in the field.

(3) Applicants are expected to pay attention to the elaboration of the significance and values of the anticipated research results. Besides, specific research contents, research design, technical protocols and research methods in applications are expected to be fully developed. Moreover, the proposed research contents should be adequate, and the research design, technical protocols and research methods be clear and scientifically feasible.

(4) Applicants are expected to provide detailed description of relevant previous work. In case of applications as extension of a previously funded project, detailed elaboration of the innovation and relevant scientific issues are required. Furthermore, all relevant published papers should be listed. In case of unpublished previous work, relevant experimental data, tables and graphics, pictures etc. are required.

(5) Applicants are expected to provide precise information, including the curriculum vitae, previous grant information and publications of the principal investigators. In the curriculum vitae, both education and working experience should be included (in chronological order with exact months and years, keeping the timeline consistent). Besides, a list of previous grant numbers and brief progress reports or final reports is required on the page of previous grant information. For publications, detailed information including the names of all authors (in the same sequence 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 lectures should be specified) should

be included. Moreover, the first author, corresponding author or co-authors should be marked by special symbol # or * respectively. Accepted manuscripts should be listed along with an attached acceptance letter, and those already submitted, unaccepted or in preparation should not be included. Patents and awards should also be listed.

(6) For applications involving special medical research objects such as human subjects, the related ethical or informed consent requirement should be met by providing a signed written institutional certification or approval.

(7) For applicants with good performance records in their previous grants, priority will be given on the basis of performance evaluation.

(8) In 2014, to keep a reasonable distribution of the scientific fund among different scientists, the Department will basically not give further funding to applicants who have got high funding intensity (such as Key Program, Major Program, Major International and Regional Joint Research Program etc.) in 2013, especially when they apply for General Program, or for programs of high funding intensity, or for research work repetitive or similar to their ongoing projects (such as the National Basic Research Program (973) projects, the National High-Tech R&D Program (863) projects , and other major special funding projects etc.).

(9) A copy of the front page of up to 5 representative papers should be attached, along with the clearly scanned electronic files.

(10) For applicants working as part-time workers in the research institution, a formal appointment agreement by the research institution is required, with a specific explanation of the appointed position, duration and the required shortest working time.

(11) The specific requirements for various programs are expected to be referred to the website of the Department (http: //health.nsfc.gov.cn).

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

The number of applications has been increasing in the Department of Health Science ever since its establishment. In year 2010, 2011 and 2012, 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), accounting respectively for 25.8%, 26.35% and 27.10% of the total applications in NSFC. In 2012, the specific number of applications for General Program, Young Scientist Fund and Fund for Less Developed Regions, 44,347, is larger than that in 2011

which was 38,253, with an increasing rate of 15.93%. To reduce the great pressure resulting from the dramatic increasing applications and the number of applications for low level repeated research, the policy of limiting the number of applications was adopted in 2013, which had led to an obvious effect on the number of applications. In 2013, the specific number of applications for General Program, Young Scientist Fund and Fund for Less Developed Regions, 38,720, is smaller than that in 2012, with a reducing rate of 12.69%. Since the scientific quality of some applications needs further improvements, research institutions are expected to further strengthen their organization and management, and to improve the scientific quality of applications under the guidance of "NSFC's requirements for institutions in enforcing management of scientific fund", in an effort to enable the rapid and healthy development of both scientific fund and medical research in China.

3. Specific guidance on selection of application codes

Peer review activities of the applications 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 and many relevant secondary codes. The scientific areas covered by the 31 primary application codes include areas related to respiratory system, circulatory system, digestive system, reproductive system/perinatology/neonatology, urinary system, locomotor system, endocrine system/metabolism and nutrition support, hematological system, neurological and psychiatric diseases, skin and its appendages, medical immunology, ophthalmology, otorhinolaryngology/head-and neck science, oral and craniomaxillo-facial science, emergency and intensive care medicine/trauma/burns/frostbite/plastic surgery, oncology, rehabilitation medicine, medical imaging and biomedical engineering, medical pathogens and infection, laboratory medicine, special medicine, radiation medicine, forensic medicine, endemiology/occupational medicine, gerontology, preventative medicine, Chinese medicine(CM), Chinese materia medica (CMM), integrated Chinese and western medicine (IM), materia medica and pharmacology.

The application codes for clinical basic research present the following basic characteristics: (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 order that applications on common 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.

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

In view of the fact that animal models for mimicking human diseases are requisite to biomedical research, especially to in vivo gene analysis, to the understanding of mechanisms underlying diseases, to identifying new drug targets, as well as to efficacy evaluation of drugs in clinical trial phases, the Department will give special support to applications for General Programs involving the development of animal models of human diseases (applications for Young Scientist Fund and for Fund for Less Developed Regions are not included) . Basically, animal models for mimicking human diseases include both spontaneous animal models and inductive (laboratory) animal models, the latter may include gene modified animals (transgenic models, gene knock in/out models, ENU inductive models and cloning models), surgical animal models and physical- or chemical-induced animal models. 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 interaction between animal models and their environment; (iv) systematic comparative studies of animal models to clinical data; (ⅴ) comparative medical studies on various animal models of different species; (vi) databases of animal models; (vii) Improvements of existing animal models; (viii) Application of relevant animal models in the development of new therapeutics or drugs.

Studies on the development of new animal models for human diseases, one of the fundamental works in experimental medical research, will be given long-term continuous support by the Department, in order to provide technical platforms and to 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. The applicants are expected to choose the proper primary and secondary application codes according to their proposed research, and “The Development of Animal Models for Human Diseases” should be written in the annotated column of the application form. Applications involving gene modified animal models are expected to be based on solid

preliminary molecular or cellular studies. In addition, 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 ethics should be met. Applications aimed at buying or developing animal models from companies or other institutions will not be supported.

5. Award size and duration of General Program in 2014

The funding intensity of the General Program in the Department is expected to be basically the same as that in 2013, and the duration will be 4 years. Doubled funding will possibly be given to excellent innovative research built upon previous strong bases. Applicants are expected to request the adequate budget for their proposed work by filling out the budget form with detailed justification.

An overview of the award number, funding, and success rate of the General Program in 2012 and 2013 by the Department is listed in the table below.

Funding for General Program Projects in the Last Two Years

Unit: 10,000 yuan

Divisions		20112			2013		
		Projects	funding	Funding rate++ (%)	Projects	funding	Funding rate++ (%)
Division I	Respiratory System, Circulatory System, Digestive System, Blood System, Gerontology	565+39*	39,810+624*	17.34	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	507+40*	35,763+640*	17.94	491+44*	34,570+704*	21.13

Divisions		20112			2013		
		Projects	funding	Funding rate++ (%)	Projects	funding	Funding rate++ (%)
Division III	Neurological and Psychiatric Diseases	311+27*	21,946+432*	17.99	301+26*	21,258+416*	22.14
	Medical Imaging and Biomedical Engineering	194+24*	13,642+384*	17.84	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,	411+36*	28,935+576*	16.64	397+32*	27,962+512*	21.23
Division V	Oncology	755+67*	53,245+1 072*	16.7	736+70*	51,884+1 120*	20.05
Division VI	Preventive Medicine, Endemiology,Occupational Medicine, Radiology	189+18*	13,253+288*	22.12	181+18*	12,763+288*	25.25
	Medical Immunology, Forensic Sciences	138+20*	9,842+320*	24.69	130+15*	9,323+240*	30.15
Division VII	Materia Medica and Pharmacology.	238+22*	16,738+352*	19.19	229+22*	16,109+352*	22.37
Division VIII	Chinese Medicine , Chinese Materia Medica, integrated Chinese and Western Medicine	552+47*	38,776+752*	15.26	536+45*	37,601+720*	18.18
Total		3,860+340*	271,950+5,440*	17.43	3,737+335*	263,310+5,360*	20.98
Average funding per award		66.05 (70.45**)			65.98 (70.46**)		

Division I of Health Sciences

The Division provides financial support for basic research on the diseases of respiratory, circulatory, digestive and hematological systems, and gerontology.

Respiratory System

The Division mainly funds the studies on morphological, functional and developmental abnormalities and diseases of lung, airway, pulmonary circulation, mediastinum, pleurae, thoracic cage and diaphragm. It also funds studies on pulmonary transplantation and new diagnostic techniques. Bronchial asthma, acute lung injury and acute respiratory distress syndrome (ALI/ARDS), chronic obstructive pulmonary disease (COPD), respiratory inflammation and infection, pulmonary circulation and pulmonary vascular disease, interstitial lung disease, sleep apnea are hot topics and we attach great importance in this field. Applications on bronchial asthma in 2013 accounted for 19%, ALI/ARDS and COPD for 15% and 13% respectively. The applications for respiratory genetic diseases and thoracic / diaphragm structure, function and developmental abnormalities were still little. Proposals for pulmonary circulation and pulmonary vascular disease could be categorized into both respiratory and circulatory systems. Applicants may select the code according to the specific scientific issues.

Circulatory System

The main funding is focused on the study in areas of morphological, functional and developmental abnormalities in circulatory system, diverse cardiac and vascular diseases, microcirculation and shock. Proposals were referred in the past years mostly to atherosclerosis and coronary heart diseases, cardiac injury and protection, arrhythmia, hypertension, and heart failure. The research about epigenetics, such as non-coding RNA in the progression and intervention of cardiovascular disease has become a new increasing topic in this field in the past 3 years. Applicants are encouraged to carry out original and translational research. Clinicians, developmental biologists and genetic biologists are encouraged to work together to study on mechanisms of cardiovascular diseases and the development of therapeutic strategy. In the cutting edge fields of stem cells and cardiovascular regeneration, researchers are encouraged to establish international collaborations, to propose innovational hypothesis based on their own research experience and eventually gain achievements with independent intellectual properties. Research on the role of endogenous biological active substance on the mechanism of cardiovascular diseases and the screening and identification of potential biomarkers for the diagnosis and treatment are encouraged.

Digestive System

The funding scope mainly covers studies on morphological, functional, developmental abnormalities and diverse non-infectious and non-tumorous diseases of digestive system. Due to the change of disease spectrum and the high morbidity of hepatitis, studies on various hepatic diseases, such as fatty liver, hepatic fibrosis, hepatic cirrhosis, hepatic injury, repair, regeneration and transplantation, have become important topics in this field. The number of proposals on the inflammatory bowel diseases and immune diseases of gastrointestinal tract has greatly increased in recent years. The studies on mechanisms of intestinal mucosal barrier, gastrointestinal motility and functional abnormalities are receiving more attention. Digestive diseases related to drugs, toxicants or alcohols are also hot issues in this field. Research on these important problems mentioned above, and studies on the pathophysiology of pre-clinical phase of these diseases and the mechanisms of functional disorders are encouraged. The number of applications on the liver disease in 2013 was kept at a relatively high level, of which applications on the liver fibrosis and cirrhosis, portal hypertension accounted for about 12%, on the liver failure and liver injury for about 10%, and on the inflammation or infection related liver diseases for about 9%. Among the gut diseases, applications on the intestinal mucosal barrier abnormalities, inflammatory bowel disease, gastrointestinal motility and functional abnormalities accounted for about 8.4%, 7%, 6.6%, respectively.In addition, applications on the digestive organ transplantation and pancreatitisaccounted for about 8%, 6% respectively. The number of applications on the hereditary diseases and abnormalities on endocrine and neurohumoral regulation of digestive system was kept at a relatively low level.

Hematological System

More and more Chinese scientists in this field have strong research backgrounds and have achieved original findings on hematological system diseases, especially leukemia. The researchers are encouraged to perform intensive and international competitive work on the basis of clinical scientific questions. The hot topics in this field include studies on characterizing hematopoietic stem cells, stem cell transplantation, hematopoietic regulation, interactions between hematopoietic or leukemic stem cells and their hematopoietic microenvironments, as well as the host's pathophysiological states. In 2013, the applications on leukemia, hematopoietic stem cell transplantation, regulation of bleeding and blood coagulation, platelets, and thrombosis, regulation of hematopoiesis and

abnormal hematopoietic microenvironment accounted for about 44% and 11%, 7%, 6%, respectively.

Gerontology

The main funding scope covers studies on mechanisms of pathophysiology in aging, and diseases related to aging mechanisms. Applications on the diseases unrelated to aging mechanisms should be submitted to other appropriate systems. To provide theoretical foundation for early warning, diagnosis, treatment, and prognosis of aging associated diseases, research on the common mechanisms of various diseases due to the pathophysiology in aging are encouraged, including cell aging, stem cell aging, inflammation, stress, autophagy, signal transduction, gene expression and translation, epigenetic regulation in aging, and so on.

Research proposals on tumorous diseases are excluded from the Division's funding scope. Proposals on tumors of respiratory, digestive and hematolympatic systems (except leukemia) should be submitted to Division V. Proposals on pathogenic organisms should be submitted to Division IV . Applications on the diseases not related to aging mechanisms should be submitted to the appropriate systems.

Division II of Health Sciences

The Division mainly supports basic researches on reproductive system, fetus, neonate and perinatology, urinary system, endocrine system/metabolism and nutrition support, ophthalmology, otorhinolaryngology head and neck science, oral and craniomaxillo-facial science.

Reproductive System/Perinatology/Neonatology

The Division mainly supports studies on the function and abnormal development of reproductive system, all diseases except tumor, and developmental disorders of fetus, diseases of neonate, assisted reproduction, prenatal diagnosis, contraception and birth control et al. The Division received 1,134 proposals in 2013. The proposals mainly focused on pregnancy and pregnancy related diseases, neonatal related diseases, fetal development and prenatal diagnosis, abnormal endocrine and related diseases of female reproductive system, sperm anomalies and male infertility, female infertility and assisted reproduction, endometriosis and adenomyosis. The total proposals in 2013 was decreased by 3.5% when compared to 2012 (1,175), but the proposals on pregnancy and pregnancy related diseases

increased dramatically. The main research scientific topics were the pathogenesis and therapeutic targets and techniques. The Division will continue to encourage those researchers who have good track record and support preferentially innovative translational researches on prompting population quality, support innovative basic research on the health of female, fetus, newborn and human reproduction.

Urinary System

The Division mainly supports studies on the functional disorders and abnormal development of kidney, renal duct, bladder, prostate and urethral canal and all the disease related proposals except tumor research. The Division received 930 proposals in 2013, which was 12.4% decrease from 2012. The proposals mainly focused on kidney disease such as primary renal diseases, secondary renal disease damage and repair of the urinary system, renal failure and alternative therapy (including renal transplantation). The kidney disease related researches focused too much on secondary renal diseases. The growth tendency of proposals on renal failure and prostate and bladder diseases fell slightly in 2013. However, the proposals on blood purification and alternative treatment remained high attention in 2013. The Division will continue to support consistent and innovative researches and translational researches in the above fields.

Endocrine System/Metabolism and Nutrition Support

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 Division received 1,123 proposals in 2013, which was 13.1% decrease from 2012. The researches focused too much on diabetes related areas. There were 579 proposals on this area, which was account for 51.5% of total proposals of endocrine and metabolism system. The proposals on energy metabolism and obesity were 228, 18.6% of total proposals, which were significantly increased from 2012. The amount of proposals on thyroid diseases were 61, 5.4% of total proposals, which was similar to that of last year. The scientific problems were focused too much on hot areas such as regulation on the microRNA (58 proposals), stem cell transplantation (45 proposals), stress (51 proposals) and autophagy (24 proposals). There were few proposals on endocrine organs such as hypothalamus, pituitary, adrenal gland, parathyroid gland,

and on the metabolism of amino acid, nucleic acid, trace elements and vitamins, and disturbance of water and electrolyte metabolism and abnormal acid-base balance. The Division will pay more attention and support preferentially on these areas in the future. In order to make innovative finding, the Division will encourage applications on problems arising from clinical practice, with proper research design and approach.

Ophthalmology, Otorhinolaryngology Head and Neck Science, Oral and Craniomaxillo-facial Science

The Division mainly supports non-neoplasm diseases of the related field. In the field of ophthalmology, the researches on fundus diseases were still the most concentrated areas in 2013, which was account for 30% of total proposals, and corneal diseases, glaucoma, optic nerve and visual pathway related diseases remained high attention. The crystal and cataract related proposals increased slightly. The stem cell related researches were still concentrated (exceed 60). 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 mainly focused on auditory abnormality and balance disorders in 2013, 37% of total proposals, which were continuously increased in the most recent years (by 8% increase of 2012). The next were olfactory, nose and anterior cranial base diseases, ear and lateral cranial base diseases, and the genetic and developmental related diseases of ear, nose and throat. The hearing related researches were key issues in otology. Meanwhile, the attention on speech perception and music recognition related studies after cochlear implantation was increased slightly. In areas of oral and craniomaxillo-facial science, the ratio of proposals based on secondary application code is similar to that of last year. The proposals were relatively uniform among main application codes. But there were more proposals on the periodontal and oral mucosa diseases (165 proposals) than that of the last year, which was accounted for 18.5% of total proposal in this field. The next were tooth defect, anodontia, repair and correction of dentognathic deformity, dental pulp and periapical diseases. The main hot topic was still the destruction and remodeling of the bone. There was a slight increase of proposals on the development of teeth and periodontal tissues, the dental-derived and other sources of stem cells in 2013 (146 proposals), relative to 2012. The Division will continue to support researches on 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.

The Division will not support researches on cancer in the above four areas. All applications on cancer research in above areas should be submitted to the Division V of Health Sciences. It is worth to pay much attention to the fact that there were 74 rejected proposals in the Division in 2013 (120 in 2012), which were cancer related researches on reproductive system, urinary system, endocrine system, ophthalmologic malignant tumors, head, neck and oral cavity. The Division will not support researches on drug design and pharmacology as well. Please submit the related proposals to the Division VII of Health Sciences. The code H0404 for the female reproductive endocrine disorders and related diseases only supports the studies on female reproductive endocrine disorders and the proposals on non-reproductive endocrine disorders should use application code H07 for endocrine system. It is specially noted that the proposals on dental material should use application code H1409, and the proposals on craniofacial bone, cartilage tissue in the field of stomatology should use code H1402.

Division III of Health Sciences

Division III mainly supports basic and applied basic researches in the fields of neurological and psychiatric diseases, medical imaging and biomedical engineering sciences.

Neurological Diseases and Mental Health

The Division mainly supports basic and applied basic researches 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 researches 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 rare nervous system diseases. Funding for researches on the pathogenesis and intervention of neuroimmunological or neuroinflammatory disorders will be one of priorities. And 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 all applications in 2013, more studies were focused on schizophrenia and depression, studies on autism and attention deficit syndrome were increased, whereas fewer researches investigate 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 grants in the field of neurological and psychiatric diseases are obviously homogeneous, 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 year 2013, 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 drosophila and zebrafish will be encouraged. Using CRISPR/Cas technique to build the animal models will bring new opportunities for genetic diseases of the nervous system. Although the applications for clinical study on cerebro-vascular diseases were increased, the clinical data collection in involved studies was commonly not met with criteria. It is encouraged to perform the translational studies for stroke with a unified standard for data collection in China. Researches on the mechanisms underlying pain need to be strengthened based on the collaboration of basic and clinical studies. Studies on postoperative cognitive dysfunction have attracted great attention by anesthesiologists. The basic research on this field is weak in China and need to be improved and enhanced by international academic exchange. Two or three general program projects will be highly funded to encourage researchers in this field in year 2014. 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.

Medical Imaging and Biomedical Engineering

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 biomedical engineering.

In the field of medical imaging, basic research which takes medical imaging and information as the content is mainly funded, including magnetic resonance imaging (MRI), X-ray and computed tomography (CT), ultrasound in medicine, nuclear medicine, medical photonics and optical imaging, molecular imaging and probes, data processing and analysis of medical images, interventional medicine and other related scientific issues. The important funding direction in the field is to solve basic scientific issues in the application of Magnetic Resonance Imaging (MRI), Functional Magnetic Resonance Imaging (FMRI), Magnetic Resonance Spectroscopy (MRS), CT, ultrasound, nuclear medicine and optical imaging etc., combined with 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 probes, functional imaging, and interventional medicine etc., are also encouraged. In addition, combined with clinical activities, researches of diagnostic or therapeutic imaging and imaging for efficacy evaluation related to various diseases such as cancer or neurological and cardiovascular system diseases are also supported.

In the field of biomedical engineering, the Division mainly funds researches on medical engineering associated with disease diagnosis and treatment as well as the basic research related to regenerative medicine, including the detection, recognition, processing and analysis of human medical signals, biomedical sensors, chips and micro-nano systems, the modeling and simulation of biomedical systems, medical information system and telemedicine, physical therapy, rehabilitation engineering and brain-computer interface, treatment planning and navigation technology, and robot-assisted therapy, biomedical instrumentation and medical equipment, nano-medicine, drug delivery materials and gene transfer systems, medical biomaterials, cell transplantation, tissue engineering and regenerative medicine, and other scientific issues. Basic researches on the biomanufacturing and three-dimensional printing, bio MEMS, biomedical

instrumentation and medical equipment, treatment planning and navigation technology, robot-assisted therapy, cell / stem cell Therapy, tissue bioreactor building and biomaterials to induce tissue regeneration etc., are also encouraged in this field.

The development of medical imaging and biomedical engineering has been accelerated by multidisciplinary studies. In 2013 there were 997 applications in medical imaging and biomedical engineering, among them 190 funded, funding rate 19.06%, a little bit of increase compared with the funding rate in 2012. Besides, the number of applications in the field of biomedical engineering is still less than the number of applications in medical imaging. The interdisciplinary and collaborative researches with scientists having different academic backgrounds will be also encouraged to further promote the rapid development of medical imaging and biomedical engineering. At the same time, preferential support will be given to young investigators working in above mentioned interdisciplinary scientific frontiers.

The field of the nervous system and mental disorders in the Division does not accept applications concerning tumors in the central nervous system and radiation oncology, which should be submitted to the Division V of Health Sciences（H16）. In addition, the field of Medical Imaging / Biomedical engineering in the Division does not accept radiation oncology and radiological protection as well as pharmacology and drug delivery quomodo applications, which should be submitted to the Division Vor Division VI, and the Division VII of the Department of Health Sciences.

Division IV of Health Sciences

The funding scope of this Division covers basic researches in fields of biological characteristics and infection of bacteria，fungi, viruses, parasites and other pathogenic organisms, laboratory medicine, abnormalities and diseases of skin and its appendages, abnormalities and diseases of locomotor system, emergency and intensive care/trauma/burns/cold injury/plastic surgery, special medicine and rehabilitation.

Medical Pathogens and Infection

The Division mainly supports basic research on collection, preservation, separation and research of medical microbes and parasites as the main pathogenic biological resources, including the pathogen biological characteristics and genetic variation, the infection and pathogenic

mechanism, the drug resistance mechanism of pathogens, the host immune response induced by pathogens, 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 and hot topics in pathogenic organisms and infectious diseases are focused on the heredity, variation and drug resistance of pathogenic organisms, and the host-pathogen interaction. This Division encourages basic research carried out innovatively in the above mentioned areas, and researches on collection and preservation of clinical pathogenic organisms, especially the new and neglected pathogens, as well as related biomedical research.

Laboratory Medicine

In laboratory medicine, the funding scope mainly covers researches 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.

Skin and Its Appendages

The funding scope mainly covers the basic researches on the structure, function and developmental abnormalities of skin and its appendages, as well as hereditary skin diseases, immune skin diseases and infectious skin diseases. With the severe increase of immune and immune related diseases, infectious diseases in this field and their threats to the public health, scientists should take them more seriously. The Division will also pay more attention to the advances in this field.

Locomotor System

The Division mainly supports applications focusing on basic scientific problems of the anomalies in structure, function and development of the

bone, joint, muscle and ligament, the etiology, the pathogenesis, prevention, diagnosis andtherapy of the genetic diseases, immune-related diseases, inflammation and infection, injury and repair, grafting and reconstruction, fatigue and recuperation, degenerative disorders, sports injury, deformity and correction and other neoplastic diseases in locomotor system. 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 support to the relevant applications.

Emergency and Intensive Care Medicine/Trauma/Burns/Plastic Surgery/SpecialMedicine/Rehabilitation Medicine

In terms of emergency and intensive care, trauma, burn and frostbite areas, the Division mainly supports basic and applied basic researches on the pathophysiological processes, pathogenesis, influencing factors, prevention, diagnostic and therapeutic technique, and related translational medicine research of these above diseases. In terms of plastic surgery, the Division focuses on wound healing and scar, superficial tissue and organ repair/regeneration/transplantation and reconstruction, as well as cranio-maxillofacia deformities and corrective therapy. In terms of special medicine, the Division mainly supports basic research probing on the pathphysiological phenomena and their therapies under aeronautical, astronautic, nautical, submarine, plateau, polar region and other extreme environmental conditions. In view of the relatively weak basis in research on aeronautical, astronautic and submarine issues, this Division will give support to the relevant applications. In terms of rehabilitation medicine, basic research on scientific issues arising from the mechanisms and clinical of rehabilitation of dyskinesia and injuries in other organs or systems caused by diseases of locomotor system or nervous system or other relative organ/systems is encouraged.

In view of research proposals received in recent years, the academic quality of proposed research in the Division is rapidly improved. In the basic research field, more and more scientists devoted themselves to choose 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 lack of efficient cooperation with biologists, research on the biological characteristics and the rule of heredity and variation of pathogen are not deep and systematic. 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. The grants to the above related scientific research at the weak link will be moderately increased.

The applications in pathogenic microorganism should strictly comply with the "Pathogenic microbiology laboratory bio-safety regulations" issued by the State Council and rules of "Ethics and Bio-Safety" issued by related ministries. Those applications not complied with these regulations and rules will not be granted. At the same time, tumor topics in the field of skin and its appendages and locomotor system are not accepted in Division IV. These applications should be sent to Division V. In addition, topics on therapeutic drugs and pharmacology should be sent to Division VII or Division VIII. Pathogenic mechanism of molecules and temporal and spatial expression and regulation of genes should not be sent to laboratory medicine. Please apply in other Divisions with related system diseases. Researches on drug-resistant pathogens should apply in the field of pathogen and infection.

Division V of Health Sciences

The Division mainly funds oncology research, involving common features of tumors in occurrence, development and progression, as well as the distinctiveness of tumors of various systems/organs (excluding leukemia) in etiology, pathogenesis, diagnosis, treatment and prevention. The scopes of funding cover not only tumor etiology, tumor development, tumor genetics, 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 including respiratory system, haematologic and lymphatic system excluding leukemia, digestive system, nervous system including tumors of special receptors, genitourinary system, breast and endocrine system, bone and soft tissue, head, neck and maxillofacial, skin, body surface and other parts of the human body.

The scientific goal of the Division is to emphasize, on the one hand, 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, and to lay the foundation for tumor diagnosis, treatment and prevention, and, on the other hand, to highlight the distinctiveness of tumors of various systems and organs. Proposals on translational research based upon clinical experiences and observation of specific systems/organs, which are aiming to promote the clinical practice in tumor diagnosis and treatment, are also emphasized.

Proposals related to common scientific questions of tumor should select relevant application codes in tumor etiology, tumor development, tumor genetics, tumor immunology, tumor recurrence and metastasis, tumor stem cell, tumor diagnosis, treatment (including chemotherapy, physical treatment, biological treatment and comprehensive treatment), tumor prevention, rehabilitation (including social and psychological rehabilitation) and new techniques of tumor research. Proposals related to distinctiveness of tumor of specific systems/organs should choose application codes of corresponding systems/organs. Application codes should be carefully selected in accordance with various scientific fields.

Oncology is one of the most active areas in medical sciences. With the rapid development and integration of cell biology, developmental biology, genetics and immunology, the trends of cancer research are steered towards tumor epigenetics, tumor stem cells, tumor immunology, and tumor systemic biology. Recently, research on cancer epigenetics has emerged as a rapid moving field，for example, the molecular functions of long noncoding RNA have aroused the interest of many scientists. Additionally, 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 focused on the association between specific metabolism of tumor cells and their biological behaviors. Some proposals focused on the role of metabolism pathways in tumorigenesis and tumor development, as well as crosstalk among different signal pathways in cancer cells. On the other hand, the translational values of metabolic factors in tumor biology have been stressed. 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 celldormancy, and tumor heterogeneity. Furthermore, cellular signal pathways are widely studied for their involvement in tumor progression, extending from a single signal pathway to crosstalk among various pathways. It should be noted that based on these studies, medical oncologists have developed novel strategies to reverse the resistance of targeted agents, revealing strong translational values.

In recent years, the quality of proposals in the field of oncology has been significantly improvedin terms of preliminary experimental data and scientific hypothesis. Proposals lacking preliminary data and deriving merely through literature reviewing are declining each year, and are not gaining support from reviewers.

Scientific questions derived 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 are highly encouraged. Integrated research proposals taking the advantage of domestic clinical resources are also encouraged. Applicants are also encouraged to aim their research focus on common and high incidence tumors in the Chinese population.

Applicants should note that the proposals on tumor epidemiology should be submitted to Division VI of Health Sciences, and leukemia-related proposals should be submitted to Division I of Health Sciences. Proposals related to distinctiveness of tumor from specific systems/organs should carefully choose application codes of corresponding systems/organs.

Division VI of Health Sciences

Division VI provides funding to the basic researches in fields of preventive medicine, endemiology occupational medicine, radiology, medical immunology and forensic medicine.

Preventive Medicine

The Division provides funding to basic researches including environmental health, occupational health, human nutrition, food hygiene, maternal and child health care, children and adolescent health, toxicology, analytical chemistry, epidemiology of infectious disease, epidemiology of non-communicable disease, epidemiological methods and medical statistics.

Endemiology

Funding is given to basic researches regarding the natural nidus diseases, biogeochemical diseases and work-related or life style-related diseases.

Occupational Medicine

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

Radiology

Funding is given to basic researches including radiological damage and radiological pathology, radiological hygiene and radiological prevention, radiotoxicology, and nontumor radiological therapy.

Funding for preventive medicine, endemiology, occupational medicine and radiology 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. Investigators should conduct the projects using integrated advance technology of molecular biology with immunology and integrated field studies with laboratory works. In order to demonstrate our national characteristics and prestigious international standing, it is a prerequisite to seek a novel research direction and to make great efforts in prospective research. Basic data accumulation and medical specimen collection will be encouraged in order to carry out in-depth, systematic study on the basis of the existing data and samples by modern medical statistic methods. The basic research about epidemiological cohort study and intervention strategy will be also encouraged.

Division VI does not accept applications for studying cancer radiotherapy.

Applicants may refer to categories under Division V of Health Sciences. Moreover, the Division does not accept applications for studying gynecologic diseases and pediatric diseases. The former may refer to categories under Division II of Health Sciences, while the latter depends on the classification of system characterization. Application of clinical test was not accepted under the category of analytical chemistry. Applicants may refer to categories under Division IV of Health Sciences. The Division does not accept applications of pure laboratory research under the category of epidemiology. Application of hereditary disease without epidemic characters was not accepted under the category of endemiology. The criterion for selecting the category depends on the classification of system characterization. In addition, the Division does not accept applications on drug toxicology and applicants may refer to categories under Division VII of Health Sciences.

Medical Immunology

The funding areas of this discipline cover basic and applied basic research in areas of morphological, structural, functional and developmental abnormalities of immune system, immune metabolism and immune aging, non-classical immune cells, tissues and organs, as well as the mechanism underlying immune pathological process, immune regulation, immunization, immunodiagnostics and immunotherapy of various diseases. Key research directions and areas are as follows: (ⅰ) The discovery of new immune molecules and signal transduction pathways, and their relevance to diseases; (ⅱ) The phylogenesis of immune systems, immune cells and their subsets involved in immune responses, and their relevance to diseases; (ⅲ) The effect of epigenetic modification on immune cell differentiation, and its relevance to diseases; (ⅳ) The inflammation process and its regulation triggered by immune recognition of antigen presenting cells, NK cells etc. (ⅴ) The mechanism underlying the immune recognition- responses- effects by both innate and adaptive immune systems; (ⅵ) Molecular and cellular mechanisms underlying immune regulation and immune tolerance of various diseases; (ⅶ) Mechanism underlying the generation and regulation of immune memory cells in host anti-disease immune response, and the relevance of immune microenvironment to diseases; (ⅷ) 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. The Division will highlight immunological studies in the above areas,

especially studies aiming at taking the 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.).

Forensic Medicine

Specific areas covered in this discipline include basic and applied basic research designed to solve the medical problems during legal practice by using the human body and biological samples. Priority areas include: (ⅰ) the identification of the cause of death, the estimation of the postmortem interval and the time of injury, the determination of the manner of death and injury, the relationship between the postmortem phenomena and the postmortem interval, the basic theoretical research of forensic thanatology, new techniques and new methods of the injury pattern determination; (ⅱ) The pathophysiological changes, molecular mechanisms and intervention studies of the organ damage caused by drug abuse and drug dependence, the study about poisoning and poisoning biomarkers, the identification of toxicants in complicated bio-matrix, the determination of poisoning time, studies of toxicant disposal process; (ⅲ) Biological evidence associated with the verification of the degree of injury and physical disability, relationship between disease and injury, the identification of medical disputes, the forensic identification of abuse and family violence; (ⅳ) Objective assessment of criminal responsibility and civil capacity of the mental disorders; (ⅴ) Basic and applied research of individual identification, paternity identification, complex kinship identification, the identification of the origin of forensic biological stains, ethnic origin identification, and the age estimation through biological samples. Systematic in-depth cross-disciplinary research aimed at providing clues for cases investigation, scientific evidence as the trail of the case, and medical basis for the formulation of relevant laws and regulations by making full use of the

theories and techniques in biology, law science and other scientific disciplines are strongly encouraged.

Division VII of Health Sciences

The Division VII mainly supports basic research and applied basic research in the discipline of materia medica and pharmacology.

Materia Medica

The scope of funding for materia medica focuses on sub disciplines including medicinal chemistry (synthetic, natural products, microbial and marine based bioactive substances), biotechnological drugs, special medicines, drug design and drug informatics, pharmaceutics, pharmaceutical materials, pharmaceutical analysis, drug resources, and other scientific issues related to materia medica.

Interdisciplinary researches are emphasized in the field of materia medica. Researches on chemical synthesis of compounds with medicinal prospect, discovery, structural optimization, preparation, and evaluation for druggability of potential medicinal active substance from terrestrial or marine microorganisms, plants, animals by innovative theories, technologies or approaches will be mainly supported in the sub-disciplines of medicinal chemistry. Researches on therapeutic antibodies, vaccines, proteins, nucleic acid drugs and cells etc., by innovative biotechnologies or approaches will be mainly supported in the sub-discipline of biotechnological drugs, exploratory researches on new types of expression systems and large scale culture techniques will be supported moderately. Researches on drugs related to aeronautics and astronautics, deep sea, radiations, militaries and special environments etc., will be supported in the sub-disciplines of special medicines. On the basis of biology, chemistry, systems biology, pharmacological principals such as ADME, drug transporters etc., and applying innovative theories and approaches to drug design, computer-aided drug design and pharmaceutical informatics to design drug, evaluate druggability and predict drug safety will be supported in the sub-discipline of drug design and drug informatics. Researches on new theories and technologies related with pharmaceutical dosage forms, physical pharmacy, biopharmacy, novel drug delivery systems and new dosage forms will be supported in the sub-discipline of pharmaceutics, and much attention should be paid to druggability in the related researches. Basic researches on development and safety evaluation of new pharmaceutical excipients and

carriers will be supported in the sub-discipline of pharmaceutical materials, in which related researches should have outstanding features and be different from researches in pharmaceutics. Researches on establishment and development of innovative analytic approaches and techniques aimed to solve key scientific problems in the field of materia medica and pharmacology will be supported in the sub-disciplines of pharmaceutical analysis, in which innovative testing approaches should be emphasized in the fields of inter-disciplines such as "-omics", drug metabolism andchemometrics researches. Researches on key scientific problem of discovery, prospecting、exploration, mining and protection, sustainable utilization of new pharmaceutical resources will be supported in the sub-disciplines of drug resources.

Pharmacology

The scope of funding for pharmacology focuses on research fields of drug action mechanism or drug resistance mechanism of therapeutic drugs or drug candidates or bioactive products with some advantages in treatment of a disease, drug metabolism and pharmacokinetics, drug toxicology and clinical pharmacology et al.

Much emphasis will be placed on further in-depth study on action mechanism of drugs and bioactive products in the discipline of pharmacology, including researches on basic rule of life activity and pathologic mechanism of disease by using drug molecular probe. On the one hand, systematic and deep mechanism research should be strengthened in pharmacological proposals in aspects of discovery and validation of new target, establishment of novel screening models, site of action, target identification, regulatory network and overall effect, pharmacokinetics and toxicity of new types of active compounds. On the other hand, basic research should be strengthened in pharmacological proposals in aspects of molecular regulatory network of complex disease and drug intervention, individualized drug therapy, new treatment program, translational medicine, innovative pharmacological model and disease models. In addition, in the sub-discipline of pharmacokinetics, new approaches and new models should be developed, and researches on molecular biological mechanism related with pharmacodynics, drug toxicology and drug intervention should be strengthened. Researches on molecular toxicology, metabolite toxicity and drug safety evaluation of new models and new approaches should be strengthened in drug toxicology.

In recent years, a large proportion of proposals in materia medica were still from sub-discipline of synthetic medicinal chemistry, natural product chemistry and pharmaceutics, in which，too many proposals were related with antitumor drug research (nearly 50% in 2013, especially in sub-discipline of pharmaceutics). The research contents should be further in depth and researches on druggability of compounds and drug delivery systems should be emphasized. Most researches in pharmacological proposals were carried on around drug action mechanism or drug resistance mechanism. Some characteristic applications could be founded based on long term work accumulation, while most studies on mechanism were still limited to the description of drug biological activities and fewer proposals were focused on the discovery of new targets and intensive study on molecular mechanism. Proposals with good topics may fail to be approved due to insufficient preliminary data and inadequate justification for the project, or oversized research plan, insufficient study in depth, ambiguous research objects, et al. Quite a few proposals were not funded because their research topics were short of innovation, or the application forms were too simple, or early studies were not enough.

Funding priority will be given to the applications with creative basic research and continuous in-depth research. Because translational medicine is of far reaching importance in improving clinical application value of basic research, the Division will strengthen laboratory basic research based on new discoveries from innovative drugs, clinical therapeutics and diagnostics, in order to discover new drug targets and diagnostic markers of disease during the procedure of exploring the mechanism of occurrence and development of disease, and establish the theoretical and experimental basis to develop innovative drugs and diagnostic reagents with independent intellectual property.

The scope of funding does not cover conventional research and pharmaceutical craft research aiming at new drug approval. The applicants should pay special attention to the protection of intellectual property and deal with care the relationship between application and secrecy. Any proprietary contents or techniques such as chemical structures, which are inconvenient to illustrate in application should be sent to the Division directly by confidential letters, and should be explained in application documents.

Division VIII of Health Sciences

The Division VIII of Health Sciences identifies its role as advancing the theories of traditional Chinese medicine (TCM) while highlighting its uniqueness. It provides funds to basic research programs in Chinese medicine (CM), Chinese materia medica (CMM) and integrated Chinese and western medicine (IM).

Chinese Medicine

Funding areas: (ⅰ) Fundamental theories of CM: essence of viscera, Qi, blood and body fluid, body constitution, etiology and pathogenesis, basis of syndrome, therapeutic principles and methods, prescription of CM, and diagnosis of CM; (ⅱ) Basic research in clinical medicine: internal medicine of CM, surgery of CM, orthopedics and traumatology of CM, gynecology of CM, pediatrics of CM, ophthalmology of CM, otorhinolaryngology of CM, stomatology of CM, geriatrics of CM, and health preservation and rehabilitation of CM; (ⅲ) Acupuncture and massage: meridians and collaterals, acupoints, acupuncture and massage; (ⅳ) Ethnomedicine.

Chinese Materia Medica

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

Integrated Chinese and Western Medicine

Funding areas: (ⅰ) Fundamental theories of integrated Chinese and western medicine;(ⅱ) Basic research in clinical integrated medicine;(ⅲ) Methodological or technical innovations in CM research.

The Division has identified a few tendencies in the current CM, CMM and IM research:(ⅰ) Innovative and creative idea plays the most important role.

Novel theories and techniques from the frontier of life sciences and other fields have been continuously introduced to this area; (ii) More in-depth studies have been done in different levels such as a whole body, a system or organs, cells and molecules, guided by the CM theory and nested in clinical practice; (iii) The pattern of human vital activities and its integrated regulatory system have been investigated through a combination of macro- and micro-perspectives; (iv) Principles and research thoughts of emerging disciplines such as system biology, network pharmacology, evidence-based medicine and translational medicine have been given more attentions to and applied in the basic TCM research and thus facilitate its development.

Generally, the Division will continue to encourage interdisciplinary cooperation, and the use of up-to-date concepts, methods and technologies from multiple fields for enhancing TCM inheritance, development and innovation. Particularly, basic and further research based on previous studies has been deemed top priority. Research should combine organically with TCM theories and avoid mechanism studies separated from clinical efficacy, and improper or unnecessary use of advanced technologies should be discouraged.

Given the current situation, the Division will give priority to support researches in the following areas in 2014: doctrine of viscera, syndrome and pathogenesis, prevention and treatment of TCM advantage diseases, prevention and treatment of major incurable diseases, basis of clinical efficacy evaluation, the correlation of classic prescription with syndrome and disease, basis of meridians and collaterals, mechanisms underlying acupuncture and moxibustion treatment, theoretical and clinical basis of IM, methodological innovation of CM; resourceology and authentication of CMM, processing and pharmaceutics of CMM, theory about the properties of CMM, pharmacodynamic material basis of CMM, pharmacokinetics and mechanisms,of CMM, toxicity and toxicology of CMM, relationship between toxicity and efficacy of CMM, and ethnopharmacology, etc.

It should be noted that the proposal will not be supported if: (i) It does not provide genuine thoughts on CM theories or practice, but only with the name of some herbs, prescriptions or herbal ingredients; (ii) No specific herbs or acupoints are provided in the proposal regarding the research of CM prescription or acupoints (unless the applicant provides a confidential letter directly addressed to the Division and specify the situation in the application form); (iii) It only focuses on the derivatives of active ingredients of CMM or on the chemical synthesis of these ingredients.

Key Program

As an important type of the research programs supported by the National Natural Science Fund, the Key Program 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.

Applications for Key Program should be prepared in principle of limited objectives, limited research scope and focused goals, paying attention to intercrossing of disciplines, making effective use of the existing major scientific research bases at national and ministerial levels, and conducting 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 of the Key Program.

Research areas and directions for the Key Program are annually announced in the *Guide to Programs*. Applicants should follow the guidelines to write proposals, determine project title according to research content, and avoid using research area as project title. Applications are advised to have clear research orientation and specific 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 as collaborators. The duration of a Key Program project is 5 years.

In 2013, NSFC funded 564 Key Program projects, with a total funding of 1.663billion yuan and an average funding of 2.9486 million yuan per project (please refer to the table below for details). In 2014, about 570 Key Program projects will be funded, and the average funding will be about the 3.5 million yuan per project.

Funding of the Key Program Projects in 2013

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	224	63	19,100	303.17	11.49	28.13
Chemical Sciences	251	59	17,950	304.24	10.79	23.51
Life Sciences	458	82	24,710	301.34	14.86	17.90
Earth Sciences	430	76	23,210	305.39	13.96	17.67
Engineering and Materials Sciences	364	82	24,830	302.80	14.93	22.53
Information Sciences	273	82	23,700	289.02	14.25	30.04
Management Sciences	146	30	6,680	222.67	4.02	20.55
Health Sciences	481	90	26,120	290.22	15.71	18.71
Total	2,627	564	166,300	294.86	100.00	21.47

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

Department of Mathematical and Physical Sciences

In 2013, the Department of Mathematical and Physical Sciences announced 84 areas for the Key Program, and received 224 applications. 63 projects were funded with funding of 191 million yuan and about 3.0317 million yuan per projects.

In 2014, the Department plans to fund 60-71 Key Program projects with more than 3 million yuan per project for 5 years.

To ensure the high quality of research projects, applicants are required to have ever chaired and completed national projects, and strong research teams.

Please give the title of the proposed research directions in the note section of the application form, otherwise the application will not be accepted.

The funding scope and research directions for the Key Program of the Department of Mathematical and Physical Sciences in 2014 are described and classified in different divisions below.

In 2014, the Division of Mathematics plans to fund 12-14 Key Program projects, ranging from 2 to 3 million yuan per project and 2.8 million yuan on average.

Main research directions are as follows:
1. Problems in arithmetic and algebraic geometry
2. Lee theory and its application
3. Symplectic geometry and symplectic topology
4. Geometry and topology of low dimensional manifold
5. Studies on frontier problems in complex analysis and complex geometry
6. Analysis in functional space
7. Theory and application of operator space
8. Theory of operator algebra classification
9. Theory of stability of partial differential equations
10. Ergodic theory and application
11. Nonlinear diffusion equation
12. Stochastic method in complex fluid and statistical mechanics
13. Statistic method and computation in large data and experimental designs
14. Theory and algorithm of large scale optimizing problems
15. Multi target optimization of complex systems
16. Theory and application of stochastic control
17. Mathematical theory and method of image merging and recognition and orientation process
18. Theory and application of fractal geometry
19. Discrete mathematical model and its application
20. Numerical methods and theory of partial differential equations on manifold

In 2014, the Division of Mechanics plans to fund 13-16 Key Program projects, ranging from 3 to 4 million yuan per project and 3.8 million yuan on average.

Main research directions are as follows:
1. Nonlinear and uncertainty system dynamics
2. Modeling, analysis and control of complex system dynamics
3. Deformation and damage mechanism of advanced materials
4. Theory, method and application of structural completeness and reliability
5. Mechanical behaviors of material and structure in multi field conditions
6. Unsteady complex flow mechanism and control
7. Hydro dynamics of ships, marine and coastal engineering
8. Flow and propulsion mechanism of aircraft and space craft
9. Biomechanical problems in human health and clinical medicine
10. Transient response of structures, explosive and impact dynamics
11. Numerical methods and software for complex mechanical problems
12. New methods and technology in experimental mechanics
13. Key mechanical problems in environmental evolution and catastrophe
14. Key mechanical problems in major equipment and advanced manufacturing
15. Key mechanical problems in non-conventional conditions
16. Key mechanical problems in new energy areas

In 2014, the Division of Astronomy plans to fund 7-10 Key Program projects, ranging from 3 to 4 million yuan per project.

Main research directions are as follows:
1. Formation and evolution of first generation celestial body and large scale cosmic structure and measurement of its cosmic parameters
2. Formation, structure and evolution of galaxies, interstellar matter
3. Violent activities in active galaxy center and galaxy levels
4. Structure and evolution of very early Galaxy and different stellar populations
5. Star formation, structure and evolution, inter stellar matter
6. Star evolution in late period, compact stellar bodies and its related explosive phenomena and radiation mechanism
7. Celestial bodies in solar system and planetary systems outside the solar system
8. Fine structure, basic magnetic element diagnosis and property, magnetic field topology in active region and evolution of solar magnetic field
9. Origin, dynamical evolution, multi band electromagnetism and particle radiation of solar activity and solar earth physical property
10. Structure, heating and fluctuation of solar atmosphere
11. Basic theory and methods of astrometry and astro-mechanics
12. High precision astronomical parameter measurement and astronomical reference frame

13. Techniques and method for astronomical observation in space and extreme environment
14. Low noise and array receiving technology, digital signal processing and large aperture radio telescope technology
15. Autonomous optics, self-adaptive optics, optical interference and very large aperture telescope technology

In 2014, the Division I of Physics plans to fund 14-16 Key Program projects, ranging from 3 to 4 million yuan per project.

Main research directions are as follows:

1. Physical problems in new sources of energy

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

2. 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

3. 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) New materials and new effect of linear optics

4. 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

5. 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

6. 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 and in extreme conditions
(3) Exploration and application of computation methods

7. Atomic and 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 impact process
(3) High precision theoretical method and computation of atomic molecular multi body relevant effect

8. 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 measurement and control of regulated light pulse and quantum state evolution
(3) Physical property of large molecule and cluster system and relevant quantum process

9. Cold atomic molecular physics and precision measurement
(1) Cold atom molecule and ion preparation and control
(2) Cold atomic system and quantum simulation
(3) Measurement of atomic and molecular precision spectrum and physical parameter

10. Optical field regulation and imaging
(1) Nano optical field regulation mechanism and method
(2) Principles and applications of ultra-high resolution optical imaging

11. New type of light source and new spectrum physics and technology
(1) Spectral method based on new light source
(2) EUV and other ultra-short wave length coherent radiation generation and regulation
(3) New mechanism and new technology of photoelectric, electric photo transformation

12. Ultra-fast, ultra strong light physics
(1) Atto second laser generation, measurement and application
(2) Ultra-fast laser regulation techniques and physics
(3) Interaction of ultra-fast strong optical field with atomic, molecular and micro nano materials
(4) Nonlinear optics in relativistic conditions

13. New phenomena in quantum
(1) Strong photon-atomic coupling and cavity quantum electro dynamics
(2) Quantum optical problems in solid state and manmade structures
(3) Quantum optical problems in open system
(4) Quantum opto-mechanical effect

14. Advanced acoustic material and energy converter
(1) Basic physical problems in advanced acoustic materials and energy converter
(2) Acoustic device, sensor and array

15. 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 method of marine acoustic chromatography and its applications in fast forecast of speed of sound in sea water

16. 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

In 2014, the Division II of Physics plans to fund 13-15 Key Program projects, ranging from 3 to 4 million yuan per project and 3.8 million yuan on average.

Main research directions are as follows:
1. Frontier issues in basic theory of mathematical physics and quantum information
2. Frontier issuess in statistical physics
3. Frontier issues in theory related to the nature of gravitation
4. New physics of over the standard models

5. Studies on τ charm physics
6. studies on the properties of hadron spectrum and hadron structure
7. Studies on frontiers of heavy ion physics and new forms of matter
8. physics related to Lepton and photon nuclear reaction
9. advanced techniques and experimental methods of neutron physics and its applications
10. Basic research on nuclear technology applications in environment, material and health sciences
11. Studies on physical problems and key technology in nuclear radiation protection and environmental protection
12. Accelerator physics, accelerator physics and advanced technology
13. Nuclear detection and advanced technology of nuclear electronics
14. frontier issues of inertia confined fusion and laser plasma physics
15. Magnetic confined fusion plasma physics and new methods of diagnosis
16. Basic research on low temperature plasma physics and key technology
17. Studies on advanced technologies and experimental methods of synchrotron and neutron scattering

Department of Chemical Sciences

During the first three years of 12th Five-Year Plan period, the number and the funding intensity of Key Program projects supported by the Department of Chemical Sciences were remained relatively stable. In 2013, the Department funded 59 Key Program projects with 179.5 million yuan and 3.0424 million yuan of average funding intensity per project. The duration of each project is 5 years. In 2014, the Department will announce guidelines and accept proposals in 60 research areas, and the average funding intensity will be from 2.0 to 4.0 million yuan for each project. In order to further improve the quality of projects, proposals from those groups and teams with excellent research resources are welcomed, and proposals for interdisciplinary research suggested by teams which have strong background in cooperation are encouraged.

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

In 2014, the research areas for Key Program projects funded by the Department are listed as follows:

1. Compounds with multi-hole structure and their function

2. Molecule-base oriented functional materials
3. Inorganic solid functional materials
4. Metal coordinative compounds and its catalytic property
5. Basis of bio-inorganic chemistry
6. Basis of applied inorganic chemistry
7. Function of inorganic nano-materials and their application
8. New reaction and new agent in the organic synthesis
9. Control of selectivity in organic reactions
10. Synthesis and catalysis of metal organic compounds
11. Basis of green and sustainable organic chemistry
12. Intermedia in organic reaction and its reaction mechanism
13. Molecular recognition and chemistry of molecular aggregate
14. Material chemistry of organic molecular with function
15. Biological and bionic organic chemistry
16. Interaction between micro-molecule and bio-macromolecule
17. Discovery and modification of bio-active molecule as well as its application
18. Experiment research of structure chemistry oriented by function
19. New methods in theoretical and computational chemistry and their application
20. Physicochemical basis of catalytic materials and catalytic process
21. Research on molecular reaction kinetics
22. Physicochemical basis of colloid and interface
23. Electrochemical basis in the process of energy conversion and storage
24. Physicochemical basis of photochemistry and photoelectrical chemistry
25. Experiment and theoretical research of chemical thermodynamics
26. Experiment research of bio-physical chemistry
27. New spectrum methods used for studying physical chemistry
28. Physicochemical basis in optimized utilization of resource/energy
29. Physicochemical basis of solid and surface
30. Synthetic chemistry of polymers
31. Structure and properties of polymers
32. Polymers with photoelectric function
33. Biological and medical polymers
34. Theoretical computation and simulation of polymer
35. Structure on condensed state of polymers
36. Polymers with echo function
37. New methods of separation and analysis of complex samples
38. Image formation and *in-situ* analysis of living body
39. Analytic chemistry of mono-molecule and mono-cell
40. Analytic chemistry basis of the chemical sensors and bio-sensors

41. New methods and new principle for analysis of controllable nano-micro-fluidics
42. Detection and determination of proteins and their functional study
43. New methods for detecting markers of major diseases
44. Key scientific issues in the area of bio-chemical engineering
45. Chemical engineering basis in the area of foods and medicines
46. Chemical engineering foundation for the high effective clean utilization of fossil energies
47. Chemical engineering foundation in the explore and utilization of new type energies
48. Key scientific issues related to chemical product engineering
49. Design of new materials for chemical engineering and their functional regulation
50. Chemical engineering basis related to the high effective utilization of resources
51. Scientific and engineering basis of typical chemical reaction and scale-up of reactor
52. Scientific foundation for environment and safety of chemical engineering
53. Transfer process and separation process
54. State existed, movement and conversion of permanent pollutants with poison in water environment
55. Interface process of pollutants and biological utilization
56. New methods for pollution control
57. Exhausting characteristics and environmental behavior of chemical pollutants (e.g. PPCPs and so on), and principle of new technology for reducing exhaust
58. Environmental exposure and toxicological mechanism of chemical pollutants and their health risk
59. Chemical modification and functional regulation of bio-macromolecules in the plants

    It is to study of new methods for chemical modification and marker of bio-macromolecule in plants and to explore regulation of its bio-function
60. Research on interfacial material system with bionic, intelligence and super-soakage function and its application

    This is a project cluster, that is encouraged to carry out basic research on interfacial material system with bionic and intelligence function oriented by practical use. Its focuses are to study material composition, micro/nano-structure, as well as relation and rule between them and function through extracting bionic parameters from living system, and to design and prepare new interfacial material with bionic intelligence.

The directions of the project cluster are:
(1) Fresh water collected by using bionic intelligence fiber;
(2) Intelligence nano-material for separation between oil and water;
(3) Anti-biological adherence interface with multi-scale bionic;
(4) Advanced energy conversion material with bionic nano-passageway and assembly of devices;
(5) Intelligence micro/nano-material used for regulating therm-energy.

The 59th research direction in above is a Key Program project driven by disciplinary frontier, while the 60th is a Key Program project cluster driven by Department. The applicant may form his/her research team to apply one of them according to international development trend and combining the basis and interest of self-studying work. When filling in the application form, the applicant should select corresponding code according to mainly studying content. The General Office of the Department will accept and handle the proposals.

Department of Life Sciences

The Department of Life Sciences continues to accept two types of applications for the Key Program. One of them, as the major part in total applications, is guided by designated areas (ADA for short) and the other, which is a complementary part, is to freely select research areas (ANA for short). In 2013，the Department of Life Sciences received 458 applications, among which, 349 applications were for ADA and 321 were accepted, with 61 projects being funded at a funding rate of 19.00%, and 109 applications were for ANA and 102 were accepted, with 21 projects being funded at a funding rate of 20.59% (counting by applications accepted).

In 2014, the Department of Life Sciences will continue to accept applications for ANA, so the applicants should read carefully the type of acceptance in each subject of this *Guide to Program*. Subjects which will accept the projects in two patterns (both ADA and ANA) include 10 subjects: microbiology, botany, forest science, biophysics, biochemistry and molecular biology, neuroscience, cognitive science and psychology; genetics and bioinformatics; cell biology, developmental biology and reproductive biology; plant protection; horticulture and plant nutrition. Tensubjects will accept the projects only for ADA, and refuse application for ANA, including ecology, immunology, biomechanics and tissue engineering; physiology and integrative biology; basic agriculture and crops, food sciences; zoology;

animal husbandry and grassland science; veterinary and aquatic science. Applicants should carefully read the application requirements, notes, and the funding plan of the department in this chapter for Key Program in 2014, to apply for the Key Program in line with the requirements of this guide. Moreover, since the research areas in the Department of Life Sciences covers biology, basic medicine and agricultural science, the designated areas of key program in each subject is closely related with the funding scope of the subject. Please note that applicants should correctly apply for the Key Program according to the funding scope and the category not supported described in the General Program part of this *Guide to Program*. The rules for categories not funded by the General Program will also apply to the Key Program.

Applicants for ADA should correctly fill in the corresponding application code listed in each Division when writing application. Proposals for ANA may choose autonomously the application code pertaining to its research content. The concrete requirements for application to the Key Program projects 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 application texts in reference to the guidelines of designated areas issued by the Department in 2014. In the column of Annotations on the basic information table of the application form, applicants should fill in the applied research areas, and fill in the corresponding application code lined out in each Division's designated areas correctly. Please note that the designation of application codes for the Key Program projects is just done for the sake of efficient management, whereas the application codes appointed may not include all the research contents of the designated areas, so 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 who have achieved great progress, and urgently in need of key support, while their research contents is not included in ADA of the Department of Life Sciences this year. Study belongs to the area of new frontline or new orientations of the subject, and which is not covered in ADA of the year, and applicants have sound basis of research work in this field, and urgently need intensive support in order to further their research.

Applicants for this category shall specify with “Application for Free Areas” in the column of “Annotations”. Moreover, 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 required to elaborate and emphasize the rationale for ANA, the important innovative progress closely related to this application, relevant research basis and papers published in international important academic journals, etc. Papers representing the “significant progress achieved” in the application should be those published in recent years, and applicants must be the first author or corresponding author.

(3) Applicants for the Key Program (including both ADA and ANA) of the Department are required to attach the first pages of five representative papers relating to the applications.

In 2014, based on the overall arrangement for the Key Program of NSFC, the Department will arrange a budget of 250 million yuan, and support about 83 Key Program projects. The funding intensity is around 3 to 4 million yuan per project, Applicants should put forward reasonable budget according to the actual needs of their research. Besides, in filling in the budget in the application, applicants need to add detailed justification for the budget in the proposal for the peer review and final approval of funding. Applications will not be approved for funding without such 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 2014 are as follows:

1. Biological characteristic of important human pathogenic microbe and its pathogenesis
2. Division, differentiation of plant cell and regulation mechanism of organ formation
3. Biodiversity function and its maintaining mechanism of ecosystem
4. Degeneration and restoration of ecosystems
5. Formation, increase and maintaining mechanisms of forest productivity
6. The structure, function and regulation mechanisms of non-coding RNA
7. Cellular and molecular mechanisms of immunological tolerance
8. Cell and molecular regulation of immunological recognition
9. Biology/mechanic mechanisms of interactions between biomaterial stuff and organisms
10. Multiscale, multimode biomedical image and signal transduction
11. Physiological and pathological mechanisms of cell functional

abnormality
12. Interaction between tissues(or organs) during the maintaining of organism function stability
13. Development of nerve cells and its function
14. Molecular genetic basis of quantity or complex traits
15. The establishment and maintaining mechanism of cell polarity
16. Epigenetic regulation mechanisms of organ development of model organisms
17. Formation and its regulation mechanisms of important agricultural traits of crops
18. Response and resilience mechanisms of crops to abiotic environment
19. Biological basis of food processing
20. Occurrence, migration and control of hazardous substance of food
21. Immunological mechanisms of crops
22. Response mechanisms and control of gardening crops to adversity
23. Physiological and molecular mechanisms of domestic animal reproduction
24. Gastrointestinal microbesof domestic animals and nutrient metabolism
25. Etiology of important epidemic disease of poultry and its infectious mechanisms
26. Basic research of new method of testing animal epidemic diseases
27. Etiology of aquatic animals and the anti-diseases mechanisms of host
28. Genetic basis of good traitsof aquatic animal
29. Biogeography of important fauna
30. Reproduction biology of rare and endangered animals

Moreover, in view of the problems existing in the past, the Department particularly reminds applicants of avoiding any of the cases listed below in 2014. Otherwise, their proposals may be refused during the preliminary checking procedure:

(1) Applications for ADA do not specify the title of designated research areas in the column of “Annotations” of the basic information table in the application text.
(2) Applications for ADA do not fill in the corresponding application code claimed by this guide.
(3) Applications for ANA do not specify “ANA” in the column of “annotations” of the basic information table in the application text.
(4) Applications for ANA do not offer an around-800-Chinese-character description about the important innovative progresses already achieved claimed by this guide.
(5) Applicants for Key Program projects (including both ADA and ANA) do

not attach the requested first pages of five representative papers to the application documents.

(6) Applicants applying for ANA to certain disciplines but the division do not accept such 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 indicate the designated areas in the "Annotation" column, but the actual research contents do not match the scope of funding.

(9) Applications submitted by applicants who are still working abroad, or who cannot ensure necessary time and efforts for implementing the proposed research in China.

For other issues to be noted for writing applications, 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 on 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.

In 2013, the Department of Earth Sciences received 430 proposals for the Key Program, and 76 were funded with a total of 232.1 million yuan. In 2014, about 80 projects will be funded, with a preferred range of 300 to 500 million yuan. The required research period of a Key Program project is 5 years.

Special notes for applicants: in 2014, titles of 11 themes to accept proposals for the Key Program in the Department of Earth Sciences are as follows: “Environmental evolution and life processes on the planet Earth”, “Origin, evolution of the continents and geodynamics”, “Theoretical studies on the forming process and exploration of mineral resources, fossil energy”, “Process and mechanism of weather, climate and atmospheric environment change” , “Global environmental change and multi-sphere interaction of the Earth”, “The effect of human activities on environment and its mechanism”,

"Processes and mechanisms of the changes in terrestrial surface system", "Evolution and regulation of the water and soil resources", "Marine processes, resources and environmental effects", "Solar-terrestrial space environment and space weather", and "Earth observation and information processing".

In regard to the problems emerged when applying Key Program projects, applicants must fill in "Annotations" in the proposal sheet with ONE of the above 11 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 2014:

(1) Biodiversity and evolution of ecosystems during critical transitions
(2) Reconstruction of life evolution and environment under the high-resolution temporal framework
(3) Origin and systematic evolution of important fossil groups and their environmental implications
(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) Process 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) 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 2014:

(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) 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 Earth and surface process
(10) Mechanism of magmatic activities and metamorphic process
(11) Deep Earth fluid and water-rock interaction
(12) Volcano and geothermal activities and related deep processes
(13) Cenozoic structural deformation, seismogenic process and geoharzard mechanisms

(14) Correlation and interaction between the Earth and near earth objects
(15) Experimental petrology and simulation of geological processes

About 6 to 8 projects will be funded.

3. The formation mechanism and the application of detection methods for mineral resources and fossil energy

The scientific objectives of this field are to realize the breakthrough of the metallogenic theory in shallow crustal structures using ore field tectonic analysis, regional ore-forming fluid tracers, unique metallogenic system and continental geodynamics; to carry out research on large-scale basin dynamics associated with oil and gas accumulation theory and non-conventional natural gas reservoir forming dynamics; to improve oil and gas geological system theory which is suitable to the complex geological conditions in China; to establish and improve the detection method and the theory of concealed ore deposits and deep oil and gas reservoirs; to reveal the evolution characteristics of regional groundwater flow system and identify factors influencing formation and evolution mechanisms of the groundwater dynamic field and chemical field.

The main research direction in this field as follows: continental geology and mineralization; metallogenic models; metallogenic system and mineralization mechanisms; the dynamics of sedimentary basins and hydrocarbon accumulation; regional groundwater hydrology and environmental geology evolution; deep and large deposit (pool) ore-bearing information detection and extraction.

Key research directions to be supported in 2014:

(1) The massively enrichment mechanism of the ore-forming materials in sedimentary basin and magma systems.
(2) Mineralization and metallogenic regularity of unique metallogenic units.
(3) Metallogenic specialization in different continental geo-dynamic environments.
(4) Regional fluid system tracing and metallogenic system evolution in areas where large ore bodies are concentrated.
(5) The characteristics, structural model and exploration indicators of different types of metallogenic system.
(6) Regional geo-dynamics evolution of large basin and hydrocarbon accumulation.
(7) Systematic evolution of the Earth and the sedimentary environment of

hydrocarbon reservoirs in basins.
(8) The formation, evolution mechanism, geophysical response and characterization of concealed mine and deep, non-conventional oil and gas reservoirs.
(9) The principle and method of ore bearing information detection and extraction of large, deep ore deposits.
(10) The regional groundwater flow system and the space distribution law & detection theory of 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 2014:
(1) New theories and methods for critical atmospheric variables detection
(2) Data integration among the atmospheric and other observations of the earth system
(3) Numerical coupled model Development
(4) Evolution and dynamical mechanism of weather and climate systems
(5) Process andmechanism of regional air pollution
(6) Research on the dynamical-physical-chemical-radiative processes within the planetary boundary layer, the middle or upper atmospheric levels, and those interactions between the middle and upper atmospheric levels.
(7) Interactions among ocean, land and atmosphere in Asian Monsoon area and their impacts on climate system
(8) Impacts of the 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 2014:
(1) Causes of formation of decadal-to-centennial-scale Asian monsoon system

(2) Characteristic and mechanism of the typical climate events in warm periods in Asia
(3) Regulations of regional water cycle and the linkage to climate change
(4) Regulation and mechanism of precipitation and dry-wet transform in westerly areas
(5) Mechanism of the marine environment change and its interactions with the climate system
(6) Key processes of the biosphere under the background of global change
(7) Characteristics of the biogeochemical cycle, and the interactions with the climate system
(8) Causes of the global change induced by natural and anthropogenic activities
(9) Causes and mechanism of global warming within the recently 10-15 years.
(10) Development in the Earth system model and relevant simulations
(11) Short-term Prediction or long-term projection of the global climate change

About 6 to 8 projects will be funded.

6. Mechanisms of human activities' effect on environment

The scientific objectives of this area are to study the effect mechanisms of human activities on environment, such as industrial and agricultural production, infrastructure construction, resources and energy exploitation, urbanization process etc., by multi-disciplinary and intercrossing disciplinary research, and understand the role of human activities in global and regional environmental evolution and the potential catastrophic consequence in the Earth system caused by human activities, for providing scientific basis to reduce global disaster, protect earth environment and promote 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 2014:
(1) Revitalization of cultivated land, change of land use and their environmental effects
(2) Urban and regional development and the environmental changes
(3) Process of groundwater pollution and its environmental remediation
(4) Environmental process of pollutants and impact mechanisms of ecological health
(5) Geological environmental and hazardous effect in major infrastructural projects and major geological disaster prevention and control
(6) Mechanisms of geological hazards caused by the exploitation of resources and prevention and control
(7) Vulnerability and recoverability research of the system with the Earth's surface, human activities and environment

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, and elucidate the interaction processes and coupling mechanisms between human and nature for providing the scientific basis to the 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

Research orientations in 2014:
(1) Interactions between climate and landform, and the environmental and disaster effects
(2) Processes and effects of cryosphere
(3) Geomorphologic processes and regional geomorphologic evolution
(4) Interactions between soil and vegetation and their spatial heterogeneity
(5) Biogeochemical cycle processes of key zones in the terrestrial surface system

(6) Migration and transformation of materials in typical ecosystem
(7) Mechanisms of ecosystem degradation and restoration
(8) Ecosystem processes and services
(9) Interaction mechanisms between patterns and processes of terrestrial surface system
(10) Scaling and scale effect in key geographic processes
(11) Synthetic integration and simulation of terrestrial surface system processes

About 6 to 8 projects will be funded.

8. Evolution and regulation of water and soil resources

The scientific objectives of this field are to elucidate the evolution processes of water and soil and their coupling mechanisms, to reveal the principles of formation and evolution of water and soil resources, and to develop 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 2014:
(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) Hydrological processes of ecosystem, cryosphere and frozen soil
(9) Watershed hydrological processes and their simulation
(10) Interactions between ground water and surface water
(11) Environmental effects and regulations of water and soil under the intensive land use
(12) Carrying capacity and safety of regional water and soil resources

(13) Valuation and ecological compensation of water and soil resources
(14) Formation and transformation of regional water resource

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 2014:
(1) Dynamical mechanisms of the meso-small scale ocean processes
(2) Multi-scale air-sea interactions and their impact on the regional climate
(3) Shelf circulation and mass transport
(4) High resolution recording the environmental evolution in the marginal seas and the comparison of ocean-continent records
(5) Marine magmatism and tectonic evolution
(6) Formation of oil-gas system in the deep ocean and the subsidence processes
(7) Environmental impacts of development and utilization of submarine resources
(8) Biogeochemical cycle of carbon, nitrogen, sulphur and phosphorus from microbiology
(9) Ocean physical-biogeochemical interaction
(10) Carbon cycle and ocean acidification
(11) Process and mechanism of coastal ocean environmental evolution and

ecosystem disaster
(12) Adaptation mechanism of marine biology to environmental changes
(13) Oceanic process and ecosystem evolution in the Antarctic region

About 6 to 8 projects will be funded.

10. Sun-Earth space environment and space weather

The scientific objectives of this area are to form a theoretical frame of the global cause-effect chain of space weather processes so as 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 for serving the safety of astronautic activities; 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 120° E Meridian Project observations and to encourage studies on hazardous space weather events during the 24th solar cycle.

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 2014:
(1) Solar driving source of space weather, related physical mechanisms and activities during the solar cycle 24
(2) Fundamental physical process in space weather and Sun-Earth connection
(3) Multi-scaled spatial and temporal structures in solar wind, magnetosphere, ionosphere and upper atmosphere; their evolution and couplings
(4) Prediction model and method in space weather, early warning of

hazardous space weather
(5) Investigations of effects of space weather on astronautics, telecommunication, navigation, materials and human health
(6) New concept, principle, method and technique in space weather exploration, project pre-research in space exploration
(7) Theory of geodetic survey, and the process and mechanism of mass transport of the Earth
(8) New theory and techniques for integrated geodetic observation by land, sea, air and space-based Earth observation systems
(9) Theory of multi-source geodetic data fusion and its applications
(10) New theory and methodology for time-variable geodesy and theory of geodetic inversion

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 2014:

(1) Interaction mechanisms between electromagnetic waves and complex land surface and theory of remote sensing modeling
(2) High precision inversion model and parallel efficient computing method of global Earth surface parameters
(3) Theory and methodology of the remote sensing inversion of complex Earth surface parameters, and the validation in remote sensing inversion products
(4) Theory and methodology of determination of high precision time benchmark and space datum
(5) Tempo-spatial framework and its construction theory and method for the digital Earth and smart Earth
(6) Model and structure of new spatial-temporal GIS data
(7) Geographical data sampling and spatial-temporal statistical analysis method
(8) Methodology of the assessment and integration of ubiquitous geographic information
(9) High precision remote sensing inversion of atmospheric composition and footprint analysis of greenhouse gases
(10) Remote sensing analysis and systematic simulation of the cycle of global water, carbon and nitrogen
(11) GIS analysis and simulation of human and natural processes

About 4 to 6 projects will be funded.

Department of Engineering and Materials Sciences

In 2013, the Department received 364 proposals for the Key Program, and among them, 82 proposals were supported in 83 fields including 3 Key Program projects in the prioritcy areas of the Department. The total funding is 248.3 million yuan and the average funding is 3,028,000 yuan per project.

Up to 80 projects will be supported in 2014 in 82 fields with an average funding of 3 million to 400 millionyuan per project for 5 years.

Key Program projects of the respective Divisions as follows:

1. Design and micro-structure regulation of high-performance steel materials
2. Preparation, performance and related scientific issues of intermetallic

compounds based on new features
3. Magnetic or/and electrical properties and related mechanisms of new metallic materials
4. Toughening mechanisms and high-temperature performances of metal matrix composites
5. Interactions and protective mechanisms of metallic materials in special environments
6. Preparation, performance, and computer simulation of nuclear materials
7. Performance enhancing and key issues of metallic intelligent materials
8. Key scientific issues of metallic biomedical materials
9. Key scientific issues of metallic microelectronic materials
10. Fundamentalresearch on the nano-piezo electronics and devices
11. Research on key materials ofhigh-performancelithium-air batteries
12. Basic research on inorganic-organic hybrid infrared nonlinear optical materials
13. Exploration inthe photoelectric effect and ultraviolet detector of two-dimensional atomic crystals
14. Research on the meso-scales split-phase evolution rule of ceramics
15. Basic research on the hierarchical porous carbon materials based on biological templates
16. Basic research on high performance rare-earth doped nitride luminescent materials
17. Structure design and property manipulation of broadband-spectrum laser materials
18. Basic research on low temperature preparation technology of ceramic/glass ceramic materials
19. Controllable growth and strengthening and toughening mechanism of carbon nanotubes in C/C composite preforms
20. Basic research on the chemistry of polymer materials: improve the material properties through molecular design
21. Basic research on the relationship between structure and properties, and the structure regulation of polymer materials
22. New theories and new methods for polymer material processing (including micro-nano processing
23. Basic issues on biomedical polymer materials
24. Fundamental research on opto-electronic organic polymer materials and devices with high efficiency and stability
25. Basic research on polymer materials related to energy, environment and resource utilization
26. Structure regulation of polymer composites and their properties
27. Research on key technology of marine deep water drilling

28. Mechanism of low permeability unconventional gas extraction
29. Surrounding rocks breaking and stability control of deep (tunnel) roadways
30. Theory and application of safety science
31. Research on key technology of deep submarine metal mineral mining
32. Physical separation theories and methods of secondary resources
33. Energy saving and control of long life and large-scale aluminum electrolytic cell
34. Physical chemistry in pressure hydrometallurgy
35. High pressure metallurgy theory of the special steel process
36. High-performance titanium alloy under multi-field
37. Preparation theory of amorphous alloys (glassy alloys)
38. Innovative principle and performance synthesis of modern mechanisms and machines
39. New principle and methodology for efficient and precise actuation and transmission
40. Theory on the stability and assurance of complex electromechanical system
41. Failure mechanism and reliability design of typical parts/components
42. Mechanical surface/interface behaviors and the control mechanism
43. Innovative design theory and methodology for electromechanical system
44. New principle and method for bio-manufacturing and bionic manufacturing
45. Novel principle, method, process and equipment for integrated high-performance precision manufacturing
46. Novel theory and method for high energy-density beam and nontraditional energy field manufacturing
47. Theory/technology/methodfor high efficiency and precision machining of parts/components
48. New process, equipment, and mode for digital and intelligent manufacturing systems
49. Novel principle and methodology for mechanical measurement and sensing systems
50. Thermodynamic system analysis, control and optimization for energy conservation
51. Turbulent flow mechanism and flow control in fluid machinery
52. Research on mass and heat transfer in power systems
53. Research on flow and combustion in power plant
54. Mechanism of combustion, pollution and emission reduction of solid fuel
55. Thermo-physical issues of multi-phase fluid under the special

environment
56. Key thermo-physical issues on the utilization of renewable energy
57. Interdisciplinary research on thermo-physical problems
58. Fundamental research on high efficient conversion and large scale storage of electric power
59. Key issues on the pulse power and discharge plasma
60. Fundamental research on the advanced power transmission equipment and related electric materials
61. Key issues on the smart grid
62. Fundamental research on electromagnetic-biological effects
63. Key issues on the efficiency and reliability of power electronic devices and its system
64. Principles and methods of urban planning for typical disasters
65. Improving principles and methods of urban climate
66. Energy-efficiency design methods of large-space buildings in typical climates
67. Conversion processes and control principles of the nitrogen-containing pollutants in urban water supply systems
68. Process mechanisms and working principles for novel electrochemical wastewater treatment technologies
69. Novel technologies and their working principles for the advanced treatment of toxic, hazardous and bio-refractory substances in municipal wastewater
70. New types of structural systems and their design theories for civil engineering
71. High performance or recycled materials and structures of civil engineering
72. Geotechnical problems in major sea-crossing transport infrastructure
73. Damage mechanism and performance control of engineering structures under hazard loads
74. Agricultural water transform and its efficiency improvement
75. Evolution and conservation of eco-hydrological system of large reservoirs or lakes
76. Dynamics and mitigation of flash flood
77. Characteristics and mitigation of urban flood and inundation
78. Flow instability and its controlling in centrifugal pumps
79. Dynamic catastrophe and its controlling in surrounding rocks for nuclear power plant
80. Slope deformation and failure as well as slope protection
81. Performance evolution of concrete dams in whole life cycle
82. Structure strength or performance and reliability for bathy vessel

Department of Information Sciences

In 2013, the Department of Information Sciences announced 68 areas and 4 priority funding areas for the application of the Key Program, and received 273 applications, of which, 82 projects were funded with a total of 237 million yuan, and average funding intensity of 2.89 million yuan per project. The success rate is 30.04%

In 2014, the Department announces 67 areas for application, of which 4 areas are the departmental key funding areas. 70-85 Key Program projects will be funded with average funding of about 3.5 million yuan per project for 5 years. Applicants should follow the guidelines for research directions in relevant areas, in accordance with the trend of development in the research area and basis of their research team and the actual research object or process, propose key scientific problems and conduct systematic and in-depth theoretical studies or experimental verifications. Apart from high level papers, research results should be verified in experimental system or in practical applications.

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

The deadline for proposing areas of the Key Program for 2015 is April 30, 2014; please refer to the department website http://www.nsfc.gov.cn/cen/oo/kxb/xx/tztg.htm for details.

Key priority funding areas of the Department

1. Basic research on the hydro acoustic sensor network for mobile node

The development of underwater communication and sensor network are greatly required by the marine environment monitoring, marine resources exploitation and the protection of national marine right and interests. This cluster of projects plans to study basic scientific problems such as large time delayed reliable transmission in dynamic variable hydro acoustic channel, high speed hydro acoustic transmission in limited band width, automatic connection of large scale random dynamic nodes and efficient group network in limited resources, as well as to develop basic platform and research environment for important applications of monitoring of light underwater vessels, so as to promote the development of hydro acoustic sensor networks in China.

Main research directions include:
(1) Data acquisition and reliable transmission for mobile node of underwater sensors
(2) Theory and key technology for high speed communication in underwater node
(3) Basic research on automatic connection of underwater multi dynamic nodes

2. Researches on the challenging problems in big data technology and application

Wide existence and explosive growth of massive, heterogeneous and mixed big data has given unprecedented challenges to the transmission, storage, computation and applications of data processing techniques. How to transmit accurately, store and compute various big data and dig up valuable knowledge from the existing or dynamically changing big data becomes an urgent problem. This key cluster of projects plans to ask applicants to consider specific application, break the limit of traditional research ideas to develop novel method and new technologies that meet the needs of big data transmission, storage, computation and processing; major research results should be verified on specific big data set. About 8 projects will be funded.

Main research directions are:
(1) Theory and method of expression, reasoning and online learning of knowledge from big data
(2) Method of big data analysis based on cognitive computation
(3) Theory and method of granular computation for big data
(4) Analysis, push and display of complex multimedia content in big data environment
(5) Theory and method of evaluation criteria od big data management system
(6) Theory and method of efficient transmission of multilevel multi region network big data
(7) Efficient storage and management of big data
(8) Architecture and key technology of time efficient computation of big data
(9) Discovery of big data structure and relationship and simple computation method
(10) Prediction and control of complex system behavior based on big data

3. Photon integration technology for optical interconnection on chips

This key cluster of projects is to study optical interconnected core

photoelectric devices and the integration technology on high speed chips, as well as properties of new types of photoelectric functional materials, and explore new mechanism and new technology in the regulation, reuse and reception of wide band optical signals, and the integration technology of active and inactive multifunctional photoelectric devices.

Main research directions are:
(1) High speed optical regulation technology based on new types of photoelectric functional materials
(2) Reuse technology and core optical devices for optical interconnection
(3) Integrated chip technology for high speed optical receivers
(4) Integrated chip technology for multifunctional active and inactive photoelectric devices

4. Middle inferred laser light source

Laser at 2～5μm band has important applications in medical, communication, remote sensing, bioengineering, and pollution monitoring areas. This key cluster of projects plans to support studies on acquiring laser light sources in this bandwidth using various methods.

Main research directions are:
(1) 3 micro band high power antimonite quantum well laser
(2) Basic problems of 3 micron band high power ceramic laser
(3) Studies on middle inferred laser based on cascade structure
(4) Key technologies for high power middle inferred Raman optical fiber laser

Key funding areas by Divisions as follows:

1. Bio mechanical measurement, analysis and simulation of human body movement
2. Plasma sheathe model for near space hypersonic aircraft and its electromagnetic properties
3. High flux integrated measurement method and technology for bio and physical chemical properties of cancer cells
4. Modeling and fast algorithm of multi physical process in electro-magnetic excitation conditions
5. Method of analyzing cognitive functions based on task operation in micro gravity environment
6. Security analysis of new types of communication network systems
7. Theoretical studies on the security at physical level for information transmission in wireless communications

8. Basic theory and key technologies for integrated optical fiber and wireless access systems
9. Structure and key technology of future wireless network access
10. Theory and key technology for marine wireless transmission and mobile communication networking
11. Theory of super resolution imaging associated microwave staring based on spatial and temporal 2-D random radiation field
12. Multi angle SAR imaging theory and method
13. Key technology for modeling visual characteristics of two eyes and 3-D video processing
14. Key technology of coordinated processing of space land multi source data for cloud detection
15. Information feedback mechanism, computation modeling and application based on neural metabolic signals
16. Information feedback computation modeling and application based on neural electric signals
17. Theory and method of neural feedback system for improving cognition function of brain
18. Scalable parallel algorithm and optical method for large scale heterogenic nuclear system for major application field
19. Organization, analysis and application of software life cycle data
20. Method and technology of coordinated modeling of software needs in network environment
21. Method and technology of analyzing vulnerability of networking structure software
22. Easy programming hetero parallel architecture
23. Basic theory and method of error tolerant computation devices
24. New principles and method of 10Tb/in^2 level superfast hard disk
25. Efficient generation of geometric model and content for 3-D printing
26. Evaluation of visual computation and image quality for multi spatial integration
27. Theory and technology of big bio data analysis based on data integration
28. Theory and method of emotional interaction based on wearable computing
29. Study and realization of machine translation for multilevel chapter syntax
30. Theory and method of next generation of network defense based on syntax
31. Basic theory and key technology of inactive sensing network
32. Theoretical modeling, architecture and control mechanism of software defining network

33. Method and application of hysteretic nonlinear system modeling and control
34. Unified modeling and control for system of car use fuel cell and dynamics system of cars
35. Method and application of key mechanical parameters of new types of equipment and unified design of controllers
36. Method of distributed coordinated control and applications in the internet of things
37. Method and application of modeling control for efficient operation of batch process
38. Modeling and analysis of multi genetic functions of synthesized bio devices
39. Basic theory and key technology for information security of industrial control systems
40. Alarm design and method of clearance for security and efficient operation of large industrial systems
41. New method of real time target image identification for terminal guidance on high speed aircrafts
42. Autonomous coordination and control of multi robots for nano device processing and manufacturing
43. Automatic detection of multi-dimensional cell information and related automatic micro nano operations
44. Autonomous operation and control methods for mission accomplishing unmanned rotor crafts
45. Basic theory and key technology for environmental sensing and autonomous control of submarine robots
46. Cognitive mechanism and computing model for internet utterance understanding
47. Processing mechanism and computing model of Chinese language cognition
48. Diluted magnetic semiconductor of self-spin injection and carrier regulation and separation
49. Basic research on applications of self-powered low power micro nano sensors
50. High speed CMOS visual chips based on bionic mechanism
51. High temperature operation vertical cavo surface emission laser
52. Basic research on terahertz HEMT devices
53. Studies on harmonic gyro of silicon surface structure
54. Basic research on anti-radiation integrated circuits based on node below 65nm
55. Alternating weak magnetic sensor based on Hetero junction magneto

electric effect
56. Studies on Cavity optical mechanics for quantum base state on chips
57. Key technology of optical devices based on chalcogenide glass
58. Regulation code pattern and parameter analysis of new generation optical network performance monitoring
59. Key technology and new method of precision measurement based on cold atom
60. Key technologies of semiconductor array optical fiber coupled output high power high light narrow line width laser
61. New method and mechanism of high-speed wide field of view micro nano manufacturing by femto second laser
62. Photo electric properties and applications of new artificial micro structure liquid crystal materials
63. Key technologies of optical fiber bio sensor for in vivo immunology tests

Department of Management Sciences

The Department of Management Sciences received a total of 146 Key Program applications in 2013, in which 24 projects were funded. The total funding is 53.00 million yuan and the average 2.21 million yuan per project. Besides, 13 Key Program Cluster applications were received and 6 of them were finally funded with a total budget of 13.80 million yuan and the average funding of 2.30 million yuan per project.

In accordance with the development planning and priority area of the 12thFive-Year Plan period, the Department of Management Sciences will release its research areas for the Key Program year by year and duly issue research areas for the Key Programs cluster and the number of the Key Program projects to be funded. The number of Key Program projects and the average funding intensity will be increased to some extent compared with the 11th Five-Year Plan period. Key Program will focus on the economic and social development and opening up policy of the country, as well as frontier scientific issues which may achieve innovative results with international impact and promote disciplinary development and some key theoretical and applied issues, which are urgently needed and possibly resolved in the improvement of the comprehensive competitiveness of the country. The research should be oriented toward scientific issues exploring management theories and laws with Chinese characteristics, and systematically carried out in the fields with sound research background and good potential to achieve theoretical and innovative breakthroughs.

The priority funding areas listed below outline the main contents, scopes and basic requirement of research work. It is not required that all areas or contents stated below should be covered in a specific proposal. On the contrary, applicants are encouraged to edge their academic thoughts, set concrete goals, conduct a thorough investigation into one or more key scientific issues, and bring about possible theoretical breakthroughs on the basis of their own academic advantages. Due attention should be paid to the linkage of theory with practice, and applicants are encouraged to detect key scientific issues on the basis of the status quo of China and try to present new management approaches and methods after in-depth investigation. Scientific methodology is emphasized and real data and cases are defined as the basic information foundation for research, and subjective assumption must be avoided.

Research proposals for Key Program may refer to requirements for the application of the General Program which could be applied for both Key Program and General Program.

Key Priority Areas of the Department of Management Sciences

In 2014, the Department proposes 25 priority areas for Key Program, and is planning to fund about 24 projects with an average funding intensity of 2.2-3.0 million yuan per project, and 8 projects of each Division (including Key Program Cluster of Division). The duration for each Key Program project will be 5 years.

1. Environmental management-oriented embedded service decision theory and support platform

Study on the environmental management-oriented embedded service decision model and mechanism, big data of environmental monitoring analysis methods, environmental management multi-objective decision method, simulation method for the effect of decision, and environmental management-oriented decision support platform development, etc. The research should provide comprehensive decision support for the environmental monitoring and management of the government and enterprise.

2. Carbon-oriented urban transport system optimization and management

Study on the mechanism, measure method and evaluation system of carbon emissions in urban transport system, based on a combination of travel theories and models of low-carbon objectives, multi-collaborative

optimization and management based on low-carbon transportation goals, the intelligent transportation system based on low-carbon goals, achieve micro guiding strategy and macro development policy of low-carbon travel.

3. Theory and methods of port management and operations

Study on the flexibility configuration and online resource allocation theory of modern port operating, the multimodal transport-oriented port planning design and management theory, port logistics intensive management under conditions of information technology, port services procurement and service quality management and optimization under multi-modal transport, "Sync Mode" and other new operating environment.

4. Operation optimization theory and methods of fresh agricultural products supply chain based on the RFID technology

In view of the perishability, periodic and regional characteristics of fresh agricultural products, study on the “company + farmer” and other typical supply-demand model of supply chain cooperation mechanism, inventory replenishment strategy of the distribution center and shopkeeper, storage scheduling and distribution methods of fresh agricultural products based on the RFID technology, and the coordinate theory of cost and value of RFID application.

5. High-dimensional, nonlinear, non-stationary time-varying financial data modeling and application

Study on the non-stationary and nonlinear financial data modeling and its application in financial markets, high-dimensional and nonlinear return on assets and asset pricing model and its applications, high-dimensional modeling and high-frequency financial data and microstructure of financial markets applications, variability modeling of financial structure relation and its applications in financial markets, variability modeling between financial markets and its applications in financial risk measurement.

6. Smart health information services management

Study on the health information management services to multi-agent intelligent acquisition and management, as well as big data analysis methods to support intelligent health information services management; intelligent health management and monitoring mode, and intelligent health assessment and knowledge management warning; intelligent health information services resources agglomeration model, and intelligent multi-agent coordination of health services management operations model.

7. The reputation awareness and trading decisions of participants in social commerce

Based on China's commercial culture and e-commerce development backdrop, research on the key factors affecting e-commerce participants' reputation in the social network environment, the methodologies for information retrieval and intelligent analyses, the methods to evaluate the reputation of participants, the mechanisms for network trust and its impact on the trading decision behaviors, the transmission mechanisms of participants reputation awareness and network trust, the consumer trading decision mechanisms based on reputation and trust, and the mechanism design of e-commerce trading based on reputation and trust.

8. Measuring service value based on customers' psychology and behaviors

Study on the customers' awareness and preference towards service value and corresponding behavior characteristics, and the relationship among various dimensions and the logic structure framework. The research also aims to combine the Internet or other traditional service modes to detect and assess the dynamic evolution of customers' service value experience from the inter-disciplinary perspective, including Psychology, Cognition, Consumption, Marketing Science etc.

9. The impact of RMB exchange rate volatility on China's enterprise growth

Research on the micro transmission mechanisms of the impact of RMB exchange rate volatility and trade liberalization on China's economy. Specific research contents mainly include the following: the impact of enterprise investment and financing, innovation and R&D, enterprise governance and risk management mechanisms on operating performance, investment efficiency and labor productivity of different types of enterprises; the impact of China's listed enterprises' behaviors and performance on industrial structure optimization and the outside financing environment of enterprises; the impact of tariff and non-tariff barriers and market growth opportunities on product market and enterprise behaviors; and the paths and policies of international competitiveness for China's enterprises etc.

10. Enterprise financing constraints and strategies

Study on the financing constraints of enterprises with different types and different life cycles in China's financing environment and develop the corresponding theories and methodologies for financing strategies. Specific research contents cover the following: the institutional environment of

enterprise financing constraint formation and its impact; the impact of economic environment and commercial cycle on enterprise financing constraints and strategies and the mechanism analysis; enterprise financing strategies and financing innovations under financing constraint conditions; and the optimized financing strategies of enterprises in financial and capital markets and risk control etc.

11. Consumer welfare and decision behaviors

Exploration on the decision behavior theories to optimize the consumer welfare. Specific research contents may cover the following: the behavior mechanisms of consumers' non-optimized and irrational decisions; the in-depth analyses of the reasons for consumers' irrational and non-optimized welfare decisions; the identification, description and analyses of China's consumers' non-optimized and irrational decision behaviors; developing the behavior decision models for optimizing consumer welfare; the intervention mechanisms to improve consumers' decision quality and avoid wrong decision; and the macro policies research on enhancing consumers' welfare etc.

12. Value co-creation modes and platform systems based on emerging information technology

Exploration on the theories and methodologies and co-creation type enterprises' formation in the commercial system stemming from the emerging information technology environment. Specific research contents may include the following: the value co-creation theories and mechanisms of commercial systems based on emerging information technology; the strategies of enterprises' joining the value co-creation platform and their adaptability to the emerging commercial systems; the paths, strategies and organization changes of enterprise transformation from traditional enterprises to value co-creation type enterprises; and enterprise commercial mode innovation strategies based on the value co-creation platform etc.

13. China's enterprise leaders' behaviors in the changing environment

Study on the China's enterprise leaders' behaviors and approaches to address the changes and manage the organizations in the changing environment, in the context of Chinese economic transformation, enterprise upgrade and globalization. Specific research content may include the following: the complexity and characteristics of Chinese economic institutional environment, the structural feature and capability evolution of enterprise leaders or leader groups in the context of Chinese institutions and culture, the connotations, features and behavior modes of transformational

leadership in different layers of enterprises, the environmental adaptability and orientation of transformational leadership in different layers of enterprises etc.

14. Medical and health operation management in the Internet era (Key Program Cluster of Division**)**

This Key Program Cluster of projects in the Division of Business Administration focuses on China's new medical and health system and various public hospitals. It aims to make full use of the advantage of inter-disciplinary cooperation in the field of operational management and conduct in-depth studies on the value-chain integration and management, data analyses and decisions, resource management and quality security and modern logistic management of China's medical and health, in the context that medical and health resource, information and knowledge can be shared and deeply developed and used in the Internet era. The ultimate goal is to develop innovation management theories and methodologies to facilitate China's medical and health resource optimization, scientific decisions, service mode innovation and incentive mechanism innovation, which eventually provide decision support for exploring the affordable and fair medical and health system with high coverage and high quality and the health care management mechanisms in accordance to China's conditions, and improving the effectiveness and efficiency of health care reforms.

In order to realize the overall scientific goals and inter-disciplinary integration in the research, the grantees of funded projects have to promise to comply with the regulations about related data, cases and information management and share. The applicants should also note the cluster of projects title in the Appendix section of the application form, i.e., Medical and health operation management in the Internet era **(**Key Program Cluster of projects of Division**).**

In 2014, the Key Program Cluster in the Business Administration Division plans to fund 4 specific projects, with a research period of five years. And the main research directions are as follows.

(1) Medical and health value chain integration and management

Study on the value chain of medical and health so as to highly effectively integrate and utilize key resources. Specific research contents are proposed to cover the following: the features of medical and health value chain, the design of outcome-based pricing strategies to optimize the coordination among patients, service providers and insurance companies, the share

institutions and standardized designs of value chain-based medical and health information, the matching design of medical and health insurance policies and resources in the value chain perspective, the balance mechanisms of public welfare and fairness of medical and health services and the profitability of medical and health agencies etc.

(2) Medical and health data analyses and decisions

It is to develop the medical and health databases and find the behavior preferences and modes of patients (customers), the features, trends and market segmentation of service providers (hospitals) etc. through modeling, data mining and statistical analyses. Specific research contents may cover the following: the data integration methodologies to measure medical and health service quality, fairness and efficiency, the methodologies of medical and health risk and cost control, the methodologies of medical and health quality indicator design and data analyses, the resource allocation and supply-demand analyses of on-line optimized health care service providers etc.

(3) Medical and health resource management and quality security

Study on the hospital resource optimization management theories and methodologies based on quality, security and efficiency. Specific research contents propose to cover the following: the capability planning of integrated services, the integrated medical and health units and the optimization strategies of medical and health network, the schedule strategies of medical and health resources, the design of real-time executive programs and emergency programs, the operational optimization strategies of life-cycle oriented medical and health, the distribution design of emergency centers, the schedule optimization methodologies of emergency devices like ambulance, the methodologies of effectively matching medical and health resource supply and demand etc.

(4) Medical and health logistic management

Study on the reliable logistic management theories and methodologies for effective medical and health management systems. Specific research contents propose to cover the following: the design methodologies of highly effective medical and health service logistic network and the integration and optimization methodologies of its operational strategies, the design methodologies of resource and benefit share mechanisms among various agents, the game analysis methodologies of various stakeholders, the design of health care resource share mechanisms etc.

15. The global value chain and China's trade competitiveness

It is to reveal the origins of global value chain, the geographic, product and value distribution features, the input-output linkage and product complexity, the new type dependency and interaction of main countries in the global value chain, the advantageous features and interactions of Asian, European and American production bases, the theoretical analyses of implementing global value chain strategies by developing countries, China's positions and changes in the global value chain distribution, the methodologies, paths and strategies to improve China's trade competitiveness, and policy suggestions for China's global trade strategy.

16. Management theory and implementation mechanism for the construction of social credit system

It is to analyze the relationship between the social credit system and economic and social development, develop the social credit system theory framework, and study the core issues of China's social credit system construction such as key technology, standard and implementation mechanism, etc.; establish the evaluation model of social credit suitable for China's national conditions and the development of scientific and reasonable evaluation system of runtime environment for social credit system, as well as the core standard for social credit system construction. On the basis of empirical research, study may put forward the construction mode and realization mechanism for social credit system.

17. Performance Management Research under the background of government functions' transformation

Study on the construction of social value and generation of public value, management organization evolution and strategy path of government performance, management foundation and mechanisms of government performance,government performance leadership and sustainability issues,information asymmetry problems and theoretical paradigm of government performance management,performance management of nonprofit government investment and so on.On the basis of establishing government performance management theory, the research may provide a theoretical basis, decision-making reference and practical guidance for the construction of government performance management system and administrative reform.

18. Research on service equalization and mechanism to achieve basic education equity

Study on all levels' targets of the basic education equalization and achieve

network resources pattern innovation of basic education equity and quality evaluation criteria under the conditions of informatization, based on the theory of education fairness and large sample's reliable data. Based on the public economics theory, education system characteristics and empirical analysis, applicants should study the causes of basic education unfair in China, reveal the formation mechanism of basic education services unequal, propose shared application service equalization theory and shared services pattern in the area of educational resources so that it can promote the equalization of basic education services,improve educational equity reform and policy adjustments.

19. Food safety control strategybased on the quality chain collaboration

Based on food monitoring, supervision, public opinion, and business information data, on the basis of empirical research and typical food case analysis, applicants should study the formation mechanism of food safety and quality chain,analyze the problems in food safety information transfer process, and study the information propagation effects and intervention strategies of food quality chain. Analyze the control parameters of food quality chain and then design collaboration contract for the multi-agent collaborative management needs. The research will propose China's food safety management and control policy recommendations based on the multi-agent collaborative model and simulation research of food quality chain.

20. Study on regional air pollution control and management mechanism innovation

Study on the suitable innovative management mechanism for china's regional air pollution control based on the empirical analysis of regional air pollution control management mechanisms at domestic and abroad. The research contents should include the international comparative study of regional air pollution control, the linkage mechanism study of inter-regional air pollution control, the performance study of air pollution control under different means of environmental regulation, the subjective behavior study of air pollution control,the collaborative control mechanisms study of atmospheric pollutants and carbon dioxide,and design the regional air pollution control management framework to mitigate the health effects of air pollution.

21. Study of conflict management for water resource

Based on China's basic national conditions and water situations, focusing on the characteristics of water resource conflict management under a changing

environment, the research should be focused to analyze the arising and evolution nature of water resource conflicts under environmental changes, examine the demands of different stakeholders as well as the response mechanisms and behavioral laws of conflicts, assesse the cooperative games of various stakeholders under the complex uncertain water conflict management system and the negotiation path and analysis platform for water conflicts, establishes the management theory and methodology for water conflicts with environmental changes, and thus provide scientific rationale and policy recommendations for modern water resource management model.

22. Study on the medium and small town development pattern based on agglomeration of production factors

Taking labor, land and capital as the main production factors to China's urbanization development, the research should be focused on the urbanization evolution at town's level. From the perspective of factor agglomeration, the current status, processes, difficulties and major development patterns and paths of small towns, the research should compare with the international experience of urbanization development model, and analysis several regional urbanization cases and experiences in China, as well as to develop the theoretical system and related policy recommendations for the development of small towns with Chinese characteristics.

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 2014*, which are set by the panel scientists on the basis of the Department's priority areas. Applicants are expected to give their own specific project title, research contents and research plans according to the listed areas, the relevant application code corresponding to the given thematic area should be filled in the application form, and the name of the selected thematic area should be written in the "annotated column" of the application form.

Detailed requirement for applications for the Key Program are expected to be referred to that for General Program in the Department of Health Sciences in this guide. Special attention should be given to the following requirement: A copy of the first page of up to 5 relevant representative papers is expected to be attached, along with their clearly scanned electronic

files, otherwise the applications may be declined.

In 2013, 481 applications for the Key Program in responsive to 35 thematic areas are accepted, 90 of them are finally funded, with a total funding of 26.120 million yuan and an average funding intensity of 2.9022 million yuan.

In 2014, approximately 90 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, with an average of 3.5 million yuan. The duration is 5 years. 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 2014 are listed as follows:

1. Basic Research on the pathogenesis and intervention of interstitial lung disease
2. Abnormal developments of heart and congenital heart diseases
3. Basic research on the occurrence and intervention of fatty liver disease
4. Regulatory mechanism and intervention of leukemia cell stemness
5. The molecular mechanisms of human infertility
6. The pathogenesis, prevention and treatment of acute kidney injury
7. Environmental and nutritional factors and thyroid diseases (excluding tumors)
8. The pathogenesis and functional reconstruction of visual nervous system injury
9. Development and regeneration of dental and craniofacial tissue
10. The pathogenesis, prevention and treatment of plaque related oral diseases
11. Pathogenesis and early diagnosis of Parkinson's disease
12. Quantitative studies of organ blood flow functional imaging
13. Basic scientific research of interventional navigation based on multi-modality imaging
14. Basic research on vital organ injury induced by special environment (temperature, pressure, gravity, hypoxia, etc.)
15. The occurrence, development and intervention of the key skin diseases
16. Infection and pathogenic mechanism of human parasites
17. The regeneration and repair of trauma in skin/soft tissue and locomotor system
18. The establishment of new indicators, methods and technology in laboratory medicine and the application in diagnosis and therapeutics
19. Protein post-translational modifications (except phosphorylation and

ubiquitination) and tumorigenesis
20. Circulating tumor cells or molecules and their roles in tumor recurrence and metastasis
21. Carcinogenic mechanism of pathogenic microorganisms
22. Interactions between extracellular matrix and cancer cells
23. Aberrant cancer metabolism and its role in tumorigenesis and cancer development
24. The effects of radioactive damage on health and their mechanisms
25. The mechanisms of health impairment caused by occupationally harmful factors
26. The pathogenesis and intervention strategies of major endemic diseases
27. The mechanism underlying immune clearance or immune escape of pathogens
28. The mechanism underlying immune imbalance and autoimmune diseases
29. Forensic study of the mechanisms of injury and death
30. Poisons associated forensic toxicological and forensic pathological questions
31. Key scientific problems in basic research on drug metabolism
32. Medicinal chemistry research on regulation of active molecules on the basis of protein-protein interaction
33. Key scientific problems in research on druggability of biomacromolecules
34. Basic research on mechanism of drug toxicity and safety prediction
35. Systematic biology research on spleen deficiency syndrome
36. Therapeutic principle and method of TCM and tissue microenvironment
37. Characteristics and mechanism study of TCM's preventative and therapeutic effects on its clinically-effective diseases and syndromes
38. Systematic analytical methodology research on *in-vivo* bioactive components of Chinese herbal medicine
39. Chemical and biological basis of the function of five taste of Chinese herbal medicine

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 making indigenous innovation in China's basic research.

Major Program projects will be implemented by unified planning and supporting research projects in batches. Research areas for the Major Program will be proposed on the basis of in-depth discussions and soliciting opinions 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.

NSFC only accepts integrated applications for Major Program, which should include both the overall application for the Major Program and proposals for research projects. Please pay attention to relationships between various projects. Proposals involving only part of the research areas or one of the research projects indicated in the guide of each Major Program will be not accepted. Each application can contain no more than 5 projects (please see the guide to Major Programs for details), and in general one project should be carried out by one institution, and may not be more than 2 collaborative research institution. Collaborative institutions may not exceed 5, 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).

Researchers working in post-doc stations or graduate students are not qualified to apply.

Applicants should follow the guidelines when writing proposals. "Major Program" should be selected in the funding category and "application for the Major Program" or "proposals for projects" in the sub-category, and the

research area of the Major Program should be indicated in the annotation. Proposals with incorrect selections will be not accepted.

In 2014, the guideline for 1 Major Program project has been announced in the third group of the Twelfth Five-Year Plan. Accordingly proposals should be refined on key scientific issues with strategic and fundamental significance and put forward clear, concentrated and interdisciplinary scientific targets, and pay attention to coordinate and link with other national S&T programs. The research team should have good accumulation of research work, sufficient research conditions and ability of making innovations, and a number of high level academic leaders.

The Regulatory Mechanism of Air-blood Barrier Damage and Repair

Acute lung injury (ALI) is a severe and intractable respiratory disease which threatens people's health and life. In China, 6-700,000 cases of ALI are reported every year, and the mortality rate is about 40-70%. In recent years, some new acute respiratory virus (such as SARS, Influenza A virus, etc.) infection have been paid more attention, which causes direct death by severe hypoxemia due to ALI. The core pathophysiological change of ALI is the damage of air-blood barrier. A variety of pathogens can cause uncontrollable lung inflammation, injury to alveolar epithelium and pulmonary vascular endothelial, inhibition of their reparative phase, coagulation fibrinolytic disorders of lung microenvironment, as well as secondary pulmonary fibrosis and other pathological changes through multiple signal pathways. Therefore, to study the occurrence, development and outcome mechanism of ALI thoroughly, find the key points in regulation of damage and repair of air-blood barrier, is very important for providing new targets and treatment strategies through translational medicine by integrating basic and clinical medicine closely.

I. Scientific targets

Define the key mechanism of air-blood barrier damage due to pathogen infection and explicit new intervention targets. Find the key points in regulating inflammation from the main aspects of "molecular recognition mode" in activating the inflammatory response of ALI. Define the key regulatory factors in repairing air-blood barrier. Illustrate the effective measures such as physical, chemical and biological effects in occurrence,

development and outcome phases of ALI and its mechanism. Provide theoretical basis for the new treatment strategies of ALI.

II. Research contents

Following four researches have tobe carried out through multidisciplinary studies, in multiple levels including microbiology, immunology, pathophysiology and clinical research, with the aid of genetics and epigenetics, proteomics, metabonomics and bioinformatics and by means of systems biology and translational medicine research ideas:

1. The key mechanism of air-blood barrier damage due to pathogen infection and new intervention targets.
2. The key points of inflammatory signaling pathways in ALI.
3. The key regulatory factors of air-blood barrier repair.
4. The effective measures such as physical, chemical and biological effects in the occurrence, development and outcome phases of ALI and its mechanism.

III. Funding period

Five years (from January 1, 2015 to December 31, 2019).

IV. Funding

Total funding is 18 million yuan.

Major Research Plan

Following the principle of "definite objective, stable support, integration and refinement and leap- forward development", focusing on key fundamental scientific issues in national strategy interests and major scientific frontier, and taking full use of the capability and advantages of the country, the Major Research Plan is designed to be a program cluster which contains a number of projects with relatively identical objectives for innovative research resources integrity in order to explore the possible breakthroughs in the identified areas.

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

Post-docs in station and graduate students are not eligible to apply.

The Major Research Plan is framed with three types of programs, namely, the Fostering Program, Key Program and Integrated Program, of which each one is open to application. Proposals shall be prepared in accordance with the requirement for the Major Research Plan and outlines for proposal preparation, featuring interdisciplinary research, emphasizing on the contributions to solving key scientific issues and fulfilling the overall goals of the Major Research Plan. Applicants should select "Major Research Plan" for the column of the funding type in the application form of proposal, and Fostering Program, Key Program, or Integrated Program for the column of sub-type, and give the titles of the Major Research Plan in the annotation. Proposal is not accepted in case of incorrect selections or without any selections.

Funding for Fostering Program project, Key Program project of the Major Research Plan is quivalent to the average level of General Program and Key Program respectively. Generally, duration for Fostering Program project is 3 years, for Key Program project is 4 years, and that for Integrated Program project is determined by the Steering Committee of each Major Research Plan according to the actual need. For Fostering Program project and Key Program project, the collaborative organizations involved may not exceed 2 in number. The Integrated Program project will not be counted in limitations

of total number of NSFC funded projects applied and undertaken for senior academic title holder, and the collaborative organizations involved may not exceed 5, and main participants must be the actual contributor to the Integrated Program project, and total number of main participants may not exceed 9.

Destruction of the North China Craton

This Major Research Plan aims to study on the destruction of the North China Craton for understanding and revealing the significance of Craton destruction in the continental formation and evolution as well as the earth layer interaction, so as to provide new ideas and scientific basis for strategy prediction in resource and earthquake prevention.

I. Scientific objectives

From the viewpoint of Earth system sciences, by highly integrating the detection means of modern Earth sciences, mathematical and physical sciences, and information sciences, as well as the observation, experimental and theoretical achievements made by cutting-edge technologies, the Plan is (i) to understand the temporal-spatial distribution, processes and mechanism for the destruction of the North China Craton; (ii) to investigate material properties and structure of different spheres in the Earth's interior and their interactions inCraton destruction; (iii) to determine effects of Craton destruction on shallower spheres and their control mechanisms for mineral resources, energy and disasters, and (iv) to further promote the cognitive level on the formation and evolution of the Earth's continents.

II. Key Scientific issue

The key scientific issue of this Plan is the destruction of the Craton.

III. Research direction in 2014 and principle for proposal screening

The Plan has been to the later stage, the steering group of experts decided that the key funding and implementing direction during this period is (i) to strengthen the research integration with rather less stress on launching new projects; (ii) to enhance the construction of scientific data center; (iii) to actively carry out various forms of academic exchange, effectively promote cooperative and substantial collaborative research.

1. Key research directions

(1) Comprehensive integration research according to discipline development trend and the implementation of the plan

(2) Exploration on different viewpoints

(3) New method exploratory researches for a better understanding of scientific problems

2. Research priorities

(1) Centering around the core scientific issue of the Plan

(2) Exploratory researches with different concepts and ideas

(3) Pay special attention to substantive disciplines, encourage international cooperation

IV. Notes to Application

(1) Applicants should carefully read this guidelinebefore preparing the application. The proposal should be in accordance with the implementation of the principle of the Major Research Plan and discuss the scientific problems closest to the "Guide", and the contribution to the key scientific issue and the overall targets of the Major Research Plan must be indicated. The goal and content of application should focus on the key scientific issues of the Major Research Plan, highlight the limited objectives, and emphasize the research on innovation and frontier problems of basic science. Proposals which do not meet the requirements of the guideline will not be accepted.

(2) Applicants can determine the project name, research contents, research approach and budget according to the specific scientific problem to be solved, based on the understanding of approved projects and summarizing the domestic and foreign achievements, as well as defining the new breakthrough and how to reach.

(3) "Major Research Plan" in the funded categories of applications must be selected in the application form, "Key Program" in the column of sub-category and "Research on Destruction of the North China Craton" in the annotation (application that the above choose is not accurate or not selected will not be accepted). Appropriate application code according to the actual contents should also be indicated.

(4) The duration of the Major Research Plan is 8 years with a total budget of 200 million yuan. The main task of project initiation has been completed since 5 years ago. In the year of 2014, 16 million yuan will be provided to Key Programs and 12 million yuan to 1Integrated Program, both of them will be a period of 4 years. .

(5) The Department of Earth Sciencesis responsible to accept the applications.

Single Quantum State Detection and Its Interactions

This Major Research Plan aims at developing relevant novel materials and artificial systems by physical and chemical means, constructing single particle quantum state and macro quantum state and detecting relevant quantum effects. It is to explore the property of quantum state and basic laws of quantum process, develop techniques of constructing quantum devices and means of quantum property detection, explore potential applications of single quantum state techniques in information and energy technology, promote the development of basic research in the fields of physics, chemistry and information technology in China, and solve some basic science and key technology issues with national strategic significance.

I. Scientific goals

To develop physical and chemical methods and technologies for relevant materials and systems, construct physical structure and systems that displays fully quantum effects, develop new methods of precision measurement, and understand and reveal the mechanism of relevant phenomena and processes at single quantum state. To discover several novel quantum effects through the measurement of single quantum state and study of interaction between quantum states, and set up solid foundation for applications of major technologies such as information processing, energy and environment;

II. Key scientific issues

1. Physical and chemical preparation of relevant materials and the construction of single quantum system
2. Property and precision detection of single quantum state system
3. Quantum state and environment, and interaction between quantum states
4. Modeling and numerical computation of quantum state interaction

III. Application and funding in 2013

In 2013, 22 applicationswere received, of which 3 were for Key Program project, 6 for Fostering Program project, and 7 for Integrated Program

project, and 6 for extended funding. After peer review, 2 Key Program projects, 1 Fostering Program project, 5 Integrated Program projects and 6 extended funding projectswere fundedwith atotal funding of 28 million yuan.

IV. Key funding research areas in 2014

The year of 2014 is the 6th year of implementation since this Research Plan has been launched. 25 million yuan will be provided in 2014 for Integrated Program and Extended Funding projects. NSFC plans to extend the funding for projects with good results and give additional funding to Integrated Program projects with good progress, and give support to the projects showing potentials of making breakthrough.

1. Integrated Program

Target of integration:

(1) Projects already funded by this Major Research Plan;

(2) Projects recommended by the expert group of this Major Research Plan (at least two letters of recommendation from members of the expert group).

Research Directions of Integration in 2014:

(1) Preparation and detection of topological quantum state

By using of composite structures of topological insulator and super conductor to explore the generation of topological super conducting state, and form and control Majorana fermions; by means of the electric field, magnetic field and surface/interface engineering to regulate surface state and fraction quantum Hall state of topological insulator.

(2) Single quantum state control and de-coherence mechanism of atomic system

Explore physical mechanism of single quantum state preparation and coherence control of atomic (ion) system, and study thede-coherence of single quantum state of atomic system caused by environment and the schemes to solve the problem.

(3) Detection, regulation and laws of variation in high pressure conditions of macro quantum state

Study the size, interface and pressure effect of macro quantum state, and explore the property and laws of single particle excitation of macro quantum state especially near the quantum critical point.

(4) Electron entanglement and inferred single photon diction in semiconductor nano lines

Study the properties and control method of electron entanglement for understanding the basic laws of entangled quantum state, as well as to explore and design semiconductor structures having up-conversion functions, and develop new ways of precision inferred photon measurement.

2. Fostering Program (Extended Funding)

Applicants of the Fostering Program (Extended Funding) projects should be the PI's of the Fostering Program and Key Program projects of this Major Research Plan which will be ended by 2014 and 2015.

V. Notes to Applications

(1) Please read this guide carefully before writing the application.

(2) In 2014, this Major Research Plan only accepts applications for Integrated and Fostering Program (Extended Funding) projects.

(3) In 2014, this Major Research Plan is planning to fund about 4 projects of Integrated Programs with average funding of 4 to 5 million yuan per project for 3 years; average funding for Fostering Program (Extended Funding) projects is about 500,000 to 600,000 yuan per project for 2 years.

(4) Integrated Program project should focus on limited targets and key areas, and emphasize on their contributions to the overall objectives and the key scientific issues of this major research plan. Please give details of the following: (ⅰ) main progress made recently on relevant areas of integration; (ⅱ) research contents, targets and technical indices of possible breakthrough; (ⅲ) a promise to share research materials, basic data and experimental platform that are needed to achieve overall scientific objectives and interdisciplinary integration.

The Fostering Program (Extended funding) is to promote in-depth research based on existing projects, so a further description of the research contents and results to be achieved is needed.

(5) Please select the proper application code.

(6) To strengthen academic exchange among the project group, NSFCwill hold an annual seminar of the funded projects every year, and various relevant academic workshops when needed. The PI's of the funded projects have the obligation to attend such seminars and workshops.

(7) Integrated Program project is not counted into the program limitation issued by NSFC. The main participants should be the substantial

contributors to the Integrated Program and shall not exceed 9 people in total.

(8) The Department of Mathematical and Physical Sciences is responsible to accept the application.

Basic Algorithms for High Performance Scientific Computation and Computable Modeling

Scientific computation is one of the important S&T progress in the 20th century, and, with the invention of electronic computer, it has been developed very fast and widely used. Scientific computation has become the third method in scientific research along with theoretical studies and experimental research, and an important means of promoting major scientific discoveries and S&T progress. Nowadays, scientific computation is regarded as an important indicator for a nation's S&T competitiveness and key factor in S&T innovation and development. Solutions of many scientific problems in major national needs requires basic algorithm of scientific computation and computable modeling. The launch of this Major Research Plan is, within the funding scope of the National Natural Science Fund, to strengthen 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 reduce computation complexity and task, improve significantly the capability of computer to solve scientific and engineering problems and meet the increasing demand from applications.

The Plan will provide further support for scientific research on scientific computation in frontier areas and major needs, promote coordinated development of hardware and software for scientific computation, leverage intercrossing and merging of mathematics with other disciplines, foster groups of high level talents in scientific computation, 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 for numerical simulation technology and method for solving bottle neck problems in scientific frontiers and national needs.

(1) Make innovative and systematic achievements in common efficient algorithm research, and, in particular, breakthroughs in construction, basic theory and parallel realization technology of high fidelity and high efficiency discrete method, nonlinear eigen value algorithm and optimization method of complex targets of partial differential equations.
(2) In areas of computable modeling and high performance computation, focusing on solving problems of modeling related to multi process coupling, data driven and model-data integration, develop practical computable model, and achieve large scale numerical simulation by efficient use of several hundred thousand processor cores.
(3) In promotion of disciplines and talent fostering, gather and foster large number of innovative talents in scientific computation with versatility on international frontier, develop a number of high level interdisciplinary research teams, and make remarkable progress in scientific computation in China.

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 conditions
(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 2014

The year of 2014 will be the 4th year of this Major Research Plan to accept applications. According to the overall planning, the Plan will be funded in the forms of the "Key Program project", "Fostering Program project" and "Integrated 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 in the later phase of the Plan. Applications not closely related to the following directions will not be accepted. The total budget for 2014 is about 35 million yuan.

Key Program project (funding not less than 3 million yuan per project for 4 years)

1. Basic Algorithms

To solve nonlinear coupled problems of multi scale, multi model in large scale numerical simulation of real multi physical coupled problems, and to overcome the difficulties such as scalability and computation efficiency of algorithms in super parallel computers, it is necessary to carry out researches on the efficient algorithms for complex coupled problems, so as to provide algorithm and theoretical support for large scale numerical simulation of real problems.

Main research contents are:

(1) Studies on the efficient computation method for nonlinear coupled problems. It is to study the high precision discrete method for nonlinear coupled partial differential equations and fast algorithm for discrete algebraic equations, develop relevant solver, and solve numerical algebraic equations of real problems with high efficiency and high precision using several tens of thousands cores.

(2) Basic algorithm for nonlinear partial differential equations. It is to solve partial differential equations with high nonlinearity or small parameters having clear scientific and engineering applications, study large time step, self-adaptive spatial temporal algorithm, and nonlinear iteration method, develop new computation method and post treatment techniques, and develop relevant theory of algorithms.

2. Efficient realization of generic algorithms

By using the special properties of 100 PF hetero parallel computer systems, studies should be focused on the efficient realization of generic algorithms, and develop library of high efficiency basic algorithms and programs on Chinese made 100 PF computers.

Main research contents are:

(1) The efficient realization of generic algorithms for100 PF computers. It is to study the programming and parallel computing environment for leveled architecture (system-node-processor-core) of tens of thousands to several million cores, data organization and transmission, key algorithm such as self-adaptive process dispatch, and massive hetero thread load balance, develop practical algorithm package for large scale multi core E level computing systems.

(2) For important application areas (such as quantum chemistry and new drug synthesis, material genetic engineering, climate and environmental system and weather forecasting) and major technology equipment, it is to study high efficiency realization of basic algorithm and computable models, develop high efficiency basic algorithm library and programs package in relevant areas, and demonstrate with examples of applications.

3. Computable modeling for important scientific areas

The studies on design principles of bio network and computing modeling of bio network may not only quantitatively describe the interactions between bio molecules and cells and of their complex behaviors, but also reveal basic molecular process and laws of information processing in life systems such as growth, development, aging and diseases of organisms. Information assimilation is a key step in weather forecast and climate prediction, therefore study on the high efficiency mathematical method for information assimilation may provide important support to improve weather forecasting and climate prediction.

Main research contents are:

(1) Design principles of bio functional modules and computable modeling of bio systems. It is to study the general conditions, quantitative laws and principles of complex bio systems. Research focuses on the development of algorithms such as computing modeling of bio systems, bio network structure and network simulation, at levels of cell (e.g. neurons), molecules and bio network, discover “design principles”, “quantitative laws” or “properties of high dimensional data and information processing” of bio functional module and network module, and explain the laws of dynamic variation and important bio processes.

(2) Study on mathematical methods of assimilation of climate prediction materials. For typical initial value problems such as ciliate prediction, it is to develop high efficiency mathematical optimization method in

information assimilation schemes, introduce new scheme of data assimilation, break the bottle-neck of high dimensions, great amount of computation or poor sample representation in data assimilation schemes, overcome some key mathematical problems such as low estimation of background error covariance and flux dependence, so as to make highly efficient assimilation of multiple source observation data; verify the new assimilation scheme in major applications such as climate prediction.

Fostering Program projects (funding about 700,000 yuan per project for 3 years)

1. Testing algorithm and realization on E level computers
2. Model reduction and algorithm in quantum chemistry, quantum physics computing
3. Uncertainty quantified method in numerical simulation of real complex systems
4. Computable coupled modeling and algorithms in climate prediction
5. Computable modeling and algorithm explorations for hard to compute real problems

Integration directions (funding for 4 years)

1. Basic algorithms
2. Computable modeling
3. Physical phenomena in extreme conditions
4. Bio information and diseases
5. High efficiency realization of generic algorithms

IV. Priorities for funding

To achieve the overall objectives of this Major Research Plan, it is required that researchers in different areas to form their research team for application (research team formed with members in the areas of algorithm, problem and software is encouraged). Priorities will be given 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 in accordance with the research directions designed for 2014, and within the key scientific problems, and emphasize should be on contributions to the overall objectives and the key scientific issues of this research plan, especially the integration of algorithm and practical problems. Application that fails to comply with this guide will not be accepted. Applicants are requested to illustrate the difference, relevance, and distinction between the application and other already-funded national programs such as National Basic Research Program of China ("973" Program) and National High-Tech R&D Program ("863" Program).

(2) Please select the proper application code: select "Major Research Plan" for funded categories, choose one of "Fostering Program", "Key Program", or "Integrated Program" for sub-category. Fill the title "Basic Algorithms for High Performance Scientific Computation and Computable Modeling" in the annotation. Proposals without proper code selections will not be accepted. Application code selection should be made in accordance with the research contents.

(3) To strengthen academic exchange among the project clusters, NSFC will organize an annual seminar of the funded projects every year, and various relevant academic workshops. The PI's of the funded projects have to attend such seminars and workshops.

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? ThisPlan 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 2014

Key research directions include

(1) Multi-source information fusion, land-atmosphere system (land) data assimilation and data reanalysis over the TP
(2) Studies on numerical model of TP's land-atmosphere coupled system (complex topography treatment, parameterization of physical processes)
(3) Mechanical and thermal forcing of multi-scale TP-topography
(4) The macro- and micro- characterization of TP-cloud-precipitation physics
(5) Mechanism of impacts of TP's land-atmosphere coupled process on global and regional energy/water cycles
(6) Troposphere-stratosphere interaction over the TP
(7) Collaborative effects of the TP and oceans on East Asian monsoon change
(8) Mechanism of TP's influences on the disastrous weather and droughts/floods
(9) Features and mechanism of the TP climate change

The Priorities for funding in 2014:

(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.

(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) To achieve the overall scientific target of the Major Research Plan, and to meet the need for multi-disciplinary integration, applicants should make a commitment to abiding by the relevant regulations concerning data and data management. To avoid duplicate investments, those who have also involved in other research project(s) should elaborate on differences from and linkages to the National Basic Research Program of China (or 973 Program) and relevant research projects funded by other sources.

(5) The total fund for this Major Research Plan in 2014 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 groundwork and accumulations, and have proposed an 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.

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

Regulatory Mechanisms of Vascular Homeostasis and Remodeling

Cardio-cerebrovascular diseases (coronary heart disease, hypertension, stroke, and pulmonary ypertension), pathologically characterized as vascular

remodeling due to vascular dysfunction and damage-repair abnormality, constitute the No.1 killer to people's health. The morbidity rate in China of cardio-cerebrovascular diseases is ascending yearly. Urgent need for dramatic improvement of diagnosis, treatment and prevention has emerged as crucial medical and social issue. The obstacles to solving this major problem include lack of deep understanding of pathological and molecular mechanisms accountable for abnormal vascular structure and function, shortage of novel interventional targets, and scarcity of more efficient therapeutic strategies. Therefore, an intensive study on the maintenance of vascular homeostasis and remodeling is of pivotal importance to prevention and treatment of vascular-associated diseases.

Homeostasis is the important physiological foundation of organic live activities. The blood vessel is an integrative organ composed of endothelial cells, smooth muscle cells, and fibroblast cells. The blood vessel senses the changes of the inner microenvironment, integrates those signals via intercellular crosstalk, produces local bioactive factors, and thus enables itself to adaptive alteration structurally and functionally. Vascular remodeling, namely the structure changes of blood vessel, is an active process involving cell proliferation, death, migration, and extracellular matrix turnover etc. This process largely depends on the integration of growth factors, vascular active substances and hemodynamics. Vascular remodeling is not only an adaptive physiological process to maintain vascular homeostasis, but also a common vital pathological process of many vascular diseases. Tons of cutting-edge scientific disciplines are involved in this area such as metabolism, oxidative stress, inflammation, biological active substances, genetics, epigenetic etc. Nevertheless, interdisciplinary research strategies connecting the canonical disciplines (e.g. physiology, pathology, cellular biology, genetics and biochemistry) and the cutting-edge technologies (e.g. omics, biological genetic engineering, bioinformatics and imaging) are desired to fully elucidate the underlying mechanism of vascular homeostatic and remodeling.

I. Scientific goals

Financial support will be provided for basic research on the common scientific problems of major cardio-cerebrovascular diseases, especially the regulatory mechanism of vascular homeostasis and remodeling. Researchers are encouraged to use interdisciplinary techniques of molecular biology, pathophysiology, molecular imaging, omics, bioinformatics, biomechanics, chemistry, and material science to elucidate the important signaling cascade

and network of vascular homeostasis and remodeling during physiological and pathophysiological states. The long-term goal is aimed to reveal the underlying mechanisms of major cardio-cerebrovascular diseases, to uncover early stage diagnostic molecular biomarkers, and to identify the therapeutic targets.

II. Key scientific issues

What are the key dynamic regulatory networks and hubs during vascular homeostasis and remodeling and how do they work?

III. Key research directions

1. **Signaling Cascade, Regulatory Network and the Rule of Dynamic Change of Vascular Homeostasis**
   The plan mainly funds researches covering cell signaling cascades, gene/protein expression/modification, dynamic change of bioactive inducer/inhibitor/metabolites, the regulatory network and the pivotal nodes during transition from homeostasis to vascular remodeling. The studies involving systemic biology are encouraged.

2. **Pathological Mechanisms of Intrinsic and Extrinsic Environmental Factor Induced Vascular Homeostasis Disruption and Remodeling**
   The Plan also funds researches elucidating how inflammation, stress, metabolism, biological active substances and biomechanics disturb the balance of vascular injury-repair. Applicants are encouraged to explore regulatory network of vascular injury-repair, the molecular mechanisms, the cell-cell interactions, the cell-extracellular matrix interactions, and the phenotype transition of cells in response to microenvironment stimuli, the cell differentiation and the dynamic process of vascular remodeling. The final goal is to find early interference targets. Joint applications between clinicians and biologists are encouraged.

3. **Cutting-edge Technology, Methodology, and Working Model for Vascular Homeostasis and Remodeling Research**
   The funding scope also covers researches that take advantage of new progress of interdisciplinary research, aim to develop new technologies, methods, and working models (such as animal models that mimic human vascular diseases), molecular imaging techniques to real-time observe gene, protein and metabolite products during vascular injury-repair process, bioinformatics resource, database and analytical platform of

vascular remodeling, and novel cutting-edge techniques involving biomechanics, nanotechnology, biodegradable material, stem/progenitor cell directional differentiation, and tissue printing to study vascular homeostasis and remodeling.

IV. Notes to Application

(1) This Major Research Plan guideline aims to strategically lead the current researches and efficiently integrate them into aproject cluster. Applicants are required to propose subject, scientific aim, research contents, relevant technologies, and corresponding research funding according to guideline. The relevance of proposed study to the guidelines is required to be proposed. The application that fails to meet the criteria of guidelines will not be accepted for evaluation. In order to avoid repeated funding, the applications are required to clarify the distinctions and connections to other funded projects on state level.

(2) Please select Major Research Plan for Application funding category, Fostering Program for Subcategory, Vascular Homeostasis and Regulatory Mechanisms for annotation. The application that fails to select the category will not be accepted for further evaluation. Correct application code is needed according to the application contents. Special requirements for Fostering Program and Key Programare the same as those in the guidelines for General Program and Key Programof the Department of Health Sciences.

(3) An overview of application and funding in 2013: 2013 was the first year that this Major Research Plan started. Totally 177 applications were accepted, including 30 Key Program projects and 147 Fostering Program projects. On the whole, most applications in 2013 were still using traditional molecular biology strategy to perform single molecular researches, although only a few take advantage of systematic biology technique to study the regulatory network, as well as limited applications involve interdisciplinary elements. Part of applications lack relevant preliminary experiment data supporting the central hypothesis. A couple of applications lack in-depth mechanism exploration. One or two applications fail to meet criteria of the Major Research Plan guidelines. In 2014, applications covering disciplinary, in-depth mechanistic, systematic biological, cutting--edge technological researches are strongly encouraged.

(4) In order to promote the academic exchange, to boost the formation of the project clusterand to improve the multidisciplinary interaction and integration, scientific symposium will be held annually.Flexible scientific

workshops will be taken place occasionally. Principle investigators funded by this Plan are under obligation to participate in the academic activities organized by the Steering Group of Experts and Administration Group of the Plan.

(5) This Major Research Plan will provide 47,000,000 yuan in 2014. 25 Fostering Program projects and 8 Key Program projects will be funded. Applications with creative research strategy or promising preliminary experiment data but in need of further exploration are allocated as Fostering Program, with 3-year period of funding and an average intensity of 1,000,000 yuan per project. Applications that boast sound research base and massive work accumulation, propose important and novel scientific problems, and start deep and systematic researches are encouraged as Key Program, with 4-year period of funding and an average intensity of 3,000,000 yuan per project.

(6) The Department of Health Sciences accepts the applications.

Precision Measurement Physics

Precision measurement physics is the basis and frontier of modern physics development, and the result of integrating scientific exploration and precision measurement techniques, and plays the critical role in meeting national needs on relevant precision measurement. Based on atomic, molecular and photonic research, this Major Research Plan is aiming to construct new system of highly stable precision measurement at special target of precision measurement physics, explore new concept and new principles of precision measurement physics, develop higher precision measurement method and technology, improve precision of measuring basic physical parameters and test the range of application of basic physical principles at higher precision level.

I. Scientific goals

Overall scientific goal

It is to further improve research capability of China in precision measurement, promote development of precision measurement physics, increase China's international influence in precision measurement physics, and reach leading level in basic physical constant measurement and basic physical quantities. Provide key concept, method and technology basis for national needs such as navigation and positioning, time keeping, resources exploration, national defense, etc. Build up a high-leveled research team for the country.

Specific scientific target

It is to improve existing experimental system for higher measurement precision; construct new system of atomic and molecular cooling, propose new principles and new method for atomic and molecular cooling for precision measurement; break the standard quantum limit in measurement, reach the international leading level in noise compression; make the uncertainty in time frequency measurement reach to the level of 10^{-18}, time frequency comparison and transfer precision higher than 10^{-19}; make measurement value of more physical constants enter CODATA; and achieve international leading results in verification of physical laws such as equivalent principle and Newton's reverse square law, etc.

II. Key scientific issues

1. Principles, method and technologies of measurement breaking the standard quantum limit
2. New principles and method breaking the existing atomic frequency standard precision
3. New mechanism and technology breaking the atomic precision control and molecular cooling

III. Application and funding in 2013

In 2013, 70 applicationswere received, of which 13 were Key Program projects, 57 Fostering Program projects. After expert review, 4 Key Program projects, 10 Fostering Program projectswere funded respectively with atotal funding of 28 million yuan.

IV. Key funding areas in 2014

In 2014, this Major Research Plan will focus on key scientific issues and support projects in the form of "Fostering Program" and "Key Program". Applications with explorative and new ideas will be funded in the form of "Fostering Program" and applications with original ideas, sound research accumulation and prospects of making breakthroughs will be funded in the form of "Key Program". NSFC is planning to provide 25 million yuan for integrated program and extended projects. This Major Research Plan will last for 8 years, and the main task and funding of the Plan will be completed in the first 5 years. In 2014 it is to allocate total funding of 45 million yuan, and the research directions are listed below.

Key Programs

Applicants may choose full or part of the contents in each research direction. The main research directions are:

1. Studies on quantum correlation measurement exceeding standard quantum limit

Main research contents include:

(1) Precision quantum measurement based on quantum correlation systems such as photon and atoms: it is to construct multi particle (photon or atom) self-spin compression or entanglement. By using of the quantum correlation or non-linear interactions between particles, it is to demonstrate measurement precision exceeding standard quantum limit on phase change for reaching or breakingthe Heisenberg limit.

(2) New principles and new method of quantum precision measurement: it is to explore other new principles and new 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 target is to realize measurement that breaks the standard quantum limit, and achieve the world leading level in noise compression.

(3) Development of quantum correlation precision measurement technology: by means of quantum correlation system and principles such as photon and atom, it is to develop relevant precision measurement technology with high precision, high sensitivity and high resolution, including but not limited to new quantum interferometer, gravimeter and magnetometer, so as to achieve higher precision measurement of various physical quantities (such as time, frequency, gravity, magnetic field, velocity, temperature, etc.) and quantum state and quantum operations.

2. Studies on principles and methods of precision measurement based on super cold atoms and molecules

Main research contents:

(1) Preparation of super cold molecules (including molecules and ions) system and principles and method for precision measurement; it is to develop the applied method 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, as well as the calibration of relevant low energy impact properties.

Research target is to develop new system of atomic and molecular cooling, and reach international leading level.

3. High precision testing of basic physical laws

Main research content:

(1) High precision experimental verification of Newton's reverse square law, high precision experimental testing of equivalent principle;

(2) High precision verification 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) It is to 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.

Research target is aiming at international leading level to verify physical laws at higher precision or deeper level.

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 , 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 as mass ratio of proton and electron, radius of proton's charge, eigen parameters such as charge, mass, magnetic moment, life of atom and molecules).

Research target is aiming to reach international leading level in measurementprecision, and measurement results are approved and accepted by CODATA.

5. High precision atomic frequency markers

Main research content:

By using of the trapped ion of electro-magnetic field or trapped atom of optical lattice, it is to develop complete atomic frequency marker system,

solve the physical and technical problems affecting the uncertainty and stability of atomic frequency markers, such as reducing the impact of atomic movement and interactions on quantum jump spectrum line, high precision detection of high quality quantum jump spectrum line, reduce the impact of quantum projection noise on the property of atomic frequency marker, reduce the impact of environmental factors on the properties of atomic frequency marker, and break the standard quantum limit to improve the performance of atomic frequency marker, etc. Research objects are included as atomic and ion systems other than calcium, strontium, aluminum.

Research target is tostudy atomic frequency markers at uncertainty levels of 10^{-18}through precision measurement and comparison.

Research direction of the Fostering Program

Addressing issues in precision measurement physics, it is to carry out studies in frontier areas of new physical system, new principles, new methods and new technologies for special problems in precision measurement physics. Applications should identify clear scientific problems, new physical ideas and specific ways of solving the problem. Projects with good research results, clear and important scientific issues to be further studied may receive continued support through the Key Programs or Integration Programs in the later stage.

Main research directions are:

1. Noise production and reduction in precision measurement physics
2. New principles of high precision atomic frequency marker
3. High precision transport and comparison of time frequency
4. Studies on precision atomic molecular spectrum line
5. New principles and new method of quantum measurement
6. Principle and method of ultra-cold atomic molecular precision measurement
7. New method of high precision verification of basic physical laws
8. New method of high precision measurement of physical constants and physical parameters
9. Studies on key unit technology of precision measurement physics

V. Criteria in program selection

(1) Research contents should meet the requirement of this guide, and research and experiments should be creative, and focused on scientific problems in precision measurement physics based on atomic, molecular

and photonic techniques.

(2) Exploratory studies will be encouraged in frontier areas, and give preferential support to research on new ideas, new systems, new methods and new technologies in precision measurement physics.

(3) Studies should be mainly focused on high precise experiment, and pay its attention to the combination of theory and experiments, and research targets should be in reflection of higher measurement precision.

(4) It is encouraged to the multi and interdisciplinary research, especially between mathematic, physics, information and geosciences.

(5) International joint research is encouraged.

VI. Notes to Applications

(1) Please read this guide carefully before writing the application. This plan is aiming to form a research project cluster. Applications should have clear key scientific issues, and close relations with the problems given in this guide, and emphasize on contributions to the overall objectives and the key scientific issues of this plan. Applications which fail to meet these requirements will not be accepted. In order to avoid repeated funding, the applications are required to clarify the distinctions and connections to other funded projects from other sources if there is any.

(2) "Major Research Plan" in the funded categories of applications should be selected in the application form, "Key Program" in the column of sub-category and “Precision Measurement Physics “in the annotation. Application that the above content is not accurately provided or not selected will not be accepted. Appropriate application code according to the actual contents should also be indicated.

(3) To fulfill the overall goal of the plan, the awardees are requested to abide by relevant regulations on data management and sharing.

Young Scientists Fund

The Young Scientists Fund is an important funding scheme under NSFC's talent funding system. It supports young scientists to freely choose their research topics within the funding scope of NSFC to conduct basic research, fosters the ability of young scientists to independently undertake research projects and do creative research, stimulates creative thinking of young scientists and trains backup talents for basic research.

Eligibility of applicants

(1) Have experience of doing basic research.
(2) Have senior professional position (title) or Ph.D. degree, or be recommended by 2 researchers in the same research area with senior professional position (title).
(3) Be less than 35 by January 1 of the year of application (born on or after January 1, 1979). Female applicants are limited to being less than 40 by January 1 of the year of application (born on or after January 1, 1974).

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 mainly evaluated. Applicants should follow the outlines of proposal for Young Scientists Fund when making applications. They may be up to 2 collaborating units within one proposal and the research period is 3 years in general.

In 2013, 15,367 projects of Young Scientists Fund were supported. The total funding was 3.7 billion yuan and the average funding was 240,800 yuan per project, which is the same as that of last year. The average success rate was 25.2%, which is 1.75% higher than that of 2012. In 2014, 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 2013

Unit: 10,000 yuan

Department	Applications	Approved funding				Funding rate (%)
		Projects	Funding	Average per project	Percentage of the total (%)	
Mathematical and Physical Sciences	4,965	1,638	41,030	25.05	11.09	32.99
Chemical Sciences	4,812	1,390	34,790	25.03	9.40	28.89
Life Sciences	9,237	2,233	51,380	23.01	13.89	24.17
Earth Sciences	5,025	1,541	38,520	25.00	10.41	30.67
Engineering and Materials Sciences	10,386	2,744	68,590	25.00	18.54	26.42
Information Sciences	7,319	1,855	46,020	24.81	12.44	25.34
Management Sciences	3,361	650	13,380	20.58	3.62	19.34
Health Sciences	15,865	3,316	76,290	23.01	20.62	20.90
Total	60,970	15,367	370,000	24.08	100.00	25.20

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

Department of Mathematical and Physical Sciences

The development of young scientists is particularly important for the development of mathematical and physical sciences. The Department has always been paying attention to foster and support young scientists, and the funding rate of the Young Scientists Fund has always been higher than that of General Program projects. In 2014, the Department will maintain a higher funding rate for the Young Scientists Fund so as to give more young people the opportunity to do independent research, and to foster outstanding talents for basic research.

Funding for Projects of the Young Scientists Fund in the Department of Mathematical and Physical Sciences in the Last Two Years

Unit: 10,000 yuan

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Mathematics	Math I	240	5,291	31.83	269	5,976	32.96
	Math II	272	6,000	30.70	306	6,774	32.42
Mechanics	Basic problems and methods in mechanics	2	53	18.18	3	81	33.33
	Dynamics and control	48	1,234	30.57	55	1,402	31.98
	Solid mechanics	100	2,573	30.67	106	2,795	31.93
	Fluid mechanics	57	1,498	30.16	66	1,731	31.88
	Bio-mechanics	19	507	30.65	18	463	32.73
	Explosive and impact dynamics	25	661	30.49	24	665	31.58
Astronomy	Astrophysics	45	1,292	39.47	59	1,632	41.84
	Astrometry and celestial mechanics	45	1,183	31.69	48	1,311	31.37
Physics I	Condensed matter physics	200	5,302	31.65	215	5,746	33.18
	Atomic and molecular physics	41	1,082	32.03	44	1,168	33.59
	Optics	124	3,405	31.71	120	3,252	33.15
	Acoustics	28	781	32.18	31	863	34.07
Physics II	Fundamental physics and particle physics	73	1,619	33.49	69	1,518	35.38
	Nuclear physics, nuclear technology and its application	75	2,005	35.05	76	2,021	32.20
	Particle physics and nuclear physics experimental facilities	58	1,659	31.69	71	2,049	34.63
	Plasma physics	49	1,365	30.25	58	1,583	33.14
Total		1,501	37,510	31.58	1,638	41,030	32.99
Average funding per project		24.99			25.05		

Department of Chemical Sciences

The Department of Chemical Sciences upholds the principle of people first and fosters innovative talents, brings into full play the maintaining and fostering role of the Young Scientists Fund, and steadily expands the funding scope 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 2014, 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		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Inorganic chemistry	185	4,625	27.37	201	5,030	29.30
	Analytical chemistry	146	3,650	27.55	165	4,130	29.26
Division Ⅱ	Organic chemistry	209	5,225	27.47	237	5,932	29.30
Division Ⅲ	Physical chemistry	259	6,480	27.55	273	6,833	29.26
Division Ⅳ	Polymers	103	2,575	27.61	110	2,755	29.49
	Environmental chemistry	165	4,125	27.32	169	4,230	29.19
Division Ⅴ	Chemical engineering	204	5,100	25.40	235	5,880	27.07
Total		1,271	31,780	27.11	1,390	34,790	28.89
Average funding per project		23.00			23.01		

Department of Life Sciences

In 2013, the Department of Life Sciences received 9,237 applications in total for the Young Scientists Fund, accepted 9,007 applications and funded 2,233 projects with a funding rate of 24.79% and an average funding of 230,100 yuan per project. The Department will continue to follow the principle of “stabilize research teams, foster young talents, stimulate innovative thinking and support independent research” for the Fund, and give steady support to young scientists. In 2014, the funding for the Young Scientists Fund will be 230,000 yuan per project. For application details, 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

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division Ⅰ	Microbiology	142	3,264	23.32	156	3,582	23.89
	Botany	133	3,048	25.05	145	3,340	27.36
Division Ⅱ	Ecology	152	3,507	24.64	167	3,846	26.51
	Forest science	117	2,687	21.79	128	2,950	23.32
Division Ⅲ	Biophysics, biochemistry, and molecular biology	100	2,309	23.36	110	2,532	26.57
	Immunology	57	1,311	25.91	62	1,436	32.98
	Biomechanics and tissue engineering	56	1,277	23.73	61	1,402	24.21
Division Ⅳ	Neuro, cognitive science and psychology	100	2,309	24.39	110	2,532	25.70
	Physiology and integrated biology	42	967	22.95	46	1,062	22.89
Division Ⅴ	Genetics and bioinformatics	108	2,474	26.80	118	2,710	28.71
	Cytobiology	67	1,551	23.43	74	1,700	27.21
	Developmental biology and reproductive biology	47	1,079	27.01	51	1,183	26.84
Division Ⅵ	Fundamentals of agronomy and crop science	159	3,665	21.75	175	4,024	22.73
	Food science	181	4,175	21.70	200	4,585	23.01
Division Ⅶ	Plant protection	117	2,684	24.89	128	2,944	25.15
	Horticulture and plant nutrition	116	2,663	21.14	127	2,924	23.26
Division Ⅷ	Zoology	68	1,575	23.78	75	1,728	26.04
	Animal husbandry and grassland science	99	2,268	21.95	108	2,491	21.73
	Veterinary science	107	2,453	23.73	117	2,690	25.71
	Aquaculture	68	1,564	21.45	75	1,719	21.13
Total		2,036	46,830	23.41	2,233	51,380	24.79
Average funding per project		23.00			23.01		

Department of Earth Sciences

In 2013, the Department of Earth Sciences received 5,025 applications from 764 institutions in total for the Young Scientists Fund, of which 2,804 applications or 55.8% were from universities, and 2,032 applications or 40.4% from research institutes. 1,541 projects were funded with a total funding of 385.2 million yuan, an average funding intensity of 250,000 yuan per project and a success rate of 30.67%. In 2013, among the funded projects of the Young Scientists Fund, 792 were from universities accounting for 51.4%, and 700 projects from research institutes accounting for 45.4%. It is one of the important goals of NSFC to continuously foster outstanding young scientists. The Department will further strengthen its funding for young and especially outstanding young talents. The Young Scientists Fund is mainly to foster young talents, and provide more opportunities for young scholars in their early career. The funding priority of Young Scientists Fund will be given to researchers with Ph.D. degrees who have just finished their education and started their career in basic research. In 2014, the funding for the Young Scientists Fund will be 250,000 yuan per project.

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

Unit: 10,000 yuan

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Geography (including soil science and remote sensing)	603	15,081	29.16	655	16,366	30.68
Division II	Geology	260	6,417	29.45	289	7,190	30.81
	Geophysics and space physics	92	2,304	29.11	99	2,483	30.56
Division III	Geophysics and space physics	137	3,435	29.09	150	3,749	30.67
Division IV	Marine science	189	4,798	28.68	208	5,236	30.45
Division V	Atmospheric science	126	3,165	28.97	140	3,496	30.70
Total		1,407	35,200	29.12	1,541	38,520	30.67
Average funding per project		25.02			25.00		

Department of Engineering and Materials Sciences

In order to encourage and foster innovative young research talents, the Department will continue to carry out the related funding policies for the Young Scientists Fund. In 2013, the Department received 10,386 applications (declined 362 applications) for the Fund with an increase of 4.63%. 2,744 projects were funded with a total funding of 685.9 million yuan, an average funding intensity of 250,000 yuan per project and a success rate of 26.42% (25.24% in 2012).

Please refer to sections in the General Program 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		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Materials Sciences I	Metallic materials	192	4,795	25.43	215	5,374	25.84
Materials Sciences Ⅱ	Inorganic non metallic materials	304	7,595	26.09	330	8,242	26.70
	Organic polymer materials	196	4,905	25.52	218	5,444	26.11
Engineering Sciences I	Metallurgy and mining science	221	5,520	24.10	260	6,507	24.64
Engineering Sciences Ⅱ	Mechanical engineering	435	10,870	25.04	478	11,950	26.32
Engineering Sciences Ⅲ	Engineering thermo physics and energy use	201	5,020	25.90	216	5,395	26.97
Engineering Sciences Ⅳ	Architecture, environment and structural engineering	539	13,485	24.77	576	14,410	27.08
Engineering Sciences Ⅴ	Hydrology and marine engineering	242	6,045	26.36	264	6,587	26.61
	Electrical science and engineering	175	4,375	24.51	187	4,681	27.02
Total		2,505	62,610	25.24	2,744	68,590	26.42
Average funding per project		24.99			25.00		

Department of Information Sciences

In 2013, the Department of Information Sciences received 7,319 applications for the Young Scientists Fund, which was increased by 0.18% compared with that in previous year, and funded 1,855 projects with an average funding rate of 25.34% (23.10% in 2012). The total funding was 460.2 million yuan and the average funding intensity was 248,100 yuan per project. In 2014, the Department will continue to pay attention to applications for the Young Scientist Fund, and increase properly the 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		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Electronics and technology	139	3,505	24.09	152	3,962	26.71
	Information and communication system	145	3,635	23.35	173	4,326	26.49
	Information acquisition and processing	175	4,291	23.74	170	4,232	26.56
Division II	Theoretical computer science, computer software and hardware	131	3,106	22.17	135	3,269	24.55
	Computer application	218	5,159	21.89	240	5,743	24.54
	Network and information security	150	3,576	21.99	168	3,973	24.89
Division III	Control theory and control engineering	182	4,449	23.70	188	4,608	23.71
	Systems science and system engineering	56	1,352	19.51	76	1,817	26.39
	AI and intelligent system	140	3,412	22.40	150	3,679	24.12
Division IV	Semiconductor science and information devices	135	3,666	24.59	152	3,893	26.21
	Information optics and photoelectric devices	106	2,852	24.82	130	3,370	25.9
	Laser technology and technical optics	111	2,987	24.94	121	3,148	25.8
Total		1,688	41,990	23.10	1,855	46,020	25.34
Average funding per project		24.88			24.81		

Department of Management Sciences

In recent years, the quality of applications and research for the Young Scientists Fund in the Department has scored significant improvement. Most of the applicants have paid attention to the exploration in scientific frontier areas, proposed proper research methods and published some high level research papers. Of course, some applicants still lacked of understanding on NSFC's policy and the proposed research work could not be completed with the limited budget and within the proposed time period. Some proposals duplicated the work of Ph.D. thesis or post-doc research, and failed to provide information required by NSFC.

In 2013, the Department received 3,362 applications for the Young Scientists Fund, about the same as that in 2012. 650 projects were funded with a funding rate of 19.33% and the average funding intensity of 205,800 yuan per project. The funding amount and success rate were all increased significantly compared with those in 2012.

In 2014, the Department will continue to follow the principle of "expanding the funding scope properly and limiting the funding intensity" for Young Scientists Fund. The average funding in 2014 will be 205,000 yuan per project for 3 years.

The requirements given in the general description of the General Program in the Department of Management Sciences in this guide are also applied to the Fund, so please read carefully before submitting proposals.

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

Unit: 10,000 yuan

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Management science and engineering	180	3,603	18.77	182	3,745	20.18
Division II	Business administration	180	3,603	18.58	196	4,035	19.90
Division III	Macro-management and policy	247	4,944	17.06	272	5,600	18.44
Total		607	12,150	17.98	650	13,380	19.33
Average funding per project		20.02			20.58		

Department of Health Sciences

The Department of Health Sciences supports mainly basic research on the occurrence, development, transfer, 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. Applicant should attach to the proposal the clearly scanned copies of the first pages of typical papers (no more than 5) 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 2014, the funding for the Young Scientists Fund will be around 250,000 yuan per project.

Please note that in 2014, the Young Scientists Fund in the Department of Health Sciences will not have the category of “animal model of diseases”.

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

Unit: 10,000 yuan

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Respiratory System, Circulatory System, Digestive System, Blood System, Gerontology	406	9,369	18.81	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	420	9,712	18.71	469	10,792	20.03

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division III	Neurological and Psychiatric Diseases	242	5,584	20.68	266	6,119.5	22.39
	Medical Imaging and Biomedical Engineering	147	3,394	21.68	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,	304	7,019	18.95	338	7,773.5	21.05
Division V	Oncology I	626	14,464	19.85	692	15,910	20.52
Division VI	Oncology II	146	3,358	24.87	140	3,220	24.18
	Medical Immunology, Forensic Sciences	97	2,235	24.87	107	2,476	26.42
Division VII	Preventive Medicine, Endemiology, Occupational Medicine, Radiology	223	5,150	24.75	245	5,641	24.26
Division VIII	MateriaMedica and Pharmacology.	396	9,145	15.69	446	10,251	17.56
Total		3,007	69,430	19.51	3,316	76,290	20.90
Average funding per project		23.09			23.01		

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 economic development of the regions.

Applicants for the Fund for Less Developed Regions should be satisfied with following qualifications:

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

Researchers, who are satisfied with above qualifications and working in Inner Mongolia Autonomous Region, Ningxia Hui Autonomous Region, Qinghai Province, Xinjiang Uyghur Autonomous Region, Tibet Autonomous Region, Guangxi Zhuang Autonomous Region, Hainan Province, Guizhou Province, Jiangxi Province, Yunnan Province, Gansu Province, Yanbian Korean Prefecture of Jilin Province, EnshiTujia and Miao Prefecture in Hubei Province, 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 cannot apply, but may join the application as main participants. Graduate students can not apply, but on-job students may apply through their employer institutions at the consent of their supervisors. Scientists listed in Clause 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 make out your application form accordingly. The collaborative units cannot exceed 2, and the research period is 4 years.

In 2013, the Fund for Less Developed Regions funded 2,497 projects with a total funding of 1.2 billion yuan. The average funding was 480,600 yuan per project, which is 4,800 yuan less than that in 2012. The funding rate was 21.09%, which is 0.87% lower than that in 2012 (please refer to the table below for the funding statistics). In 2014, 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 2013

Unit: 10,000 yuan

Department	Applications	Projects and funding approved				Funding rate (%)
		Projects	Funding	Average funding per project	Percentage of the total (%)	
Mathematical and Physical Sciences	602	175	7,720	44.11	6.43	29.07
Chemical Sciences	924	206	10,310	50.05	8.59	22.29
Life Sciences	2,830	644	32,190	49.98	26.83	22.76
Earth Sciences	727	156	7,830	50.19	6.53	21.46
Engineering and Materials Sciences	1,555	299	14,970	50.07	12.48	19.23
Information Sciences	1,079	207	9,120	44.06	7.60	19.18
Management Sciences	678	120	4,140	34.50	3.45	17.70
Health Sciences	3,443	690	33,720	48.87	28.10	20.04
Total	11,838	2,497	120,000	48.06	100.00	21.09

Please refer to sections of the General Program of various departments for the funding scope of the Fund and 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 is aiming at creating a good research environment for these regions, fostering and stabilizing an appropriate amount of researchers, training talents in basic research for local scientific and technological development, and increasing the capability of solving urgent scientific problems in the development of national economy and society. In the evaluation of proposals for the Fund, special attention is paid to researches that have relative good research background with characteristics and advantage，so as to give full play to the role of the Fund for Less Developed Regions in talent fostering, and strengthen the support to researchers in the western regions of China.

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

Unit: 10,000 yuan

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Mathematics	Math I	38	1,700	31.14	41	1,637	32.53
	Math II	32	1,450	26.45	37	1,443	26.62
Mechanics	Basic problems and methods in mechanics	1	56	20.00	2	90	66.67
	Dynamics and control	4	217	26.67	3	139	42.86
	Solid mechanics	10	517	34.48	9	425	21.43
	Fluid mechanics	4	230	23.53	5	233	38.46
	Bio-mechanics	1	60	50.00	3	138	37.50
	Explosive and impact dynamics	0	0	0	0	0	0
Astronomy	Astrophysics	4	215	33.33	7	310	41.18
	Astrometry and celestial mechanics	2	109	66.67	0	0	0
Physics I	Condensed matter physics	23	1,240	28.40	24	1,188	29.27
	Atomic and molecular physics	6	292	33.33	7	332	30.43
	Optics	12	678	30.00	12	580	31.58
	Acoustics	1	55	20.00	2	105	22.22

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Physics II	Fundamental physics and particle physics	7	372	21.21	18	858	34.62
	Nuclear physics, nuclear technology and its application	7	372	35.00	2	96	12.50
	Particle physics and nuclear physics experimental facilities	2	107	50.00	1	48	20.00
	Plasma physics	1	50	50.00	2	98	40.00
Total		155	7,720	29.03	175	7,720	29.07
Average funding per project		49.81			44.11		

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 2014.

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		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Inorganic chemistry	28	1,378	24.35	28	1,400	22.58
	Analytical chemistry	26	1,321	23.42	26	1,300	22.22
Division II	Organic chemistry	51	2,530	24.88	47	2,360	22.07
Division III	Physical chemistry	27	1,368	23.48	29	1,450	22.14
Division IV	Polymer sciences	17	845	23.94	17	850	22.67
	Environmental chemistry	25	1,250	23.81	26	1,300	22.41
Division V	Chemical engineering	32	1,618	23.53	33	1,650	22.30
Total		206	10,310	24.01	206	10,310	22.29
Average funding per project		50.05			50.05		

Department of Life Sciences

In 2013, the Department received 2,830 applications for the Fund for Less Developed Regions (accepted 2,755), and funded 644 projects. The funding rate was 23.38% with the average funding of 499,800 yuan per project. The average funding for 2014 will be 500,000 yuan per project. In the future, the Department will continue to follow the principle of "fostering regional talents, supporting sustained exploration, gathering outstanding talents and promote regional development" for this Fund, provide steady support to local talents and encourage and fund research applications related to local resources and natural conditions. For details, please refer to the sections in the General Program of the Department in this Guide.

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

Unit: 10, 000 yuan

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Microbiology	35	1,749	24.31	34	1,683	23.29
	Botany	50	2487	26.32	51	2,537	23.18
Division II	Ecology	69	3,451	24.82	69	3,435	23.63
	Forest science	48	2,380	24.87	51	2,571	23.29
Division III	Biophysics, biochemistry, and molecular biology	18	892	25.00	15	728	24.59
	Immunology	6	297	24.00	6	284	26.09
	Biomechanics and tissue engineering	7	345	25.00	6	284	24.00
Division IV	Neuro, cognitive science and psychology	12	619	24.00	16	796	25.00
	Physiology and integrated biology	9	464	23.68	11	535	23.91
Division V	Genetics and bioinformatics	21	1,059	24.14	18	910	22.78
	Cytobiology	5	238	25.00	5	262	21.74
	Developmental biology and reproductive biology	7	357	23.33	6	318	22.22

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division VI	Fundamentals of agronomy and crop science	74	3,701	24.92	78	3,913	23.15
	Food science	52	2,606	24.30	53	2,650	23.77
Division VII	Plant protection	40	1,987	24.69	43	2,150	22.87
	Horticulture and plant nutrition	51	2,535	24.64	45	2,264	23.20
Division VIII	Zoology	24	1,202	25.53	21	1,046	23.08
	Animal husbandry and grassland science	57	2,868	24.26	59	2,957	22.96
	Veterinary science	46	2,297	24.08	43	2,173	24.16
	Aquaculture	13	666	23.64	14	694	23.33
Total		644	32,200	24.67	644	32,190	23.38
Average funding per project		50.00			49.98		

Note: No project for Small Fund for Exploratory Studies in the Fund for Less Developed Regions was funded.

Department of Earth Sciences

In 2013, the Department of Earth Sciences received 727 applications for the Fund from 134 research institutions. Among them, 617 were from universities, accounting for 84.9%, and 97 from research institutes, accounting for 13.3%. 156 projects were funded with a total funding of 78.3 million yuan, an average funding of 502,000 yuan per project and a funding rate of 21.5%. Among the projects funded in 2013, 130 were conducted by universities, accounting for 83.3%, and 22 by research institutes, accounting for 14.1%. In 2014, the average funding will be about 500,000 yuan per project.

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		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Geology (including soil science and remote sensing)	112	5,567	22.76	112	5,635	21.58
Division II	Geology	13	694	21.67	16	829	20.78
	Geochemistry	11	532	23.40	9	474	20.45
Division III	Geophysics and space physics	6	294	23.08	6	302	21.43
Division IV	Marine science	4	215	21.05	3	129	25.00
Division V	Atmospheric science	11	528	22.92	10	461	21.28
Total		157	7,830	22.69	156	7,830	21.46
Average funding per project		49.87			50.19		

Department of Engineering and Materials Sciences

According to the policies of NSFC on the Fund for Less Developed Regions, the Department will provide steady support to foster research talents in these regions, and encourage applicants conduct basic research in conjunction with local resources and features of economic development. In 2013, the Department received 1,555 applications (declined 92) for the Fund with an increase of 9.89%. 299 projects were funded with a total funding of 149.7 million yuan. The average funding per project was 500,700 yuan with a funding rate of 19.23% (21.13% in 2012).

Please refer to sections in the General Program for various divisions for the funding scope of the Fund.

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

Unit: 10,000 yuan

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Materials sciences I	Metallic materials	28	1,420	21.88	28	1,400	19.58
Materials sciences II	Inorganic and non-metallic materials	32	1,595	20.65	31	1,573	19.25
	Polymer materials	21	1,045	20.19	20	1,004	20.00
Engineering sciences I	Metallurgy and mining science	39	1,950	22.81	40	1,982	19.14
Engineering sciences II	Mechanical engineering	51	2,555	21.52	54	2,684	18.49
Engineering sciences III	Engineering thermo physics and energy utilization	16	805	21.33	15	773	19.48
Engineering sciences IV	Architecture, environmental and structural engineering	58	2,925	20.28	61	3,042	18.60
Engineering sciences V	Hydrology and marine engineering	33	1,630	20.00	31	1,571	19.75
	Electrical science and engineering	21	1,035	22.34	19	941	21.59
Total		299	14,960	21.13	299	14,970	19.23
Average funding per project		50.03			50.07		

Department of Information Sciences

In 2013, the Department of Information Sciences received 1,079 (increasing 11.12% from last year) applications for the Fund and funded 206 projects with a total funding of 91.2 million yuan. The funding rate was 19.18% (21.22% in 2012) and the average funding was 440,600 yuan per project (441,700 yuan in 2012). In 2014, the Department will continue to give preferential support to the Fund for Less Developed Regions, and properly increase the funding rate. The average funding will be 500,000 yuan per project. All eligible researchers are welcome to apply.

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		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Electronic science and technology	17	730	25.76	18	764	20.22
	Information and communication system	11	483	17.46	15	649	18.52
	Information acquisition and processing	20	834	21.51	22	937	19.82
Division II	Theoretical computer science and computer software and hardware	25	1,086	21.37	22	972	18.64
	Computer application	46	2,040	20.54	44	1,953	18.97
	Network and information security	20	895	20.83	19	839	19.00
Division III	Control theory and control engineering	21	921	24.71	12	544	14.46
	Systems science and system engineering	10	430	17.54	14	630	24.14
	AI and intelligent systems	17	764	21.52	17	767	19.10
Division IV	Semiconductor science and information devices	8	386	21.62	9	397	20.45
	Information optics and photoelectric devices	5	241	21.74	8	352	20.51
	Laser technology and technical optics	6	290	19.35	7	316	20.00
Total		206	9,100	21.22	207	9,120	19.18
Average funding per project		44.17			44.06		

Department of Management Sciences

In 2013, the Department of Management Sciences received 678 applications for the Fund, which was largely increased from that in 2012, and funded 120 projects. The funding rate was 17.70% and the average funding was 345,000 yuan per project.

The average funding in 2014 will be 320,000 to 380,000 yuan per project for 4 years.

The requirements given in the general description of the General Program in the Department of Management Sciences in this guide are also valid for this Fund. Applicants may carefully refer to related information.

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

Unit: 10,000 yuan

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Management science and engineering	26	934	20.16	23	793.5	18.70
Division II	Business administration	32	1,149	19.98	33	1,138.5	18.23
Division III	Macro management and policy	57	2,047	17.70	64	2,208	17.11
Total		115	4,130	18.79	120	4,140	17.70
Average funding per project		35.91			34.50		

Department of Health Sciences

The Department of Health Sciences supports mainly basic research on the occurrence, development, transfer, 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 for fully utilizing their various advanced research facilities. Applicant should attach to the proposal the clearly scanned copies of the first pages of papers (not more than 5) relevant to application. Please refer to sections in the Fund for Less Developed Regions and General Program in this guide for detailed information.

In 2014, 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.

Please note that in 2014, the Fund for Less Developed Regions in the Department of Health Sciences will not have the category of “animal model of diseases”.

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

Unit: 10,000 yuan

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
Division I	Respiratory System,Circulatory System, Digestive System, Blood System, Gerontology	93	4,555	21.33	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	78	3,836	20.42	80	3,892	18.48
Division III	Neurological and Psychiatric Diseases	41	1,983	21.24	40	1,975	22.73
	Medical Imaging and Biomedical Engineering	20	970	20.62	20	966	22.47

Divisions		2012			2013		
		Projects	Funding	Funding rate (%)	Projects	Funding	Funding rate (%)
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	3,349	20.86	68	3,342	19.21
Division V	Oncology I	107	5,201	17.86	106	5,193	16.77
Division VI	Oncology II	43	2,121	24.71	43	2,118	21.08
	Medical Immunology, Forensic Sciences	17	821	25.37	17	818	26.56
Division VII	Preventive Medicine, Endemiology, Occupational Medicine, Radiology	45	2,206	22.61	45	2,201	21.53
Division Ⅷ	Materia Medica and Pharmacology.	178	8,708	20.27	178	8,676	21.07
Total		690	33,750	20.59	690	33,720	20.04
Average funding per project		48.91			48.87		

Excellent Young Scientists Fund

As one of the program categories in the talent-training program, Excellent Young Scientists Fund is a good link between the existing the Young Scientists Fund and the National Science Fund for Distinguished Young Scholars, so as to promote fast growth of creative young talents. It is mainly to support young scientists who have 5 to 10 years research experience and certain research achievements with creative ideas and active in frontiers of science for conducting basic research in directions of their own choice.

I. Eligibility of applicants

1. Applicants should meet the following qualifications

(1) Chinese citizenship;
(2) Be under the age of 38 years old (man) by January 1 of the year of application (born on or after January 1 of 1976), and under the age of 40 years old (woman) by January 1 of the year of application (born on or after January 1 of 1974);
(3) With senior professional position (title) and Ph.D. degree;
(4) Have no official employment relations with foreign institutions;
(5) 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)-(5) listed above.

2. The following people may not apply

(1) Do not have employer or employer is not home institution;
(2) Have been awarded the National Science Fund for Distinguished Young Scholars, or Excellent Young Scientists Fund;
(3) Applying for the National Science Fund for Distinguished Young Scholars this year;
(4) Doing research at Post Doc station.

II. Notes to applicants

(1) Key considerations in evaluation of applications to the Excellent Young

Scientists Fund include the basis of applicant's research experience and potential for innovation. When writing proposal, these two points should all be emphasized. For the background of research, the creativity and scientific merits of research results of the applicant should be described. For the potential of creative research, the scientific merit and creativity in proposed research, and feasibility of the research plan should be also described.

(2) Please select "Excellent Young Scientists Fund" for funding category", and "research area" rather than specific title of the research project for the project title section of the application form.

(3) It is not necessary to list "main participants", and the Excellent Young Scientists Fund mainly reviews the research ability and creative potential of the applicant only.

(4) The funding for all financial grants obtained by the applicant from the central government agencies or local government should be mentioned in the application form.

In 2014, the Excellent Young Scientists Fund plans to support 400 projects, each for 3 years, with funding of 1 million yuan per project.

Funding of Excellent Young Scientists Fund in 2013

Department	Applications	Approved projects	Funding rate (%)
Mathematical and Physical Sciences	328	50	15.24
Chemical Sciences	443	58	13.09
Life Sciences	418	56	13.40
Earth Sciences	282	39	13.83
Engineering and Materials Sciences	550	74	13.45
Information Sciences	437	55	12.59
Management Sciences	111	14	12.61
Health Sciences	388	53	13.66
Total	2,957	399	13.49

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 to 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.

Eligibility of applicants

1. Applicants should meet the following requirement:
(1) Chinese citizenship;
(2) Be under the age of 45 years old by January 1 of the year of application (born on or after January 1 of 1969);
(3) Have good scientific integrity;
(4) Hold senior professional position (title) or have Ph.D. degrees;
(5) Have experience of conducting basic research projects or other basic research;
(6) Do not have 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.

2. The following people may not apply:
(1) Doing research at Post Doc station or graduate students;
(2) Applying for the Excellent Young Scientists Fund this year;
(3) Have on-going project of Excellent Young Scientists Fund (project ending this year excepted);
(4) Have been awarded the National Science Fund for Distinguished Young Scholars.

Notes to applicants

(1) The evaluation of applicants for the National Science Fund for

Distinguished Young Scholars is based on the academic attainment and creativity of the applicant himself/herself. Therefore Names of "main participants" are not required in the application form.

(2) Main academic achievements of the applicant should be provided in the abstract part of the application form.

(3) Research area rather than specific research project title is required in the project title section.

(4) For papers and citations, only a table of statistics is required;

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

In 2013, the National Science Fund for Distinguished Young Scholars received 1,978 applications, and funded 198 projects, total funding amounts to 387.6 million yuan.

In 2014, the Fund plans to award 200 projects, each for 4 years, with 2 million yuan per project (1.4 million yuan per project for those in mathematics and management sciences).

Science Fund for Creative Research Groups

Since the establishment of the Science Fund for Creative Research Groups in 2011, 343 groups have been funded. In 2013, the Fund awarded 29 groups, with total funding of 170.4 million yuan. In 2014, the Fund plans to award 30 groups.

Approved by the Council Meeting of NSFC, the revised "Management Rules for the Science Fund for Creative Research Groups" will be implemented on February 1, 2014. Some new guidelines for application, evaluation and management of the Fund were set by the revised management rules. The key points are listed as below.

1. The objectives

The Science Fund for Creative Research Groups supports research groups, which haveprominent middle-aged and young scientists as academic leaders and PIsto carry out creative research focusing on key research orientations, and foster them to become major players in the international scientific frontiers concerned.

2. Applications and funding

(1) Starting from 2014, applications will be submitted directly by home institutions, instead of being recommended by relevant government departments.
(2) The funding for each project of the Science Fund for Creative Research Groups is 12 million yuan for 6 years (8.4 million yuan for mathematics and management sciences).
(3) PI may request further funding to continue his/her researchbased on needs for another 3 years when the end of the current project.

3. Eligibility of applicants

Applicants should meet the following requirements:
(1) Have experience of conducting basic research projects or other basic research;
(2) Guarantee to work in home institutions at least 6 months every year

within the funding period;
(3) Have a research team based on long term joint working experience, including 1 academic leader and 5 or more key researchers;
(4) The academic leader as the PI should hold senior professional position (title) and high academic level and international influence, and under the age of 55 years old by January 1 of the year of application (born on or after January 1 of 1959);
(5) Key researchers as group member should hold senior professional position (title) or have Ph.D. degrees;
(6) Applicant and participants should be at the same home institution.

PI having been awarded by the Science Fund for Creative Research Groups before may not apply again; PI and participants with senior academic title of an ongoing project of the Science Fund for Creative Research Groups may not apply or participate in application; those with senior academic title may only apply for one project of the Science Fund for Creative Research Groups each year; the participants who quit from the project of the Science Fund for Creative Research Groups may not apply or join in the application within 2 years.

4. Criteria of evaluation

Evaluation of the 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 have been achieved;
(3) Ideas and feasibility of proposed research;
(4) Academic influence of the applicant, and ability of steering the research direction and proposing major scientific problems, organization and cohesiveness 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.

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 applied at the end of the two year funding.

Two-year Funding Program

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 1964).
(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) Applicant should choose collaborator in mainland China, and sign

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

(6) The applicant should already have collaboration with their collaborators in mainland China and the proposed work should be in the area of international scientific frontiers.

(7) The applicant should promise to work in the home institution for more than 2 months every year.

Applicant or collaborator could only apply/hold one project of the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao.

Notes to applicants

(1) The Two-year Funding Program of the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao mainly evaluate 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 2013, the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao received 383 applications and 120 of them were funded with total funding of 24 million yuan, and average funding per project is 200,000 yuan.

In 2014, the 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 Program

Eligibility of applicants

(1) Grantees of the Two-years Funding Program of the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao, who have made substantial progress and finished their projects on time in

2011, or grantees who completed their projects on time in 2010 but did not apply for the Extended Funding Programor applied but not awarded with the extension funding.

(2) Applicant has spent enough time in the home institution during the implementation of the Two-year Funding Program.

(3) Applicant has signed the extended agreement of cooperation with home institution. The agreement should include the title, research direction and proposed goals of the joint research project, the home institution 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 scientific frontiers with important scientific significance, and facilitate the disciplinary development and talent fostering.

(5) The applicant should promises to work in the home institution for more than 2 months every year.

Applicant or collaborator could only apply/hold one project of the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao.

Notes to applicants

(1) The Extended Funding Program 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 2013, the Joint Research Fund for Overseas Chinese Scholars and Scholars in Hong Kong and Macao received 61 applications for the Extended Funding Programand 20 of them were funded with funding of 40 million yuan.

In 2014, the Fund is planning to award 30 applications of the Extended Funding Program. Each project will be awarded 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 presently comprised of Key International (Regional) Joint Research Program (formerly known as Major International (Regional) Joint Research Program), 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, formerly known as Major International (Regional) 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 partners shall have long-term steady collaboration (e.g. coauthored publications and

continued personnel exchanges and communications) and the overseas partners shall have matching fund for this research. In the process of cooperation, attention shall be given to the protection of intellectual property rights.

In 2013, altogether 109 out of the total 487 applications under the Major International (Regional) Joint Research Program were funded with a total funding of 300 million yuan, with an average funding amount of 2.75 million yuan per project and a success rate of 22.38%.

In 2014, the Key International (Regional) Joint Research Program plans to fund 100 projects 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; and

(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 in research projects related to the submitted application, as well as a list of publications related to the submitted application by the foreign partners in the past 3 years.

(4) Letter of confirmation by the foreign collaborator: If the foreign collaborator cannot sign the English Application Form, a letter of confirmation by him/her should be provided. The letter of confirmation should contain true contact information about the foreign collaborator. The letter of confirmation should be written in official forms 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 2014:

Department of Mathematical & Physical Sciences

(1) Mechanical behavior of materials under extreme environment
(2) Non-linear mechanics of complex systems
(3) Sky surveys and space observations
(4) New astronomical technological methods associated with the large telescopes
(5) Superfast and super strong light physics and precision measurement physics
(6) Spectrum of advanced materials and high-performance computing of physical processes
(7) Low-dimensional systems of quantum transport experiments
(8) Study of high performance particle detector
(9) Hadron structure and new cutting-edge research of hadron states
(10) Magnetically confined fusion beam injection and related physical and technical issues
(11) Physical issues in new energy
(12) 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) Analytical chemistry for life sciences
(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 and control
(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) Mineralization model, mineralization system and mechanism
(2) Urbanization process and its effects on resources and environment
(3) Environmental pollution and its impacts
(4) Interactions between oceanic plate and the continental margin
(5) Coupling relation between deep and surface earth processes
(6) Seabed resources mineralization and accumulation theory
(7) Global change and the surface process

(8) Impact of climate change on surface earth processes and ecosystems
(9) Exchange of energy and matter cycle in the climate system
(10) Solar-terrestrial energy transfer between and its impact on human activities
(11) Water resources and water cycle
(12) Monitoring, early warning and risk prevention and control of geological disasters
(13) Asia monsoon-arid environmental systems and global environmental change
(14) Life process under extreme conditions
(15) Mechanism and prediction of marine multi-scale dynamic process

Department of Engineering and Materials Sciences
(1) Photoelectric functional materials
(2) Energy materials
(3) Environmental material
(4) High-performance structural materials
(5) Basic theory, preparation and characterization techniques of materials sciences
(6) Law of efficient resource mining and its interactions with environment
(7) Interface science of metallurgy and material preparation
(8) Function and integration of complex electromechanical systems
(9) Precise manufacturing of high performance parts / components
(10) Efficient and clean use of fossil energy
(11) Carbon dioxide capture and storage (CCS)
(12) Smart grid infrastructure
(13) Design principles and technology system for urban and rural energy-saving building
(14) Urban science in environmental change
(15) Basic theory and frontier technology of marine engineering
(16) Whole life design and control engineering structures
(17) Basic research on biomaterials and their surface and interfacial functions related to intervention medicine
(18) Efficient use of water resources in changing environment
(19) Mechanism, toxicological effects and control of combined pollution of drinking water
(20) Interdisciplinary scientific issues on energy efficiency, use of renewable energy and greenhouse gas control
(21) New materials and new artificial structural materials

Department of Information Sciences

(1) Basic theory and key technology of electromagnetic vortex
(2) Hybrid integrated circuit design
(3) Wide band gap semiconductor UV detectors
(4) THz science and technology
(5) Intelligent network and E-Health science applications
(6) Mobile Internet and its scientific applications
(7) Data acquisition and modeling of the mechanisms of the human brain and body
(8) Computational theory and methods for big data
(9) New methods and applications of pattern recognition and machine learning under big data environment
(10) Key area oriented high-performance computing
(11) Energy-efficient real-time image and video processing technology
(12) New method and realization technology of object-oriented control theory
(13) Efficient algorithms and applications of complex optimization issues
(14) Infrared and terahertz imaging
(15) High-speed electro-optic modulators and coherent receivers
(16) New energy-efficient light source
(17) Biomedical sensor
(18) Application of fiber optic sensing technology in geological disaster monitoring

Department of Management Sciences

(1) Behavior based complex management system
(2) Management science issues in emerging technology and service economy
(3) Public policy research
(4) Key management science issues with Chinese characteristics
(5) Regional coordinated and sustainable development
(6) Innovation systems and S&T policy

Department of Health Sciences

(1) Cardiovascular diseases
(2) Nutrition, metabolic, and diseases
(3) Immunity and diseases
(4) Tumor
(5) Aging and diseases
(6) Pain and analgesia
(7) Mental illness and mental health
(8) Infectious diseases

(9) Eye, ENT and oral diseases
(10) Injury and repair
(11) Reproductive health
(12) Health of women and children
(13) Stem cells and diseases
(14) Regenerative medicine
(15) Medical imaging and biomedical engineering
(16) New technologies and methods for disease diagnosis and treatment
(17) Epidemiologic and preventive strategies for major diseases and injuries
(18) Environmental and genetic factors and major diseases
(19) Food hygiene
(20) New drugs
(21) Pharmacogenomics and metabolomics
(22) 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 concluded 70 cooperation agreements/MOUs with science funding agencies and research institutions in 35 countries/regions. By negotiation, NSFC reaches agreements with its foreign 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 partners on their websites and then organize scientists to submit and 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 or multilateral joint research projects funded by NSFC and its international partners under the framework of cooperation agreements /MOUs signed between them in hope of supporting Chinese researchers and their collaborators abroad to carry out research in basic sciences.

The Personnel Exchange Program under Areements/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 overseas partners through wide cooperation and exchange, laying a solid foundation for future substantial collaboration.

Academic Conference Program under Agreements/MOUs is aimed at supporting scientists to hold bilateral or multi-lateral international conferences in China with a view to enabling Chinese scientists to keep pace with the latest research frontiers and hotspots in the international academic arena, to enhancing the partnership between Chinese scientists and their foreign peers, and to promoting the visibility of the results achieved by NSFC funded projects and raising the profile of China's academic community.

Applicants could 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 could also refer to the International Cooperation column of NSFC's website for relevant information about these programs in 2014. An introduction of the funding opportunities under this category in 2014 is listed as follows:

Asia and Africa

By 2013, NSFC has signed bilateral agreements or MOUs on S&T cooperation with 11 scientific funding organizations in Asia and Africa and 8 international organizations in the world.

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 in the defined priority area. Participants in the annual workshops will propose concrete research topics for joint funding. Since 2013,

biomedical science is defined as the priority area for both sides.

The encouraged research topic for 2014 is clinical genomics research. The joint call for proposals will be launched by NSFC and JST on their websites respectively, and no more than 5 three-year projects are funded per year, with NSFC investing 2 million RMB for each project.

Japan Society for the Promotion of Science (JSPS)
The call for proposal is issued by both organizations on their 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 each year) each year.

(2) Bilateral workshop
NSFC and JSPS jointly support 4 bilateral workshops per year organized 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

National Research Foundation (NRF)
The call for proposals is issued by both organizations on their websites in October and the deadline for personnel exchange project and bilateral academic workshop is usually in the middle of January of the next year. The joint funding will be decided by the Sino-Korean Joint Committee on Basic Science. 22 exchange projects and 10 bilateral academic workshops were funded in 2013. Around 30 bilateral projects including both exchange projects and bilateral workshops will be funded by both sides in 2014.

(1) Exchange Project
Around 20 two-year exchange projects are planned to be funded by NSFC and NRF in 2014.
(2) Bilateral workshop
Around 10 bilateral workshops are planned to be funded by NSFC and NRF in 2014. Participants of bilateral workshops from each side must come from at least three institutions.

Israel

Israel Science Foundation (ISF)

NSFC and ISF carry out their joint funding on the joint research project and bilateral workshop in the area of natural science.

(1) Joint Research Project

NSFC and ISF will launch a joint call for proposals in fields of life sciences and medical sciences in 2014. No more than 15 three-year projects are planned for joint funding with NSFC investing 2 million RMB 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.

Japan & 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 funding area for each year usually follows the theme of the Northeastern Asia
Symposium jointly organized by NSFC, JSPS and NRF in the previous year. The priority funding area in 2014 is high-performance computing method and modeling.

The call for proposal will be simultaneously announced on the websites in December by the three parties and 2 five-year projects will be jointly funded, with NSFC investing 4 million yuan in each approved project.

Others

NSFC has signed scientific agreements for funding personnel exchange projects and bilateral workshops with the National Research Council of Thailand, Research Foundation of Thailand, Department of Science and Technology of India, Council of Scientific & Industrial Research of India,

Research Foundation of South Africa, Academy of Scientific Research and Technology of the Arab Republic of Egypt, and Pakistan Science Foundation etc. Bilateral projects are jointly decided case by case with 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 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 science to participate in various research activities at ICTP, such as summer seminars, short-term joint research or post-doctoral research.

The list for specific activities and an open call for candidates is announced on NSFC's website in November every year. Name list of selected candidates are further recommended to ICTP. 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, 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 necessary supports fully or partially for 5-7 Chinese young scholars to participate in the annual 3-month Young Scientists Summer Program from May to August at IIASA every year. For detailed information, 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), IIASA encourages Chinese scientists and IIASA researchers to conduct joint scientific research on 3 global issues, i.e., food and water resources, energy and climate change,

poverty and peace, 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 2013, a total of 9 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 12 projects are planned for funding in 2014 with an average funding amount of 2-3 million RMB per project for 5 years. For information about the priority funding areas in 2014, please refer to the call for proposals to be released.

5. United Nations Environment Program (UNEP)
According to the cooperation agreement between UNEP and NSFC, both sides will support scientists to conduct scientific collaborative research in 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 expert discussion, 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 to3 projects are planned for funding in 2014 (1 project in each field), with an average funding amount of 3 million RMB per project for 5 years. For information about the priority funding areas in 2014, please refer to the call for proposals to be released.

6. International Union of Pure and Applied Chemistry (IUPAC)

According to the agreement among NSFC and 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 each country 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 funding agencies and research organizations involved. This program required that applications should be submitted by PIs from at least 3 out of 4 countries that the contracting funding agencies and research organizations represented respectively. In 2013, NSFC funded 9 three-year projects with an average funding amount of 900,000 RMB per project.

Based on the consultation among IUPAC and each contracting funding agency, the next round of multilateral cooperation program will be launched in 2015, and specific funding areas are to be identified by the parties involved.

America and Oceania

NSFC has signed 19 scientific cooperation agreements or MOUs with science funding organizations and research institutions in 11 countries in America and Oceania. Categories of programs to be funded include joint research, short-term visits and bilateral academic workshops.

USA

The U.S. National Science Foundation (NSF)
Joint Research Projects

NSFC and NSF accept joint research applications in the areas of information sciences, biodiversity, etc. irregularly throughout the year. Both parties provide funds for scientists from their respective countries to cover research costs, international travel costs and local accommodation in the other country.

(1) NSFC-NSF Joint Research Program on Software
To promote joint research on software between Chinese and US scientists, NSFC and NSF together fund joint research projects with an implementation period of 3 years between scientists of both countries. NSFC provides up to 3 million RMB for each approved project, covering research costs, international travel costs and local accommodation of visiting researchers. Two projects were jointly funded by NSFC and NSF in 2013.

(2) 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 of both countries. NSFC provides up to 3 million RMB for each approved project, covering research costs, international travel costs and local accommodation of visiting researchers. One project was jointly funded by NSFC and NSF in 2013.

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

The U.S. National Institutes of Health (NIH)

NSFC and the U.S. National Institutes of Health (NIH) signed an MOU on Oct. 14, 2010 and launched joint call in 2013 for joint research projects with a 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 RMB each project.

Based on mutual consultation, both sides will launch joint call for proposals in the field of HIV/AIDS in 2014, with an average funding amount of up to 3 million RMB per project for 3 years.

Canada

Fonds de recherche du Québec – Santé (FRQS)
Joint Research Projects
NSFC and FRQS plan to launch joint call for research proposals in the field of bio-medical sciences. 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.

Australia

National Health and Medical Research Council of Australia (NHMRC)
NSFC and NHMRC concluded an agreement on cooperation in January, 2013 and plan to launch joint call for research proposals in the field of type-2 diabetes in 2014. 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.

Europe

NSFC has signed agreements and MOUs on scientific cooperation with 31 science foundations or research councils in 15 countries in Europe. Activities to be funded include joint research projects, short-term exchange visits, and bilateral academic workshops.

UK

Royal Society (RS)
NSFC and the Royal Society of UK (RS) provide support for up to 30 joint projects with a period of 2 years. NSFC provides international travel costs for Chinese scientists and local costs for British scientists in China. RS provides at most 6,000 pounds for each project, covering international travel costs for British scientists to China and local costs for Chinese scientists in UK. In August, 2014, 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, 2015. Projects approved will start on April 1, 2015 and end on March 31, 2017.

Royal Society of Edinburgh (RSE)

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 international travel costs for Chinese scientists to UK and local costs for British scientists in China. RSE provides at most 6,000 pounds for each project, covering the international travel costs for British scientists to China and local costs for Chinese scientists in UK. NSFC and RSE will announce their call for proposal simultaneously in both countries at the end of 2014. Chinese scientists should submit proposals directly to NSFC and Scottish scientists to RSE, and the result will come out at the start of 2015. Projects approved start on May 1, 2015 and end on April 30, 2017.

Research Councils UK (RCUK)

(1) Workshop

NSFC will continue to cooperate with RCUK such as EPSRC, BBSRC, NERC, MRC and ESRC to fund small-scaled bilateral workshops co-organized by Chinese and British scientists.

(2) 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.

Germany

German Research Foundation (DFG)

According to the agreement on cooperation between NSFC and DFG, both sides provide support for short-term (no longer than 3 months) research

visits, bilateral workshops and joint research projects.

(1) Joint Research Program
NSFC and DFG encourage substantial joint research between scientists of both countries. 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) 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 throughout the year.

(3) 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 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 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 of 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 launch of joint call for proposals to the final funding of the projects. The funding period of the major interdisciplinary joint research project is 4 years.

France

French National Center for Scientific Research (CNRS)

NSFC and CNRS support exchange visits with a duration of 3 years between Chinese and French scientists. NSFC funds up to 50,000 RMB per year to cover 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 in 2014.

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 area 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) Bilateral Workshop

Chinese and Finnish researchers shall submit their applications for bilateral workshops 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) Exchange Program

Chinese and Finnish researchers shall submit their applications for personnel exchanges and visits 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 in January 2013.

(2) 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 throughout the year.

(3) 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 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 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 throughout the year.

Russia

Russian Foundation for Basic Research (RFBR)
In 2014, NSFC and the Russian Foundation for Basic Research (RFBR) will jointly support cooperation and exchange activities in natural sciences and engineering. In accordance with the agreement between NSFC and RFBR, the joint call for proposals is announced once a year and Chinese and Russian teams shall each have 5 researchers. Projects approved will receive a two-year funding of 90,000 RMB from NSFC, for Chinese researchers'

international travel and living expenses in Russia. RFBR will also provide funds for Russian researchers' international travel and living expenses in China. Altogether both sides fund up to 50 projects each year. The call for proposal in 2014 will be announced on the websites of NSFC and RFBR in early 2014.

Hong Kong and Macao SARs and Taiwan Region of China

NSFC supports various forms of cooperation and exchange between inland and Hong Kong, Macao, and Taiwan scientists in areas of mutual interests. By far, NSFC has conducted scientific 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. Cooperative activities jointly funded include academic conferences and joint research projects.

Hong Kong

NSFC and the Research Grant Council of Hong Kong (RGC) will continue to fund join research in areas of natural sciences. 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 with substantial contents 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 2014, 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 in the area of marine biology 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 in October, 2000, aims at promoting scientific cooperation and exchanges among institutions of higher learning in China and Germany 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 2014 will reach around 40 million RMB.

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 able 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 and require no on-going NSFC funded projects. However, applicants should be PIs or participants qualified to apply for the funding from NSFC. 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.

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 commen 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 from German side. Funding for each project approved is usually 600,000-1,000,000 RMB (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 15 participants from the sending party and 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 funds Sino-German joint research groups for in-depth cooperation between Chinese and German scientists in clearly defined areas. Chinese and German scientists may apply for this program to plan for larger projects and establish necessary collaborative platform. Funding for this program covers costs for bilateral workshops, short-term exchange visits, joint research, publications and consumables, etc. Applicants may apply for funding according to the funding requirements of the Center, which does not provide staff salaries. Applicants must be participants of workshops or undertakers of projects funded by the Center so as to ensure a solid foundation for cooperation and good communications and coordination between collaborators. The funding period is 3 years and should not be prolonged.

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 seminar can be

held either in Germany or in China and usually lasts at most 14 days, including two days for arrival and departure. The number of participants from sending party shall not exceed 15. 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 Lindau Postdoc Scholarship
The Center, together with Lindau Nobel Laureates Foundation, funds 35 (including 10 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.

Grantees with Ph.D. degree of this program may apply for the funding from the Center for a stay of 6-12 months in Germany if they could get invitations from German research institutes or universities.

(3) Visit of German Excellent Young Researchers to China
This funding scheme launched by the Center for excellent young German scientists. During the trial period, 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, can apply for. 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 and the grantees can visit at most 3 cities, of which the visits shall be already arranged by host institutions and hosts, during their stay in China.

(4) Young Scientists Forum
The forum aims at providing an opportunity for Chinese and German young scientists to meet and discuss with the outstanding scientists in their own fields. The forum shall have a specific focused theme and can in principle invite at most 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 at most 5,000 Euros or 50,000 RMB. The Center does not fund publication of textbooks, translated works, etc.

6. Pre-Activity Planning
The Center invites application from qualified applicant who would like to pay a visit to make preparation and plans for a meeting or a project, and to organize small-scale meetings to formulate such plans. The funding is provided for a short visit and only 1 person could be funded.

The Center accepts applications for the above-mentioned 6 categories of activities jointly submitted by scientists from Chinese and German universities and research institutions. Applications must be written in both Chinese and German or Chinese and English, and submitted 3 months before the start of the applied activities (8 copies in written form and one electronic copy for each application). The content of the Chinese and German (English) version applications shall be the same. In the applications, the content, theme, academic significance and academic purpose of the project, the participants, contact information, detailed schedule as well as specific costs and distribution shall be specified. Related personnel costs shall be listed according to the funding standard set by the Center on its website. The 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.

Research Fund for International Young Scientists

Established in 2009, the Research Fund for International Young Scientists aims to support foreign young researchers with 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. The research fund is for now jointly operated by the Chinese Academy of Sciences, Ministry of Education (MOE) and NSFC as a

trial. Candidates are selected from those recommended by CAS and MOE, and have to submit individual applications which will be evaluated by NSFC expert panel. The host institutions in China are responsible for providing necessary working and living conditions for the applicants.

The applicants shall satisfy the following requirements

(1) Excellent foreign young researchers with Ph.D. degrees, less than 35 years old on January 1 of year of application (born on January 1, 1979 or after).
(2) No less than 3 years of experience in basic research in renowned universities and academic institutes, or postdoctoral experience.
(3) Work in Chinese universities or research institutes successively for 6 months or 12 months.
(4) Obey Chinese laws and NSFC's managerial rules during the stay in China.

The host institutions shall satisfy the following requirements

(1) The host of applicant in the host institution is assigned as the contact person to provide consultation for the foreign applicant and assist him/her in managing the fund.
(2) An agreement is to be signed with the applicant with the following content:
    (i) Topic, direction and targets of the research;
    (ii) Living and working conditions provided for the applicants during the stay in China;
    (iii) Time period the applicants promised to work in the host institutions;
    (iv) An agreement on protection of intellectual property rights.

In 2013, a total of 101 applicants were approved for funding with a budget of 19.5 million RMB, and 28 of the applicants were approved for renewed funding. In 2014, around 80 applicants are planned for funding and 20 grantees are planned for renewed funding with a total budget of 20 million RMB.

Funding Period

Currently funding period for the research fund lasts for either 6 months or 12 months, with a funding of 100,000 RMB and 200,000 RMB respectively.

Funding Content

Research costs and costs for international collaborative activities.

Application Procedures

1. New Project Application

After the applicant finalized his/her host institution in China, he/she should fill in the recommendation application form and submit it to the host institution, which in turn submit it to the Chinese Academy of Sciences (CAS) or the Ministry of Education (MOE) according to the administrative affiliation of the host institution. Then, CAS and MOE recommend the applications to NSFC. Applicants reviewed and approved by NSFC may log in NSFC's application system (ISIS) to fill in and submit the formal application form.

Supplemental Documents

(1) A copy of cooperation agreement signed between the applicant and his/her host institution in China; (ⅰ)The agreement shall be signed between the applicant and the host institution, and include terms about provision of the local subsistence for the applicant ; (ⅱ)Subsistence deadline: fully covering the period of the fund, or the terms of the agreement may require that the applicant should work full-time in China during the funding period; (ⅲ)Signature refers to both the legal signature and official seal of the host institution.

(2) A copy of the applicant's Ph.D. degree diploma, and representative publications by the applicant;

(3) Two recommendation letters (at least 1 of the letters is written by a foreign scientist);

(4) A copy of the first page of up to 5 representative publications.

Please refer to the Special Notice on the Research Fund for International Young Scientists announced on NSFC's website for more detailed information concerning the recommendation and application in 2013.

2. Renewed Project Application

Application Eligibility: Applicants should be PIs of on-going projects financed by the Research Fund for International Young Scientists.

Supplemental Documents

(1) Application Form (Progress and achievements of the on-going projects should be clarified);

(2) A copy of cooperation agreement signed between the applicant and his/her host institution in China; (ⅰ)The agreement shall be signed between the applicant and the host institution and include terms about

provision of local subsistence for the applicant; (ii)Subsistence deadline: fully covering the period of the fund, or the terms of the agreement may require that the applicant should work full-time in China during the funding period; (iii)Signature refers to both the legal signature and official seal of the host institution.

(3) A copy of the PI's travel records during the funding period of the on-going project.

For detailed information about the recommendation, application and renewal application requirements in 2014, 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).

International (Regional) Academic Conferences Held in China

This program funds scientists to hold international conferences in China with a view to enabling Chinese scientists to keep pace with the latest research frontiers and hotspots in the international academic arena, to enhancing the partnership between Chinese scientists and their foreign peers, and to promoting the visibility of the results achieved by NSFC funded projects and raising the profile of China's academic community.

The conferences held in China should be closely related to the on-going NSFC projects, and the themes of these conferences shall be of major significance to the progress of relative scientific disciplines in China and in line with NSFC priority areas and its implementation of major research plans. This program encourages bilateral/multilateral workshops and seminars with specific themes.

Eligibility of Applicant

Researchers holding or participating in on-going NSFC projects with the duration of no less than 3 years may send their applications to the relevant scientific departments of NSFC.

Funding Content

Costs for the conference start-up include the cost of preparatory meetings, conference documents printing, etc.

Supplemental Documents and Relevant Requirements

Supplemental documents include copies of approval documents granted by the authorities concerned in charge of the PI's home institutions, name list of foreign participants in the conference, and the announcement of the conference, etc.

Application Window and Channel

Proposals for international/regional conferences held in China should be submitted to the relevant science department of NSFC in charge of the on-going project no less than 3 months prior to the planned date of the conferences. Please note that no proposals for international/regional conferences are accepted by NSFC during its annual collective application submission period. For one conference, only one application is permitted by NSFC.

Programs of Joint Funds

The joint funds, which set up by NSFC and other relevant government departments, provincial governments and industrial sectors, are designed to develop the guiding role of the National Natural Science Fund and attract resources from different sectors for jointly supporting 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 2014, the joint funds in the *Guide to Programs* include NSAF Joint Fund, Joint Fund for Astronomical Research, Joint Fund for Research on Major Science Facilities, Joint Fund for Coal Research, Joint Fund for Iron and SteelResearch, Joint Fund for Civil AviationResearch, Joint Fund for Research on High-Speed Trains, 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, which 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 material such as papers, books, reports, software, patents and awards which relate to the research projects, NSFC's contribution and support of the project should be acknowledged in a prominent place and in an appropriate form. The acknowledgement should include the mention of NSFC and its partners as funding bodies, 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.

In 2014, the funding intensity for all joint funds will be increased moderately, and the funding period will remain unchanged, namely, 3 years for Fostering Program Projects and 4 years for Key Program Projects. The requirements of the limitation on the total number of NSFC projects for one PI may apply to the joint fund programs. For more details, please refer to the relevant requirements in the *Guide to Program*.

NSAF Joint Fund

Jointly set up by NSFC and the China Academy of Engineering Physics (CAEP), the Fund is aimed to encourage scientists in related fields to carry out basic and applied researches for national security, so as to explore new research directions, discover new phenomena and laws, upgrade the innovative ability of science and technology in national defense, and foster young professionals in this area.

The budget for this fund in 2014 is 50 million yuan, which means a significant increase of the average funding scale. In 2014, it is planning to fund two types of projects, namely, "Key Program Projects" and "Fostering Program Projects". Key Program project has 6 directions, with average funding of 3-4 million yuan per project for 4 years. There are 6 encouraged research directions for Fostering Program Project, and 42 projects with defined targets are planned for funding with an average funding of 800,000 yuan per project for 3 years. For more detailed information, please refer to NSFC website (http://www.nsfc.gov.cn) or contact the administration office of the NSAF Joint Fund.

I. Research Directions for the Key Program

1. Research on issues related to multi-phase state equation of metal materials
2. Multi scale computation platform for complex self-adaptive matter
3. Research on fluid solid coupling in under water explosion related to ship structures
4. Development of Euler's algorithm structure of multi matter interface instability and mixed high resolution
5. Studies on preparation and configuration effectiveness of selective

separation lithium isotope/polymer composite adsorption materials
6. Explorations on structure and performance of new types of high energy explosives

Note: CAEP Researchers can apply for or participate in applying for this program. Collaboration among two or three institutions is encouraged.

II. Research Directions and Projects for the Fostering Program

1. Encouraged research directions

(1) Research on the impact of meso state of surface processing on dynamic fracture behavior of metal cylindrical shells
(2) Studies on computation method of physical properties of multi-media magneto hydrodynamic equations
(3) parallel computation method of energy equation on mixed grid
(4) Studies on dynamical process and crystal mechanical property of low temperature hydrogen isotope nuclei
(5) Simulation of multi scale coupling in metal material fractures
(6) Studies on response properties of and laws of piezo resistive micro-accelerometers under severe dynamic loading

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

2. Projects with defined targets

(1) Studies on high precision reaction potential of compression properties of multi crystal tantalum at pressure range of 500 Gpa
(2) Studies on the laws of expansion and hysteresis flow field of underwater explosion products by non-ideal explosives
(3) Development of high plasticity large size X ray aluminum crystals
(4) Studies on 3-D radiation driven asymmetric efficient analytical method based on compression sampling
(5) Studies on method of analysis and control of stability of rotating projectiles
(6) Studies on maximum principle scheme of 3-D diffusion equations
(7) Mathematical method of selection of multi-source mixed signals
(8) Non-destructive detection method for binding defects in multi-layer hetero metal structure s
(9) High performance near normal incident multi coating reflector for 6nm～10nm band X rays
(10) Theory of gas products in self fission of ^{240}Pu
(11) 3-D reconstruction of non-uniform nuclear waste package by γ

scanning imaging
(12) Modulation of laser output wavelength by electric field controlled colloid photonic crystals
(13) Optical acoustic interactions in high power laser optical materials
(14) Spectrum regulation mechanism in super continuous spectrum laser generation
(15) Mechanism of pulse compressed grating laser damage
(16) Basic problems of erbium doped transparent ceramic pulse laser
(17) Synthesis of quasi light beam of millimeter/sub-millimeter wave and properties of beam transmission
(18) Physical properties and preparation of photonic band gap millimeter wave cavity resonator
(19) Studies on basic problems of the impact of package effect on stability of micro accelerometer
(20) Technology of processing non matching signals based on pressure sensor
(21) Studies on the mechanism of interference of high repetition super wide band electromagnetic pulse on pulse pressure receiver
(22) Studies on method of stabilizing MEMS/GMR integrated magnetic sensors
(23) Studies on method of analyzing structure vibration response to multi-dimensional random loading
(24) Method of preparation and technology and mechanical properties of nano structure crystal particle D6A alloyed materials
(25) Studies on the reliability of the function of explosive gate null gate
(26) Studies on the mechanism of strong time variation property of ceramic material grinding
(27) Studies on the structure activity relation of molecular design and high temperature performance of carborane polymer
(28) Studies on formation of surface passive film and hydrogen mechanism of iron nickel base hydrogen resistant alloy
(29) Studies on fast lithium ion solid electrolyte in all solid membrane lithium ion battery
(30) Studies on new types of non-cubic phase laser ceramic materials
(31) Studies on texture control and the relationship of microstructure and electric property of flexible piezoelectric membrane
(32) Studies on failure mechanism of movable RF MEMS devices
(33) Studies on stability control method of micro inertia devices
(34) High resolution 3-D imaging technology for space targets using micro motion analysis
(35) Studies on molten salt loading mechanism of nano porous magnesium

oxide fiber
(36) Research on mechanism of removing inter-level materials in super precision cutting of KDP crystals
(37) Studies on mechanism of mechanical relaxation of self-adaptive fiber
(38) Studies on single energy imaging technology by soft X-ray of ellipsoid surface crystal
(39) Studies on stress release mechanism of under thermo effect of high energy laser membrane of anisotropic base
(40) Experimental and theoretical research on constitutive relations of Ti/Ni alloy
(41) Theoretical studies on high pressure property of cerium tungsten and cerium copper alloy
(42) Research and application of parallel multilevel grid method for hetero multi core computer system

Note: CAEP researchers may not apply for, but may participate in projects.

Please refer to separate publications or the CAEP website (http://www.caep.ac.cn) for detailed information on specific content and form of research results, etc.

Joint Fund of Astronomy

NSFC and the Chinese Academy of Sciences (CAS) jointly set up the Joint Fund of Astronomy, which opens to all universities and research institutions in China (especially non-astronomy research ones), combine NSFC's strength in evaluation, funding and management with the function and roles of the national research platforms (observation bases) in astronomical fields that have already been established by 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, extend areas of space astronomical research, 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" and "Key Program". Key Program will not specify project titles and applicants may decide their project titles, research contents, research schemes and research funding according to the 1-5 important scientific issues which are provided

in the following section. The sixth issue is not within the scope of the Key Program. In 2014, the Joint Fund of Astronomy plans to fund about 4- 6 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 2014, the funding will be arranged 25 million yuan in total. There will be a moderate increase in the funding intensity. For the Fostering Program, the average funding will be 600,000 yuan per project for 3 years, and for Key Program, the average funding will be 2.5 million yuan per project for 4 years.

Funding Areas in 2014

(1) Scientists from research institutions and universities outside CAS astronomical observatory system use optical, radio, infrared observation facilities and data to conduct observation and theoretical research on cosmology, galaxies, stars, the sun and solar systems and other basic astronomical areas (Researchers in CAS astronomical observatory system are not allowed to apply as PIs, but may participate in the research as principal members of the research group.).
(2) 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 week photoelectric signals, storage and transmission techniques, high energy, optical, infrared and radio techniques related to astronomical telescopes, automated control techniques and machinery, etc.
(4) Applied basic research on problems in major astronomical projects such as data, computation and information access, etc., including storage and sharing of mass astronomical data, data mining, high performance computation and virtual observatory techniques.
(5) Basic astronomical methods and key scientific issues originated from national strategic needs.
(6) Analytic research on frontier scientific issues related to large astronomic observation facilities under construction or planned for construction so as to provide scientific knowledge on the development, testing and

operation of 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 the Fostering Program are accepted in this area).

Joint Fund for Research on Major Science Facilities

The Joint Fund for Research on Major Science Facilities was established jointly by NSFC and the Chinese Academy of Sciences (CAS), 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 for 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 the innovation capability in basic science and creativity in frontier science areas and raise the international profile of China's scientific research, 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 arethe Beijing Electron Positron Collider(BEPC) and the Beijing Spectroscopy (BES) in Beijing, the Heavy Ion Research Facility and Cooling Storage Ring (HIRFL-CSR) in Lanzhou, the Shanghai Synchrotron Radiation Facility (SSRF) in Shanghai, and The National Synchrotron Radiation Laboratory (NSRL) and the Steady High Magnetic Field Facilities (SHMFF) in Hefei.

The Joint Fund for Research on Major Science Facilities includes "Fostering Program" and "Key Program. In 2014, the total funding of 60 million yuan will be arranged, with 30 million yuan for Key Program and 30 million yuan for Fostering Program. The average funding for a Key Program is 3 million yuan per project for 4 years and that for Fostering Program is 700,000 yuan

per project for 3 years.

I. Three Major Funding Areas

(1) By using of general equipment and focusing on multi-disciplinary study, research will be funded mainly in areas of physical sciences, information sciences, material sciences and environmental sciences, etc. and the development of new research directions.
(2) By using of special devices, research will be funded such as high energy physics research on BESIII and nuclear physical research on HIRFL-CSR in Lanzhou.
(3) Research on techniques and methods, and R&D on small specialized devices for improving the experimental capability of major facilities and the development and key technology.

II. Priority Research Areas in 2014

Fostering Program

Multidisciplinary research on synchrotron radiation in physics, chemistry, life sciences, medical sciences, environmental sciences, materials sciences, geology, agriculture, metrology, microelectronics and micromechanics; experimental studies on τ-charm physics on BESII and basic research on relevant software and data analysis; nuclear physics experimental studies on HIRFL-CSR in Lanzhou and applied basic research on heavy ions; studies on ion beam in life sciences, medical sciences, materials 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

Research areas are more than funding 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 of environmental pollutants
(2) Structure and property of advanced energy materials

(3) Electronic structure and magnetism of complex materials
(4) Structure and functions of complex bio molecular system
(5) Fine analysis of important minerals

2. Research on scientific problems based on Steady State Strong Magnetic Field Facilities
(6) Correlated materials in strong magnetic field conditions(≥20T）
(7) Studies on mechanisms related to life activities based on strong magnetic field resonant spectroscopy and imaging
(8) Chemical synthesis, material preparation and properties under high magnetic field (≥20T）

3. Frontier physics and expanded studies based on BEPCII and HIRFL
(9) New resonant state in Tau-charmonium energy region
(10) Hadron spectroscopy in Tau-charmonium energy region
(11) Singular nuclei reaction and structure
(12) Highly ionized ion and fine spectroscopy
(13) Heavy ion radiation effects

4. New principles, new methods and key technology for the facilities
(14) New method and new technology of CSR experiments
(15) Experimental method, key technology and devices for beam station
(16) New theory and methods of imaging
(17) New principles, new methods and new technology and key components for accelerator
(18) Key technology of detector and electronics
(19) Method and software of experimental data analysis and processing
(20) Self (ferro magnetic) resonance method in strong magnetic field
(21) 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 aims closely 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, improves traditional industry and increases the competitiveness of Chinese iron and steel industry.

The year 2014 is the final year of the implementation of the "fourth term agreement". Budget will be 12 million yuan for this year, in which funding for "Fostering Program" is 600,000 yuan per project for 3 years, and funding for "Key Program" is 2.4 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 science etc., which are of great significance to the iron and steel industry in China.

The performance of 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 Directions for Fostering Program

1. Denitrification at low temperature for sintering gas
2. Formation and evolution of strip casting inclusion
3. Regularity and mechanism of environment fracture and corrosion of marine high strength steel
4. Forming properties of thickness-variable steel plate
5. Nano phase control, strengthening and toughness mechanism of Cu-bearing nano intensified steel
6. The surface functional coating of carbon steel
7. Preparation and strengthening and toughening mechanism of bionic multipolar laminated steel matrix composites
8. Phase change and nanometer precipitation composite reinforcement mechanism and process control of 1,200 MPa grade cold-rolled super-high strength steel

II Research Directions for Key Program

1. Key technical bases on COREX

Energy, smelting efficiency evaluation and optimization of the COREX smelting reduction iron-making process, the efficient utilization of hydrogen gas of middle energy content, physical and chemical coupling behavior and applicability evaluation of the raw and fuel material in the COREX shaft furnace and gasifier, the material flow, energy flow and etc. matching mechanism and optimization between COREX and the blast furnace process.

2. Smelting technology and related mechanism on the high-speed rail bearing steel

Quantitative relation of the purity (inclusions) and the using performance of the high-speed rail bearing steel smelting, the inclusion formation influence thermodynamic 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 high-speed rail bearing molten steel, inclusions movement and growth mechanism under the tundish electromagnetic field in the smelting process.

3. Low density, high elastic modulus, high strength and toughness steel organizational performance and technology

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 strength plastic modulus performance and etc.. Relationship of the material composition, process and structure studied could be established for commercialization.

4. Structure transformation and service behavior for the high-performance resource conservation duplex stainless steel

Alloy design of resource conservation duplex stainless steel (save Ni and Mo) with high strength, high plasticity, better welding performance and thermal performance. Effect of solidification behavior on solidification structure, structure transformation in continuous casting process, structure evolution and two phase deformation mechanism in the hot working process. Influence factors, failure mechanism and special evaluation method of the parent metal and welded joint under the complicate environment.

5. Preparation large new nickel-based alloy ingot new way casting and related basis by electroslag remelting

Theory based on the new method of the conductive mold electroslag remelting. Large nickel based alloy solidification mathematical model. Slag system used for electroslag remelting nickel-based alloy. Dynamics model of element composition in electroslag remelting and casting process. Influence of the new methods on the casting microstructure and mechanical properties.

6. Mechanical and corrosion behavior of casing string in gas wells under extreme conditions (ultra-deep, ultra-high temperature, severe corrosion)

Considering the extreme conditions and complex environments in gas well, the static and dynamic mechanical behavior of the completion string and its impact on the wellbore seal integrity will be studied. Through the research of mechanical, erosion and corrosion behavior of the joints, the evaluation methods will be established for the erosion and corrosion of the casing joints in gas well under extreme conditions. The effect of acidification on joint sealing performance under variant external pressure, internal pressure, tensile and bending load at each well section and casing corrosion properties will be studied.

7. 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 3-5 projects will be funded under the category of the Key Program

Joint Fund of Civil Aviation Research

The Joint Fund of Civil Aviation Research is set up jointly by NSFC and the Civil Aviation Administration of China (CAAC). The Fund is open to all scientists in China. It is aimed to attract researchers from the universities and research institutions across China to participate in basic research and applied basic research in the development of aviation science and technology, so as to enhance the ability of original innovation in the aviation industry, promote the integration of knowledge and technology innovation in the field, and contribute to making China a nation with strong aviation industry.

Under mutual agreement, NSFC and CAAC decide to implement the third phase of the Joint Fund of Civil Aviation Research from 2011, with an annual budget of 19.5 million yuan.

As a component of the National Natural Science Fund, the Joint Fund is managed by both parties. Researchers in non-aviation sectors are encouraged to carry out joint research with those in aviation sectors.

Research Areas in 2014

In 2014, it is planning to fund 3 Key Program projects, with average funding 2.5 million per project for 4 years, and "Fostering Program" will be 400,000 to 600,000 yuan per project on average for 3 years, and the number of projects to be funded is decided according to the actual application and evaluation.

Fostering Program

1. New theory and technology, the simulation technology for civil aviation system, intelligent air traffic and information security, the theory and methods of system reliability and system security, and the theory and technology for airport sensing
2. The theory and methods for the management of national aviation resources, the theory on aviation security management and aviation crime prevention and controls, and the contingency decision system for emergency
3. Basic theory and technology for aviation safety, new theory and methods for security check, new materials and new technology of airplane and theory and technology of detection.

Key Program

1. Theory and key technology for runways in permafrost environment
2. Key technology of wind shear and turbulence warning at airport
3. Theory and application of structure and behavior of composite road surface at airport
4. Coordinated traffic dispersion for main air route network congestion operated in multi modes
5. Information service system for general aviation

Joint Fund of High Speed Railway

I. Aim of the Joint Fund of High Speed Railway

The railway scientific research involves the major public interest of the state. Aiming at promoting the integration of production, teaching and research, attracting and motivating the scientific and technology resources, the Joint

Fund of High Speed Railway supports basic research related to the development of the high speed railway, and promote the creativity and innovation in the field of railway industry in China.

II. Principles of the Joint Fund

The Joint Fund is open to scientists all over China and supports fundamental and theoretical researches in the technology area of high speed railway.

The performance of the application, evaluation and management of the Joint Fund will follow the Regulations of NSFC for relevant programs. Proposals should be submitted to the Department of Engineering and Materials Sciences of NSFC. And funded projects will be administered jointly by NSFC and China Railway Corporation.

III. Funding areasin 2014

The key funding areas in 2014 is around the scientific issues about the safety and construction of high speed railway. 10 Key Program projects will be funded with 3 million yuan per project for 4 years.

1. Study on the behavior of HSR ballastless-track structure and bridge structure
2. Research on damage, state and control of HSR ballastless track in extreme weather conditions
3. Research on HSR tunnel state and safety risk control
4. Research on pneumatic coupling and safety control of HSR train-bridge system under effect of side wind
5. HSR monitoring and prevention method for seismic activities
6. Fundamental theories and method for safety evaluation of HSR signaling system
7. Analysis on HSR traveling demands and design of the service network
8. Failure causes and key reliability technologies for mechanical traction drive system of high speed trains
9. Design theories and methods for permanent magnetic traction system of high speed train
10. Theories and methods for vibration and noise reduction of high speed trains
11. Train-OCS safety protection theories and methods for high speed trains
12. Electrical matching method for HSR EMU and general earthing system

NSFC-Guangdong Joint Fund

NSFC and the Guangdong Provincial Government jointly implement the second phase (2011-2015) of Joint Fund of Natural Science (NSFC-Guangdong Joint Fund for short), which are 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 development of S&T and talent teams in the region.

The NSFC-Guangdong Joint Fund is open to scientists all over China, and is part of the funding system 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 2014, the Joint Fund is planning to arrange a total funding of 77.25 million yuan, and will acceptapplications for the Key Program in 5 areas listed below with funding of 2.8 million per project for 4 years. Eligible researchers all over the country are welcomed to apply for this Fund according to the scope and requirement in the Guide.

I. Agriculture

1. Biological basis of important trait improvement for economic animal and plants in south China and disease and pest controls

Focusing on key objectives such as high yield and high quality, it is to study the molecular mechanism of the generation, threat and epidemics of important pathogens of economic animal and plants in south China, and reveal self- resistant mechanism of the crops, so as to provide theoretical basis for control of important diseases of economic animal and plants in south China.

Main research orientations:

(1) Biological basis of improvements of important traits of economic animals and plants
(2) Research on pathogenic mechanism and disease resistant mechanism of important pathogens of crops
(3) Biological basis of improvements of important traits of livestock
(4) Laws of epidemics and pathogenic mechanism of important livestock

diseases

2. Special aquaculture and disease control in South China Sea and Beibu Gulf

Focusing on important needs of efficient special aquaculture and disease control in South China Sea and Beibu Gulf, it is to conduct relevant basic research.

Main research orientations:
(1) Basic research on disease control of aquaculture in South China Sea
(2) Basic research on beading and genetic modification of excellent aquaculture varieties.

II. Population and Health

1. Control of high incidence diseases in South China

Focusing on high incidence disease, it is to conduct basic research related to new method, new target and new schemes of clinical research.

Main research orientations:
(1) Key scientific problems on the treatment of the Beta thalassaemia
(2) Basic research related to the tuberculosis
(3) Research on rheumatoid arthritis and mechanism of joint damage
(4) Mechanism of COPD airway reconstruction caused by air pollution

2. Basic research on modernization of the traditional Chines medicine in the region of the South of the Five Ridge

Focusing on major diseases and common and high incidence diseases in south China, making full use of herbal medicine and special prescriptions in south China, it is to conduct basic research on physical basis and functions of herbal medicine in south China, and promote the development and clinical application of herbal medicine in south China.

Main research orientations:
(1) Discovery of active components in herbal medicine in the region of the South of the Five Ridge and studies on druggability
(2) Basic research on control of hepatitis by herbal medicine in the region of the South of the Five Ridge
(3) Studies on the mechanism of controlling cancer by herbal medicine in the region of the South of the Five Ridge

III. Resources and Environment

1. Dynamic process and response mechanism of salty tidal water intrusion in Pearl River Estuary

2. The control principles and risk of pollution caused by industrial transfer

Industrial transfer leads to the movement of pollution to upper valley, and makethe great changes of the land utilization and the pollution risk for water environment. Focusing on important scientific problems of the quality change of soil environment, the protection of water source, and the rehabilitation of the complex land pollution in water source regions, it is to conduct relevant basic researches.

Main research orientations:

(1) Risk of water contaminations and control principles for drinking water source region
(2) The evolution mechanism and environmental impacts on the regional soil environment quality
(3) Principles of the rehabilitation of polluted land caused by industrial transfer

3. Specialized resources in South China

South China has rich mineral and bio resources. Focusing on the formation and evolution of special mineral and bio resources in this region, it is to conduct relevant basic researches.

Main research orientations:

(1) Accumulation process and mineralization of rear metal element in South China
(2) Evolution of bio-diversity and environmental adaptive mechanism in the karst regions in South China
(3) Mechanism of generation and control principles for heavy metal and radioactive pollution in mining and neighboring areas
(4) Multi field coupling mechanism of deep geothermal resources

IV. New Materials and Advanced Manufacturing

1. New materials

Focusing on the need of industrial development in biomedical materials, new energy materials and marine equipment for South China Sea, it is to conduct relevant basic researches.

Main research orientations:
(1) Basic research on biomedical materials and tissue engineering materials
(2) Basic research on new energy materials and devices
(3) Mechanism of deterioration of marine engineering materials in South China Sea environment

2. Advanced manufacturing

Focusing on demand on the advanced manufacturing technology and theory by areas such as precision manufacturing of high performance parts and high speed coordination of multi robots represented by LED light source, new energy cars and high performance bearings, it is to conduct studies on basic theory of advanced manufacturing in strength areas of Guangdong Province.

Main research orientations:
(1) Basic research on optical structure design and manufacturing for LED packaging
(2) Complex coupled system dynamical studies and energy management for new energy cars (including mixed power cars)
(3) Basic research on precision manufacturing technology for high performance parts
(4) Studies on basic theory and methodology of high speed coordination of multi robots for microelectronic manufacturing

V. Electronic and Information Technology

1. Digital medicine and health care service

Focusing on the increasing need for health care in South China, and key scientific problems in advanced instruments for upgrading medical instruments, and detection, diagnosis, therapy and rehabilitation of major diseases, it is to conduct basic researches on relevant information technologies.

Main research orientations:
(1) Studies on diagnosis, treatment and rehabilitation technologies for major diseases based on application of information technology
(2) Studies on key technologies of high end diagnosis equipment based on information technology
(3) Studies on supplementary diagnosis and treatment technologies of multi-dimensional visualization based on multi-mode medical imaging processing

2. Theory and key technologies for big data and super computing

Focusing on the urgent need for big data and super computing services in information technology in Guangdong Province, it is to conduct studies on key technology and system of big data and super-computing, and provide e theoretical basis for industrial development.

Main research orientations:

(1) Key technology of big data and supercomputing service platform

(2) Key technology of resources management in big data and super computing environment

(3) Visualized data management, analysis and application based on super computing environment

3. Wideband communication and coordinated control theory for intelligent power grid

Focusing on the urgent need of dedicated network for intelligent power grid wide band communication and distributed power optimization of the micro power grid, it is to conduct studies on theory and key technologies for wide band communication and coordinated control of intelligent power grid and provide theoretical basis for the development of intelligent power grid

Main research orientations:

(1) Structure, theory and key technology for dedicated wide band communication network of intelligent power grid

(2) Theory and key technology for coordinated management of generation, supply and utilization of power for distributed electric system in micro power grid

4. Key technology of the mobile internet for practical application

Focusing on key and common scientific problems in network development, and addressing the need of public security, intelligent transportation, intelligent home and society, environmental monitoring, it is to conduct studies on theory and key technology of mobile network monitoring, big data merging and processing, reliability analysis of internet of things, and wide area 3-D monitoring, etc.

Main research orientations:

(1) Service and privacy of mobile network

(2) Structure, theory and key technology of network monitoring based on coordinated method

(3) Medical imaging processing and key technologies of virtual operation
(4) Theory and key technology of network system security based on feedback mechanism

NSFC-Yunnan Joint Fund

In order to implement the Outline of the National Medium- and Long-Term Program for Scientific and Technological Development (2006-2020), and the "Science and Technology Plan for the Innovative Yunnan", NSFC and the Yunnan Provincial Government jointly set up the Joint Fund for Basic Research (NSFC-Yunnan Joint Fund for short) to attract more talented professionals, carry out basic research on important and key scientific and technical issues of the economy, society, science and technology in Yunnan and surrounding regions, booster the development of science and technology and talent resources, facilitate the indigenous innovation and international competition, and 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 Regulations on the National Natural Science Fund and related administrative measures as well as the detailed procedures of the NSFC-Yunnan Joint Fund.

In 2014, 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

Focusing important species in the plateau regions in Yunnan, it is to conduct biodiversity studies on species, genetics and ecosystem.

1. Biodiversity

Main research orientations:

(1) Studies on the mining of specialized bio germplasm resources in Yunnan
(2) Protection, evolutional mechanism and bio-adaptability of important

bio groups
(3) Interaction among species in specialized bio systems of Yunnan
(4) Molecular studies on storage of recalcitrant seeds

2. Agricultural and forest resources
Main research orientations:
(5) Genetic analysis of important traits of agricultural and forestry crops
(6) Mechanism of disease and pest resistance and control
(7) Basic research on genetics of specialized good livestock germplasma resources
(8) Studies on mechanism of formation of products of important insect resources

3. Other areas
Main research orientations:
(9) Basic research on arbovirus diseases of livestock in sub regions of great Mekong River
(10) Basic research on the control of invasion of major hazard alien species in Yunnan
(11) Breeding of new varieties and continuous cultivation of important cultivated pharmaceutical plant germplasm
(12) Structure and function of composite ecosystem of rubber mixture in Yunnan

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, structural optimization, druggability and functional mechanism of new natural active materials based on specialized resources in Yunnan
(2) Studies on effectiveness and functional mechanism of specialized drugs in Yunnan
(3) Research on the effective component and functional mechanism of ethnic medicine (Yi, Dai, etc.) and specialized drugs in Yunnan

2. Basic study on the pathogenic mechanism and control of regional high incidence diseases and major diseases in Yunnan
Main research orientations:
(4) Basic research on high incidence and regional diseases in Yunnan

(5) Basic research on vaccines for new epidemic disease
(6) Basicresearch on drug addiction and rehabilitation, and treatment of AIDS
(7) Basicresearch on laws of trans-regional spreading, pathogenesis mechanism and control of epidemic disease in Yunnan and surrounding regions
(8) Development of modeling and basic biological studies on major disease based on specialized animal resources in Yunnan

III. Resources and Environment

1. Basic research on environmental changes and eco rehabilitation of highlands in Yunnan

Main research orientations:

(1) Origin, evolution and environmental background of important bio species in geological past
(2) Degrading of highland red soil and its impact on environment
(3) Impact on environment mechanism of restoration of large scale mining
(4) Mechanism of pollution control and reuse of heavy metal waste water
(5) Re-vegetation and recovery of rock and desertification regions and dry and hot valleys
(6) Environmental evolution and control technology for water pollution in plateau lakes

2. Research on mechanisms of natural disasters in Yunnan

Main research orientations:

(7) Mechanism of geological disasters such as earthquake, landslide and mudslide
(8) Relationship between major draught and flooding and water vapor transport in Indian Ocean and the west Pacific

3. Theoretical research on laws of mineral deposit formation and exploration in Yunnan and surrounding regions

Main research orientations:

(9) System and mechanism of mineral deposit in typical mineral deposit regions in Yunnan and surrounding regions
(10) Basic research on deep mineral information identification

IV. Utilization of Mineral Resources and New Materials

Basic research on the theory and technology for the integrated utilization of

mineral resources and strategic scientific issues of important materials.

1. Basic research on new technologies of metallurgy of non-ferrous metal

Main research orientations:

(1) New technology of enrichment and extraction of nonferrous metals

(2) Technology of efficient recycling of secondary resources of nonferrous (including rare and precious) metals

2. Research on new technology of deep processing of nonferrous metal materials

Main research orientations:

(3) New technology of deep processing of nonferrous metals such as copper, aluminum, and indium

(4) Preparation and application of functional materials of rare and precious metals

3. Clean and high efficiency use of specialized mineral resources

Main research orientations:

(5) Efficient use of complex nonferrous metal resources

(6) Integrated use of titanium mineral resources in Yunnan

(7) Clean and efficient utilization of coal and phosphor resources in chemical industry in Yunnan

4. Other research

Main research orientations:

(8) New types of inferred detection materials and devices

NSFC-Xinjiang Joint Fund

NSFC-Xinjiang Joint Fund was set up jointly by NSFC and the Government of the Xinjiang Uygur Autonomous Region on March 21, 2011 which is aimed 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 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 Regulationsof the National Natural Science Fund and related administrative measures as well as the detailed procedures of the NSFC-Yunnan Joint Fund.

In 2014, the Joint Fund is planning to arrange a total funding of 48.75 million yuan, mainly for Fostering Program, Key Program and Special Grant for Local Young Talents in 4 areas listed below. For Fostering Program, the average funding is 600,000 yuan per project for 3 years, and for Key Program, the average funding is 2.8 million yuan per project for 4 years. The Special Program 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 year old with funding of 1 million yuan per project for 4 years. Eligible researchers all over the country are welcomed to apply for this program according to requirements in this Guide though home institutions.

I. Water Resources and Agriculture

Focusing on the allocation of water resources, the sustainable use of urban water resources, water pollution control, the efficient use of water resources in oasis agriculture in arid, it is to conduct studies on key scientific problems related to water resources and water environment.
Focusing on sustainable development of agriculture and livestock husbandry, it is to conduct basic and applied basic research on molecular breeding and farming modes.

Main research orientations:

1. Water cycling process and sustainable use of water resources in arid cities and oasis
2. Process and mechanism of impact of important water resources engineering on farming eco environment
3. Mechanism of water environment pollution and eco restoration in arid regions
4. Mechanism of water compensation and discharge of shallow and deep level ground water in arid area
5. Bio mechanism and control of the use of crop water and nutrition in oasis field
6. Effectiveness analysis on intercropping patterns for major crops in Xinjiang

7. Genetic diversity evaluation and mining of excellent genes of germplasm resources of special crops (including economic crops) in Xinjiang
8. Genetic analysis of important economic traits of herbivorous livestock
9. Laws and control technology of important epidemic disease of livestock in Xinjiang

II. Mineral Resources

1. Basic research on geology of mineral deposit

To meet the demands of mineral resources of China, it is to conduct research on geology and comparison of mineral deposit based on rich mineral resources in Xinjiang and neighboring areas,

Main research orientations:

(1) Studies on laws of deposit and potentials of resources of coal bed gas and shale gas in Xinjiang
(2) The subduction collision process of the Tianshan orogenic zone and its role in formation of mineral deposit
(3) Mechanism of formation of porphyry copper ore deposit in north Xinjiang and comparisons with neighboring regions
(4) Important geological events in the orogenic zone of mid-Asia and roles in the formation of mineral deposit
(5) Function and laws of salt mineral deposit

2. Integrated use of mineral resources

Taking advantages of mineral resources and the needs of industrial development in Xinjiang, it is to conduct basic research on integrated use of mineral resources and farsighted key scientific problems in new materials and specialized chemical engineering areas in Xinjiang.

Main research orientations:

(1) Efficient extraction of mineral resources (potassium, magnesium, lithium, boron and strontium) in salt lakes in Xinjiang and synthesis of new materials
(2) Basis of reaction process in special chemical engineering in Xinjiang and green catalyst
(3) Design, preparation and relevant applied basic research on high alue added functional materials based on special mineral resources in Xinjiang
(4) Nonferrous metal functional materials based on specialized minerals in Xinjiang

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. Diversity and eco adaptability mechanism of micro bio resources at extreme environment
2. Mechanism of maintaining inter species relationship and eco functions of major forest in Xinjiang
3. Basic research on protection and utilization of special bio resources
4. Basic research on bio-diversity survey and utilization of resources in typical lakes in Xinjiang

IV. Population and Health

Research on pathogenic and control of high (low) incidence diseases in Xinjiang; Basic research on discovery of drugs in us of specialized pharmaceutical plant resources in Xinjiang.

Main research orientations:

1. Molecular genetic mechanism and early therapy of congenital heart disease of children
2. Interactions of genetic and environmental factors in metabolic syndrome and diabetes, primary hypertension, chronic liver disease and Alzheimer’s disease
3. Blood substitution and protection of important organs in perioperitive period
4. Epidemic characteristics and pathogenic mechanism and control of infectious diseases such as tuberculosis, Bruce's septicemia and E hepatitis
5. Studies on druggability of special herbal medicine resources and evaluation of wild herbal germplasm

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 Regulations of the National Natural Science Fund and related administrative measures.

In 2014, the Joint Fund is planning to arrange a total funding of 29.55 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) Less than 40 years old on January 1 in the year of application (born after January 1, 1974);
(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 project;
(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 of NSFC.

Joint Fund for the S&T Cooperation Across the Taiwan Strait

The Joint Fund for the S&T Cooperation A cross the Taiwan Strait is jointly established by NSFC and Fujian Provincial Government. This joint fund

aims at giving the full play of the guiding role of NSFC, guiding social S&T resources into basic research, further attracting scientists from both sides of the Strait to conduct S&T cooperation on major scientific issues and key technical problems of mutually concerned by Fujian and Taiwan region, fostering the human resources, improving the S&T innovation capability of economic regions on both sides of the Strait, and promoting the 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 2014, the Joint Fund is planning to arrange a total funding of 66 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. Agriculture

Main research orientations:

1. Studies on innovation and mechanism of eco culturing of good germplasm of important economic crops and trees in Fujian and Taiwan
2. Studies on disease resistant mechanism of main crops in Fujian and Taiwan
3. Basic research on laws of occurrence and control of important pests in agriculture and forestry
4. Studies on protection of important aquaculture bio resources and diversity of species in Fujian and Taiwan
5. Basic research on excellent germplasm innovation of local herbs in Fujian and Taiwan
6. Biological basis and safety checks in food processing
7. Immunological basis of important disease of economic animals

II. Population and health

Main research orientations:

1. Physical basis and functional mechanism of drug effect of special herbal medicine and natural product in Fujian and Taiwan and targeted drug to

control major or frequent diseases
2. Basic Research on discovery of marine microorganism drugs
3. Basic research on pathogenic mechanism and controls of high incidence cancer (stomach cancer, liver cancer and nose throat cancer)
4. Basic research on neural degenerative disease
5. Cardiovascular and metabolic diseases
6. Studies on construction of biomedical materials and related scientific problems

III. Resources and environment

Main research orientations:
1. Key process of ecosystem and eco restoration in important estuary and ports on both sides of the Taiwan Strait
2. Regional environmental pollution and control mechanisms in air, sea and land in the Taiwan Strait
3. Impact of environmental evolution on forest ecosystems on both side of the Taiwan Strait
4. Tectonic evolution and mineral deposit formation in the orogenic system of Wuyi Mountain
5. Basic research on geology of oil and gas deposit in Taiwan Strait and surrounding regions
6. Studies on water exchange and control mechanism in Taiwan Strait and surrounding regions

IV. Electronics and information sciences

1. Theory and method of computer sciences

Main research direction:
(1) Studies on theoretical model and new methods of security audit of cloud data
(2) Studies on secure and efficient merging theory of hetero internet of things, massive data analysis and method of complex signal channel modeling
(3) Studies on theory and method of rendering of stereo streaming media and syntax understanding

2. Theory and method of electronic devices and optics

Main research orientations:
(1) Applied basic research on high performance light emitting devices
(2) Applied basic research on high performance conducting polymers

(3) Basic research on photo electronic devices based on 3rd generation of wide band gap semiconductors
(4) Studies on new technology of laser light field regulation and imaging of optical field through nontransparent media

Special Funds

Special funds are set up by NSFC to support or strengthen research in certain areas or aspects, and currently include the Tianyuan Fund for Mathematics and the National R&D Program for Major Research Instruments.

Tianyuan Fund for Mathematics

Tianyuan Fund for Mathematics is a special fund to collect the collective wisdom of mathematicians, explore funding method, which suits the features and laws of development in the area of mathematics, and promote the establishment of a strong country in mathematics. The fund supports researchers to conduct studies according to the features and needs of mathematics, foster young talents, promote academic exchange, optimize research environment, spread mathematical culture and thus strengthen creativity of the country in mathematics. The fund in 2014 provides funding mainly for the following six types of funding:

1. Tianyuan Youth Program

The main objective of the Tianyuan Youth Program 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 institution should not be the university supported by the National Program for Key University Construction in short "985 program", applicants should be under the age of 33 for man and 35 for woman by January 1 of the year of application and have their Ph.D. degrees for less than three years (please make sure to state the graduation time in the resume), and have not been a PI of NSFC's project (not including international or regional cooperation projects). Post-doctors working at the post-doctor station are not qualified to apply for this program. The funding for the Tianyuan Youth Program is 30,000 to 50,000 yuan per project for 1 year.

2. Program for Mathematical Summer Schools and Training Workshops for Young Teachers

The summer schools funded by this program 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 schools will be organized by three types of theme, namely, basic mathematics, applied mathematics and statistics. One summer school 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 be focused 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 should be conducted by contract and decided by the Academic Steering Committee of the Tianyuan Fund for Mathematics in consultations with relevant schools and research institutions.

3. Program for 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. Lectures could include basic courses and special courses with large audience lasting for 4 weeks. Special lectures will be accepted through free application or through contract by invitation. Application should provide teaching outline, teaching contents and name list of the lecturers. Each special lecture will be funded with up to 150,000 yuan.

Program for High level workshop mainly support research groups of high level and excellent mid aged and young mathematicians to sponsor workshops on clear topics and important international mathematical issues. The funding is up to 100,000 yuan per workshop.

Academic meetings will not be supported by this program in principle except a few annual meetings of national professional societies.

4. Program for the Publication of Mathematical Books and the Development of Information Resources in Network Environment

This program 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 for Mathematics with relevant publishers or units in accordance with the needs of mathematical development.

5. Program for 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 made 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 made 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 made 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. Program for 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, discover 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 undertake 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 of application and requirement: application to the Tianyuan Youth Program is the same as Young Scientists Fund of NSFC. Applications to other types of programs may be submitted to the Department of Mathematics and Physics 3 month before projects commence, but not later than the 31st of July 2014.

National R&D Program for Major Research Instruments

The National R&D Program for Major Research Instruments (formerly the Special Fund for Research on National Major Research Instruments and Facilities) is aiming to encourage and foster the exploratory R&D of research instruments with creative ideas, and in particular for major original research instruments and equipment, which should be based on frontier of science and national needs and driven by scientific targets, so as to provide new means and tools for scientific research and increase indigenous innovation of China.

In 2014, the Special Fund for Basic Research on Scientific Instruments is merged into the National R&D Program for Major Research Instruments

In 2013, 50 projects were funded by the Special Fund for Basic Research on Scientific Instruments with funding of 150 million yuan. Average funding was 3 million yuan per project, and the funding rate was 10.42%.

In 2013, 247 proposals were accepted and 40 of them were funded by the Special Fund for Research on National Major Research Instruments and Facilities accepted with funding of 300 million yuan. Average funding was 7.5 million yuan per project, and the funding rate was 16.20% on average.

In 2014, the National R&D Program for Major Research Instruments is planning to arrange 450 million yuan for funding. Application is limited to 10 million yuan per project for 5 years in general.

1. Funding scope

(1) R&D on indigenous scientific instruments and equipment with original creation and important roles for exploring research frontier;
(2) R&D on scientific instruments for discovering new phenomena, revealing new laws, verifying new principles and acquiring new data on the basis of breakthroughs in core technology and integrated innovation;
(3) R&D on the new scientific instruments and components having 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).