

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 Steel Research, Joint Fund for Civil Aviation Research, 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.nsf.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 weak photoelectric signals, storage and transmission techniques, high energy, optical, infrared and radio techniques related to astronomical telescopes, automated control techniques and machinery, etc.
- (4) Applied basic research on problems in major astronomical projects such as data, computation and information access, etc., including storage and sharing of mass astronomical data, data mining, high performance computation and virtual observatory techniques.
- (5) Basic astronomical methods and key scientific issues originated from national strategic needs.
- (6) Analytic research on frontier scientific issues related to large astronomical 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 are the 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($\geq 20T$)
- (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 ($\geq 20T$)

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 areas in 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 accept applications 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 breeding 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 Chinese 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, evolutionary 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) Basic research on drug addiction and rehabilitation, and treatment of AIDS
- (7) Basic research 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 Regulation of 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 perioperative 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 Across 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