

Working paper

R2007:001

Mapping of research financing organizations in the US, China, and Japan

Pre-study for VINNOVA, June 2006

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Foreword

This report is a first mapping of research financing organizations in the United States, China and Japan. The study has been initiated by VINNOVA with the intention to enable a more in-depth study on Swedish scientists and researchers possibilities of finding financing and cooperation projects with extra-European environments.

The three chapters were written in May and June and updated in December 2006 and since the information contains links and figures it will have to be updated regularly in order to stay accurate. Following this pre-study, ITPS suggests a more in-depth study and analysis on the most important organizations in the three countries, but also a discussion on the country specific conditions as how to succeed in launching bilateral research agreements.

The study has been undertaken by Anna S. Nilsson and Björn Falkenhall in the United States, Sylvia Schwaag Serger with the help of Sun Hongli and Jessica Zhang in China and Bogumil Hausman with the help of Kyoko Nakazato and Andreas Göthenberg in Japan.

It is our hope that the mapping will be of value for the Swedish research community and a serve as a tool for guidance among some of the international potential cooperation partners.

Östersund, January 2007

Suzanne Håkansson
Director, Policy Intelligence

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Summary

This report is a pre-study, preliminary mapping important R&D financing bodies in the United States, China, and Japan. The three chapters were written in May and June and updated in December 2006. The contents will have to be updated regularly in order to stay accurate. Following this pre-study, ITPS suggests a more in-depth study and analysis on the most important organizations in the three countries, but also a discussion on the country specific conditions as how to succeed in launching bilateral research agreements.

The United States

There are large amounts of money spent on research grants in the US, both from the federal and private sides. There are grants at state level too, but most of these can be expected to focus on activities within that specific state and are thus not covered in this report.

Non US organizations may take part of a Federal grant when they have collaboration with a US partner who applies and receive grants. Companies that are partly Swedish may, for example, be able to be rewarded with SBIR or STTR grants in most Federal agencies, provided that the companies operate primarily in the US and are at least 51 percent owned and controlled by US citizens or permanent residents. See 1.1.1 for rule of eligibility.

Apart from opportunities through partnering with US organizations, the key question for Swedish organizations is through which organizations is it possibly for a non-US actor to apply for grants?

There is a variety of alternative ways for non-US actors to apply for grants from the main federal agencies. NIH, DOE (through existing bilateral and multilateral agreements), and DARPA are open to international applicants. Other bodies may, under certain circumstances, open to international applicants: DHS (use contacts provided in 1.2.2), NSF (provides grants for international collaborative project, but only cover the US part), EPA (restructuring their research program and are conducting talks regarding international collaborations with certain countries), DOT (differs between the various agencies under DOT, see 1.2.8), HHS (differs between the various agencies under HHS, see 1.2.9) and NASA.

Regarding the private foundations there are some that provide grants on international basis. The largest and most relevant ones are described in this document. Although, it should be stressed that even if these foundations have an international focus, their main giving is often national or concentrated to certain state/states in the US.

We would like to put emphasis on the complexity of the question regarding the opportunities for Swedish organizations to receive research grants from the US and the fact that each case will have its own “best solution”.

China

While the knowledge base in China is small in relation to GDP and total population, and even if knowledge-intensive goods and services, especially “homemade” ones, only account for a negligible part of China’s economy, China

still has significant knowledge resources compared with most other countries. The strength of China lies within a number of thematic areas or knowledge pockets where China is establishing internationally competitive research environments. It also has a rapidly growing number of people with tertiary education, especially within areas of technology and natural science. A significant share of these academics can compete with most engineers and scientists in the developed countries.

China's investments in knowledge have grown at a remarkable pace in the last ten years, reflecting a strong determination to become an internationally competitive knowledge economy. China's human capital is becoming stronger, both in terms of quantity and quality. China's "homemade" human capital is further supplemented by people of Chinese origin who have been educated abroad and are now increasingly starting to return to mainland China.

Even if the R&D expenditure of China is difficult to measure and compare, there is no doubt that China is among the world's leading countries in terms of absolute R&D investments. Furthermore its R&D expenditure, unlike that of most other top countries, is growing fast both in absolute figures and in relation to GDP. Between 1999 and 2005, China's R&D expenditure increased by approx 130 per cent or an average of 24 per cent per year. In regard to government expenditure on R&D, the main funding bodies are the National Development Reform Commission, the Ministry of Science and Technology (MOST), the Ministry of Education, the Ministry Information Industry, the Ministry of Agriculture, the Ministry of Health, and the National Natural Science Foundation of China (NSFC). In addition, there are the Chinese Academy of Science (CAS), the Chinese Academy of Social Sciences (CASS), the Chinese Academy of Medical Sciences (CAMS), and the Chinese Agricultural Sciences which receive their funding directly from the government. Finally, another important funding body is the National Ministry of Defense. However, data on R&D expenditure for military purposes and by the Ministry of Defense are not publicly available and expenditure on military R&D is not included in the overall statistics for R&D expenditure.

Japan

In Japan, about 80 % of R&D is financed by the private sector and 20% by the government. Japan has set the goal of "becoming an advanced science and technology oriented nation" as a national strategy and enacted the Science and Technology Basic Law. Under which a comprehensive range of measures has been taken, including the "First Basic Plan" for FY1996-2000 and the "Second Basic Plan for FY 2001-2005. In March 2006, the "Third Basic Plan" was launched for FY 2006 to 2010 with a target budget of 25 trillion Yen (1,666 billion SEK). The Third Basic Plan aims to promote policy mission-oriented R&D, which contains four priority areas (Life Science, IT, Environmental Science and Nanotech & Materials) and four promotion areas (Energy, Manufacturing technology, Social Infrastructure and Frontier Sciences-space and ocean).

Japanese S&T related policies and measures were conducted by each ministry with the leadership and coordination of the Council for S&T Policy (CSTP) at the Cabinet Office. CSTP is headed by the Prime Minister, cabinet members, and executive members from both academia and industry.

Ministry of Education, Culture, Sports, Science and Technology (MEXT) dominates the governmental S&T budget, and 63 % is channeled to MEXT. The second largest ministry in terms of S&T is the Ministry of Economy, Trade and Industry (METI), which controls 17 % of the S&T budget. For other ministries, the share of S&T related budget is respectively: Ministry of Health, Labour and Welfare, 4%, Ministry of Agriculture, Fishery and Forestry 3 %, Defense Agency 5 %, and others 8 %.

Most ministries have national research institutes and funding “agencies” under it on the subjects directly related to its specific objective. Some money goes directly to ministries for projects. Some of the major research institutes and funding agencies are introduced in this report. Examples of the major ones are: the Japan Society for Promotion of Science (JSPS) and the Japan Science and Technology Agency (JST) under MEXT and the New Energy and Industrial Development Organization (NEDO) under METI.

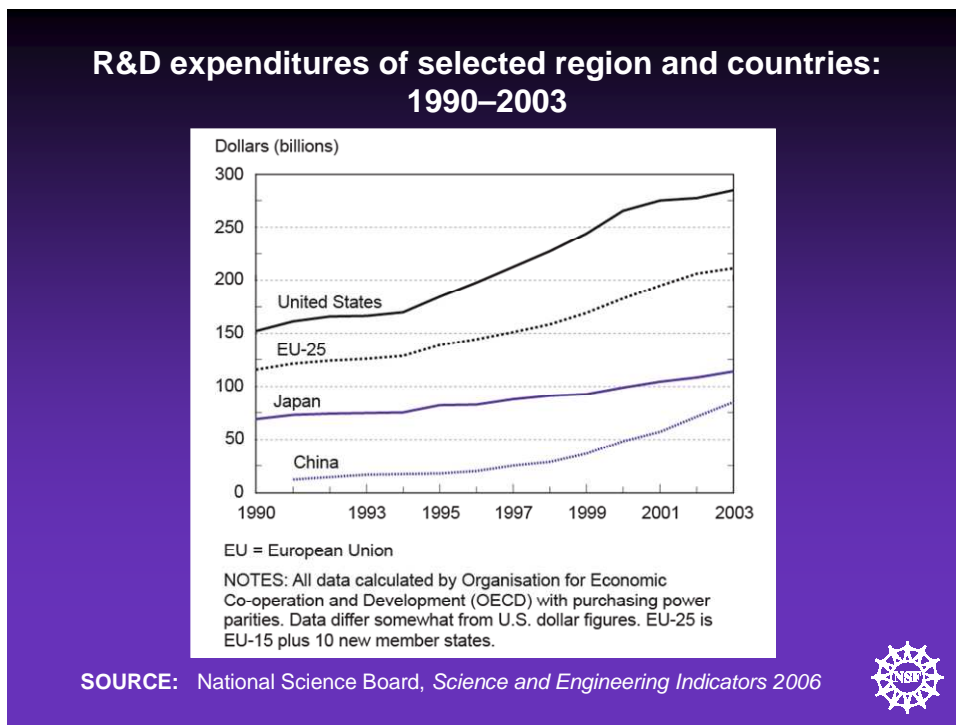
1 Financing of R&D in the United States

An overview of Federal agencies and private foundations, with regards to access for non-US organizations

1.1 US – the dominant player in the world

R&D is performed and funded primarily by a small number of developed nations. In 2000, global R&D expenditures totaled at least \$729 billion, half of which was accounted for by the two largest countries in terms of R&D performance, the United States and Japan. The R&D performance of Organization for Economic Co-operation and Development (OECD) countries grew to \$652 billion in 2002. The G-7 countries (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States) performed over 83 % of OECD R&D in that year. More money was spent on R&D activities in the United States in 2002 than in the rest of the G-7 countries combined. The dominance of the US is illustrated in figure 1.

Figure 1 R&D expenditures of selected regions and countries, years 1990–2003



R&D intensity indicators, such as R&D/gross domestic product (GDP) ratios, also show the developed, wealthy economies well ahead of lesser-developed economies. Overall, the United States ranked fifth among OECD countries in terms of reported R&D/GDP ratios. Israel (not an OECD member country), devoting 4.9 % of its GDP to R&D, led all countries, followed by Sweden (4.3%), Finland (3.5 %), Japan (3.1%), and Iceland (3.1 %). Although China and Germany reported similar R&D expenditures in 2000, on a per capita basis, Germany's R&D was over 16 times that of China.

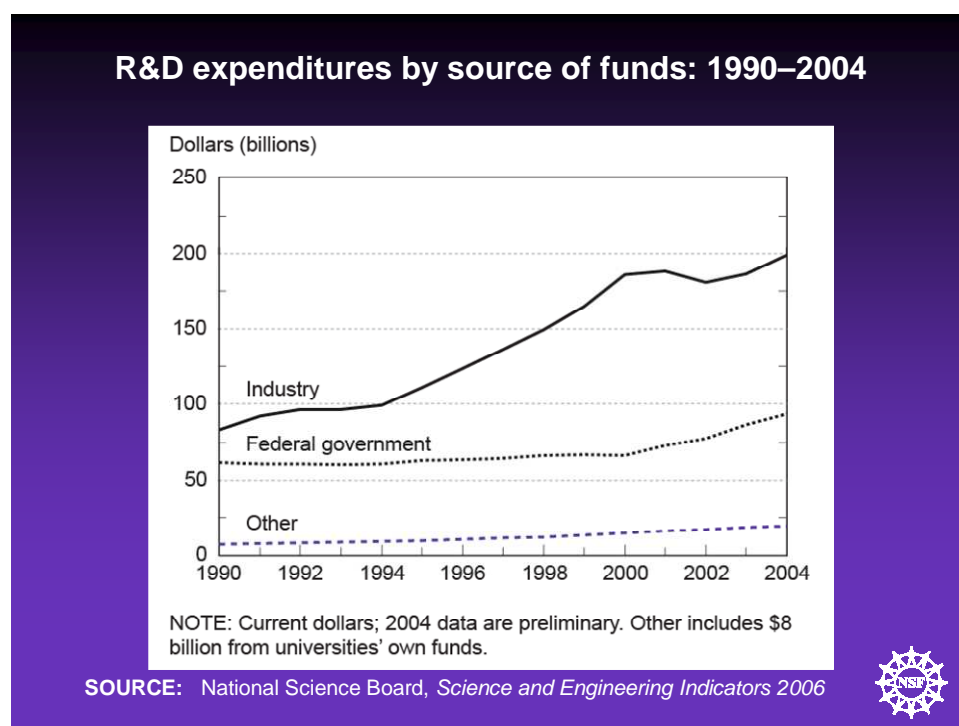
In the United States, the slowdown in GDP growth in 2001 preceded the decline of U.S. R&D in 2002. This resulted in U.S. R&D to GDP ratios of 2.7 % in 2001 and 2.6 % in 2002. Following the 2002 decline, R&D grew more rapidly than GDP in the United States, resulting in an R&D to GDP ratio of 2.7% in 2003. The U.S. economy expanded at a faster pace in 2004, but R&D as a proportion of GDP remained at 2.7 %.

U.S. R&D declined for the first time in almost 50 years in 2002 as a result of cutbacks in business R&D, but it has since recovered due to growth in all sectors of the economy. U.S. R&D grew to \$291.9 billion in 2003 after declining in 2002 for the first time since 1953. U.S. R&D is projected to increase further to \$312.1 billion in 2004.

1.2 R&D funding and performers

The business sector's share of U.S. R&D peaked in 2000 at 75 %, but following the stock market decline and subsequent economic slowdown of 2001 and 2002, the business activities of many R&D-performing firms were curtailed. The business sector is projected to have performed 70 % of U.S. R&D in 2004, see figure 2.

Figure 2 R&D expenditures by source of funds in the US, years 1990–2004



The decades-long trend of federal R&D funding shrinking as a share of the nation's total R&D reversed after 2000. The federal share of R&D funding first fell below 50 % in 1979 and dropped to a low of 24.9 % in 2000. The federal share of R&D funding grew to a projected 29.9 % in 2004 as private investment slowed and federal spending on R&D expanded, particularly in the areas of defense, health, and counterterrorism.

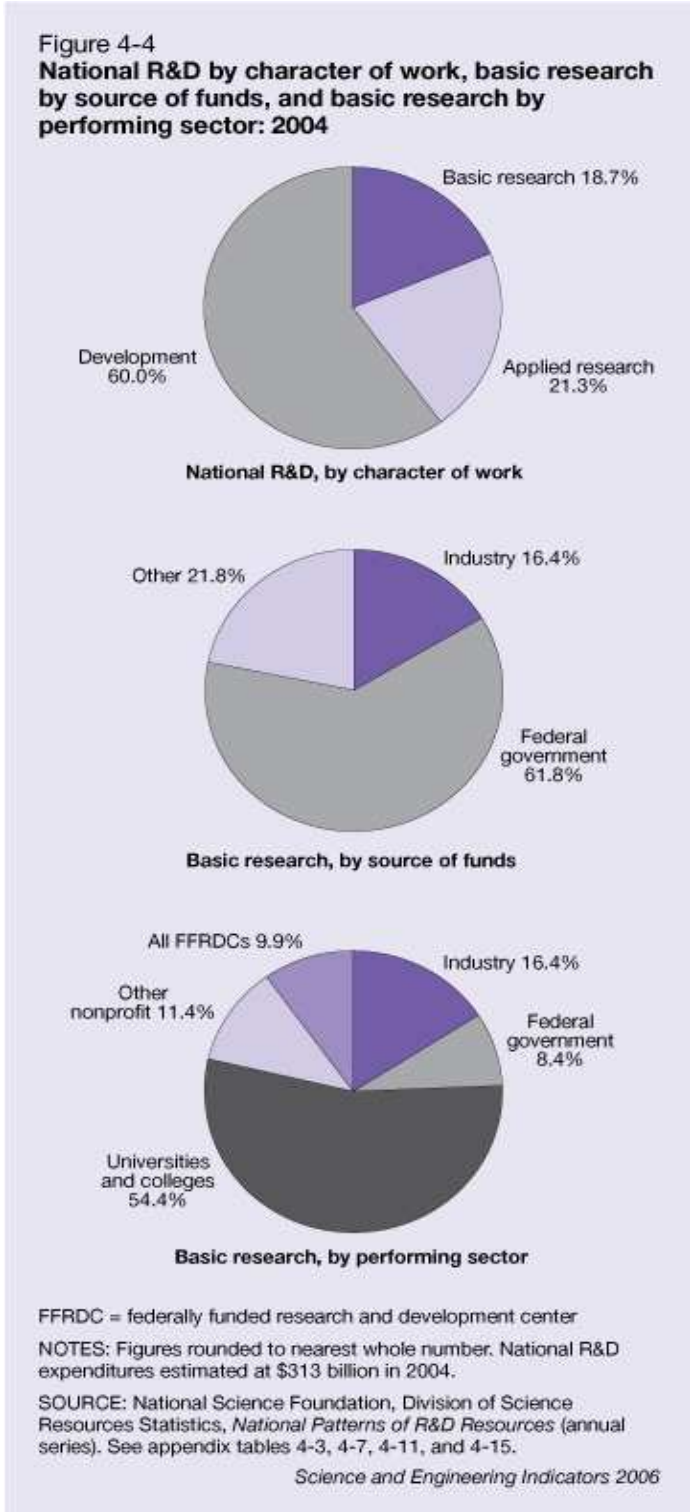
U.S. R&D is dominated by development, largely performed by the business sector, whilst most basic research conducted at universities and colleges. In 2004 the United States performed an estimated \$58.4 billion of basic research, \$66.4 billion of applied research, and \$187.3 billion of development. Universities and colleges have historically been the

largest performers of basic research in the United States, and in recent years they have accounted for over half (55 % in 2004) of the nation's basic research. Most basic research is federally funded. The development of new and improved goods, services, and processes is dominated by industry, which performed 90.2 % of all U.S. development in 2004. The percentage shares for different categories and actors are illustrated in figure 3.

Business sector R&D is projected to have rebounded from its 2002 decline to a new high in 2004. R&D performed by the business sector is estimated to have reached \$219.2 billion in 2004. The average R&D intensity of companies performing R&D in the United States peaked in 2001 at 3.8 %, as R&D budgets remained steady despite a decline in sales of R&D-performing companies. R&D intensity declined to 3.2 % in 2003 as a result of the 2002 decline in company R&D and stronger sales growth in 2003. Computer and electronic products manufacturers and computer-related services companies, combined, performed over one-third of all company-funded research and development in 2003.

In the president's 2006 budget submission, the federal government is slated to set aside \$132.3 billion for R&D, amounting to 13.6 % of its discretionary budget. Federal agencies are expected to obligate \$106.5 billion for R&D support in FY 2005. The five largest R&D-funding agencies account for 94 % of total federal R&D. Defense-related R&D dominates the federal R&D portfolio. The largest R&D budget function in the FY 2006 budget is defense, with a proposed budget authority of \$74.8 billion, or 59 % of the entire federal R&D budget. In FY 2006, the Department of Defense (DOD) requested research, development, testing, and evaluation budgets in excess of \$1 billion for four weapon systems.

Figure 3 Percentage shares of R&D in US by character of work, basic research by source of funds and basic research by performing sector, year 2004



R&D is geographically concentrated, and states vary significantly in terms of the types of research performed within their borders. In 2003, the top 10 states in terms of R&D accounted for almost two-thirds of U.S. R&D. California alone accounted for more than one-fifth of the \$278 billion of R&D that could be attributed to one of the 50 states or the District of Columbia.

Federal R&D accounts for 86 % of all R&D in New Mexico, the location of the two largest federally funded research and development centers (FFRDCs) in terms of R&D performance, Los Alamos National Laboratory and Sandia National Laboratories.

Over half of all R&D performed in the United States by computer and electronic products manufacturers are located in California, Massachusetts, and Texas. The R&D of chemicals manufacturing companies is particularly prominent in two states, accounting for 61% of New Jersey's and 49 % of Pennsylvania's business R&D. Together these two states represent almost one-third of the nation's R&D in this sector.

1.3 Trends in federal R&D spending

On February 6, President Bush released his proposed budget for fiscal year (FY) 2007. The American Association for the Advancement of Sciences describes and analyses the budget in the *AAAS Report XXXI: Research and Development FY 2007*¹ Their summary of the situation is as follows, see also figures 4–6:

The new budget proposes substantial increases for key physical sciences and engineering programs as part of an American Competitiveness Initiative (ACI), first previewed in the State of the Union address as a response to a growing wave of concern about the state of U.S. innovation. The three favored agencies of the National Science Foundation (NSF), the Department of Energy (DOE) Office of Science, and the National Institute of Standards and Technology (NIST) laboratories in Commerce would receive substantial budget increases after years of flat or declining funding.

The overall federal investment in research and development (R&D) would increase to nearly \$137 billion in 2007, but in a repeat of past budgets the continuing Administration priorities of weapons development and space vehicles development would take up the entire increase and more. As result, funding for the remainder of the R&D portfolio would fall, even after the ACI increases are taken into account.

The federal investment in basic and applied research (excluding development and R&D facilities) would decline 3.3 percent to \$54.8 billion, meaning increases for some physical sciences and related research programs would be more than offset by cuts in other agencies' research. The National Institutes of Health (NIH) budget would be flat for the second year in a row and would fund less than 1 out of every 5 grant applications; and the National Aeronautics and Space Administration (NASA), despite being a major sponsor of physical sciences research, would see its research funding fall sharply to offset a big increase in development of new space vehicles.

¹ AAAS R&D Web site at www.aaas.org/spp/rd.

The large proposed increases for selected physical sciences and engineering research programs are not enough to keep the federal investment in basic and applied research (excluding development) from declining for the third year in a row after peaking in 2004. Looking to the future, the Bush Administration's 5-year budget plans show that in the push to reduce budget deficits primarily through cuts in discretionary spending, all R&D funding agencies except NASA, NSF, NIST, and DOE Science would see their budgets decline in real terms over the next five years.

R&D in the FY 2007 Budget: Cuts for Most Areas, Gains for Weapons, Space Vehicles, and the Physical Sciences

On February 6, President Bush offered the same themes as in previous years: big increases for defense and homeland security, trims in some entitlement programs, proposed extensions of expiring tax cuts, and a promise to reduce the budget deficit by cutting domestic discretionary spending. But the President also announced a major initiative in his State of the Union address to boost federal investments in physical sciences research. The FY 2007 budget follows through with large increases for key physical sciences funding agencies, but otherwise the budget request is similar to past requests: federal R&D would increase slightly less than projected inflation, the entire increase and more would go toward the development of new weapons and new space vehicles, and increases in the remainder of the federal R&D portfolio would be offset by cuts in other areas. The large increases for the DOE Office of Science, NSF, and the NIST laboratories in the American Competitiveness Initiative and the increases for NASA development enable non-defense R&D to increase 1.6 percent, in contrast to the 0.5 percent requested cut for all domestic programs in the FY 2007 budget. But within a declining domestic budget, there would be stark contrasts between priority programs and everything else: the above priorities would receive large increases, while everything else in the federal R&D portfolio would face steep cuts, with only biomedical research flat in the middle.

Figure 4 Trends in Federal R&D spending, fiscal years 1976–2007 in billions of constant FY 2006 dollars

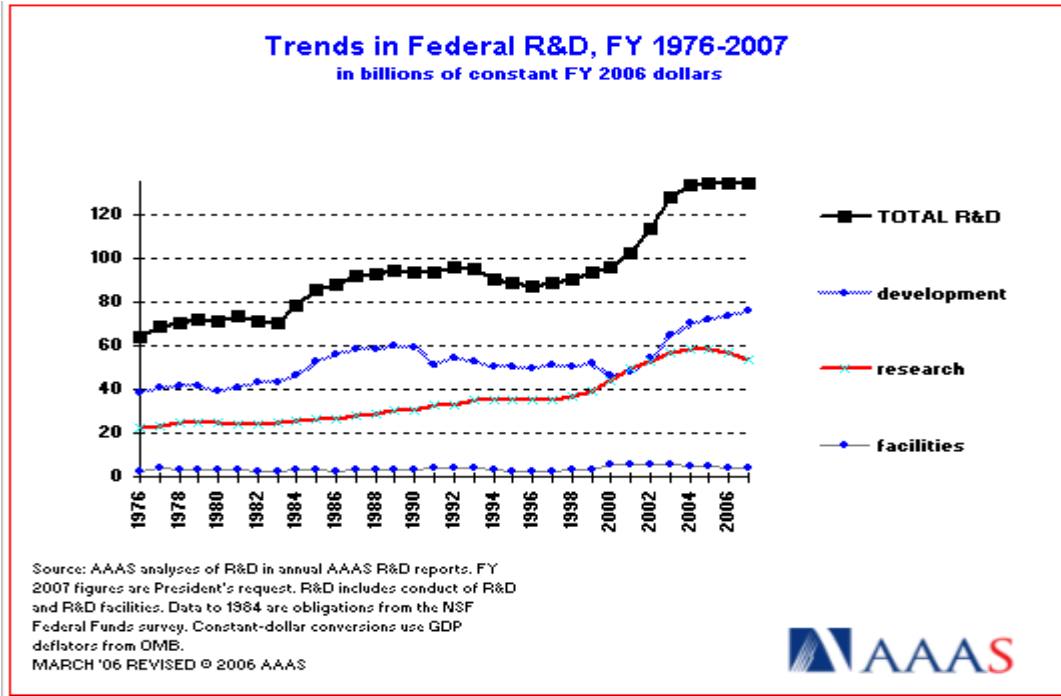


Figure 5 Trends in Federal R&D spending for main agencies, fiscal years 1995–2007, FY 1995 = 100

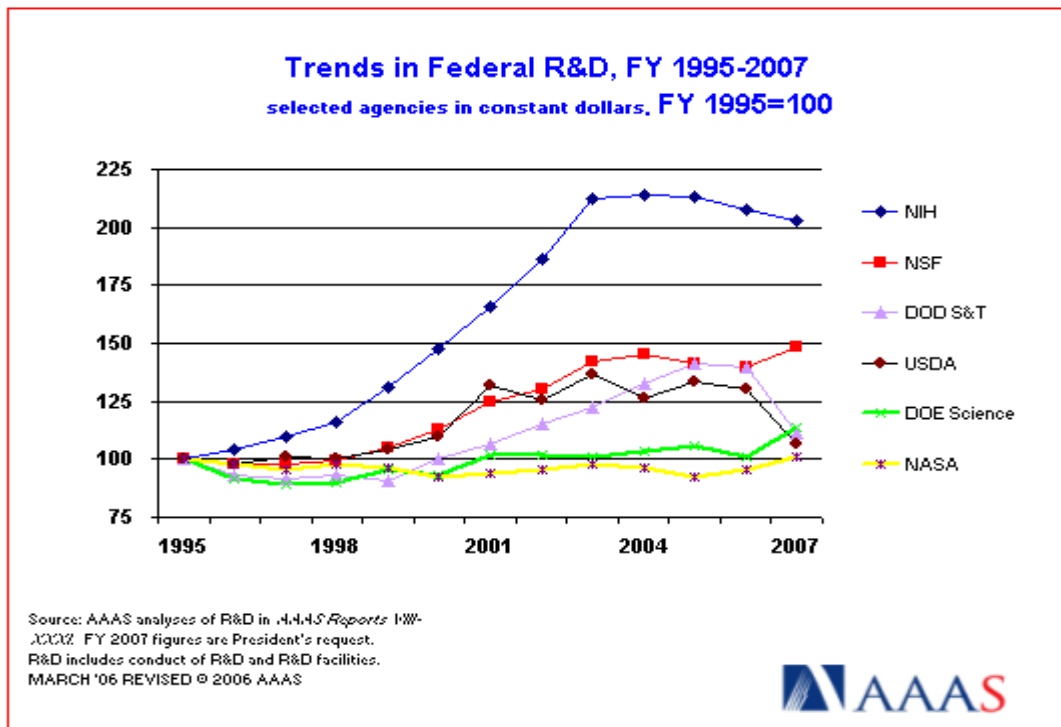
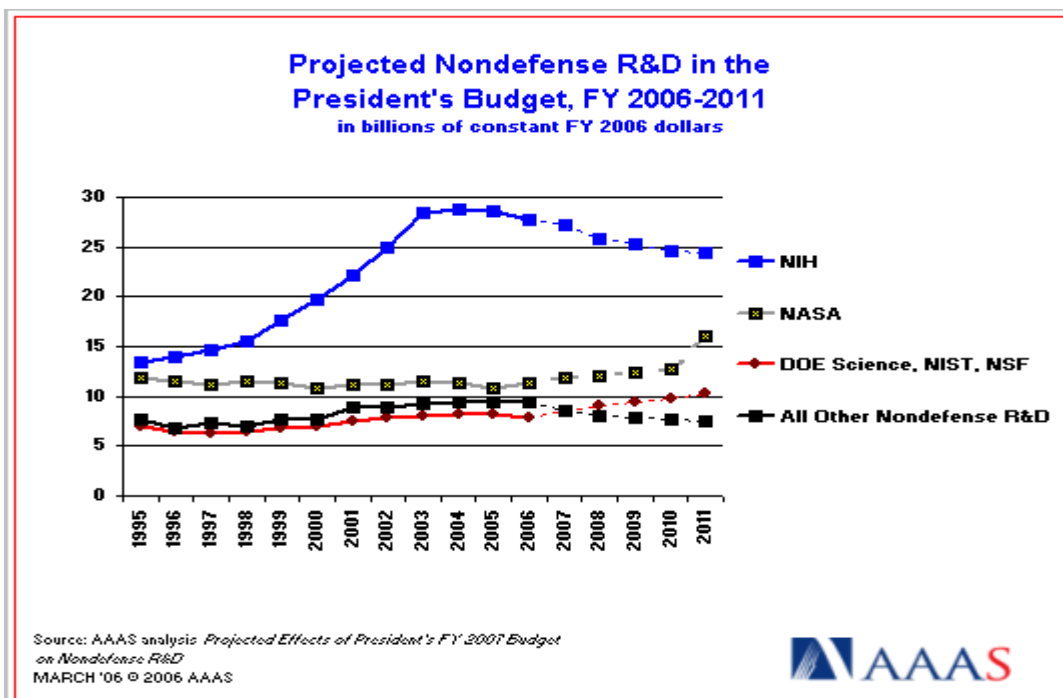


Figure 6 Projected non defense R&D spending in the President's Budget, fiscal years 2006 – 2011 in billions of constant FY 2006 dollars



For a deeper description and analysis of the Science system in the US, see for example the report “American Science – the Envy of the World? An Overview of the Science System and Policies in the United States”²

1.4 The most important Federal organizations providing research funding and grants

The Office of Federal Financial Management has issued a policy directive requiring that all Federal agencies post grant opportunities. “Grants.gov” provides organizations with the ability to search for grant opportunities at Federal agencies electronically. It includes more than \$350 billion in annual grants from 26 Federal agencies and enables grantors and the grant community to come together to make grants management easier and more efficient for everyone. State, local, and tribal governments, colleges and universities, non-profits, and other organizations can access Grants.gov to find grant opportunities in one online location: <http://www.grants.gov>.

There is no unified policy regarding eligibility for grants at the 26 different agencies. They all have different procedures and regulations, which means that non-Americans may or may not be able to apply for grants. This chapter provides a brief description of the main agencies that distribute research grants, based on information that the agencies themselves provide primarily through their websites. You will find a guidance regarding their activities, types of awards and eligibility, along with links and contact information. Some agencies do not provide much information, but ask that you contact them directly with

² ITPS rapport A2004:004 by Eliasson K. It is available at: http://www.itps.se/Archive/Documents/Swedish/Publikationer/Rapporter/Allmänna/A2004/A2004_004.pdf

questions, which explains the difference in amount of information we have been able to provide here.

1.4.1 National Institutes of Health (NIH)

National Institutes of Health

9000 Rockville Pike

Bethesda, Maryland 20892

E-mail: grantsinfo@od.nih.gov, phone: +1 301 435 0714

Regarding relations with Sweden: Division of International Relations, Europe: Ann Davis, e-mail: ad310y@nih.gov, phone: +1 301 496 6688

www.nih.gov

The National Institutes of Health, a part of the U.S. Department of Health and Human Services, is the primary Federal agency for conducting and supporting medical research. Composed of 27 Institutes and Centers, the NIH provides leadership and financial support to researchers in every state and throughout the world.

Eligibility

In general, NIH grants may be awarded to organizations that are domestic or foreign, public or private, non-profit or for-profit. Eligible organizations include governments, including Federal institutions, institutions of higher education, hospitals, and, in this usage, also individuals. Any special criteria for applicant eligibility or requirements concerning the qualifications of the PI or other staff or participants will be specified in the program solicitation, program guidelines, or other publicly available documents.

Types of awards

NIH uses several different extramural award instruments in support of its mission. NIH grants and cooperative agreements are financial assistance instruments. Under a cooperative agreement, NIH expects to be substantially involved in carrying out the project. Grants are used both for investigator-initiated research and for more targeted research. Cooperative agreements generally do not result from investigator-initiated applications. The NIH Grant Policy Statement (GPS) pertains to grants and cooperative agreements; however, NIH may apply terms and conditions that differ from those in the NIHGPS consistent with the nature of its involvement under cooperative agreements.

All the different types of grant-programs are described on the following website: http://grants1.nih.gov/grants/funding/funding_program.htm

The website for extramural grants is: <http://grants1.nih.gov/grants/oer.htm>

Submissions

The different dates and guides for submitting to the programs are continuously updated on the following website: <http://grants1.nih.gov/grants/dates.htm>

Extent of international collaboration and specifically with Sweden

In FY 2003 NIH made research grants worth over 127 million USD to institutions outside the USA. Out of this, over 38 million USD went to the EU. Sweden received 4,057 USD of that sum, an increase from FY 2002, when Sweden received 3,284 USD.

1.4.2 Department of Homeland Security (DHS)

U.S. Department of Homeland Security

Washington, D.C. 20528

Tim Sharp, HSARPA SBIR Program Manager, e-mail: Timothy.Sharp@dhs.gov phone +1 202 254 6105

www.dhs.gov & www.dhssbir.com

Starting January 2007, the Swedish Embassy in Washington DC will have a DHS attaché. Swedish organizations are encouraged to contact this person with inquiries. They may also contact Bengt Svensson, the military attaché at the Swedish Embassy or Totalförsvarets forskningsinstitut in Sweden where Lars Sandström has direct contact with DHS. www.foi.se

The Directorate for Science and Technology (S&T Directorate) is the primary research and development arm of the Department of Homeland Security. The S&T Directorate provides Federal, state and local officials with the technology and capabilities to protect the homeland.

Eligibility

The Homeland Security Advanced Research Projects Agency (HSARPA) engages industry, academia, government, and other sectors in innovative research and development, rapid prototyping, and technology transfer to meet operational needs.

Types of awards

The Department of Homeland Security Science and Technology Directorate conducts and funds research in various areas, or portfolios, organized into three main categories; (1) Countermeasures; (2) Support to Department Components; and (3) Cross-Cutting.

Submissions

DHS S&T awards are not released on any set schedule. They are published on <http://www.hsarpabaa.com> and www.fedbizopps.gov (Federal business opportunities) when they are approved for release and are announced throughout the year.

1.4.3 National Science Foundation (NSF)

The National Science Foundation,

4201 Wilson Boulevard,

Arlington, Virginia 22230, USA

e-mail: policy@nsf.gov, phone: +1 703 292 5111

www.nsf.gov

The National Science Foundation funds research and education in most fields of science and engineering. It does this through grants, and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the United States. The Foundation accounts for about one-fourth of Federal support to academic institutions for

basic research. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Eligibility

NSF rarely provides support to foreign organizations. NSF will consider proposals for cooperative projects involving US and foreign organizations, provided support is requested only for the US portion of the collaborative effort.

Scientists, engineers or educators in the U.S. and U.S. citizens may be eligible for support, provided that the individual is not employed by, or affiliated with, an organization and:

- the proposed project is sufficiently meritorious and otherwise complies with the conditions of any applicable proposal generating document;
- the proposer has demonstrated capability and has access to necessary facilities to carry out the project; and
- the proposer agrees to fiscal arrangements which, in the opinion of the NSF Division of Grants and Agreements, ensure responsible management of Federal funds. Unaffiliated individuals should contact the appropriate NSF program prior to preparing a proposal for submission.

Except for NSF fellowships, which by statute can be made only to citizens, nationals, or lawfully admitted permanent resident aliens of the United States, there generally are no nationality restrictions in any NSF program. Scientists, engineers and educators usually initiate proposals that are officially submitted by their employing organization. Before formal submission, the proposal may be discussed with appropriate NSF program staff. Graduate students are not encouraged to submit research proposals, but should arrange to serve as research assistants to faculty members. Some NSF divisions accept proposals for Doctoral Dissertation Research Grants when submitted by a faculty member on behalf of the graduate student. The Foundation also provides support specifically for women and minority scientists and engineers, scientists and engineers with disabilities, and faculty at predominantly undergraduate academic institutions.

Types of awards

- Standard Grants, in which NSF agrees to provide a specific level of support for a specified period of time with no statement of NSF intent to provide additional future support without submission of another proposal
- Continuing Grants, in which NSF agrees to provide a specific level of support for an initial specified period of time, usually a year, with a statement of intent to provide additional support of the project for additional periods, provided funds are available and the results achieved warrant further support.

For more information see <http://www.nsf.gov/awards/about.jsp>.

Submissions

Proposers should allow adequate time for NSF review and processing of proposals. Many NSF programs accept proposals at any time. Other programs, however, establish due dates for submission of proposals. Target dates, deadlines, and submission windows are published in specific program descriptions, program announcements and solicitations that can be obtained from NSF at pubs@nsf.gov or through www.nsf.gov. Unless otherwise stated in a program announcement or solicitation, proposals must be received by the specified date.

Grant Proposal Guide (GPG)

http://www.nsf.gov/pubs/gpg/nsf04_23/nsf04_23.pdf

NSF Grant Policy Manual (GPM)

http://www.nsf.gov/pubs/manuals/gpm05_131/gpm05_131.pdf

1.4.4 Department of Energy (DOE)

US Department of Energy

1000 Independence Avenue, SW

Washington DC 20585

Grants and Contracts Division, Office of Science, phone +1 301 903 5212

www.doe.gov

The Department of Energy's overarching mission is to advance the national, economic, and energy security of the United States; to promote scientific and technological innovation in support of that mission; and to ensure the environmental cleanup of the national nuclear weapons complex.

Eligibility

Colleges and universities, non-profit organizations, for-profit commercial organizations, state and local governments, and unaffiliated individuals may submit grant applications in response to grant solicitation notices. There are bilateral and multilateral agreements see below.

Types of awards

DOE manages fundamental research programs in basic energy sciences, biological and environmental sciences, and computational science and is the Federal Government's largest single provider of funds for materials and chemical sciences.

Submissions

The Office of Science at DOE accepts applications at any time. The Office of Science publishes an annual notice of availability in the Federal Register at the beginning of each fiscal year. Periodically, the Office of Science also publishes notices of availability in the Federal Register, highlighting specific technical program areas. These notices contain deadline dates for submission of applications. For information see <http://www.science.doe.gov/production/grants/grants.html>. Formal applications must be sent electronically by an authorized institutional business official through the DOE Industry Interactive Procurement System (IIPS) at: <http://e-center.doe.gov>

Extent of international collaboration

In an area of declining public research budgets, international science and technology agreements offer avenues to leverage publicly funded domestic research and accelerate scientific achievement through information sharing and technical cooperation. International agreements also serve as valuable instruments of U.S. economic competitiveness by providing U.S. scientists with opportunities to gain access to, and build upon, other nations' research. The International Agreements Database provides information on bilateral and multilateral agreements between the United States and other countries. Since International Science and Technology relationships have become integral tools in achieving overall U.S. foreign policy and other national goals, cooperation in science and technology plays a vital role in preventing the proliferation of weapons of mass destruction, meeting the challenges of "mega-science" research, providing a framework for promoting sustainable development, increasing energy security, and strengthening the economic ties that underlie global stability. The following website links to agreements with specific countries and on specific subjects: <https://ostiweb.osti.gov/iaem/>

1.4.5 Environmental Protection Agency (EPA)

U.S. Environmental Protection Agency
 Ariel Rios Building
 1200 Pennsylvania Avenue, N.W.
 Washington, DC 20460
 Grants Administration Division E-mail: ogdweb.gad@epa.gov,
 Phone: +1 (202) 564-5325
www.epa.gov

EPA leads the US's environmental science, research, education and assessment efforts.

Eligibility

The major funding categories are fellowships, which are awards to individual students or recent graduates for environmental study, and research grants. Grants and fellowships are offered to researchers affiliated with academic institutions and other not-for-profit organizations.

Types of awards

In recent years, between 40 and 50 percent of EPA's enacted budgets have provided direct support through grants to State environmental programs. EPA grants to States, non-profits and educational institutions support high-quality research that will improve the scientific basis for decisions on national environmental issues and help EPA achieve its goals. The extramural research grants amount to 70 million \$ in 2006. Some examples:

Fellowships

- Science to Achieve Results (STAR) Graduate Fellowships & Greater Research Opportunities (GRO) Graduate Fellowships. For more information contact Stephanie Willett, USEPA, Office of Research and Development, National Center for Environmental Research or visit www.epa.gov/ncer/fellow. E-mail: willett.stephanie@epa.gov
- Greater Research Opportunities (GRO) Undergraduate Fellowships. For more information contact Georgette Boddie, USEPA, Office of Research and Development,

National Center for Environmental Research or visit www.epa.gov/ncer/fellow. E-mail: boddie.georgette@epa.gov

- Public Health Fellowships. For additional information go to: http://www.asph.org/document.cfm?page=751&JobProg_ID=1
- American Association for the Advancement of Science (AAAS) Fellowships. For more information go to the AAAS fellowship site: http://fellowships.aaas.org/02_Programs/02_Environment.shtml

The STAR program

Funds research grants in numerous environmental science and engineering disciplines through a competitive solicitation process and independent peer review. The program engages the nation's best scientists and engineers in targeted research that complements EPA's laboratory research and research conducted by partners in other Federal agencies. See www.epa.gov/ncer.

Submissions

Depending on the assistance program you are applying for, you will need to obtain an application kit from the appropriate Grants or Program Office that will administer the assistance program. This will be one of ten EPA Regional Offices or from its Headquarters Office in Washington, DC. You should contact the appropriate office identified in the solicitation. Solicitations may be viewed under http://www.epa.gov/ogd/grants/funding_opportunities.htm. At http://www.epa.gov/ogd/grants/how_to_apply.htm are links to assist you with applying for EPA assistance.

Extent of international collaboration and specifically with Sweden

The present research program is under reconstruction and is estimated to be set by mid 2006. By June 2006, EPA was involved in discussions with the UK, Holland, France and Germany regarding research collaborations. These were linked to Era-net and the EU program of sustainable industry. There is no such agreement with Sweden yet.

1.4.6 Department of Defense (DoD)/ Defense Advanced Research Projects Agency (DARPA)

DARPA/DIRO

3701 North Fairfax Drive
Arlington, VA 22203-1714

Connie Jacobs, e-mail: connie.jacobs@darpa.mil

Additional information on doing business with DARPA is available from the DARPA General Information Line, at phone +1 703 526 6630
www.dod.gov & www.darpa.mil

The Defense Advanced Research Projects Agency is the central research and development organization for the Department of Defence. It manages and directs selected basic and applied research and development projects for DoD, and pursues research and technology where risk and payoff are both very high and where success may provide dramatic advances for traditional military roles and missions.

Eligibility

DARPA can contract with a foreign entity, provided they follow all the US laws. There is no specific limit to the amount of funding. DARPA's strategy to accomplish its mission is to provide a forum for the evaluation of competing scientific and technological ideas.

Types of awards

The funding is provided through a contract to provide a specific service (such as developing a technology) and it is not a research grant per se. Please refer to www.darpa.mil "Solicitations" and look at the seven Technical Offices Broad Agency Announcements (BAAs). BAAs encourage unique and innovative ideas. Additionally, technical dialogues are invited. If your idea is relevant, you will be encouraged to submit a short white paper before a formal proposal is developed. If your ideas do not fit into any of our BAAs, then you should try another agency within the Department of Defense.

Entities seeking R&D support from DARPA should explore the Agency's interests in research by reviewing sources such as the Federal Business Opportunities (FedBizOps) web site: www.fedbizopps.gov and The Department of Defense Small Business Innovation Research (SBIR) Program Solicitations: www.sbirworld.com/FederalAgencyLinks.asp?mnuFed=1

Submissions

DARPA welcomes new technical ideas at any time from all public and private entities.

1.4.7 National Aeronautics and Space Administration (NASA)

NASA Headquarters
Suite 1M32
Washington, DC 20546-0001
E-mail: public-inquiries@hq.nasa.gov, phone: +1 202 358 0001
www.nasa.gov

NASA conducts its work in four principle organizations, called mission directorates:

- Aeronautics: pioneering and proving new flight technologies that improve our ability to explore and which have practical applications on Earth.
- Exploration Systems: creating new capabilities for affordable, sustainable human and robotic exploration.
- Science: exploring the Earth, moon, Mars and beyond; charting the best route of discovery; and reaping the benefits of Earth and space exploration for society.
- Space Operations: providing critical enabling technologies for much of the rest of NASA through the space shuttle, the international space station and flight support.

Eligibility

NASA depends upon the private sector – industry, educational institutions and other non-profit organizations – for the greater part of its research needs. Therefore, NASA encourages the submission of unique and innovative unsolicited proposals which will further the Agency's mission.

Types of awards

- The NASA Research Announcement (NRA) - An NRA is used to announce research interests in support of NASA's programs, and, after peer or scientific review using factors in the NRA, select proposals for funding. NRA's may result in grants, contracts or cooperative agreements.
- The Announcement of Opportunity (AO) - This is generally used to solicit proposals for unique, high cost research investigation opportunities that typically involve flying experimental hardware provided by the proposer on one of NASA's Earth-orbiting or free-flying space flight missions. Selections through AO's can be for periods of many years, involve budgets of many millions of dollars for the largest programs, and usually are awarded through contracts, even for non-profit organizations, although occasionally grants are also used.
- The Cooperative Agreement Notice (CAN) - This is used to solicit ground-based research opportunities in which a fairly high degree of cooperation and interaction is expected between NASA and the selected institutions for completion of proposed research activities that further one of NASA's strategic objectives (e.g., to develop a research institute, an extensive educational/public outreach activity or provide technology transfer to develop a capability to enhance U.S. competitiveness). Further, the announced program intends a level of sponsorship, in the form of cost or resource sharing from both parties of the agreement. A CAN results in the award of a cooperative agreement.
- The NASA Announcement (AN) - This announcement is for a program in which non-funded selections of investigations are made on a competitive basis (e.g., to acquire new data from an operating space science mission). Typically, the AN have been used to award observation time on still-operating astronomical satellites, where due to imposed budget policies, funds were not available for continued data analysis. There is no official award instrument. Recipients receive a letter from NASA indicating that their proposal was selected and that there will be further contact with the NASA Program Office.
- Earth System Science (ESS) Fellowship Program - The purpose is to ensure continued training of interdisciplinary scientists to support the study of the Earth as a system. Particular emphasis is placed on the applicant's ability and interest in pursuing academic training and research using observations and measurements from NASA's Earth-orbiting satellites. Students admitted to or enrolled in a full-time M.Sc. or Ph.D. program in Earth system science or related disciplines at accredited U.S. universities are eligible to apply. United States citizens and permanent residents will be given highest priority, but applicants of other nationalities will be considered provided that; 1) applicant is residing in the United States and he/she is admitted and enrolled as a full-time student in a graduate program of an accredited U.S. educational institution; 2) applicant's proposed research is unique and there is no comparable research proposed by U.S. citizens and permanent residents; and 3) applicant is holding an outstanding academic credential. http://hurricanes.nasa.gov/research/fellowship_guide.pdf

For more information about NASA grants and research opportunities please see: <http://research.hq.nasa.gov/GenInform.cfm> and <http://nspires.nasaprs.com/external/>

Submissions

NASA supports the option to use the website www.grants.gov for the submission of proposals in response to most NASA Research Announcement (NRA) and Cooperative Agreement Notice (CAN) programs. The document on the following website provides guidelines for the preparation of formal unsolicited proposals to those who wish to convey their creative methods or approaches to NASA: <http://ec.msfc.nasa.gov/hq/library/unSol-Prop.html>

To find out how to bid on NASA contracts, to track contract actions or read NASA's forecast of upcoming procurements, visit the NASA Acquisition Information Service: <http://www.hq.nasa.gov/office/procurement/index.html> . If your firm is a Small or Disadvantaged Business, visit the Web page of the Office of Small and Disadvantaged Business Utilization: <http://www.hq.nasa.gov/office/codek/> . Every NASA Center maintains a Small Business Innovative Research office: <http://sbir.gsfc.nasa.gov/SBIR/SBIR.html>. The NASA Innovative Partnerships Program sponsors a national network of specialized centers, business incubators and services to assist US business and industry in developing and commercializing NASA funded technology: <http://www.ip.nasa.gov/>

1.4.8 Department of Transportation (DOT)

U.S. Department of Transportation

400 7th Street, S.W.

Washington, D.C. 20590

E-mail: dot.comments@dot.gov, phone +1 202-366-4000

www.dot.gov

Top priorities at DOT are to keep the traveling public safe and secure, increase their mobility, and have the transportation system contribute to the nation's economic growth. DOT employs almost 60,000 people across the country, in the Office of the Secretary of Transportation (OST) and its operating administrations and bureaus, each with its own management and organizational structure: Office of the Secretary of Transportation (OST), Federal Aviation Administration (FAA), Federal Highway Administration (FHWA), Federal Motor Carrier Safety Administration (FMCSA), Federal Railroad Administration (FRA), Federal Transit Administration (FTA), Maritime Administration (MARAD), National Highway Traffic Safety Administration (NHTSA), Office of the Inspector General (OIG), Pipeline and Hazardous Materials Safety Administration (PHMSA), Research and Innovative Technology Administration (RITA), Saint Lawrence Seaway Development Corporation (SLSDC), Surface Transportation Board (STB).

Eligibility

Eligibility differs between the administrations. Follow the links on their websites, see <http://www.dot.gov/ost/m60/grant/grelate.htm>

Types of awards

The Department of Transportation annually funds approximately \$32 billion in grants and cooperative agreements. Guidance for departmental formula and discretionary grant programs is contained in their authorizing legislation, program regulations, or departmental regulations. This guidance generally includes general project management requirements

and the limitations, if any, on spending authority. Departmental grants are generally made to State and local governments, with a lesser amount going to Indian tribes, universities, and non-profit organizations. These grants are normally used to assist these entities in the planning, design, and construction of transportation improvements (e.g., highway, transit, and airport improvements). A limited amount of funding is available for research and development projects. Grants or cooperative agreements are awarded by most but not all DOT operating administrations. Some DOT operating administrations have posted information on their financial assistance programs, see <http://www.dot.gov/ost/m60/grant/grelate.htm>. Also see www.grants.gov

Regarding procurements: The following site contains links to each operating administration under DOT. It explains the general mission of each of the OAs and includes the points of contact for the major procurement offices: <http://www.dot.gov/ost/m60/conoport.htm>

Submissions

It differs between the administrations. Follow the links on their website, see previous section.

1.4.9 Department of Health and Human Services (HHS)

The U.S. Department of Health and Human Services
200 Independence Avenue, S.W.
Washington, D.C. 20201
Phone: +1 202 619 0257
www.hhs.gov

HHS is the United States government's principal agency for protecting the health of all Americans and providing essential human services, especially for those who are least able to help themselves. Some highlights include:

- Health and social science research
- Preventing disease, including immunization services
- Assuring food and drug safety
- Medicare (health insurance for elderly and disabled Americans) and Medicaid (health insurance for low-income people)
- Health information technology
- Financial assistance and services for low-income families
- Improving maternal and infant health
- Head Start (pre-school education and services)
- Faith-based and community initiatives
- Preventing child abuse and domestic violence
- Substance abuse treatment and prevention
- Services for older Americans, including home-delivered meals

- Comprehensive health services for Native Americans
- Medical preparedness for emergencies, including potential terrorism.

HHS represents almost a quarter of all Federal outlays and it administers more grant dollars than all other Federal agencies combined. HHS' Medicare program is the nation's largest health insurer, handling more than 1 billion claims per year. Medicare and Medicaid together provide health care insurance for one in four Americans. Many HHS-funded services are provided at the local level by state or county agencies, or through private sector grantees. The Department's programs are administered by 11 operating divisions, including eight agencies in the U.S. Public Health Service and three human services agencies.

- Administration for Children and Families (ACF)
- Administration on Aging (AoA)
- Agency for Healthcare Research and Quality (AHRQ)
- Agency for Toxic Substances and Disease Registry (ATSDR)
- Centers for Disease Control and Prevention (CDC)
- Centers for Medicare & Medicaid Services (CMS)
- Food and Drug Administration (FDA)
- Health Resources and Services Administration (HRSA)
- Indian Health Service (IHS)
- National Institutes of Health (NIH), see 1.2.1
- Substance Abuse and Mental Health Services Administration (SAMHSA)

In addition to the services they deliver, the HHS programs provide for equitable treatment of beneficiaries nationwide, and they enable the collection of national health and other data. (HHS Budget, FY 2007, is \$698 billion)

Eligibility

Prospective applicants should consult publications at each agency for finding information on grant program availability and the deadlines for submitting applications to the sponsoring Federal agency. Whether non-US organizations may apply differs between the agencies. Each grant program announcement lists a specific contact within the grant-making agency. This person or office can answer any questions about the program, as well as provide application forms. For information go to <http://www.hhs.gov/grantsnet/grantinfo.htm>

Types of awards

The Department of Health and Human Services (HHS) manages approximately 300 grant programs and awards over \$239 billion in mandatory and discretionary grant funds annually. One may search the electronic version of the Federal Register to locate specific program announcements for those funding areas of interest. The Internet address for accessing the electronic version of the Federal Register is: http://www.access.gpo.gov/su_docs/aces/aces140.html

The Federal Register and NIH Guide are published respectively, on a daily and weekly basis in electronic formats. The Health Resources and Service Administrations (HRSA) Preview is published periodically during the year. Electronic access to the NIH Guide and the HRSA Preview guide are available on-line through the GrantsNet (see: "Search for Funding Opportunities" at <http://www.hhs.gov/grantsnet/searchfunding.htm>).

Submissions

See Eligibility above.

1.4.10 Small Business Innovation Research Program & Small Business Technology Transfer Research Program

One way for companies to access financial funds from Federal agencies in the US is through the Small Business Innovation Research Program (SBIR) or the Small Business Technology Transfer Research Program (STTR). These competitively awarded, three-phase Federal Government programs are designed to stimulate technological innovation and provide opportunities for small business. Teaming of the private and public sectors include joint venture opportunities for small businesses and the nation's premier non-profit research institutions. Most agencies have such programs and there is a specific website for these programs, with links to each Federal agency's specific program: www.sbirworld.com/FederalAgencyLinks.asp?mnuFed=1

Eligibility

A small business is one that at the time of award of Phase I (and of Phase II, if awarded):

- (1) is organized for profit, with a place of business located in the United States, which operates primarily within the United States or which makes a significant contribution to the United States economy through payment of taxes or use of American products, materials or labour;
- (2) is in the legal form of an individual proprietorship, partnership, limited liability company, corporation, joint venture, association, trust or cooperative, except that where the form is a joint venture, there can be no more than 49 percent participation by foreign business entities in the joint venture;
- (3) is at least 51 percent owned and controlled by one or more individuals who are citizens of, or permanent resident aliens in, the United States, except in the case of a joint venture, where each entity to the venture must be 51 percent owned and controlled by one or more individuals who are citizens of, or permanent resident aliens in, the United States; and
- (4) has, including its affiliates, not more than 500 employees and meets the other regulatory requirements found in 13 CFR Part 121. Business concerns, other than investment companies licensed, or state development companies qualifying under the Small Business Investment Act of 1958, 15 U.S.C. 661, et seq., are affiliates of one another when either directly or indirectly, (a) one concern controls or has the power to control the other; or (b) a third-party/parties controls or has the power to control both.

1.5 Private foundations of special interest for Swedish organizations and researches

Many major foundations in the US support development in a certain state or region, but the foundations described in the following have explicit interest in funding research and their geographic focus is international/national. Annual giving for each foundation exceeds \$ 2,000,000. All foundations that meet these first two search criteria are also listed in Appendix 1 at the end of this section. It should be noted that not all of the foundations listed in the Appendix are of interest in the context of R&D, as some are focused on international relations or political science and their giving are also shattered on many different fields.

1.5.1 James S. McDonnell Foundation

1034 S. Brentwood Blvd., Ste. 1850
St. Louis, MO 63117-1229
Telephone: (314) 721-1532
FAX: (314) 721-7421
<http://www.jsmf.org>

Type of grant maker: Independent foundation.

Background: Established in MO.

Purpose and activities: The 21st Century Science Initiative, the foundation's revised program and funding strategy, will award two types of grants in three program areas. The three program areas are Bridging Brain, Mind, and Behavior; Brain Cancer Research; and Studying Complex Systems.

Program area(s): The grant maker has identified the following area(s) of interest: 21st Century Collaborative Activity Awards; 21st Century Research Awards; Bridging Brain, Mind, and Behavior; Researching Brain Cancer; Studying Complex Systems.

Fields of interest: Brain research; Cancer research; Medical research; Science.

Geographic focus: National; international

Types of support: Research.

Limitations: Giving on a national and international basis.

Application information: See foundation's Web site for application information.

Financial data: (yr. ended 12/31/04): Assets, \$412,153,566 (M); expenditures, \$17,328,071; total giving, \$15,576,440; qualifying distributions, \$16,708,334; giving activities include \$15,576,440 for 76 grants (high: \$1,822,400; low: \$830; average: \$75,000-\$300,000).

EIN: 542074788

1.5.2 Burroughs Wellcome Fund

21 T. W. Alexander Dr.
P.O. Box 13901
Research Triangle Park, NC 27709-3901
Telephone: (919) 991-5100
Contact: Russ Campbell, Comm.'s. Off.
FAX: (919) 991-5160
E-mail: info@bwfund.org
Contact info. for Russ Campbell III tel.: (919) 991-5119, FAX: (919) 991-5179, E-

mail: rcampbell@bwfund.org
 http://www.bwfund.org

Donor(s): Burroughs Wellcome Co.; The Wellcome Trust.

Type of grant maker: Independent foundation.

Background: Incorporated in 1955 in NY.

Purpose and activities: The fund is an independent private foundation dedicated to advancing the medical sciences by supporting research and other scientific and educational activities. Major program areas include: basic biomedical sciences, infectious diseases, interfaces between physical and biological sciences, translational research, and science education.

Program area(s): The grant maker has identified the following area(s) of interest: Career Awards at the Scientific Interface; Career Awards in the Biomedical Sciences; Clinical Scientist Awards in Translational Research; Investigators in Pathogenesis of Infectious Diseases; Science and Philanthropy; Student Science Enrichment Program.

Fields of interest: Biological sciences; Canada; Medical research.

Geographic focus: National; international

Types of support: Program development; Research.

Limitations: Giving limited to the U.S. and Canada. No grants to individuals, or for building or endowment funds, equipment, operating budgets, continuing support, annual campaigns, deficit financing, publications, conferences, or matching gifts; no loans.

Publications: Annual report (including application guidelines); Informational brochure (including application guidelines); Newsletter; Occasional report.

Application information: See fund Web site for application information. Application form required.

Board meeting date(s): Feb., Apr., July, and Oct.

Deadline(s): Varies depending on the program

Final notification: Varies

Financial data: (yr. ended 08/31/05): Assets, \$702,980,000 (M); expenditures, \$64,330,000; total giving, \$24,351,000; qualifying distributions, \$24,351,000; giving activities include \$24,351,000 for grants.

EIN: 237225395

Selected grants: The following grants were reported in 2004.

\$1,500,000 to Harvard University, Cambridge, MA for 3 grants: \$500,000 (For career award in biomedical sciences, including approval for future faculty appointment, for proteomic studies of post-translational histone modifications), \$500,000 (For career award in biomedical sciences, for project, including approval for future faculty appointment, on integration of glycolysis and apoptosis by pro-apoptotic protein BAD, performed at Medical School in Boston), \$500,000 (For career award in biomedical sciences, for project, including approval for future faculty appointment, performed at Medical School in Boston, on comprehensive analysis of phosphoinositide function).

\$500,000 to Columbia University, New York, NY, for career award in biomedical sciences, for project, including approval for future faculty appointment, on role of Hox proteins in sensory-motor neuronal connectivity and identity.

\$500,000 to Stanford University, School of Medicine, Stanford, CA, For career award in biomedical sciences, for project, including approval for future faculty appointment, on single-molecule fluorescence studies of eukaryotic translation initiation and regulation.

\$500,000 to University of California at San Diego, School of Medicine, La Jolla, CA, for career award in biomedical sciences, for projects, including approval for future faculty appointment, on role of Group B Streptococcal hemolysin/cytolysin and pigment in

pathogenesis of invasive neonatal infections.

\$500,000 to University of California, Berkeley, CA, for career award in biomedical sciences, for project, including approval for future faculty appointment, on genomewide analysis of micro RNA function in *Drosophila*.

\$500,000 to University of California, San Francisco, CA, for career award in biomedical sciences, for project, including approval for future faculty appointment, on regulating chromatin domains in yeast and during animal development.

\$500,000 to University of Pennsylvania, School of Medicine, Philadelphia, PA, for career award in the biomedical sciences for project, including approval for future faculty appointment, FMRI studies of process architecture of face perception.

\$500,000 to University of Washington, Seattle, WA, for career award in biomedical sciences, for project, including approval for future faculty appointment, determining antigen specificity of CD25plus CD4plus regulatory T cells.

1.5.3 The Starr Foundation

399 Park Ave., 17th Fl.

New York, NY 10022

Telephone: (212) 909-3600

Contact: Florence A. Davis, Pres.

FAX: (212) 750-3536

Additional tel.: (212) 909-3611

<http://www.starrfoundation.org/>

Donor(s): Cornelius V. Starr†.

Type of grant maker: Independent foundation.

Background: Incorporated in 1955 in NY.

Purpose and activities: The foundation makes grants in a number of areas, including education, medicine and healthcare, human needs, public policy, culture and the environment.

Program area(s): The grant maker has identified the following area(s) of interest: Brewster Starr Scholarship Program.

Fields of interest: Arts; Education; Environment; Health care; Health organizations; Higher education; Human services; Medical research; Social sciences.

Geographic focus: National; international

Types of support: Fellowships; General/operating support; Professorships; Program development; Scholarship funds.

Limitations: Giving primarily on a national and international basis, with emphasis on New York City, NY nationally and emphasis on Asia internationally. No grants to individuals; no loans.

Application information: Please consult foundation Web site for further application details before submitting letter. The foundation prefers not to receive videotapes. The foundation is no longer accepting applications for scholarships. Application form not required.

Initial approach: Letter

Copies of proposal: 1

Board meeting date(s): Six times per year

Deadline(s): None

Final notification: Varies

Financial data: (yr. ended 12/31/04): Assets, \$3,546,599,566 (M); gifts received,

\$817,242; expenditures, \$171,750,663; total giving, \$168,167,773; qualifying distributions, \$171,548,910; giving activities include \$159,491,584 for 754 grants (high: \$25,000,000; low: \$2,000; average: \$25,000-\$125,000), \$8,676,189 for 120 grants to individuals (high: \$21,000; low: \$250; average: \$2,000-\$12,000) and \$17,999,000 for set-asides.

EIN: 136151545

Selected grants: The following grants were reported in 2005.

\$25,000,000 to World Trade Center Memorial Foundation, New York, NY, For construction, operation and maintenance of World Trade Center Site Memorial Complex, payable over 5 years.

\$10,000,000 to Weill Medical College of Cornell University, New York, NY, For tri-institutional stem cell initiative, involving collaboration of Weill Cornell, Rockefeller University and Memorial-Sloan Kettering.

\$6,000,000 to Hospital for Special Surgery, New York, NY, For Research Campaign, Discovery to Recovery and Capital Campaign, payable over 2 years.

\$5,500,000 to Greenberg Medical Research Institute, Center for the Study of Hepatitis C, New York, NY, For capital and program support, payable over 5 years.

\$5,300,000 to Greenberg Medical Research Institute, New York, NY, for Center for the Study of Hepatitis C, payable over 5 years.

\$3,600,000 to Smile Train, New York, NY, For cleft care training and treatment programs in India and China, payable over 2 years.

\$3,000,000 to New York Blood Center, New York, NY, for National Cord Blood Program, payable over 2 years.

\$3,000,000 to Teach for America, New York, NY, for general support, payable over 3 years.

\$2,500,000 to Metropolitan Museum of Art, New York, NY, for challenge grants to build educational facilities, payable over 2 years.

\$2,500,000 to Young Audiences (YA), New York, NY, for Arts for Learning, payable over 2 years.

1.5.4 Thrasher Research Fund

15 W. South Temple St., Ste. 1650

Salt Lake City, UT 84101

Telephone: (801) 240-4753

Contact: Aaron V. Pontsler, Research Mgr.

FAX: (801) 240-1625

E-mail: thrasherinfo@thrasherresearch.org

Additional E-mail: pontslerav@thrasherresearch.org

<http://www.thrasherresearch.org>

Donor(s): E.W. "Al" Thrasher.

Type of grant maker: Independent foundation.

Background: Established in 1977 in UT.

Purpose and activities: The fund seeks to foster an environment of creativity and discovery aimed at finding solutions to children's health problems. The fund awards grants for research that offers substantial promise for meaningful advances in prevention and treatment of children's diseases, particularly research that offers broad-based applications. Emphasis is placed on projects with potential findings that would be clinically applicable

in a relatively short period of time for the prevention, diagnosis and/or treatment of pediatric medical problems.

Program area(s): The grant maker has identified the following area(s) of interest: New Researcher Award Program.

Fields of interest: Medical research; Pediatrics research.

Geographic focus: National; international

Types of support: Research.

Limitations: Giving on a national and international basis. No support for research using fetal tissue, other funding organizations, behavioral science research, or educational programs. No grants for general operations, construction or renovation of facilities, student aid, or scholarships; no loans.

Publications: Application guidelines; Biennial report (including application guidelines); Informational brochure (including application guidelines).

Application information: Guidelines are available on Web site, and should be viewed before submitting any applications. Applicants whose concept papers are approved will receive an invitation to submit a full proposal as well as an electronic application kit.

Application form required.

Initial approach: Concept paper

Copies of proposal: 1

Board meeting date(s): Quarterly

Deadline(s): Revolving

Final notification: 6 to 9 months from initial consultation

Financial data: (yr. ended 12/31/04): Assets, \$92,903,337 (M); expenditures, \$5,228,732; total giving, \$4,044,992; qualifying distributions, \$4,044,992; giving activities include \$4,044,992 for grants.

EIN: 876179851

1.5.5 Max Kade Foundation, Inc.

6 E. 87th St., 5th Fl.

New York, NY 10128-0505

Telephone: (646) 672-4354

Contact: Lya Friedrich Pfeifer, Treas.

Donor(s): Max Kade†.

Type of grant maker: Independent foundation.

Background: Incorporated in 1944 in NY.

Purpose and activities: Grants primarily to higher educational institutions, with present emphasis on post-doctoral research exchange programs between the United States and Europe in medicine or in the natural and physical sciences. Foreign scholars and scientists are selected by the sponsoring universities upon nomination by the respective Academy of Sciences. Grants also for visiting faculty exchange programs and training of language teachers.

Program area(s): The grant maker has identified the following area(s) of interest: Max Kade Language Centers; Postdoctoral Research Exchange Program; Training of Language Teachers, Graduate Study Abroad, and International Conferences; Visiting Faculty Exchange Program.

Fields of interest: Biological sciences; Biomedicine; Chemistry; Engineering; Europe; Germany; Higher education; Language/linguistics; Literature; Medical research; Physical/earth sciences.

Geographic focus: National; international

Types of support: Exchange programs; Program development.

Limitations: Giving primarily in the U.S. and Europe. No grants to individuals, or for operating budgets, capital funds, development campaigns, or endowment funds; no loans.

Publications: Occasional report.

Application information:

Initial approach: Letter or proposal

Board meeting date(s): As required

Deadline(s): None

Financial data: (yr. ended 12/31/04): Assets, \$92,809,689 (M); expenditures, \$4,379,221; total giving, \$3,842,235; qualifying distributions, \$4,241,983; giving activities include \$3,842,235 for 162 grants (high: \$790,000; low: \$200; average: \$10,000-\$100,000).

EIN: 135658082

Selected grants: The following grants were reported in 2003.

\$300,000 to University of Heidelberg, Heidelberg, Germany, To construct and furnish Max Kade House and Activity Center and to make reservations for U.S. students.

\$200,000 to University of Kiel, Kiel, Germany, For construction and furnishing of Max Kade House and reservations for U.S. students.

\$100,000 to Friends of Dresden, New York, NY, for restoration of cultural, artistic and architectural legacy of Dresden, Germany.

\$53,800 to Yale University, Department of Immunobiology, New Haven, CT, for research and training in field of immunobiology, focusing on study of protein complexes involved in inflammation and immunity.

\$51,300 to Yale University, Department of Economics, New Haven, CT, for research and training in field of econometrics, focusing on study of estimating linear dynamical models for processes with arbitrary unit root structure.

\$48,800 to Massachusetts General Hospital, Department of Cardiovascular Research, Boston, MA, for research and training in field of cardiovascular research, focusing on study of tumor biology and reactions to therapy.

\$48,800 to University of California, Department of Medicine, San Francisco, CA, For research and training in field of cardiovascular imaging, focusing on study of MRI guided cardiovascular therapeutic interventions and delivery of gene and cellular therapy to vessels and myocardium.

\$42,500 to Brigham and Women's Hospital, Department of Medicine, Boston, MA, For research and training in gastroenterology and medicine, focusing on study of regulation of CD1d-restricted Tcells.

\$42,500 to Johns Hopkins University, Department of Cell Biology, Baltimore, MD, for research and training in field of microbiology, focusing on study of Limpl function and molecular interactions in muscle.

\$42,500 to Medical College of Wisconsin, Department of Dermatology, Milwaukee, WI, for research and training in field of dermatology, focusing on study of prevention of immune responses against type XVII collagen.

1.5.6 Richard Lounsbery Foundation, Inc.

1020 19th St. N.W., Ste. LL60

Washington, DC 20036

Telephone: (202) 872-8080

Contact: Maxmillian Angerholzer III, Secy.

FAX: (202) 872-9292

E-mail: foundation@rlounsbery.org
<http://www.rlounsbery.org/>

Donor(s): Richard Lounsbery‡; Richard Lounsbery Foundation Trust, Inc.

Type of grant maker: Independent foundation.

Background: Incorporated in 1959 in NY.

Purpose and activities: The Richard Lounsbery Foundation aims to enhance national strengths in science and technology through support of programs in the following areas: science and technology components of key U.S. policy issues; elementary and secondary science and math education; historical studies and contemporary assessments of key trends in the physical and biomedical sciences; and start-up assistance for establishing the infrastructure of research projects.

Program area(s): The grant maker has identified the following area(s) of interest: Richard Lounsbery Award.

Fields of interest: Biomedicine research; Elementary/secondary education; Health care; Science.

Geographic focus: National; international

Types of support: Matching/challenge support; Seed money.

Limitations: Giving nationally and internationally. No grants to individuals, or for endowments, capital or building funds; no loans.

Publications: Annual report.

Application information: Funds mainly committed to projects developed by the director. The foundation does not print any material and has no mailing list. Application form not required.

Initial approach: E-mail 2-page inquiry

Board meeting date(s): Jan., Apr., July and Oct.

Financial data: (yr. ended 12/31/04): Assets, \$24,227,873 (M); gifts received, \$2,228,834; expenditures, \$3,487,202; total giving, \$2,617,108; qualifying distributions, \$3,190,825; giving activities include \$2,617,108 for 66 grants (high: \$167,925; low: \$1,000).

EIN: 136081860

Selected grants: The following grants were reported in 2003.

\$500,000 to Rockefeller University, New York, NY, for Frederick and Elizabeth Seitz Postdoctoral Fellowship Fund, payable over 4 years.

\$142,477 to Consortium for Oceanographic Research and Education, DC, for Census of Marine Life project.

\$85,134 to George Washington University, DC, For community mental health education program.

\$80,000 to Woodrow Wilson International Center for Scholars, DC, for Serious Games Initiative.

\$70,000 to American Association for the Advancement of Science, Center for Science, Technology, and Progress, DC.

\$50,000 to Institut des Hautes Etudes Scientifiques (IHES), Bures-sur-Yvette, France, For Lounsbery Fellowship.

\$50,000 to University of California, Oakland, CA, for Emerging Matter Project.

\$25,000 to Chemical Heritage Foundation, Philadelphia, PA, for Joseph Priestly exhibit.

\$25,000 to Manhattan Institute for Policy Research, Center for Medical Progress, New York, NY.

\$10,000 to Clarke School for the Deaf, Northampton, MA, for Millennium Mathematics Curriculum Project.

1.5.7 The Bristol-Myers Squibb Foundation, Inc.

(formerly The Bristol-Myers Fund, Inc.)

c/o Fdn. Coord.

345 Park Ave., 43rd Fl.

New York, NY 10154

E-mail for Distinguished Achievement Awards: daa_admin@bms.com

<http://www.bms.com/aboutbms/founda/data>

Donor(s): Bristol-Myers Squibb Co.

Type of grant maker: Company-sponsored foundation.

Background: Incorporated in 1982 in FL as successor to a foundation established in 1953.

Purpose and activities: The foundation supports organizations involved with education, health, medical research, community development, civic affairs, minorities, and women and awards grants to scientists conducting medical research.

Program area(s): The grant maker has identified the following area(s) of interest: Better Health for Women; Civic and Community Services; Education; Employee Matching Gifts; Freedom to Discover Biomedical Research Grants; Freedom to Discover Distinguished Achievement Awards; Medical Research and Health.

Fields of interest: Africa; African Americans/Blacks; Cancer research; Children/youth, services; Community development; Education; Elementary/secondary education; Health care; Heart & circulatory research; Higher education; Hispanics/Latinos; Human services; Medical research; Minorities; Native Americans/American Indians; Neuroscience research; Public affairs; Women.

Geographic focus: National; international

Types of support: Curriculum development; Employee matching gifts; Employee volunteer services; Employee-related scholarships; General/operating support; Grants to individuals; In-kind gifts; Management development/capacity building; Program development; Program evaluation; Research.

Limitations: Giving on a national and international basis, including in Africa, with emphasis on Wallingford, CT, Evansville, IN, New Brunswick, Princeton, and Skillman, NJ, and Buffalo and Syracuse, NY. No support for political, fraternal, social, or veterans' organizations, religious or sectarian organizations not of direct benefit to the entire community, or federated campaign-supported organizations. No grants to individuals (except for Distinguished Achievement Awards and employee-related scholarships), or for endowments, conferences, sponsorships or independent medical research, or specific public broadcasting or films; no loans.

Publications: Corporate giving report.

Application information: Unsolicited requests for Biomedical Research Grants are not accepted.

Initial approach: Proposal; complete online nomination form for Distinguished Achievement Awards

Board meeting date(s): Dec. and as needed

Deadline(s): Oct. 1; preferred between Feb. and Sept.; Oct. 31 for Distinguished Achievement Awards for cancer, Dec. 5 for cardiovascular, Feb. 27 for metabolic diseases, Jan. 13 for nutrition, Mar. 13 for neuroscience, and Apr. 13 for infectious diseases

Final notification: 2 to 3 months

Financial data: (yr. ended 12/31/04): Assets, \$32,119,565 (M); gifts received, \$34,037,000; expenditures, \$21,965,242; total giving, \$21,955,431; qualifying distributions, \$21,955,431; giving activities include \$19,601,763 for 262 grants (high:

\$2,750,000; low: \$1,000) and \$2,353,668 for employee matching gifts.

EIN: 133127947

Selected grants: The following grants were reported in 2003.

\$650,000 to Robert Wood Johnson University Hospital Foundation, New Brunswick, NJ.

\$500,000 to Childrens Health Fund, New York, NY.

\$395,724 to National Merit Scholarship Corporation, Evanston, IL.

\$200,000 to Association of Black Cardiologists, Atlanta, GA.

\$195,172 to Groupe Pivot Sante Population, Bamako, Mali, For West Africa Community Outreach and Education Initiative. Grant made through Secure the Future, program providing care and support for women and children with HIV/AIDS in Western Africa.

\$185,000 to Pharmaceutical Research and Manufacturers of America Foundation, DC.

\$140,000 to Catholic Medical Mission Board, New York, NY, For work in Central America in collaboration with Pan-American Health Organization.

\$135,000 to Puerto Rico Department of Education, San Juan, PR, For Puerto Rico Education Initiative.

\$130,000 to China Foundation for Hepatitis Prevention and Control, China, For Asia Initiative.

\$108,260 to Namibia Tuberculosis Association, Windhoek, Namibia, For grant made through Secure the Future, program providing care and support for women and children with HIV/AIDS in Western Africa.

1.5.8 Gordon and Betty Moore Foundation

The Presidio of San Francisco

P.O. Box 29910

San Francisco, CA 94129-0910

Telephone: (415) 561-7700

Contact: Grants Admin. Dept.

FAX: (415) 561-7707

E-mail: info@moore.org

Additional E-mail: grantprocessing@moore.org

<http://www.moore.org/>

Donor(s): Gordon E. Moore; Betty I. Moore.

Type of grant maker: Independent foundation.

Background: Established in 2000 in CA.

Purpose and activities: Giving primarily to improve the quality of life for future generations, the foundation seeks to develop outcome-based grants that will provide lasting and meaningful benefits to the environment, science and the San Francisco Bay Area community. In doing so, the foundation emphasizes measurable impact and supports programs that clearly identify targeted results and encourage transformative change.

Program area(s): The grant maker has identified the following area(s) of interest: Employee Matching Gifts; Environment Conservation; San Francisco Bay Area; Science.

Fields of interest: Environment; Science.

Geographic focus: National; international

Types of support: Employee matching gifts; Land acquisition; Program development; Program-related investments/loans; Research.

Limitations: Applications not accepted. Giving on a worldwide basis, with some focus on the San Francisco Bay Area, CA, for selected projects. No support for religious or political organizations. No grants to individuals, or for arts, building/renovation, endowments,

capital campaigns, labor issues, or for sports programs.

Publications: Financial statement; Grants list.

Application information: Does not accept unsolicited proposals. Instead, the foundation funds foundation-generated initiatives that focus on specific issues, and makes local grants through its San Francisco Bay Area program.

Financial data: (yr. ended 12/31/04): Assets, \$5,042,534,007 (M); expenditures, \$274,344,975; total giving, \$225,986,140; qualifying distributions, \$244,164,193; giving activities include \$225,231,317 for 349 grants (high: \$37,644,667; low: \$250; average: \$1,000-\$1,000,000) and \$754,823 for 229 employee matching gifts.

EIN: 943397785

Selected grants: The following grants were reported in 2003.

\$32,385,000 to Conservation International, DC, For Global Conservation Fund, Centers for Biodiversity Conservation, and Scientific Field Stations.

\$14,691,614 to California Institute of Technology, Pasadena, CA for 3 grants: \$8,080,864 (For Center for Analysis of Higher Brain Function, facility to investigate active mammalian brain), \$4,344,650 (To design Thirty Meter Telescope (formerly named CELT), grant optical/infrared ground-based telescope), \$2,266,100 (To establish Molecular Observatory for Structural Molecular Biology).

\$6,330,000 to Resources Legacy Fund, Sacramento, CA, For public acquisition of salt-producing land at edge of San Francisco Bay.

\$1,650,000 to Public Library of Science, San Francisco, CA, To establish online scholarly publisher to make scientific and medical literature a public resource.

\$1,532,500 to University of California, Berkeley, CA, To establish center to analyze and compare genome sequences of broad spectrum of organisms, and to determine mechanisms responsible for evolutionary diversity among animals, plants, and microbes.

\$1,525,000 to Field Museum of Natural History, Chicago, IL, To conduct rapid inventories leading to creation of new protected areas, establish long-term management of protected areas and their buffer zones, and provide conservation training.

\$1,367,578 to Wildlife Conservation Society, Bronx, NY, To consolidate key aspects of newly created network of protected areas covering ten percent of surface area of Central African country of Gabon.

\$1,323,480 to Malpai Borderlands Group, Douglas, AZ, For work of grassroots, collaborative organization that blends stewardship, conservation, agriculture, and science.

1.5.9 Howard Hughes Medical Institute

c/o Office of Grants and Special Progs.

4000 Jones Bridge Rd.

Chevy Chase, MD 20815-6789

Telephone: (301) 215-8500

Contact: For general inquiries: Dr. Peter J. Bruns, V.P., Grants and Special Progs.; Dr.

William R. Galey, Prog. Dir, Grad. Prog.; Stephen A. Barkanic, Prog. Dir., Undergrad

Prog.; Dr. Jill G. Conley, Prog. Dir., International Prog., Precollege Prog., Research

Resources Prog.; Dr. Dennis Liu, Prog. Dir., Educational Products

FAX: (301) 215-8888

E-mail: grantswww@hhmi.org

<http://www.hhmi.org>

Additional tel.: (800) 448-4882

Donor(s): Howard R. Hughes‡.

Type of grant maker: Public charity.

Background: Incorporated in 1953 in DE.

Purpose and activities: The purpose of the Institute is promotion of human knowledge within the field of basic sciences (chiefly medical research and education) and the effective application thereof to benefit mankind. The Institute is a medical research organization, not a private foundation, under Federal tax codes. Through its Medical Research Program, the Institute's scientists conduct fundamental biomedical research throughout the U.S. in the fields of cell biology, computational biology, genetics, immunology, neuroscience, and structural biology. Through its Office of Grants and Special Programs, the Institute awards grants for education in biology and related sciences, funds research at medical schools, and supports fundamental research abroad. The emphasis of the grants program is graduate, undergraduate, and pre-college and public science education. Graduate support is primarily awarded under two programs: 1) Research Training Fellowships for Med. Students. Deadline: early Jan.; 2) HHMI-NIH Research Scholars Program. Deadline: Jan. 10. The Undergraduate Science Education Program, awards grants to colleges and universities for 1) student research and expanding access in the sciences; 2) science equipment and lab renovations; 3) faculty and curriculum development; and 4) outreach programs in the sciences and mathematics with elementary and secondary schools, and with junior/community colleges. The HHMI Professors awards, an Undergraduate Program initiative, supports and empowers accomplished research scientists in transmitting the excitement and values of scientific research to undergraduate education. The Institute continues to monitor trends in science education and science, including public and private support. The Precollege Science Education Program addresses concerns about science literacy in the general population by engaging K-12 students, teachers, and families in science education.

Program area(s): The grant maker has identified the following area(s) of interest: Graduate Program; HHMI Professors Award; International Program; Precollege and Public Program; Research Resources; Undergraduate Program; Washington, DC Metropolitan Area Initiatives.

Fields of interest: African Americans/Blacks; Argentina; Asians/Pacific Islanders; Australia; Bangladesh; Biological sciences; Biomedicine; Brazil; Bulgaria; Canada; Chile; Czech Republic; Education; Estonia; France; Germany; Greece; Guinea; Higher education; Hispanics/Latinos; Hungary; India; Israel; Lithuania; Medical research; Medical school/education; Mexico; Minorities; Native Americans/American Indians; Poland; Russia; Secondary school/education; Slovakia; South Africa; Switzerland; Taiwan; Uganda; Ukraine; United Kingdom; Uruguay; Venezuela.

Geographic focus: National; international

Types of support: Building/renovation; Curriculum development; Equipment; Fellowships; Grants to individuals; Professorships; Program development; Program evaluation; Research.

Limitations: Giving on a national and international basis. Graduate, undergraduate, and pre-college grants are nationwide; grants to foreign scientists made in selected countries. Some graduate fellowships given outside the U.S. Research grants have gone to scientists in Canada and Mexico (1991), Australia, New Zealand, and the United Kingdom (1992), The Baltics, Cent. Europe, and the former Soviet Union (1995), Argentina, Brazil, Canada, Chile, Mexico, and Venezuela (1997), and Australia, Bangladesh, Bulgaria, Czech Republic, Estonia, France, Germany, Greece, Guinea, Hungary, India, Israel, Lithuania, Mexico, Poland, Russia, Slovak Republic, South Africa, Switzerland, Taiwan, Uganda, Ukraine, United Kingdom, Uruguay, Venezuela (2000). No support for biomedical

research in the U.S., except to scientists employed by the Institute; no grants or fellowships except to individuals or institutions competing under established science education programs. No grants for conferences or publications.

Publications: Annual report; Application guidelines; Informational brochure (including application guidelines); Newsletter; Occasional report; Program policy statement.

Application information: Applicants should consult guidelines in program announcements prior to application. Fellowships and grants are awarded on the basis of national or international competitions. Proposals for Undergraduate Science Education Program and the Precollege Science Education Program are by invitation only. For the HHMI Professors awards, each invited institution may nominate up to two faculty members. In addition to the science education programs, grants are awarded to biomedical scientists in specified countries under the international program. Awards in all programs are based on peer review. Application form required.

Initial approach: Letter, proposal, or application, depending on program

Board meeting date(s): Feb., May, Aug., and Nov.

Deadline(s): Request program announcements for program-specific deadlines

Final notification: Each grants program has an individual notification date; program brochures and announcements should be consulted

Financial data: (yr. ended 08/31/04): Assets, \$15,396,735,408 (M); expenditures, \$640,853,700; total giving, \$57,627,987; giving activities include \$57,627,987 for 563 grants (high: \$1,600,000; low: \$114) and \$446,782,710 for foundation-administered programs.

EIN: 590735717

1.5.10 The Merck Company Foundation

1 Merck Dr., WS 1A-17

P.O. Box 100

Whitehouse Station, NJ 08889-0100

Telephone: (908) 423-2042

Contact: Christine Funk, Assoc. Mgr., Corp. Contribs.

FAX: (908) 423-1987

Contact for PPPI: Heather Richmond, Coord., tel.: (908) 423-4820

http://www.merck.com/cr/company_profile/philanthropy_at_merck/the_merck_company_foundation/home.html

Donor(s): Merck & Co., Inc.

Type of grant maker: Company-sponsored foundation.

Background: Incorporated in 1957 in NJ.

Purpose and activities: The foundation supports programs designed to improve access to quality health care and promote the appropriate use of medicines and vaccines; build capacity in the biomedical and health sciences; promote environments that support innovation, economic growth, and development in an ethical and fair context; and support communities where Merck employees work and live.

Program area(s): The grant maker has identified the following area(s) of interest: Champions for the Environment Program; Partnership for Giving (P4G); The Merck Program on Pharmaceutical Policy Issues (PPPI); Touched by an Agency.

Fields of interest: Environment; Health care; Human services; Medical research; Philosophy/ethics; Public health.

Geographic focus: National; international

Types of support: Employee matching gifts; General/operating support; Program development; Research; Seed money; Technical assistance.

Limitations: Applications not accepted. Giving on national and international basis in areas of company operations. No support for political organizations, fraternal, labor, or veterans' organizations, religious organizations not of direct benefit to the entire community, or discriminatory organizations. No grants to individuals, or for political campaigns or activities, fundraising, capital campaigns, non-public broadcasting media productions, basic or clinical research projects, direct medical care or the purchase of medications, devices, or biologics, meetings, conferences, symposia, or workshops, fellowships or scholarships for training purposes intended for a specific individual or institution, debt reduction, beauty or talent contests, or programs directly supporting marketing or sales objectives of Merck.

Publications: Annual report; Corporate giving report.

Application information: Contributes only to pre-selected organizations.

Board meeting date(s): Semiannually and as required

Financial data: (yr. ended 12/31/04): Assets, \$160,982,025 (L); gifts received, \$726,374; expenditures, \$43,148,317; total giving, \$41,736,724; qualifying distributions, \$42,151,014; giving activities include \$38,446,204 for 368 grants (high: \$9,816,126; low: \$10) and \$3,290,520 for 2,909 employee matching gifts.

EIN: 226028476

Selected grants: The following grants were reported in 2004.

\$9,816,126 to African Comprehensive HIV/AIDS Partnerships, Dover, DE.

\$3,679,648 to JK Group, Plainsboro, NJ.

\$2,882,138 to Merck Institute for Science Education, Rahway, NJ.

\$1,325,000 to United Negro College Fund, Fairfax, VA.

\$500,000 to Regional Performing Arts Center, Philadelphia, PA.

\$71,553 to Fondos Unidos de Puerto Rico, San Juan, PR.

\$50,000 to Flint RiverCenter Partners, Albany, GA.

\$40,000 to Hyacinth AIDS Foundation, New Brunswick, NJ.

\$25,000 to American Heart Association, San Juan, PR.

\$20,000 to University of Wisconsin, Eau Claire, WI.

1.5.11 Lucent Technologies Foundation

600 Mountain Ave., Rm. 6F4

Murray Hill, NJ 07974

Telephone: (908) 582-7906

Contact: Michele Donato, Mgr., Finance and Opers.

E-mail: foundation@lucent.com

Application address for Graduate Research Fellowships: Bell Labs Graduate Research

Fellowship Prog., Scholarship Management Svcs., Scholarship America, Inc., 1

Scholarship Way, P.O. Box 297, St. Peter, MN 56082, E-mail: coopgraduate@lucent.com

Tel. for Conqueror of the Hill: (908) 582-7436

E-mail for Conqueror of the Hill: lucentcoh@lucent.com

<http://www.lucent.com/social/foundation/home.html>

Donor(s): Lucent Technologies Inc.

Type of grant maker: Company-sponsored foundation.

Background: Established in 1996.

Purpose and activities: The foundation supports programs designed to improve student

academic performance; enrich professional development for teachers; support both teachers and students; and provide global opportunities for youth development. Special emphasis is directed toward programs designed to provide science and math education.

Program area(s): The grant maker has identified the following area(s) of interest: Bell Labs Graduate Research Fellowship Program; Conqueror of the Hill Student Competition; Lucent Connects Volunteer Grants Program; Lucent Environmental, Health & Safety Champions Awards.

Fields of interest: African Americans/Blacks; Education; Higher education; Hispanics/Latinos; Mathematics; Native Americans/American Indians; Science; Women; Youth development.

Geographic focus: National; international

Types of support: Continuing support; Employee volunteer services; Fellowships; General/operating support; Grants to individuals; Program development; Program evaluation; Seed money.

Limitations: Giving on a national and international basis, with emphasis on areas of company operations. No support for political candidates. No grants to individuals (except for Graduate Research Fellowships and Conqueror of the Hill), or for political causes, sectarian religious activities, capital campaigns, chairs or endowments, or conferences or fundraising events; no product donations.

Publications: Application guidelines.

Application information: The foundation utilizes an invitation only Request For Proposal (RFP) process for grants. Unsolicited requests are not accepted. Letters of inquiry should be no longer than 2 pages.

Initial approach: Letter of inquiry requesting invitation to apply; download application form and mail to application address for Graduate Research Fellowships

Board meeting date(s): Quarterly

Deadline(s): None; postmarked by Jan. 13 for Graduate Research Fellowships; Feb. 28 for Conqueror of the Hill

Final notification: Early Apr. for Graduate Research Fellowships

Financial data: (yr. ended 09/30/05): Assets, \$929,640 (M); gifts received, \$6,418,500; expenditures, \$5,258,577; total giving, \$5,951,645; qualifying distributions, \$6,522,306; giving activities include \$5,951,645 for grants.

EIN: 223480423

Selected grants: The following grants were reported in 2003.

\$1,200,000 to Scholarship America, Saint Peter, MN for 3 grants: \$400,000 each (For Graduate Research Fellowships).

\$801,600 to Institute of International Education, New York, NY for 2 grants: \$530,800 (For Global Science Scholars), \$270,800 (For Global Science Scholars).

\$745,000 to Project GRAD, Newark, NJ, For teacher and student educational development for science literacy.

\$353,400 to Lancaster School District, Lancaster, PA, For teacher development program.

\$300,000 to Broward County School Board, Fort Lauderdale, FL, For teacher development program.

\$282,400 to University of Southern Maine, Portland, ME, For K-16 University Outreach.

\$250,000 to Civil Society Institute, Newton Centre, MA, For Early Childhood Improvement.

1.6 Summary

There are large amounts of money spent on research grants in the US, both from the federal and private side. There are of course grants at the state level too, but most of these can be expected to focus on activities within that specific state and are thus not covered in this report.

An obvious way that non US organizations may take part of a Federal grant is when they have collaboration with a US partner who applies and receive grants. Companies that are partly Swedish may, for example, be able to be rewarded with SBIR or STTR grants in most Federal agencies, provided that the companies operate primarily in the US and are at least 51 percent owned and controlled by US citizens or permanent residents. See 2.4.10 for rule of eligibility.

Apart from opportunities through partnering with US organizations, the key question for Swedish organizations is: Through which organizations is it possibly for a non-US actor to apply for grants?

When looking at the main Federal agencies providing research grants, there is a variety in terms of the opportunity for non-US actors to apply. The following are open to international applicants: NIH, DOE (through existing bilateral and multilateral agreements) and DARPA. The following may under certain circumstances be open to international applicants: DHS (use contacts provided in 2.4.2), NSF (provides grants for international collaborative project, but only cover the US part), EPA (restructuring their research program and are conducting talks regarding international collaborations with certain countries), DOT (differs between the various agencies under DOT, see 2.4.8), HHS (differs between the various agencies under HHS, see 2.4.9) and NASA.

Regarding the private foundations there are some that provide grants for research on international basis and the biggest and most relevant ones are described in this document. It should though be stressed that even if these foundations have an international focus, their main giving is often national or concentrated to certain state or states in US.

This overview provides an indication as to the complexity of the question regarding the opportunities for Swedish organizations to receive research grants from the US. It should also be remembered that the structures of the various organizations are continually changing, which makes it worthwhile to use the websites provided in order to access updated information.

Appendix 1: Large US-foundations

Table 1 The 28 largest US-foundations by total giving, Focus of interest: research or science, Geographic area: national or international, Total annual giving: more than \$ 5,000,000

Foundation Name	City, State	Total Giving ▼
Gates Foundation, Bill & Melinda	Seattle, WA	\$1,356,327,000
Ford Foundation, The	New York, NY	\$511,679,000
Moore Foundation, Gordon and Betty	San Francisco, CA	\$225,986,140
MacArthur Foundation, John D. and Catherine T.	Chicago, IL	\$209,996,176
Pew Charitable Trusts, The	Philadelphia, PA	\$198,477,867
Starr Foundation, The	New York, NY	\$168,167,773
Packard Foundation, David and Lucile, The	Los Altos, CA	\$150,115,645
Hughes Medical Institute, Howard	Chevy Chase, MD	\$57,627,987
GE Foundation	Fairfield, CT	\$49,177,477
Merck Company Foundation, The	Whitehouse	\$41,736,724
Luce Foundation, Inc., Henry, The	New York, NY	\$33,603,688
Bradley Foundation, Inc., Lynde and Harry, The	Milwaukee, WI	\$33,332,537
Lilly and Company Foundation, Eli	Indianapolis, IN	\$25,609,278
Burroughs Wellcome Fund	Research Triangle	\$24,351,000
Bristol-Myers Squibb Foundation, Inc., The	New York, NY	\$21,955,431
Templeton Foundation, John	West	\$21,426,052
3M Foundation	St. Paul, MN	\$18,741,756
McDonnell Foundation, James S.	St. Louis, MO	\$15,576,440
Fidelity Foundation	Boston, MA	\$13,394,555
Kohlberg Foundation, Inc., The	Mount Kisco, NY	\$12,502,227

IBM International Foundation	Armonk, NY	\$10,505,172
de Rothschild Foundation, Edmond, The	New York, NY	\$8,907,737
Strauss Foundation, Levi	San Francisco, CA	\$8,867,814
Motorola Foundation	Schaumburg, IL	\$8,426,009
Guggenheim Memorial Foundation, John Simon	New York, NY	\$8,147,008
Timken Foundation of Canton	Canton, OH	\$7,460,995
Lucent Technologies Foundation	Murray Hill, NJ	\$5,951,645
Research Corporation	Tucson, AZ	\$5,542,493

Source: *The Foundation Center 2006*

References

AAAS, Report XXXI: Research and Development FY 2007 (2006)

The Foundation Center (2006)

National Science Foundation, Science and Engineering Indicators (2006)

State Science and Technology Institute (2006)

2 China's R&D System

2.1 Introduction

While China's knowledge base is small in relation to GDP and total population, and even if knowledge-intensive goods and services, especially "homemade" ones, only account for a negligible part of China's economy, China still has significant knowledge resources compared with most other countries. China's strengths lie within a number of thematic areas or knowledge pockets where China is establishing internationally competitive research environments. It also has a rapidly growing number of people with tertiary education, especially within areas of technology and natural science. A significant share of these academics can compete with most engineers and scientists in the developed countries.

China's investments in knowledge have grown at a remarkable pace in the last ten years, reflecting a strong determination to become an internationally competitive knowledge economy. China's human capital is becoming stronger, both in terms of quantity and quality. China's "homemade" human capital is further supplemented by people of Chinese origin who have been educated abroad and are now increasingly starting to return to mainland China.

Even if China's R&D expenditure is difficult to measure and compare, there is no doubt that China is among the world's leading countries in terms of absolute R&D investments. Furthermore its R&D expenditure, unlike that of most other top countries, is growing fast both in absolute figures and in relation to GDP. Between 1999 and 2005, China's R&D expenditure increased by approx 220 per cent or an average of 21 per cent per year (see Table 3.1 below). This can be compared with the traditional big investors in R&D (in absolute figures), Germany, the USA and Japan, whose expenditure has grown by an annual average of between four to five per cent in recent years (see below). It should also be mentioned that R&D figures for India, which is often compared with China, are considerably lower than for China, in terms of volume – 19 billion US dollars, adjusted for spending power, in 1999 compared with 36 billion for China – as well as in terms of growth rate and share of GDP (approx 0.8 per cent in 2003). Since 1999, China has overtaken countries such as the UK, France and Germany and is now the world's third largest country measured in total current PPP values and R&D expenses, behind the USA and Japan (OECD).³

³ *Estimates of China's total R&D expenditure vary greatly, however, depending on whether the expenditure is measured in purchasing power values or in nominal terms. According to Eurostat, China's R&D expenditure only totaled approx 16.5 billion euros in 2003, compared with 252 billion euros for the USA and 120 billion euros for Japan. This puts China behind Germany (54 billion euros), France (32 billion euros) and Great Britain (30 billion euros) according to Eurostat's calculations. While the OECD figures could be considered to overestimate China's R&D expenditure slightly (Schaaper, 2005), Eurostat's estimates significantly underestimate China's R&D expenditure.*

Table 2 Investment in R&D, 1999-2005¹

	Share of GDP (%)		current PPP \$ (m)		Increase (%)	
	1999	2005	1999	2005	Total 1999-2005	Average annual increase
USA	2.66	2.68	243,548	312,535	28,3%	5,1%
EU-15	1.84	1.91	162,500	204,000	25,5%	5,9%
Japan	2.99	3.15	94,723	118,026	24,6%	4,5%
Germany	2.40	2.49	47,625	61,712	29,6%	5,3%
China	1.00	1.34	36,097	115,197	219,1%	21,3%
France	2.16	2.13	31,823	40,363	26,8%	4,9%
Great Britain	1.87	1.88	25,44	32,197	26,6%	6,1%
Sweden	3.65	3.86	7,700	11,385	47,9%	6,7%

Source: OECD

¹: or latest available year; Figures for USA, EU-15 and Great Britain are from 2003 instead of 2005, figures for Japan, Germany and France from 2004

A number of factors mitigate China's impressive R&D record. Firstly, China still invests comparatively little of its R&D expenditure in basic research. Basic research accounts for less than six per cent of the total R&D expenditure compared with almost 20 per cent for the USA and 13 per cent for Japan (OECD). This is an important fact, bearing in mind that basic research plays a crucial role in a country's future innovation capacity (OECD, Stipp, 2005). In addition, R&D still accounts for a much smaller share of the total added value in high-technological branches – such as the aerospace industry, medicines, computers and office equipment, and electronics and communication equipment – than for OECD countries on average (OECD and the Ministry of Science and Technology). Finally, it is worth mentioning that the business sector accounts for a lower share of R&D, both in terms of investments and implementation of R&D, than, for example, in the USA, Japan, Germany or Sweden (Schaaper, 2005 and Eurostat, 2005). In 2003, 62 per cent of R&D was carried out in the private sector compared with 70 per cent in the USA and Germany, 75 per cent in Japan and 78 per cent in Sweden. The Chinese business sector's share of R&D is however much higher than in many of the new EU countries such as Poland, Hungary and the Baltic States, where the figures are between 20 and 40 per cent.

China's R&D expenditure is strongly concentrated in a few regions (see Table 3). Thus, nearly half of all R&D expenditure is concentrated in four regions which account for less than 15 per cent of China's total population.

Table 3 Regional distribution of R&D expenditure, 2004

	R&D exp. (100 m RMB)	Share of total	Population	Share of total
Beijing	317	16,1%	1493	1,1%
Jiangsu	214	10,9%	7433	5,7%
Guangdong	211	10,7%	8304	6,4%
Shanghai	171	8,7%	1742	1,3%
Shandong	142	7,2%	9180	7,1%
Zhejiang	116	5,9%	4720	3,6%
Liaoning	107	5,4%	4217	3,2%
Total	1966		129988	

Source: China Science and Technology Statistics Data Book and China Statistical Yearbook 2005.

2.2 Human resources

China's human capital is still smaller than in the USA and the EU but the gap is narrowing fast in terms of quantity and, though to a lesser extent, quality (Freeman, 2005, Sigurdsson 2004). Today, China is the second largest country in the world in terms of the number of researchers, behind the USA. China is at about the same level as the EU and the USA in absolute numbers of students (see Table 4). Almost half of all Chinese students study subjects within natural science and technology, which is a much higher proportion than in the USA.

China has far fewer students in advanced research programs than the EU and the USA however. Measured in number of researchers, the EU and the USA are still ahead of China with approximately 40 per cent more researchers. In addition, far fewer researchers work in industry (just over half of all researchers) than in the USA (80 per cent) and Japan (63 per cent) (Schaaper, 2004). Even if China still trails the USA and the EU, an increasing number of experts believe that China will quickly catch up with the other countries' S&T resources. For example, Freeman estimates that China will have more doctors within science and technology than the USA in 2010 (Freeman, 2005).

Table 4 Human resources in China compared with other countries/regions

	researchers	students in tertiary education	Ph.D.s science ¹ and technology	
	2005	2004 Gross enrolment ratio (%)	2004	2005
China	926,262	19	19400000	13500
USA	1,334,628	82	16900000	20500
EU-25	1,209,077	57	17300000	25200
Japan	677,206	54	4030000	5500e
India	..	12	11900000	6500e

Sources: UNESCO (2005), EU (2005), Freeman (2005), NSF, Japan National Bureau of Statistics, Indian Ministry of Science and Technology

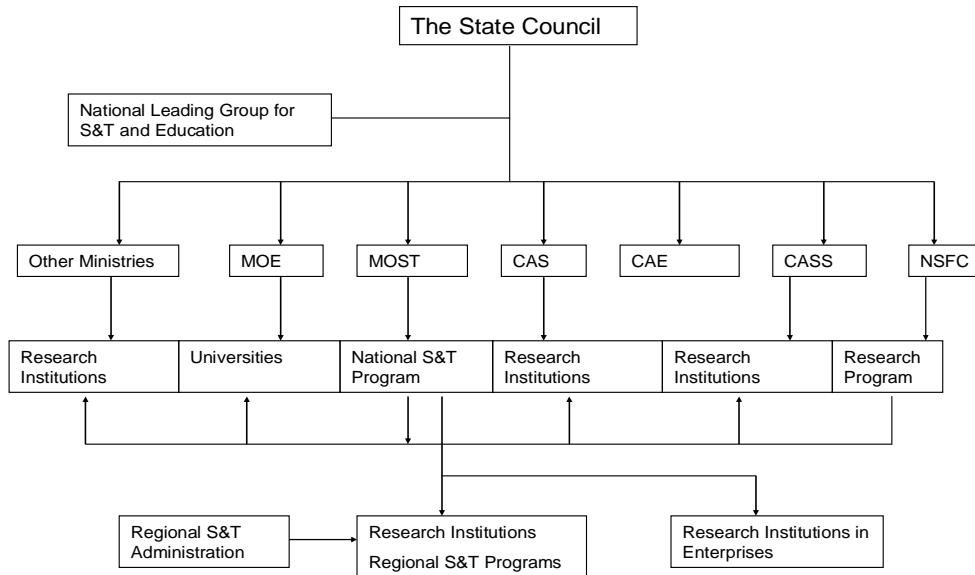
1: figures for China and Japan are from 2004, for EU-25 from 2003, for India from 2002/2003.

e: estimate based on consultation of various sources.

2.3 R&D funding

With regard to government expenditure on R&D, the main funding bodies are the National Development Reform Commission, the Ministry of Science and Technology (MOST), the Ministry of Education, the Ministry Information Industry, the Ministry of Agriculture, the Ministry of Health, and the National Natural Science Foundation of China (NSFC). In addition, there are the Chinese Academy of Science (CAS), the Chinese Academy of Social Sciences (CASS), the Chinese Academy of Medical Sciences (CAMS), and the Chinese Agricultural Sciences which receive their funding directly from the government. A further important funding body is the National Ministry of Defense. However, data on R&D expenditure for military purposes and by the Ministry of Defense are not publicly available and expenditure on military R&D is not included in the overall statistics for R&D expenditure.

Figure 7 Governance of science technology system



CAS – Chinese Academy of Sciences
 CASS – Chinese Academy of Social Sciences
 CAE – Chinese Academy of Engineering
 NSFC – National Natural Science Foundation of China
 MOE – Ministry of Education
 MOST – Ministry of Science and Technology

Source: Mu, Rongping (2004), *Development of Science and Technology Policy in China*, http://www.nistep.go.jp/IC/ic040913/pdf/30_04ftx.pdf

Figure 7 provides an overview over the administration system for science and technology in China. MOST has the overall responsibility for S&T funding. The National Leading Group for S&T and Education is a council that is chaired by the Prime Minister and composed of the Minister for Science and Technology, the Minister for Education, as well as other relevant actors. The constellation of the group and the level of its participants vary according to the subject to be discussed. As an example, when the Group discussed IT Security, Wen Jiabao chaired the meeting which was attended by the Ministers of Science and Technology and of Education, among others.

The National Natural Science Foundation of China (NSFC), and the Chinese Academy of Science (CAS), the Chinese Academy of Social Sciences (CASS) and the Chinese Academy of Engineering (CAE) receive their funding directly from the government and are institutions which report directly to the State Council.

The National Development Reform Commission (NDRC) of China which is not included in the figure appears to be a further important actor, having at its disposal around 50

percent of the government's total R&D budget. By comparison it is estimated that MOST disposes over less than 15 per cent of the total government R&D budget.

MOST has the official responsibility for science and technology (S&T) funding and for formulating strategies and policies for S&T development. In addition, MOST is charged with conducting research on S&T issues of importance for economic and social development, with administering national technology industry development zones and with promoting international cooperation and exchanges in the field of S&T (Hsiung, Deh-I 2002, *An Evaluation of China's Science and Technology System and its Impact on the Research Community*, A Special Report for the Environment, Science and Technology Section, US Embassy Beijing).

Table 5 S&T programs

Program	Created	responsibility	govt. funds appropriated 2004	aim/focus	target areas
Key technologies R&D program	1983	MOST	1.5 bn Yuan	to address major S&T issues in national economic and social development	agriculture, biological technology, Hi-tech industry, social development information technology and infrastructure,
National High-tech R&D Program	1986	MOST	?	Boost high-tech development and industries. Funding to universities, research institutes and companies.	biotechnology (including agriculture), energy and environment, new materials and manufacturing technology
National Basic Research Program (973)	1997	MOST	900 m Yuan	Strengthen basic research in line with strategic national objectives	agriculture, energy, information technology, environment, health, materials
National Natural Science Fund	1986?	NSFC	2.2 bn Yuan		

Table 5 and 6 provide a useful overview over key R&D programs. However, the figures should be taken with a grain of salt. It is exceedingly difficult to get an accurate picture of the actual sums allocated to the programs.

Table 6 National R&D programs

Unit: 100 Million RMB	Start-up year	Implementing Agency	1981-1985	1986-1990	1991-1995	1996-2000	2001-2005
Key Technologies R&D Program	1983		15	35	45.2	50	50
National Basic Research Program (973 Program)	1997	MOST	—	—	—	12	21 till (2003)
National High-Tech R&D Program (863 Programs)	1986		—		59		150
National Science Fund Committee	1986	NSFC	—	5.7	15.9	44.7	100
Knowledge Innovation Program	1998	CAS	—	—	—	54	200

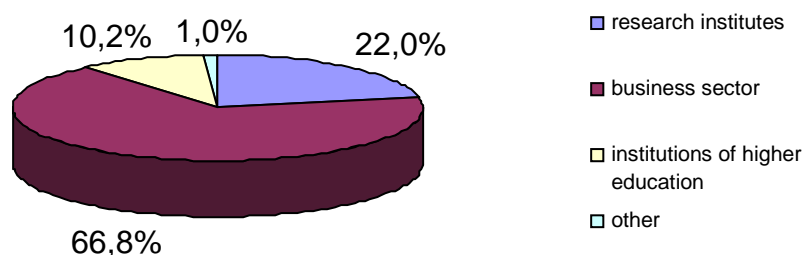
Source: Prof. Yang FANG (2005), China Natl. Center for Science and Technology Evaluation, presentation June 2005,

<http://www.wren-network.net/resources/2005kistep/NationalModels/4.YangFang.ppt#4>

2.4 R&D performers

Research institutes play a considerably larger role when it comes to carrying out R&D than in most other countries. Thus, in 2004 research institutes accounted for 22 percent of total R&D funds received, while the business sector accounted for 67 percent and institutions of higher education for around 10 percent. In comparison, in Sweden in 2001 research institutes only received 3 percent of total R&D funds, with 78 percent going to enterprises and nearly 20 percent to institutions of higher learning.

Figure 8 R&D funds by performing sector, 2004



Source: 2005 China Statistical Yearbook on Science and Technology

In the past 20 years, there has been a drastic reduction in number of research institutes. However, those research institutes that survive today receive relatively generous funding for R&D from the government and carry out a significant share of China's basic research activities. By contrast, with the exception of a few selected universities who have been singled out for special funding by the Government (in the 211 program), the vast majority of Chinese universities is currently struggling to secure funding for both its R&D and education activities, receiving only a little more than half of its funding for S&T activities from the government (and around 40 percent from the business sector). The number of students has increased dramatically, with new student enrolment growing by on average around 20 % per year in the past five years. According to some observers, in general the universities focus more on applied research while the research institutes carry out much of the basic research.

In 2004, there were around 1700 institutions of higher education in China, of which around 700 comprehensive universities. In the same year, there were slightly less than 4000 independent research institutions (IRI) which received 75 % of their total funding from government funds.

There are 158 national key laboratories which play a significant role in basic research activities. The majority of them, 87 to be exact, are under the Ministry of Education and one third, or 52, belong to the Chinese Academy of Sciences. The laboratories can either be found at universities or they may exist as independent institutions.

2.5 Interesting research environments

2.5.1 Identifying interesting research environments

Given the vast number of universities and research institutions and their large differences in terms of research and scientific excellence, there is a need for methods and tools for identifying research environments that may be interesting for Swedish partners. So far only a few interesting research environments are internationally known. The few that have received international attention are currently being swamped with foreign institutions seeking to establish cooperation with them as China rapidly gains international importance as a strategic cooperation partner. The most famous examples are Beida and Tsinghua universities, who are becoming very selective (some have even said arrogant) in whom they choose to cooperate with, thus creating what may be termed the 'Beida and Tsinghua bottleneck'.

One of the challenges in identifying interesting research environments in China is the fact that, while they may be well known within China, many are not yet 'on the map' outside China. One obvious problem is that much information about research environments is only available in Chinese. Another factor is that many interesting labs and institutes have only been established recently or are in the process of being established (many by Chinese returnees). The fact that many research environments are still relatively unknown provides also means that now is a good time to establish research cooperation with these centers.

Research environments in China may be interesting because they carry out high-quality research, because they are of strategic importance to or in China, because they have close personal ties to Sweden (usually in the form of Chinese returnees), or because of a combination of the above.

When it comes to scientific excellence and strategic importance there are several methods for identifying interesting research environments. There are a number of rankings of Chinese universities carried out by universities or independent institutions. None of these are formally acknowledged by the Ministry of Education, since the Ministry refuses to rank its universities out of principle, but they provide a useful aid for identifying interesting Chinese research environments (one ranking of universities in general and according to subject can be found in Appendix 1).

Another way to identify interesting research environments is through bibliometric studies, i.e. by looking at international scientific publications. VINNOVA recently commissioned Karolinska Institutet, for example, to examine which research environments in China have produced relevant international publications (by looking at citation indices among other things).

A third tool for identifying potentially interesting research environments is by looking at the public funding given to research institutions (both universities and independent research institutions) through various programs, such as the 863 and 973 program but also the National Natural Science Foundation.

2.5.2 Examples of interesting research centers

As was mentioned in section 4, much of China's advanced scientific and technological research is carried out at its research institutes. The single most important actor in the institute sector is undeniably the Chinese Academy of Sciences (CAS) which currently has 89 research institutes, 52 of which are national key laboratories. In 2004, CAS institutes employed a total of 43 000 people, of which 13 000 are senior scientists) of the 13 000 close to 5 000 held full professorship). Examples of internationally recognized CAS institutes are the Dalian Institute of Chemical Physics which is renowned for its research on fuel cells (<http://www.dicp.ac.cn/englishvers/>), the National Center for Nanoscience and Technology in Beijing (http://www.nanocr.cn/e_index.jsp) and the Institute of Microelectronics or Institute of Semiconductors, both in Beijing. In addition, CAS runs a number of advanced large science facilities such as the Beijing Electron Positron Collider, Beijing Synchrotron Radiation Source and the Hefei Synchrotron Radiation Lab and is the process of constructing a full conducting Tokamak Device and the Large Sky Area Multi-Object Fiber Spectroscopic Telescope

Table 7 CAS Institutes divided according to discipline

Mathematics and physics	15
Chemistry and chemical engineering	12
Biological sciences	20
Earth Sciences	19
Technological sciences	21
Others	2

2.5.3 Possibilities for funding and co-funding of Sino-Swedish cooperation

Officially, foreign researchers are allowed to participate in China's national R&D programs. In practice, however, only Chinese nationals (or Chinese returnees) and institutions are funded directly through government funds. The way to get funding or co-funding for Sino-Swedish projects is to work with Chinese researchers or institutions who

receive funding through their national programs. Another possibility for funding of research cooperation is through EU's framework programs for R&D which favors Chinese participation in research projects (and often does not require matching funding for Chinese participation, i.e. it fully funds such projects).

2.6 R&D cooperation

2.6.1 Cooperation agreements

Source:

- 1 ITPS documents
- 2 Information provided by Chinese and Swedish universities
- 3 Information on websites of Chinese and Swedish universities
- 4 Other media

As of December 2006, we have collected general information of altogether 90 formal written agreements/memorandums that were signed by Chinese and Swedish universities. The agreements cover both research and education cooperation or exchange and cover a wide range of academic disciplines including human rights, electronic engineering, computer engineering, communication, medicine, geography, nuclear physics, chemical engineering, economics, industrial ecology, public health, natural science, energy technology, urban planning etc.

Based on the summary of survey of cooperation between Chinese and Swedish universities took on Sep 23, 2003 and China's 211 project university list, we contacted the Foreign Affairs Offices of 29 Chinese universities, 17 of them have cooperation agreements with Swedish universities. Approximately half of the agreements were signed after September 2003, indicating a rapid increase in the cooperation between Chinese and Swedish universities. Most of the universities who have not signed official agreements with Swedish universities expressed that they were interested in building relationships with Western universities.

The answers also show that the international offices at Swedish universities often do not have a complete picture of the total number of agreements signed by departments or professors at their institutions with Swedish counterparts. As a result, it is very difficult to get a comprehensive picture of the actual number of agreements between Swedish and Chinese institutions, but it is safe to say that the total is likely to be considerably higher than the 90 agreements which we found. . At the same time, it is important to note that a significant number of the cooperation agreements exist primarily on paper, i.e. they do not result in tangible activity other than an official signing ceremony and document.

Based on this survey, the Chinese university with most agreements with Swedish counterparts is Fudan University; it has agreements with six different Swedish institutions.

'The academic cooperation supports the development of cooperation between Sweden and China in other areas', mentioned in 2003 survey. That is proved by some of the respondents. Beijing Institute of Technology is developing a long-term cooperation with Ericsson on the basis of agreement.

According to the communication with the Foreign Affairs Offices in Chinese universities, there are three main problems of Chinese universities that restrict the cooperation for both sides:

A. Lack of information

‘We want to connect with more Swedish universities, but we do not know how,’ said by the teacher who is responsible for the international cooperation of Guizhou University, ‘we do not know where to get the useful and correct information, we even have no idea how many universities there are in Sweden.’ He also suggested that Swedish organizations could do some education promotion and help to create good contacts of universities by providing accessible information.

B. Basic construction

There are more Chinese students coming to Sweden than the other way around. For example, Panzihua University and Halmstad University had a Memorandum of Understanding signed in September 2002, focusing on three main items: Student Exchange, Faculty Exchange and Joint research activities and publications. Till now, none Swedish student has come to Panzihua University, ‘Maybe the living condition is the main problem, and what’s more, we do not have enough teaching resources to arrange the study of Swedish students here,’ stated by an officer of the Foreign Affairs Office of Panzihua University. Another reason for this is, according to some respondents, the limitation of courses in English at Chinese universities. The 2003 survey also mentioned it.

C. Lack of interest

Some agreements have not been carried out just for a simple reason: the professor who connected both sides left the university. After that, no one else was interested in it and wanted to undertake this responsibility. Another situation is, university sign a frame agreement on school level, but some of the faculties are not interested in the fully implementation. They make the agreement always be ‘frame’.

Generally, the academic exchange and cooperation between Chinese and Swedish universities are developing very well and more universities are realizing the importance of that.

Survey results

Number of agreements	90
Number of non-general agreements	Around half
Number of Chinese institutions	43
of which on the Chinese mainland	29
of which in the 211 program	21
Number of Swedish institutions	23
Number of agreements signed after 2003	Around half

In addition to agreements between universities, there are a number of strategic agreements between Swedish and Chinese institutions which are pertinent to research cooperation between the two countries.

Bilateral agreements / cooperations of relevance to Sino-Swedish research cooperation:

- Vinnova – Ministry of Science and Technology (MOST)
- STINT – China Scholarship Council / Ministry of Education (scholarships)
- Swedish Institute – China Scholarship Council / Ministry of Education (Ph.D. scholarships)
- Swedish Statistics Bureau – China Statistics Bureau (innovation indicators)
- Swedish Energy Agency (STEM) – MOST
- IVA – Chinese Academy of Engineering (CAE)
- Development Research Center (DRC) – ITPS

2.7 Example of successful research cooperation: Joint Research Center of Photonics – Zhejiang University and KTH

The Joint Research Center of Photonics of the Royal Institute of Technology and Zhejiang University (JORCEP) was founded in 2003 with the mission to conduct research and jointly offer Masters and Doctoral education in the field of photonics. The center also acts as a center of excellence in photonics for both universities.

Research: Focus areas

- I. Photonic crystals and meta-materials
- II. Planar lightwave circuits
- III. Electromagnetically induced transparency (EIT)
- IV. High-speed electro optic modulators
- V. Plasmon optics
- VI. Optical networking

Education

- I. International Masters program in Photonics (launched fall 2005)
- II. Joint PhD education

Staff

- I. The center has an affiliated staff of over 14 senior scientists and 12 PhD students. The staff is headed by two Chief scientists (two Swedish nationals, one of whom of Chinese origin) and there is a Swedish coordinator based at the center in Zhejiang University.
- II. Controlled by a board with 50-50 representation from KTH and ZJU

Financing

Financed primarily by VINNOVA, but also indirectly by the Swedish Strategic Research Foundation (SSF). Thus, VINNOVA finances the Swedish manager/coordinator of the center at Zhejiang, Erik Forsberg. One of the two Chief Scientists, Sailing He (who is of Chinese origin), receives significant funding from Zhejiang University and from China's 863-program. This funding is for his own research i.e. not clearly earmarked for the Sino-Swedish cooperation. Most likely, and with the exception of the VINNOVA funds, the cooperation is therefore funded, one could side inadvertently, by Swedish and Chinese public funding allocated to the researchers on the Swedish and Chinese for their 'ordinary research', respectively.

History

More than 30 papers have been published in the name of the center so far.

2.8 Guidelines for how to establish mutually beneficial research cooperation in the future:

- *cooperation should be based on a clear interest from and offer mutual benefits for both the Swedish and the Chinese side*
- *disseminating information about and the results from the cooperation to a wider audience: it is important to make sure that the cooperation and its benefits are not limited to the cooperation partners only (i.e. the individual researcher or institution)*
- *having the right people to manage the cooperation*
 - a person is easier to run between China and Sweden without any trouble on things like visa
 - a person who is affiliated with and sufficiently 'embedded' in (i.e. has networks in and carries out research and/or teaching) both the Chinese and Swedish related research or teaching institutions
 - should be a good scientist in the project sector for Sino-Swedish cooperation
 - the project manager should be a good scientist and at the same time a person good at management
 - a person with good links with the related government ministries and agencies, especially on the Chinese side
- *formal agreements, for example Memorandums of Understanding between two regions in China and Sweden, sometimes have little concrete results, nonetheless they may be important for enabling cooperation at other levels (if two regions have a cooperation agreement it might be easier for the universities in that region to establish cooperation).*

2.9 Suggestions on how further work on this topic should be structured

- Completing the analysis of research funding, financing bodies, performers, policymaking
- Completing section on possibilities for funding and co-funding of Sino-Swedish cooperation (not clear whether this should cover only Chinese side or also Swedish side and possibly EU or other international possibilities for funding).

- Addressing the issue of how to formulate a national strategy for R&D cooperation with China (process, priorities, relevant actors, ...). One key question that should drive this process is the question of how Sweden as a country can benefit and what it wants to get out of China's scientific, economic and social development.
- Identifying roles and responsibilities for different actors in R&D strategy on cooperation with China but also their needs (in terms of information, funding, coordination, regulations, etc.) for effectively implementing a national R&D strategy. Relevant actors include:
 - Ministries
 - Government agencies (e.g. Högskoleverket, Svenska Institutet, Embassy, Vinnova, Vetenskapsrådet, ISA, etc.)
 - Universities and research institutes
 - Companies
 - Researchers
 - Others?

2.10 Summary

China is rapidly becoming a key producer and consumer of global knowledge resources. Furthermore, China is pursuing a focused policy of creating world-class knowledge hubs and of attracting world-class talent and R&D from around the world. In its ambition to become a leading innovation and knowledge economy in the world, China is using its large domestic market as leverage. Thus, some companies state that, in order to be able to produce or sell in China, they are required, by the Chinese government, to establish R&D centers in or transfer technology there. This is what is sometimes referred to as the 'technology-for-market' strategy. Overall, however, China's drive to increase its knowledge resources and to achieve world-class excellence in research should be welcomed by the rest of the world, as it raises the global pool of knowledge resource.

Sweden, as a country but also at an actor or regional level, needs to formulate a clear strategy of how it wants to benefit from China's development, or, how it wants to avoid not benefiting from it. Research cooperation with China should be welcomed, but it should also underpinned by clear goals, particularly when it is promoted with public funds, of how the cooperation is expected to benefit research excellence or Sweden's economic welfare (for example, by strengthening Sweden's image or 'brandname' in China, by selling education to the growing number of Chinese students seeking an education abroad, by ensuring access for Swedish companies to Chinese markets, etc.). Given the priority attributed by the Chinese leaders to knowledge and innovation, research cooperation could also be an important vehicle for strengthening economic or political cooperation between Sweden and China. Finally, it could contribute to improving other objectives of relevance to Sweden and its partners, such as improving the environment (with pollution in China being of concern and relevance to all countries in the world), improving the quality of living in China, etc.

Aside from research, cooperation could target education, incubators or science parks, government agencies (policy exchange and/or competence-building and training).

When seeking to establish research cooperation, several factors speak in Sweden's favor. Firstly, Sweden is seen as an innovative country, which is of relevance given that China places high priority on making China a leading innovation country and that it is looking to other countries for inspiration or insights on how to achieve this goal. Secondly, Sweden is known, in China, for its successful companies, excellent researchers (Nobel prize), clean environment and traditionally good and long-standing relations with the People's Republic.

A number of factors may also constitute obstacles or disadvantages when seeking to establish cooperation with China. Swedish actors in China are frequently viewed as being uncoordinated, fragmented and competing with each other. Chinese actors sometimes question if Sweden knows what it wants. Also, many Swedish actors visiting China have a relatively low level of knowledge of modern-day China, of the institutions or actors they visit in China or of what they want with their visit. By contrast, Chinese actors tend to be relatively well informed about their Swedish counterparts (particularly if they are interested in establishing cooperation with them). Furthermore, some Swedish actors still adopt a slightly blasé or condescending view towards China, viewing it primarily as a developing country rather than as a highly diverse country with both extreme poverty and lack of education, on the one hand, and extreme skills and academic excellence, on the other.

Finally, there is today a fierce competition between countries who are seeking to establish research and education cooperation with China. This sometimes leads to Chinese institutions, particularly those that are most courted by foreign countries (such as, for example, Tsinghua or Beida) becoming very selective in their choice of who to cooperate with.

What is needed is a much better knowledge of Chinese academic sector and its institutions. Many foreign institutions seeking to establish cooperation with China focus on the handful of institutions known abroad. This creates a 'bottleneck' for research cooperation in China. In the appendix, we list a Chinese ranking of its universities which shows that there are numerous institutions, aside from the most famous ones, which have good research and which may be more open to mutually beneficial cooperation with Sweden.

Appendix 1: University ranking according to subject⁴

Subject Ranking - 5%		
070102信息与计算科学 (370) Information and Calculation Science		
1	Zhejiang University	浙江大学
2	Dalian University of Technology	大连理工大学
3	Shanghai University	上海大学
4	Sun Yat-sen University	中山大学
5	Peking University	北京大学
6	Xi'an Jiaotong University	西安交通大学
7	Shandong University	山东大学
8	Beijing Jiaotong University	北京交通大学
9	Fudan University	复旦大学
10	Jilin University	吉林大学
11	East China Normal University	华东师范大学
12	Sichuan University	四川大学
13	Xiangtan University	湘潭大学
14	Nankai University	南开大学
15	Wuhan University	武汉大学
16	Northwestern Polytechnical University	西北工业大学
17	Henan University	河南大学
18	University of Electronic Science and Technology of China	电子科技大学
19	Shanghai Normal University	上海师范大学
070401生物科学 (218) Bioscience		
1	Peking University	北京大学
2	Sun Yat-sen University	中山大学
3	Tsinghua University	清华大学
4	Huazhong Agricultural University	华中农业大学
5	Fudan University	复旦大学
6	Wuhan University	武汉大学
7	Zhejiang University	浙江大学
8	Beijing Normal University	北京师范大学
9	China Agricultural University	中国农业大学
10	Xiamen University	厦门大学
11	Sichuan University	四川大学
070402生物技术 (245) Biotechnology		
1	Peking University	北京大学
2	Fudan University	复旦大学
3	Huazhong University of Science & Technology	华中科技大学
4	Zhejiang University	浙江大学
5	Sun Yat-sen University	中山大学
6	Wuhan University	武汉大学
7	Jilin University	吉林大学

⁴ Compiled by the Research Center for Chinese Science Evaluation of Wuhan University (RCCSE). This is one of the first or only university rankings according to subject. The Ministry of Education does not officially endorse any university rankings but the rankings done by this center are generally considered to be objective and respectable.

8	Nankai University	南开大学
9	Inner Mongolia University	内蒙古大学
10	Shanghai Jiao Tong University	上海交通大学
11	Northwest A&F University	西北农林科技大学
12	Xi'an Jiaotong University	西安交通大学
071201 电子信息科学与技术 (273) Electronic Information Science and Technology		
1	Xidian University	西安电子科技大学
2	University of Electronic Science and Technology of China	电子科技大学
3	Tsinghua University	清华大学
4	Beijing University of Posts And Telecommunications	北京邮电大学
5	Southeast University	东南大学
6	Xi'an Jiaotong University	西安交通大学
7	Huazhong University of Science & Technology	华中科技大学
8	Zhejiang University	浙江大学
9	Beijing Institute of Technology	北京理工大学
10	Shanghai Jiao Tong University	上海交通大学
11	Harbin Institute of Technology	哈尔滨工业大学
12	Fudan University	复旦大学
13	Peking University	北京大学
14	Nanjing University	南京大学
071203 光信息科学与技术 (82) Optical Information Science and Technology		
1	Huazhong University of Science & Technology	华中科技大学
2	University of Electronic Science and Technology of China	电子科技大学
3	Xidian University	西安电子科技大学
4	Sun Yat-sen University	中山大学
071205 信息安全 (57) Information Safety		
1	Xidian University	西安电子科技大学
2	University of Electronic Science and Technology of China	电子科技大学
3	Wuhan University	武汉大学
071401 环境科学 (175) Environmental Science		
1	Peking University	北京大学
2	Beijing Normal University	北京师范大学
3	Nanjing University	南京大学
4	Nankai University	南开大学
5	Zhejiang University	浙江大学
6	Harbin Institute of Technology	哈尔滨工业大学
7	Tongji University	同济大学
8	Sichuan University	四川大学
9	Xiamen University	厦门大学
080205 材料科学与工程 (239) Material Science and Engineering		
1	Beijing University of Science And Technology	北京科技大学
2	Tsinghua University	清华大学
3	Harbin Institute of Technology	哈尔滨工业大学
4	Central South University	中南大学
5	Shanghai Jiao Tong University	上海交通大学
6	Northwestern Polytechnical University	西北工业大学
7	Sichuan University	四川大学

8	Shandong University	山东大学
9	Zhejiang University	浙江大学
10	Wuhan University of Technology	武汉理工大学
11	South China University of Technology	华南理工大学
12	Jilin University	吉林大学
080605 计算机科学与技术 (526) Computer Science and Technology		
1	Tsinghua University	清华大学
2	Huazhong University of Science & Technology	华中科技大学
3	Beijing University of Aeronautics And Astronautics	北京航空航天大学
4	Peking University	北京大学
5	Jilin University	吉林大学
6	Shanghai Jiao Tong University	上海交通大学
7	Harbin Institute of Technology	哈尔滨工业大学
8	Southeast University	东南大学
9	Xi'an Jiaotong University	西安交通大学
10	Wuhan University	武汉大学
11	Northeastern University	东北大学
12	Nanjing University	南京大学
13	University of Electronic Science and Technology of China	电子科技大学
14	University of Science and Technology of China	中国科学技术大学
15	Xidian University	西安电子科技大学
16	Fudan University	复旦大学
17	Chongqing University	重庆大学
18	Sichuan University	四川大学
19	Central South University	中南大学
20	Dalian University of Technology	大连理工大学
21	Beijing Jiaotong University	北京交通大学
22	Tongji University	同济大学
23	Zhejiang University	浙江大学
24	Beijing Institute of Technology	北京理工大学
25	Sun Yat-sen University	中山大学
26	Nanjing University of Science and Technology	南京理工大学
080607 生物医学工程 (72) Biomedicine Engineering		
1	Shanghai Jiao Tong University	上海交通大学
2	Sichuan University	四川大学
3	Southeast University	东南大学
4	Xi'an Jiaotong University	西安交通大学
080611 软件工程 (143) Software Engineering		
1	Wuhan University	武汉大学
2	Sun Yat-sen University	中山大学
3	Tsinghua University	清华大学
4	Northeastern University	东北大学
5	Nanjing University	南京大学
6	Huazhong University of Science & Technology	华中科技大学
7	Dalian University of Technology	大连理工大学
081801 生物工程 (187) Biological Engineering		
1	Huazhong Agricultural University	华中农业大学

2	Zhejiang University	浙江大学
3	Shanghai Jiao Tong University	上海交通大学
4	Jilin University	吉林大学
5	East China University of Science & Technology	华东理工大学
6	China Agricultural University	中国农业大学
7	Sichuan University	四川大学
8	Shandong University	山东大学
9	Nanjing Agricultural University	南京农业大学

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3 Japan's R&D Financing System

3.1 Introduction

The purpose of this chapter is to give an overview of the research funding system for Science and Technology (S&T) in Japan. The final goal is to help Swedish researchers (individual researchers, universities, institutes and funding bodies) to intensify research collaborations with Japan.

The author while writing this report got an extensive support from other staff members of the ITPS Tokyo office; Kyoko Nakazato (NEDO, JSPS), Emiko Tamura (RIKEN), Izumi Tanaka (NIES, IGES, RITE, FRCGC, AIST), and Andreas Göthenberg. The presented material is based on our own research and available written resources (see the reference list for details).

The total expenditure on R&D in Japan was 16.9 trillion Yen in FY2004, reaching 3.15 % of GDP (OECD 2006). Looking at the share of the total R&D expenditures, 20 % is funded by the government and 79.7 % is funded by the private sector including private funding of private universities.

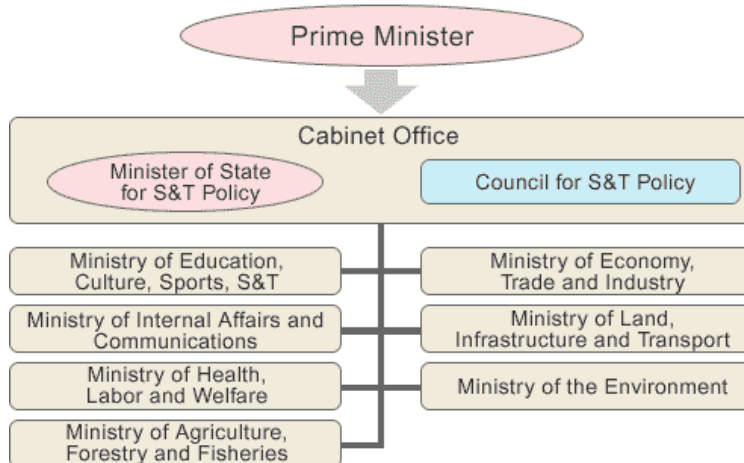
3.2 Central S&T Administration in Japan

The Council for Science and Technology Policy (CSTP) was established in January 2001 within the Cabinet Office (Figure 9).

The main responsibilities of the council include:

- Defining the national strategy for S&T
- Taking initiatives in S&T budgeting, working in close cooperation with the Ministry of Finance (MOF).
- Evaluating Government Funded Research and Development

Figure 9 The science and technology administration structure in Japan



Source: CSTP 2006a.

The CSTP consists of 14 members and the Prime Minister, who chairs the council. Six cabinet members, heading Ministries closely related to S&T policy, are included as regular members. Other Ministers may sit on the council as temporary members. One seat is designated for the President of the Science Council of Japan, and seven executive members, whose professional careers range from various natural sciences and technologies to social sciences, are drawn from industry and academia (Table 8).

Table 8 Current members of the Council for Science and Technology Policy (as for December 2006)

Chairperson	Mr. Shinzo ABE	Prime Minister
Cabinet Members	Ms. Sanae TAKAICHI	Minister of State for Science and Technology Policy
	Mr. Yasuhisa SHIOZAKI	Chief Cabinet Secretary
	Mr. Yoshihide SUGA	Minister for Internal Affairs and Communications
	Mr. Koji OMI	Minister of Finance
	Mr. Bunmei IBUKI	Minister of Education, Culture, Sports, Science and Technology
	Mr. Akira AMARI	Minister of Economy, Trade and Industry
Executive Members (academia/industry)	Dr. Hiroyuki ABÉ (Full-time member)	Professor Emeritus, Tohoku University
	Dr. Taizo YAKUSHIJI (Full-time member)	Visiting Professor, Keio University
	Dr. Ayao TSUGE (Full-time member)	Former Representative Director & Managing Director, Mitsubishi Heavy Industries, Ltd
	Dr. Tasuku HONJO (Full-time member)	Visiting Professor, Kyoto University
	Dr. Reiko KURODA	Professor, the University of Tokyo
	Mr. Etsuhiko SHOYAMA	President, Chief Executive Officer and Director Hitachi, Ltd.
	Dr. Yuko HARAYAMA	Professor, Graduate School of Engineering Tohoku University
	Science Council	Dr. Ichiro KANAZAWA

Source: CSTP 2006b.

The Council for S&T Policy is responsible for establishing Japan's S&T policies. To implement the policies, the ministries and agencies define programs. The programs after being approved by CSTP are assigned budgets from the Ministry of Finance (MOF). The approved programs are finally carried out by the ministries/agencies or organizations under them.

The following sections in this chapter describe important Ministries and their funding for fiscal year 2005 (NSF 2006). The total amount is 467,236 Million Yen (equivalent of 29,562 Million SEK).

3.3 Ministry of Internal Affairs and Communications (MIC)

The Ministry of Internal Affairs and Communications (MIC) is responsible for creating the fundamental national systems of Japan. These systems include the national administrative organizations, the public service personnel system, local tax/finance, the

election system, fire/disaster prevention, information and communications, postal services, and statistical systems (Table 9).

Table 9 MIC projects and their budget

Ministry/ Agency	Implementing Organization	Program (as of JFY2005)	Budget (JFY2005) (Yen Million)
MIC	NICT (Nat'l Inst. for Communication Technologies)	Funding Program Promoting for Key Technology Research	10,300
	MIC	Strategic IT R&D Promotion	3,181
	NICT	Advanced Technology R&D Grant	640
	Fire Agency	Fire Disaster S&T R&D	370
	NICT	Basic Research Promotion in IT fields	206
Total			14,696

Source: NSF 2006

3.4 Ministry of Education, Culture, Sports, S&T (MEXT)

MEXT is the government body primarily responsible for research and development. MEXT promotes comprehensive research and development in order to accomplish the highest creative achievements in worldwide comparisons.

The budget of MEXT is used to promote educational reform, science and technology, sports and culture, and the arts. It includes salary expenses for teachers at public elementary schools, development of educational facilities, promotion of science and technology, subsidization of private schools and the scholarship loan program.

Table 10 MEXT programs and their budget

Ministry/ Agency	Implementing Organization	Program (as of JFY2005)	Budget (JFY2005) (Yen Million)
MEXT	MEXT & JSPS (Japan Society for the Promotion of Science)	Grants-in-Aid for Scientific Research	188,000
	JST (Japan S&T Agency)	Basic Research Programs	47,595
	CAO & MEXT & JST	Coordination Funds for Promoting S&T	39,500
	MEXT	21st Century COE Program	38,171
	MEXT & JST	Innovative Nuclear R&D Program	12,145
	JST	Project to Develop Innovative Seeds	9,674
	MEXT & JST	Promotion of Key Technology R&D (Nanotechnology-related interdisciplinary areas, Life Science that meets societal needs, next-generation IT)	7,874
	JST	S&T Incubation Program in Advanced Regions	4,980
	JST	Collaboration of Regional Entities for the Advancement of Technological Excellence (CREATE)	4,675
	JST	Development of Systems and Technology for Advanced Measurement and Analysis	4,000
	JST	Research Program on Development of Innovative Technology	1,890
	MEXT	Open Competition for the Development of Innovative Technology	1,318
	MEXT	Earth Observation System	1,017
	MEXT	University-oriented Venture Companies	25
Total			360,864

Source: NSF 2006

3.4.1 Japan Science and Technology Agency (JST)

Japan Science and Technology Agency (JST) was established as a core organization to implement the science and technology policy of Japan in line with the objectives of the Science and Technology Basic Plan.

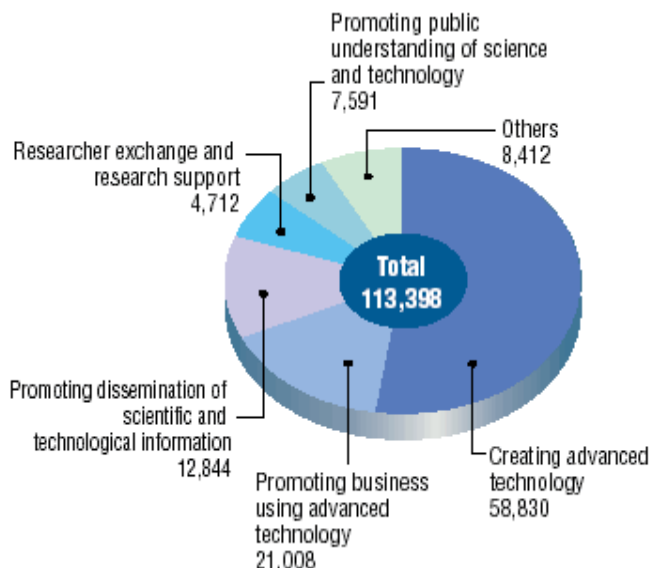
The mission of JST is to promote science and technology in Japan by conducting a broad range of activities:

- Promotion of consistent research and development from basic research to commercialization with particular emphasis on the creation of new technological seeds

- Upgrading the infrastructure for the promotion of science and technology, including dissemination of scientific and technological information

The expenditures of JST for fiscal year 2005 reached 113,398 Million Yen (equivalent of 7 144 Million SEK) (Figure 10).

Figure 10 Expenditures of JST in Fiscal Year 2005 (in Millions of Yen, 1000 Yen = 63 SEK)



Source: JST 2006

With the aim of following up various agreements reached through intergovernmental talks regarding S&T cooperation, JST runs the Strategic International Cooperative Program which promotes international exchanges between researchers on specific research areas in line with the agreements. The research countries and areas of special importance are assigned by MEXT while JST, in collaboration with its foreign counterpart organizations, implements the subprograms: cooperative research of relatively small-scale, personnel exchanges (i.e., invitations and dispatches), and organizing meetings such as symposiums and workshops. The current list of counterpart countries includes: USA (9 projects), China (13 projects), Korea (1), UK (14 projects), Sweden (10 projects), France (5 projects), Republic of South Africa (1 project), and Japan-China-Korea (4 projects).

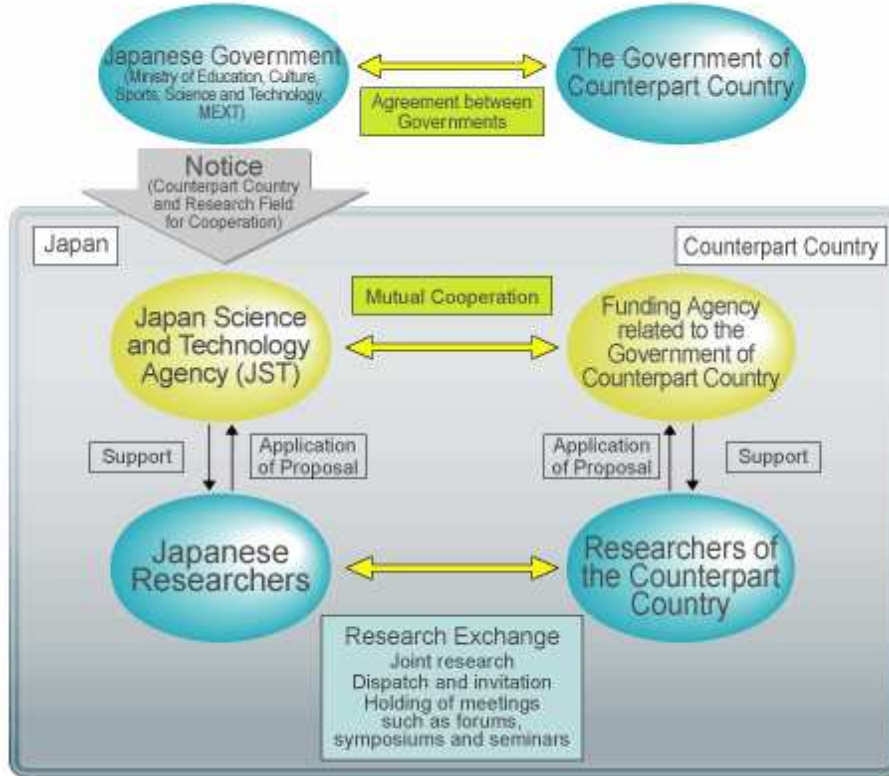
The financed projects can have different forms:

- Holding meetings such as forums and symposiums in which researchers from both countries participate.
- Supporting joint research projects: in principle, 3 years of duration per project and about 5 to 10 million Yen of budget per project per fiscal year.
- Dispatching and inviting researchers.
- Other requests from researchers (training courses, etc.).

JST and the counterpart funding agency make a project structure with a flexible combination of any possible subprograms described above. JST supports expenses for researchers of the Japanese side while the counterpart funding agency supports expenses for researchers of its own country.

Figure 11 Structure of the Strategic International Cooperative Program

System of Strategic International Cooperative Program



Source: JST 2006

The Swedish projects are results of JST collaboration with the Swedish Agency for Innovation Systems (VINNOVA) and the Swedish Foundation for Strategic Research (SSF). The projects are in the area of Multidisciplinary BIO. Three calls have already been issued under the program. The most recent call period ends in February 2007. Projects are funded for a period of two years. For detailed description of the support granted see (VINNOVA 2006).

Table 11 List of Swedish projects run in collaboration with JST. The Swedish founding is provided by VINNOVA and SSF.

	Title	Japanese Research Leader	Counterpart Research Leader	Period
1	Development of Biomimetic Odor Sensors	Kyushu University, Graduate School of Information Science and Electrical Engineering, Professor, Kiyoshi Toko	Linkopings Universitet, Inst. for Fysik och MattekNIK, Professor, Ingemar Lundstrom	2005/6/1~ 2008/3/31
2	Ubiquitin-Dependent Regulation in Signal Transduction and Disease: the Smad Pathway	University of Tokyo, Graduate School of Medicine, Department of Molecular Pathology, Professor, Kohei Miyazono	Ludwing Institute for Cancer Research, TGF-Beta Signaling Group, Associate Member, Aristidis Moustakas	2005/6/1~ 2008/3/31
3	Systems Biology of Signal Transduction	The Systems Biology Institute, President, Hiroaki Kitano	Goteborg University, Cell and Molecular Biology, Professor, Stefan Hohmann	2005/6/15 ~ 2008/3/31
4	Probing the Plasmodium Falciparum Genome	Kyoto University, Institute for Chemical Research, Bioinformatics Center, Associate Professor, Susumu Goto	Karolinska Institutet, Microbiology and Tumor Center, Professor, Mats Wahlgren	2005/6/8~ 2008/3/31
5	Single-Cell Analysis of Transcript Expression and Colocalization	RIKEN Yokohama Institute, Genomic Sciences Center, Genome Exploration Research Group, Project Director, Yoshihide Hayashizaki	University of Uppsala, Genetics and Pathology, Molecular Medicine, Professor, Ulf Landegren	2005/6/1~ 2008/3/31
6	Microfluidic device for single-cell biology studies	University of Tokyo, Dept. of Applied Chemistry, Professor, Takehiko Kitamori	Uppsala University, Dept. of Genetics & Pathology, Ass. Professor, Mats Nilsson	2006/6/1~ 2009/3/31
7	Structure of membrane proteins in eicosanoid and glutathione metabolism	National Institute of Advanced Industrial Science and Technology, Biological Information Research Center, Team Leader,	Karolinska Institutet/KTH, Biosciences and Nutrition, Professor, Hans Hebert	2006/6/1~ 2009/3/31
8	BMP-enriched chondroid matrix for bone regeneration	Nagoya University Graduate School of Medicine, Oral and Maxillofacial Surgery, Professor, Minoru Ueda	Uppsala University, Materials Chemistry, Professor, Joens Hilborn	2006/6/1~ 2009/3/31
9	The Faithful Transmission of the Genome; a System Biology Approach	Tokyo Institute of Technology, Center for Biological Resources and Informatics, assistant prof. Katsuhiko Shirahige	Karolinska Institute, Dept.of Cell and Molecular Biology, Dr. Camilla Sjoegren	2006/6/1~ 2009/3/31
10	Novel Transdermal Drug Delivery System: Designing meso-structured materials for controlled and triggered release	Tohoku University, Department of Pharmaceutical Sciences, Professor, Junichi Goto	Stockholm University, Structural Chemistry, Arrhenius Laboratory, Professor, Osamu Terasaki	2006/6/1~ 2009/3/31

Source: VINNOVA 2006

JST Basic Research

In 1981, JST initiated an innovative research effort called Exploratory Research for Advanced Technology (ERATO). The aim was to promote the creation of advanced science and technology, while stimulating future interdisciplinary scientific activities and searching for better systems to conduct basic research. Within the ERATO program, JST selects program directors, who are innovative, scientifically versed, key individuals. The directors are responsible for setting up exciting programs and selecting young, talented, international researchers for the teams of the programs.

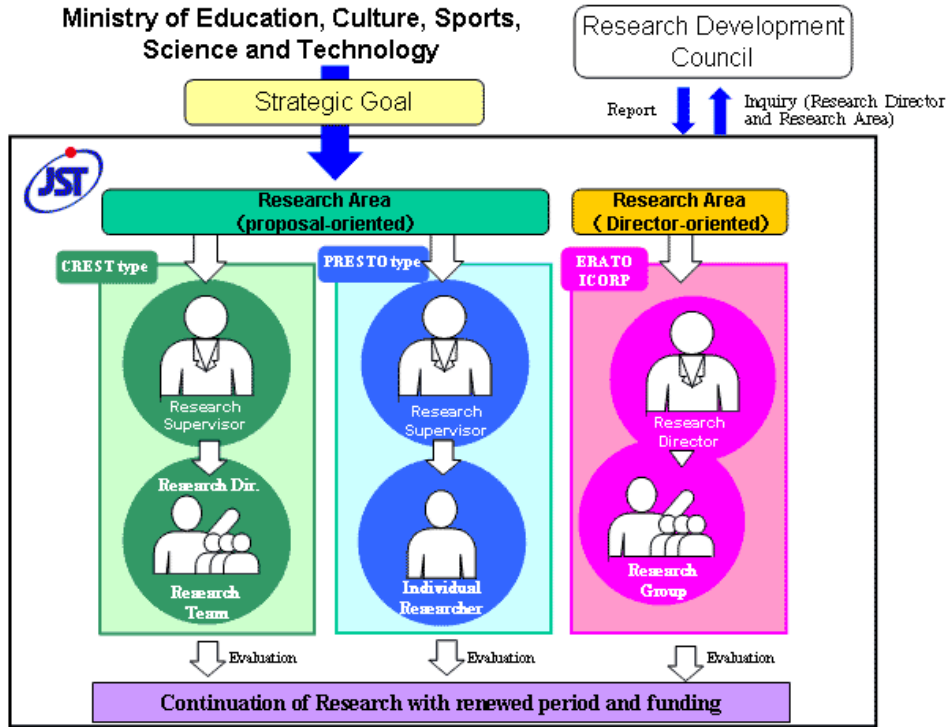
The fields of research are broad and cover many unexplored and pre-competitive regions of science and technology. Themes that are fashionable or trendy are eliminated in preference of those that are emerging and challenging.

One feature of the ERATO program is that each director has a supporting project office to take care of administrative issues. Each project team comprises of 10 to 20 researchers, usually grouped into 2 to 4 sub teams. To tap the creative spirit and ideas of youth, teams usually comprise young Ph.D.-type scientists and engineers in their early thirties coming from a heterogeneous mixture of world-wide academic, governmental and private sectors.

After 20 years of activity, the ERATO program has proved to be more successful than expected and has become highly rated both in Japan and abroad. The success of the ERATO program has led to the launch of three additional programs: ICORP (International Cooperative Research Project) in 1989, PRESTO (Precursory Research for Embryonic Science and Technology) in 1991, and CREST (Core Research for Evolutional Science and Technology) in 1995. ICORP is an international version of the ERATO program, which is conducting 5-year, 50-50 cosponsored, joint-research projects involving two key individuals, their institutions and the funding organizations in Japan and abroad. With these programs, JST promotes establishment of large international scientific projects. The other program, PRESTO, aims at providing open pastures prepared by respected senior scientists for individual young researchers to develop their emerging abilities by supporting and stimulating their embryonic research for three-year periods. JST is continuing to put efforts into developing new innovative research programs in global science and technology. The third program, CREST, has been established to encourage basic research in Japan by invigorating the potential of universities, national laboratories, and other research institutions with the clear aim to build up a tangible foundation for future directions of Japan's science and technology (ERATO 2006).

An example of collaborative research between Sweden and Japan within ICORP is the Subfemtomole Biorecognition Project between Osaka Bioscience Institute, Prof Yasuyoshi Watanabe, and the PET Center at University of Uppsala, Prof Bengt Langstrom. This project is running from January 1993 until December 2007. The Swedish National Board for Industrial and Technical Development (NUTEK) is the supporting agency on Swedish side (ICORP 2006).

Figure 12 Schematic view of the JST basic research



Source: ERATO 2006

3.4.2 Japan Society for the Promotion of Science (JSPS)

Outline of JSPS

Japan Society for the Promotion of Science (JSPS) is, along with Japan Science and Technology Agency (JST), the core science and technology funding agency under the Ministry of Education, Culture, Sports, Science and Technology (MEXT). JSPS operation is supported almost completely by annual subsidies from the Japanese Government. The division of roles between JSPS and JST is basically that JSPS is emphasizing on bottom-up processes and responds to initiatives from the scientific community. JST sees its role as implementing the priorities of the government's S&T policy. On October 1, 2003, JSPS became an independent administrative institution (JSPS 2006a).

There are four major functions conducted at JSPS. The amount described below shows the budget for fiscal year 2006. Some of the major functions are explained in detail later.

Funding support for research initiatives

- Competitive research funding: Grants-in-Aid for scientific research (189.5 billion Yen) (in some part jointly conducted with MEXT)

Fostering next generation of scientists

- Research fellowships for Japanese young scientists (14.6 billion Yen), Postdoctoral fellowships for Japanese scientists to conduct research abroad (1.7 billion Yen)

Advancing international collaborations

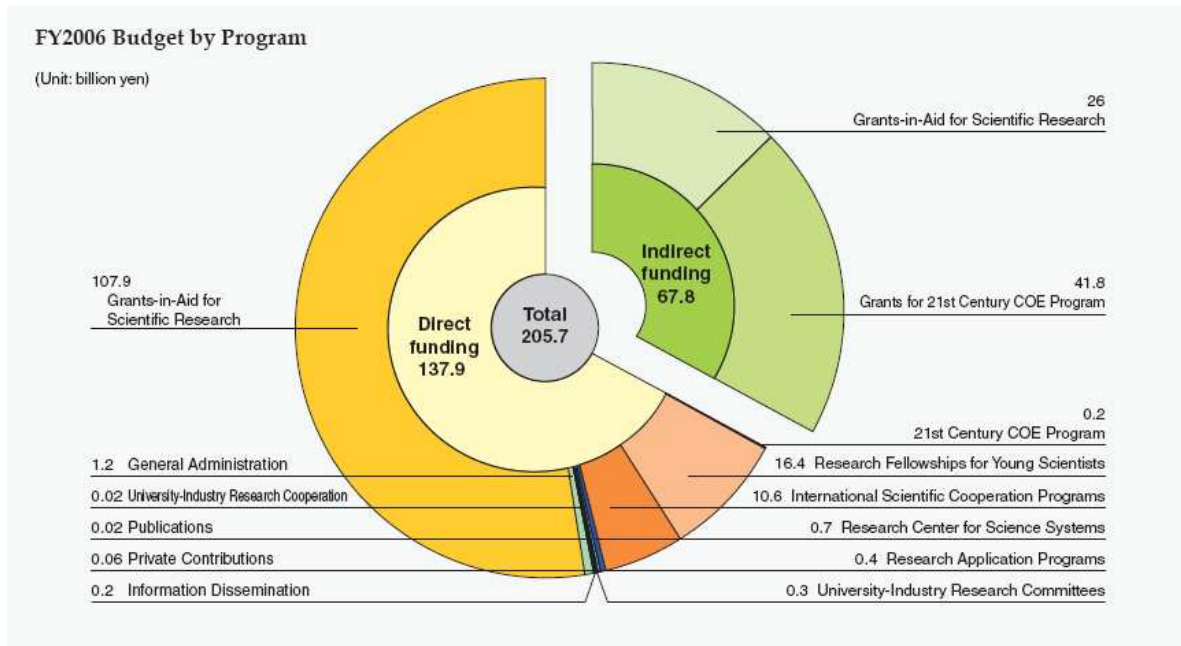
- Programs for countries in North/South America, Europe and Oceania (1.2 billion Yen)
- Networking Research Hubs (Core-to-Core Program), Fostering Future Generations of Researchers
- Programs for Asian and African Countries (1.7 billion Yen)
- Creating Research Hubs, Human Resource Development, Strategic Program for Building Asian S&T Community, Bilateral Exchanges
- Fellowships for Overseas Researchers (7 billion Yen)
- Award for Eminent Scientists (7 billion Yen)
- International Scientific Meetings (500 million Yen)
- Strategic Fund for Establishing International Headquarters in Japanese universities. (500 million Yen)

Promoting university reform

- 21st Century Center of Excellence (COE) Program (37.8 billion Yen). (Program will finish in FY2006 and a new scheme, Global COE Program under MEXT, will start from FY2007)
- Initiatives for Attractive Education in Graduate Schools (4.2 billion Yen).

JSPS has overseas offices in Sweden (Stockholm), UK (London), USA (San Francisco, Washington), France (Strasbourg), Germany (Bonn), and Thailand (Bangkok). In addition, JSPS has two research stations in Nairobi and Cairo. The Stockholm office was established in 2001 and is located at the Karolinska Institutet campus.

Figure 13 FY2006 JSPS Budget by Program

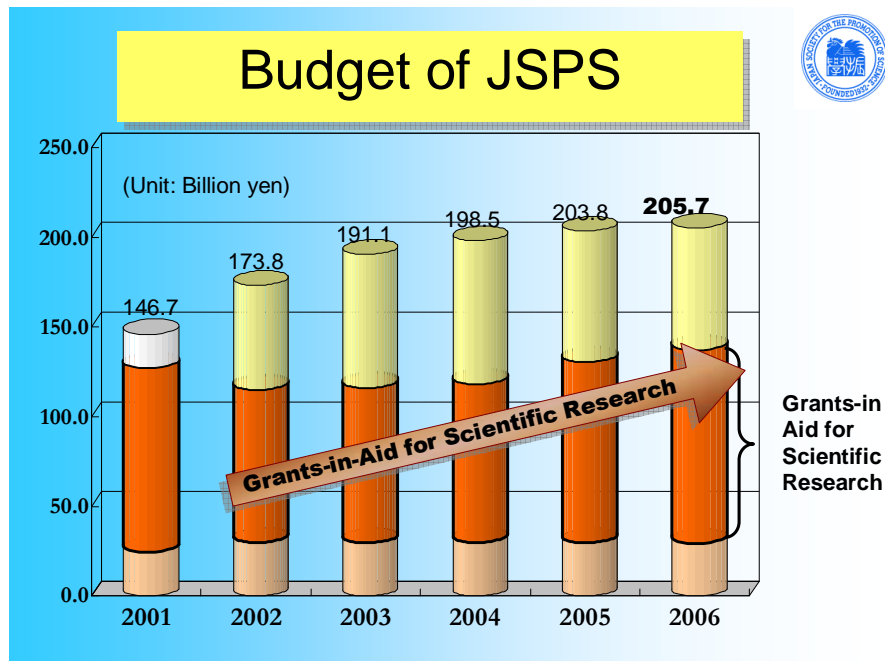


Source: JSPS 2006b

Note: Indirect funding means that the budget is directly distributed through MEXT for Grant-in-Aid and Grants for 21st Century COE Program, while the administration is conducted by JSPS.

More than 40 % of the competitive research funding in Japan is provided by JSPS Grants-in-Aid program. In order to contribute to the scientific advancement in Japan, this program provides grants to support a high caliber of research across the entire spectrum of academic fields. These grants are awarded to researchers at Japanese universities and research institutions.

Figure 14 The budget of JSPS and the growth of the Grants-in-Aid program, 2001 to 2006



Source: JSPS 2006c

JSPS has collaborations with 82 overseas institutions, including two international agencies, in 43 countries. JSPS conducts various bilateral and multilateral programs targeted for countries in North/South America, Europe, Oceania, Asia and Africa. These include exchange of researchers, the Core-to-Core Program, joint seminars and conferences for young researchers. Under these programs, about 9,000 researchers are dispatched and received each year.

As for collaboration with Sweden, in addition to having the office in Stockholm, JSPS has signed agreements with the Royal Swedish Academy of Sciences (KVA), the Swedish Agency for Innovation Systems (VINNOVA) and the Swedish Foundation for Strategic Research (SSF) to nominate researchers who wish to come to Japan and conduct scientific collaboration with Japanese colleagues.

The motivation of the Core-to-Core Program is to create and strengthen networks for multilateral collaborations among the most advanced research institutions in cutting-edge fields of science between Japan and North America, Europe and Oceania. The program is implemented in two phases. The initial phase of the program is called "Integrated Action Initiative" and applications should be made by Japanese universities or research institutes and 10-20 million Yen/year is provided for the duration of 2 years to the Japanese side. The second phase of the projects is called "Strategic Research Network", 10-30 million Yen/year is provided for the duration of 3 years to the Japanese side.

Currently one project is on-going in the Integrated Action Initiative phase of the Core-to-Core Program between Sweden and Japan.

Table 12 The JSPS Core-to-Core Program between Japan and Sweden.

Research theme	Research Centers for Stem Cell Biology and Regeneration Medicine.
Japanese side	Prof Toshio SUDA, School of Medicine, Keio University
Swedish side	Prof Sten Eirik JACOBSEN, Lund University
Duration	1 April 2006 to 31 March 2008

Source: JSPS 2006d

To promote international scientific cooperation, JSPS provides Fellowship for Overseas Researchers, which aims to give opportunities for excellent foreign researchers to come to Japan and conduct joint research activities with colleagues at Japanese universities and research institutes. During the 2002 fiscal year, 4296 researchers from 91 countries were conducting research in Japan through Postdoctoral Fellowship for Foreign Researchers, Invitation Fellowship for Research in Japan, the Bilateral Program, and the Multilateral Program. JSPS offers fellowship programs tailored to each stage in the career of a researcher.

The JSPS Fellowship programs described below are the ones eligible for Swedish researchers. Total 27 Swedish researchers came to Japan in FY2005 through Postdoctoral Fellowships for Foreign Researchers.

- **Standard Fellowships:** This program allows researchers affiliated with Japanese universities or research institutes to invite promising young researchers from overseas to Japan and participate in collaborative research activities at their institutions for 1-2 years. Applications for this program must be submitted by Japanese side who wishes to host a foreign postdoctoral fellow. The fellowship includes a travel grant and monthly stipend of 392,000 Yen.
- **Short-term Fellowships (for North American and European Researchers):** The purpose of the program is to provide opportunities to young pre- and post-doctoral researchers from the US, Canada and Europe to conduct, under the guidance of their hosts, cooperative research with leading research groups at universities and other Japanese institutions. Applications for this program must be submitted to JSPS by the Japanese side. Fellowships are awarded for a period of 15 days to 11 months and include a travel grant and monthly stipend of 392,000 Yen.
- **JSPS Summer Program:** Young pre- and postdoctoral researchers from the US, Canada, France, Germany and the UK are invited to Japan for 2 months during the summer period to participate in joint research at a Japanese institution. Swedish researchers can also participate when recommended by the above countries. The fellowship includes a travel grant and stipend of 534,000 Yen.
- **Research Fellowships for Young Scientists:** Swedish doctoral students studying at Japanese universities are eligible to apply.
- **Invitation Fellowships for Research in Japan:** This program invites researchers at mid-career or above to Japan for 14-60 days to hold discussions and give lectures, and conduct joint research on specific themes for 2-10 months. Scientists of all countries having diplomatic relations with Japan are eligible to apply. Applications can be made

by Japanese researchers wishing to invite a foreign scientist. In addition foreign nominating authorities can recommend candidates from their respective countries. The fellowship includes a travel grant and monthly stipend of 369,000 Yen for long-term (18,000 Yen per day for short-term). In FY2005, total 6 Swedish researchers came to Japan.

- **JSPS Award for Eminent Scientists:** Researchers with highly distinguished records of pioneering achievements are invited to make multiple trips to Japan over a period of up to one year. They use these visits to offer guidance and advice on research activities at Japanese organizations. Awards include travel, per-diem (42,000 Yen) and family allowances.

Table 13 Table of the Swedish nomination authorities for the JSPS programs

Swedish counterpart authorities	Fellowships		Bilateral Programs Scientist Exchanges
	Invitation Fellowship	Postdoctoral Fellowship	
Royal Swedish Academy of Sciences (KVA)		○	○
Swedish Agency for Innovation Systems (VINNOVA)	○	○	
Swedish Foundation for Strategic Research (SSF)		○	

Source: JSPS 2006b

Table 14 Statistics on the number of Swedish researchers coming to Japan under the JSPS Fellowship programs per each nominating Swedish authority.

		2001	2002	2003	2004	2005	2006
Royal Swedish Academy of Sciences (KVA)	Postdoctoral Fellowship (standard)	N/A	2	1	2	4	1
Swedish Agency for Innovation Systems (VINNOVA)	Invitation Fellowship	1	0	1	0	3	3
	Postdoctoral Fellowship (standard)	0	1	2	0	0	3
Swedish Foundation for Strategic Research (SSF)	Postdoctoral Fellowship (standard)	N/A	1	1	2	2	4

Source: JSPS 2006d

3.5 Ministry of Health, Labour and Welfare (MHLW)

The Ministry of Health, Labour and Welfare plans and proposes policies for the realization of a high-quality and effective system for offering medical services in the 21st century, in response to the aging of the society in recent years, changes in the disease structure and stronger people's demands for medical services of higher quality.

The Ministry is implementing various measures designed to establish and improve working conditions, including the reduction of working hours; to secure the safety and health of workers; and to provide appropriate workmen's accident compensation. It is also promoting a comprehensive measure to enrich the lives of working people.

Table 15 MHLW programs and their budget

Ministry/ Agency	Implementing Organization	Program (as of JFY2005)	Budget (JFY2005) (Yen Million)
MHLW	MHLW	Health and Labour Science Research Grant	38,187
	NIBI (Nat'l Inst. of Biomedical Innovation)	Basic Research in Health, Welfare and Medical Fields	2,224
Total			40,411

Source: NSF 2006.

3.6 Ministry of Agriculture, Forests and Fisheries (MAFF)

The Ministry comprehensively undertakes administration related to agriculture, forestry and fishery, covering production to consumption and also rural development and promotion of the welfare of rural inhabitants with a view to achieving stable supply of food, sound development of the agriculture, forestry and fishery industries and upgrading the welfare of rural inhabitants.

Table 16 MAFF programs and their budget

Ministry/ Agency	Implementing Organization	Program (as of JFY2005)	Budget (JFY2005) (Yen Million)
MAFF	NARO (Nat'l Agriculture and Bio- oriented Research Organization)	Promotion of Basic Research Activity for Innovative Bio-science	4,455
	MAFF	Research Project for Utilizing Advanced Technologies in Agriculture, Forestry and Fisheries	3,846
	NARO (Nat'l Agriculture and Bio- oriented Research Organization)	R&D Program for New Bio-Industry Initiatives	2,670
	MAFF	Support for Private Sector in the Fields of Agriculture, Forestry, Fisheries and Foods	1,433
Total			12,403

Source: NSF 2006

3.7 Ministry of Economy, Trade and Industry (METI)

The priority measures of the Ministry of Economy, Trade and Industry for fiscal year 2006 include:

- Creating competitive industries through innovation
- Deployment of external economic policies in East Asia and beyond
- Promotion of energy and environmental policies
- Revitalization of small and medium enterprises and the recovery of regional economies

Table 17 METI programs and their budget

Ministry/ Agency	Implementing Organization	Program (as of JFY2005)	Budget (JFY2005) (Yen Million)
METI	METI	Local Area Revitalization by Industry- University-Government Cooperation	13,720
	NEDO (New Energy & Industrial Development Organization)	Industrial Technology R&D projects	6,164
	JOGMEC (Japan Oil, Gas, and Metals National Corporation)	Development and Use of Oil and Natural Gas	4,659
	NEDO	University-oriented Business Creation	3,162
	METI	Innovative and Viable Nuclear Energy Technology Development Project	2,183
Total			29,888

Source: NSF 2006.

3.7.1 New Energy and Industrial Technology Development Organization (NEDO)

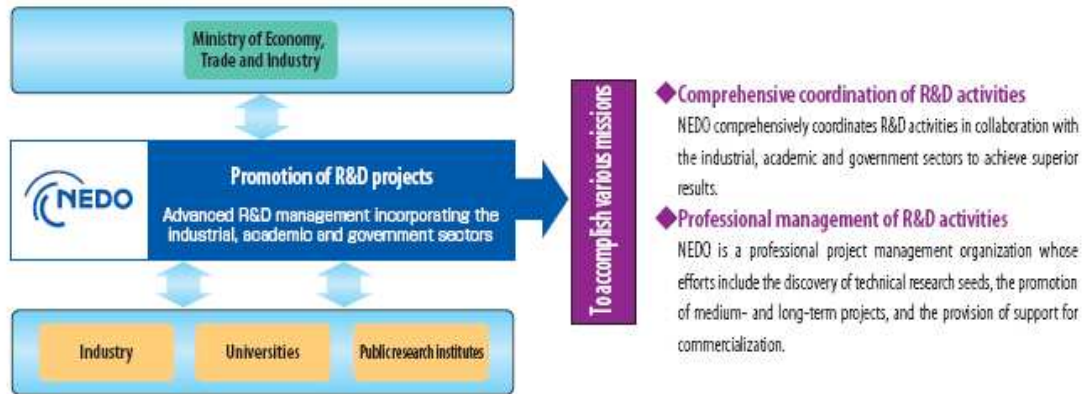
Outline of NEDO

The New Energy and Industrial Technology Development Organization (NEDO) is one of the largest public R&D management organizations under the Ministry of Economy, Industry and Trade (METI). NEDO provides funding to promote the development of advanced industrial, environmental, new energy and energy conservation technologies.

NEDO was originally established to develop new oil-alternative energy technologies. With years, the activities of NEDO expanded into industrial and environmental technology research and development, promotion of new energy and energy conservation. Following its reorganization as an incorporated administrative agency in October 2003, NEDO is now also responsible for R&D project planning and formation, project management and post-project technology evaluation functions.

NEDO has overseas offices in China (Beijing), Thailand (Bangkok), Indonesia (Jakarta), USA (Washington) and France (Paris).

Figure 15 The R&D Promotion Scheme of NEDO.

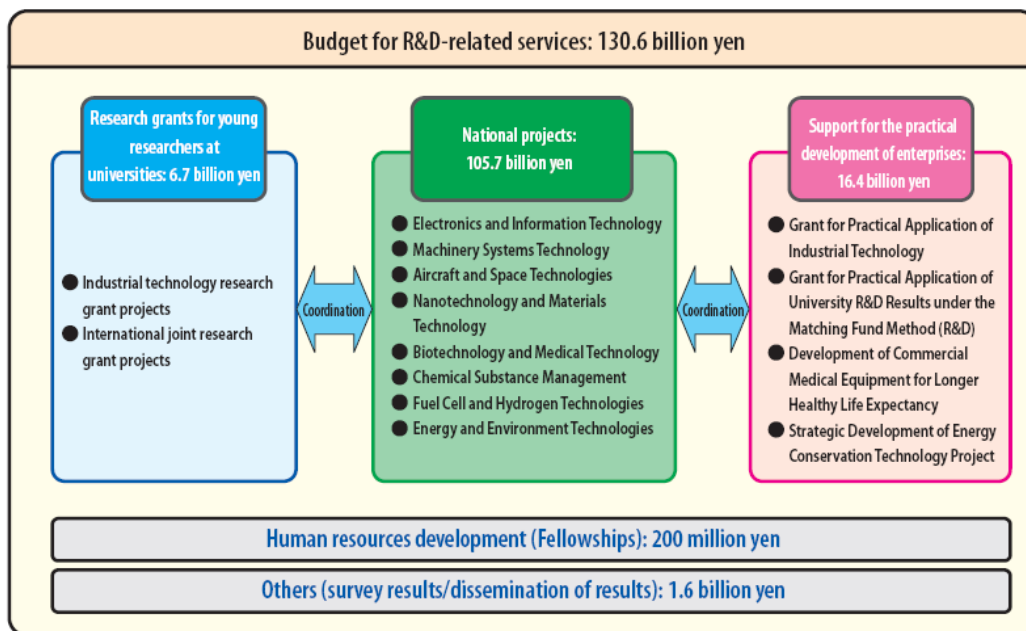


Source: NEDO 2006a

NEDO activities

NEDO promotes research and development through open proposals, proposals for national projects, and support for the practical development of enterprises. Topics of the R&D-related project activities and the budget for FY2006 is depicted in Figure 16.

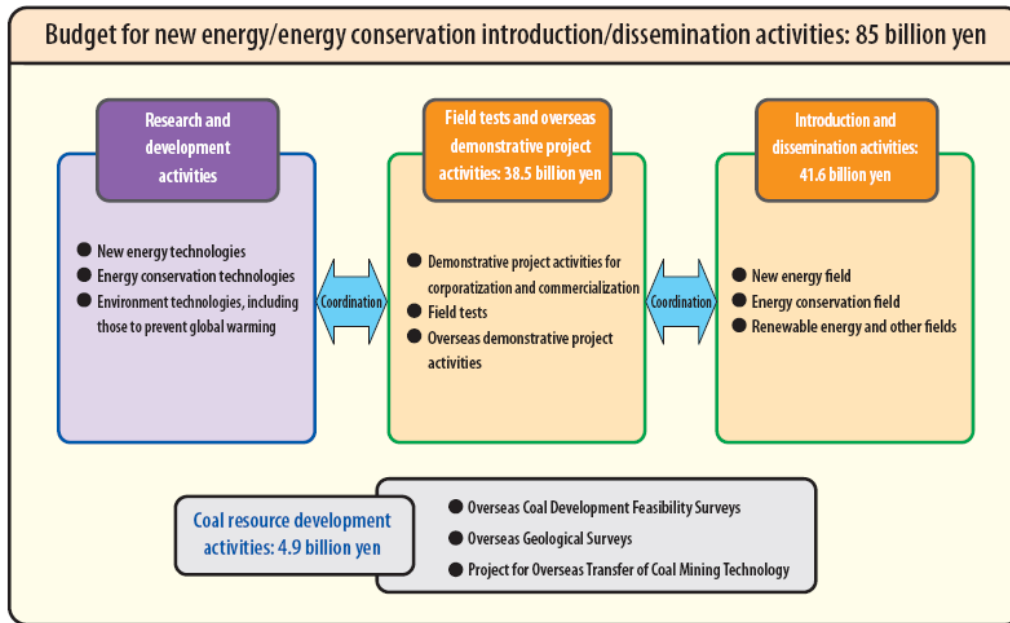
Figure 16 NEDO project topics



Source: NEDO 2006a

In order to effectively and efficiently introduce and popularize new energy and energy conservation programs, NEDO provides integrated support in technological development, verification testing and promotion/dissemination activities. Activities related to new energy, energy conservation, introduction/dissemination activities, and budget for FY2006 are depicted in Figure 17.

Figure 17 Activities related to new energy and energy conservation



Source: NEDO 2006a

NEDO plays a key role in the promotion of Kyoto Mechanisms as well. The budget for the programs related to the acquisition of Kyoto Mechanisms Credits is 5.4 billion Yen in FY2006.

International Joint Research Grant Program (NEDO Grant)

Among international research grants provided by NEDO, the one eligible for Swedish researchers is “International Joint Research Grant Program (NEDO Grant)”. Research teams who apply for NEDO Grant must consist of four or more researchers, with two or more nationalities including Japanese. The application has to be made by the Japanese side.

Research period: three years

Grant amount: 70 million Yen or less (first two year 50 million Yen or less)

The NEDO Grant may be closed in FY2007 (NEDO 2006c).

Table 18 Swedish researchers who have participated in the International Joint Research Grant Program (NEDO Grant)

Area of research	From	To	University	Name
D-Electronics functional material	1994	1996	Lund University	Ingolf LINDAU
Mesoscopic Super conductivity	1997	1999	Chalmers Tech Inst	Tord CLAESON
Mesoscopic Super conductivity	1997	1999	Chalmers Tech Inst	Per DELSING
Mesoscopic Super conductivity	1997	1999	Chalmers Tech Inst	Goran WENDIN
Mesoscopic Super conductivity	1997	1999	Chalmers Tech Inst	Vitaly S. SHUMEIKO
High functional MCFC	1996	1998	KTH	Daniel SIMONSSON

Source: NEDO 2006b

Swedish researchers are also eligible to participate as members of a Japanese team in NEDO's domestic research program called, "Grant for Industrial Technology Research". The application must be made by the Japanese side. This grant targets young researchers below 40 years of age.

3.8 Ministry of Land, Infrastructure & Transportation (MLIT)

The mission of Ministry of Land, Infrastructure & Transportation in Japan is to create a strong foundation through policies designed to support comfortable communities, a vibrant economic society, everyday security, a beautiful environment, and a regional diversity. In more practical terms; the mission is to utilize, develop and conserve land in Japan in an integrated and systematic way, develop infrastructure necessary for attaining those goals, implement transportation policies, promote the progress of meteorological tasks, and maintain marine safety and security.

Table 19 MLIT programs and their budget

Ministry/ Agency	Implementing Organization	Program (as of JFY2005)	Budget (JFY2005) (Yen Million)
MLIT	JRTT (Japan Railway Construction, Transportation Technology Agency)	Basic Research in Transportation Field	444
	MLIT	Construction Technology R&D	350
Total			794

Source: NSF 2006.

3.9 Ministry of Environment (MOE)

The Ministry of Environment is fully responsible for:

- The Government's environmental policy planning, drafting and promotion.
- Basic Environment Plan/Regional Environment Pollution Control Program.
- Waste measures and hazardous waste import/export regulations.
- Regulations, monitoring and measurement to prevent air pollution, water pollution, etc.
- Conservation and management of nature and preservation of biodiversity.
- Compensation for victims of pollution-related health damage.

Table 20 MOE programs and their budget

Ministry/ Agency	Implementing Organization	Program (as of JFY2005)	Budget (JFY2005) (Yen Million)
MOE	MOE & AiRIES (Association of International Research Initiatives for Environmental Studies)	Global Environment Research	3,015
	MOE	Technology Development for Preventing Global Warming	2,676
	MOE	Research on Processing Waste	1,150
	MOE	Environmental Technology Development Project	815
Total			7,656

Source: NSF 2006.

3.10 Institutes with own funding capabilities

In Japan there are many institutes with their own funding capabilities. This section covers the most important ones taking into consideration the amount of funding resources and the scale of research being conducted.

3.10.1 RIKEN

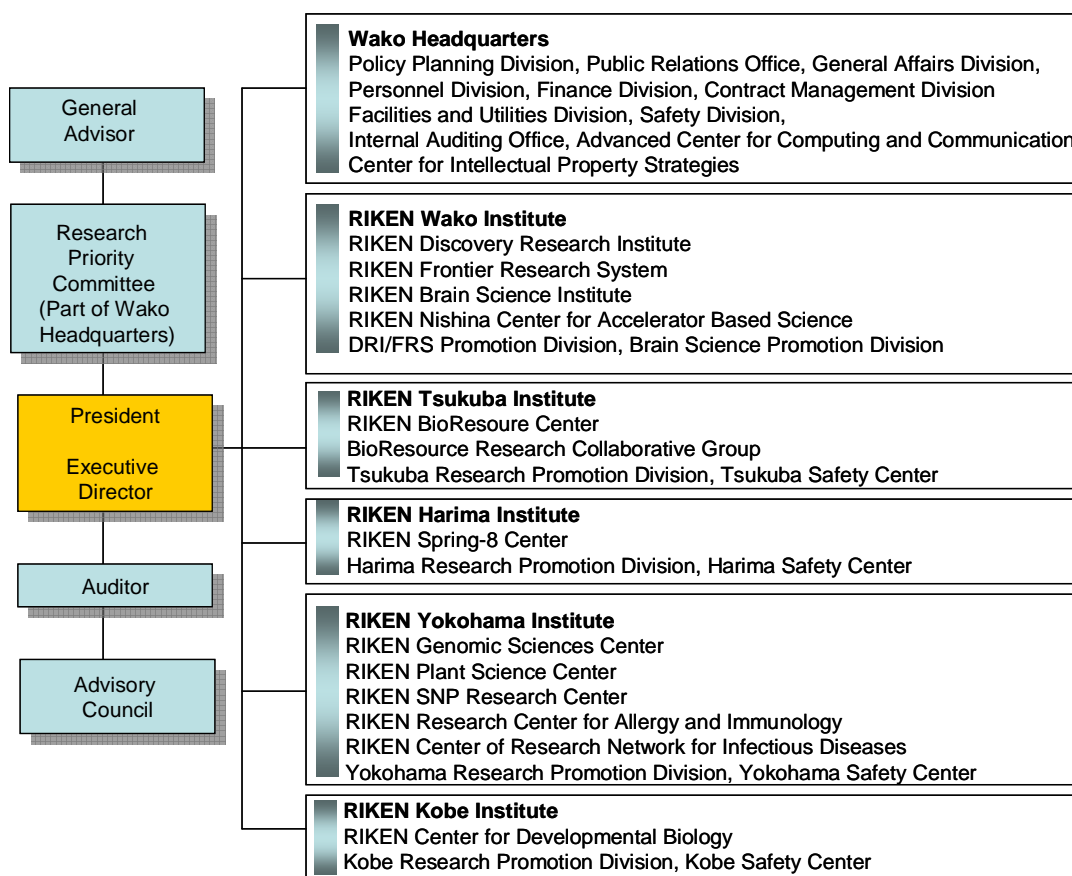
The Institute of Physics and Chemical Research, generally known as RIKEN from the abbreviation of its Japanese name, was founded in 1917 as a private foundation. It was reorganized in 1958 to form a non-profit corporation, with a new campus in Wako in the suburbs of Tokyo. In the fall of 2003, RIKEN underwent another administrative restructuring and operates until now as an independent administrative institution.

RIKEN consists of five institutes with 23 centers (Figure 18):

Wako Institute: The Wako Institute has several different research centers, including the Discovery Research Institute (DRI), Frontier Research Systems (FRS), Brain Science Institute (BSI), Initiative Research Units, and sponsored laboratories. BSI has expanded its international ties with several nations as it pursues a broad range of activities in brain science.

- Tsukuba Institute: The Bio Resource Center (BRC) at Tsukuba Institute supports research by preserving and distributing bio resources and developing biotechnologies.
- Yokohama Institute: Four research centers are grouped together in Yokohama Institute: Genomic Science center (GSC), Plant Science Center (PSC), SNP Research Center (SRC), and the Research Center for Allergy and Immunology (RCAI).
- Harima Institute: Spring-8 (Super Photon Ring-8-Gev) the largest third generation synchrotron radiation facility in the world is located at the Harima Institute. International attention focused on Harima with the construction of the X-Ray Free Electron Laser prototype.
- Kobe Institute: The Center for Development Biology (CDB) at Kobe Institute conducts research on various aspects of development biology. Together with Riken Kobe Research Promotion Division of Kobe Safety Center, CDB earned many rewards for its diverse activities.

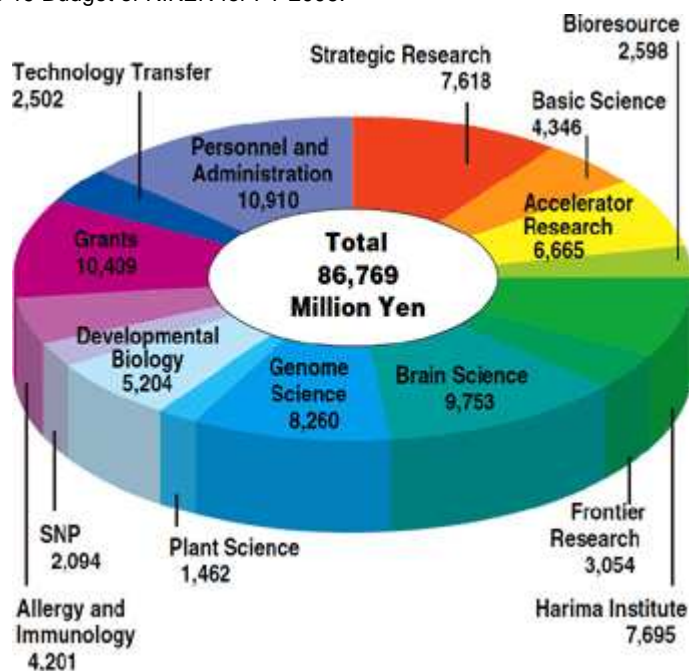
Figure 18 RIKEN Organization



Source: RIKEN 2005.

Budget of RIKEN for FY2006 is 87,864 Million Yen (equivalent of 5,567 Million SEK). RIKEN has 2,930 staffs in total, about 600 are full time permanent researchers and 2700 are contract researchers.

Figure 19 Budget of RIKEN for FY 2006.



Source: RIKEN 2005.

Scientists at RIKEN also receive funding from various kinds of government bodies, including MEXT, as well as public and private organizations. The final total revenue becomes about 100 billion Yen per year.

There are possibilities for Swedish scientists to directly join the National Projects run by RIKEN. Those large scale national projects are fully supported by the Japanese government. Their budgets include some financial resources to invite foreign scientists to RIKEN and/or to send Japanese scientists abroad.

Current large scale national projects run by RIKEN:

- “The Next-generation Super Computer Development projects” with a budget of 100 billion Yen. The project aims to achieve the highest computer performance in the world.
- “Next-generation Radiation Source Development” aiming to develop the X-ray free electron laser, with the budget of 40 billion Yen.
- “Molecular Imaging Research”, a project to develop new drug discovery process, conducted at Kobe institute
- “Protein Analysis Platform Technology Development” project based on the result of protein 3000 projects which will be accomplished in FY 2006
- “Terahertz Light Research” with ambition to construct what will become the base of the next-generation advanced terahertz imaging system.

As an example of a possible international collaboration, Brain Science Research Project at RIKEN is open for researchers from overseas. A typical project period is about 5-6 years with evaluation taking place each two years. The requirement is that participating researchers have to publish at least one scientific journal article per year.

RIKEN also runs a summer school for young foreign students. The requirement is a recommendation letter from his/her professor.

Currently the average ratio of foreign scientists working at RIKEN is around 10 %. Recently Dr. Rhoji Noyori, President of RIKEN (a Nobel Prize winner in 2002) has expressed ambition to increase the number to 30% in the near future.

RIKEN has its own international research centers overseas:

- RIKEN-RAL Muon Research Facility in the UK
- RIKEN-BNL Research Center in the USA
- RIKEN-MIT Neuroscience Research Center in the USA.

RIKEN also conducts several international cooperations with foreign universities and institutes. One of them is Stockholm University (Table 21).

Table 21 International collaborations at RIKEN

Country	Institute	Subject	Agreement
China	Chinese Academy of Sciences	General	1982
France	Institut Pasteur	Biotechnology	1984
Germany	Max-Planck-Gesellschaft	General	1984
U.K.	Rutherford Appleton Laboratory (RAL)	Muon Science	1990
France	European Synchrotron Radiation Facility (ESRF)	SR Research	1993
U.S.A.	Brookhaven National Laboratory (BNL)	Nuclear Physics	1996
Israel	The Weizmann Institute of Science	General	1996
France	Universite Louis Pasteur (ULP)	General	1996
Canada	National Research Council (NRC)	General	1997
Vietnam	The Vietnam Atomic Energy Commission (VAEC)	Nuclear Physics	1997
U.S.A.	Massachusetts Institute of Technology (MIT)	Brain Science	1998
U.S.A.	National Institutes of Health (NIH)	Genome Science	1999
U.K.	Daresbury Laboratory (DL)	Biomolecular	2000
Sweden	Stockholm University	Atomic Physics	2000
Russia	Joint Institute for Nuclear Research (JINR)	Nuclear Physics	2001
France	Centre National de la Recherche Scientifique (CNRS)	General	2001

Source: RIKEN 2005.

3.10.2 National Institute for Environmental Studies

National Institute for Environmental Studies (NIES) was established in 1974, to provide solutions to the pollution problems Japan was facing at that time. Now, NIES conducts research on the emerging topics including global warming. Some of the topics covered by this institution are Social and Environmental Systems, Environmental Chemistry, Environmental Health Sciences, Atmospheric Environment, Water and Soil Environment, and Environmental Biology. NIES is affiliated with Ministry of the Environment.

More information is available at: <http://www.nies.go.jp/index.html>.

NIES hosted two JSPS Swedish fellows from University of Göteborg in 2002-2003

3.10.3 Institute for Global Environmental Strategies

Institute for Global Environmental Strategies (IGES) was established by the Government in 1998 as a research institute that conducts pragmatic and innovative strategic policy research to support sustainable development in the Asia-Pacific region. IGES works closely with Ministry of the Environment.

In one of the projects, IGES works on the climate policy, which evaluates domestic policies, proposes measures for effective implementation of the Kyoto Mechanisms, identifies ways to achieve global participation in the future climate regime, and recommends policies for facilitating adaptation to climate change. IGES is also one of the key actors in the promotion of the Kyoto Mechanism.

Additionally, IGES serves as the IPCC-NGGIP Technical Support Unit (TSU). It supports activities of the IPCC Task Force Bureau, which oversees the IPCC National Greenhouse Gas Inventories Programme (NGGIP). The unit develops and publishes guidelines for the calculation and reporting of national greenhouse gas emissions and removals.

IGES works closely with other Asian-Pacific countries to realize a sustainable development region and to voice the perspective of Asia-Pacific in the international agenda.

More information is available at: <http://www.iges.or.jp/en/index.html>.

3.10.4 Research Institute of Innovative Technology for the Earth

Research Institute of Innovative Technology for the Earth (RITE) was founded in the 1990 as a research hub to focus on the development of innovative environmental technologies and the broadening of the range of CO₂ sinks. It is an NPO and is affiliated to Ministry of Economy, Trade and Industry. Professor Kaya, the Director-General of RITE, is an influential and outspoken individual in the climate and energy related field

More information is available at: <http://www.rite.or.jp/English/E-home-frame.html>

3.10.5 Frontier Research Center for Global Change

Frontier Research Center for Global Change (FRCGC) was established in 1997 and reorganized in 2001. FRCGC is one of the leading actors in Japan on global-change research, along with NIES and Center for Climate System Research of the University of Tokyo. It focuses on international joint research and participates in evaluation projects such as the Intergovernmental Panel on Climate Change (IPCC) and the World Climate Research Project (WCRP). It's the home to the Earth Simulator, one of the fastest super-computers in the world.

More information is available at: <http://www.jamstec.go.jp/frcgc/eng/index.html#>

3.10.6 National Institute of Advanced Industrial Science and Technology

National Institute of Advanced Industrial Science and Technology (AIST) conducts research on innovative technologies for efficient utilization and conservation energy, and environment-friendly energy sources, including, but not limited to, Chemical Risk Management, Life Cycle Assessment, Photovoltaics, Fuel Cells, and Biomass, among other industrial technologies

More information is available at:

http://www.aist.go.jp/aist_e/aist_laboratories/4environment/index.html

3.11 Summary

Japan set the goal of “becoming an advanced science and technology oriented nation” as a national strategy and enacted the Science and Technology Basic Law. Under this law a comprehensive range of measures has been taken, including the “First Basic Plan” for FY1996-2000, and the “Second Basic Plan” for FY 2001-2005. In March 2006, the “Third Basic Plan” was launched for FY 2006 to 2010 with a target budget of 25 trillion Yen. Among other things, the Third Basic Plan aims to promote policy mission-oriented R&D especially within four priority areas (Life Science, IT, Environmental Science and Nanotech & Materials) and four promotion areas (Energy, Manufacturing technology, Social Infrastructure and Frontier Sciences, i.e. space and ocean).

Japanese S&T related policies and measures are conducted by each ministry and coordinated by the Council for S&T Policy (CSTP). CSTP is headed by the Prime Minister and consists of cabinet members along with members from both academia and industry.

Ministry of Education, Culture, Sports, Science and Technology (MEXT) dominates the governmental S&T budget, and 63% is channeled through MEXT. The second largest ministry in terms of S&T is the Ministry of Economy, Trade and Industry (METI), which controls 17% of the S&T budget. For the other ministries, the share of S&T related budget is respectively: Ministry of Health, Labour and Welfare, 4%, Ministry of Agriculture, Fishery and Forestry 3%, Defense Agency 5%, and others 8%.

Most ministries have their own national research institutes and funding “agencies” on the subjects directly related to their respective missions. In this report, the Central S&T Administration, the major funding agencies and some research institutes are introduced. Examples are the Japan Society for Promotion of Science (JSPS), the Japan Science and Technology Agency (JST), and the RIKEN Institute under the Ministry of Education, Culture, Sports, Science and Technology (MEXT), the New Energy and Industrial Development Organization (NEDO) and National Institute of Advanced Industrial Science and Technology (AIST) under the Ministry of Economy, Industry and Trade (METI).

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