

# Funding and Networks for Nanotechnology in China

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# 1.Funding for nanotechnology in China

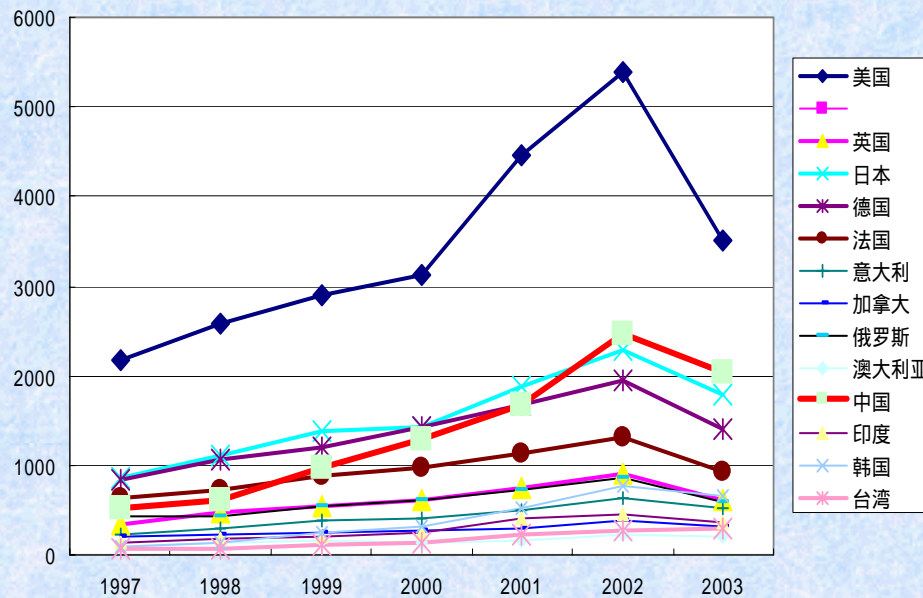
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- From 1999 to 2002, Funding for Nanotechnology from government organizations increases 7 times
  - 350M RMB from MOST for Basic and applied Research
  - 320M RMB from NSFC for Basic research
  - 150M RMB from CAS for Basic and applied Research
  - 380M RMB from SDRC for Networks and Promoting Technology Transfer
- Funding from local governments and enterprises 1300 M RMB for commercialization
- Funding is limited comparing with Developed Countries



# Progress of Nano in China

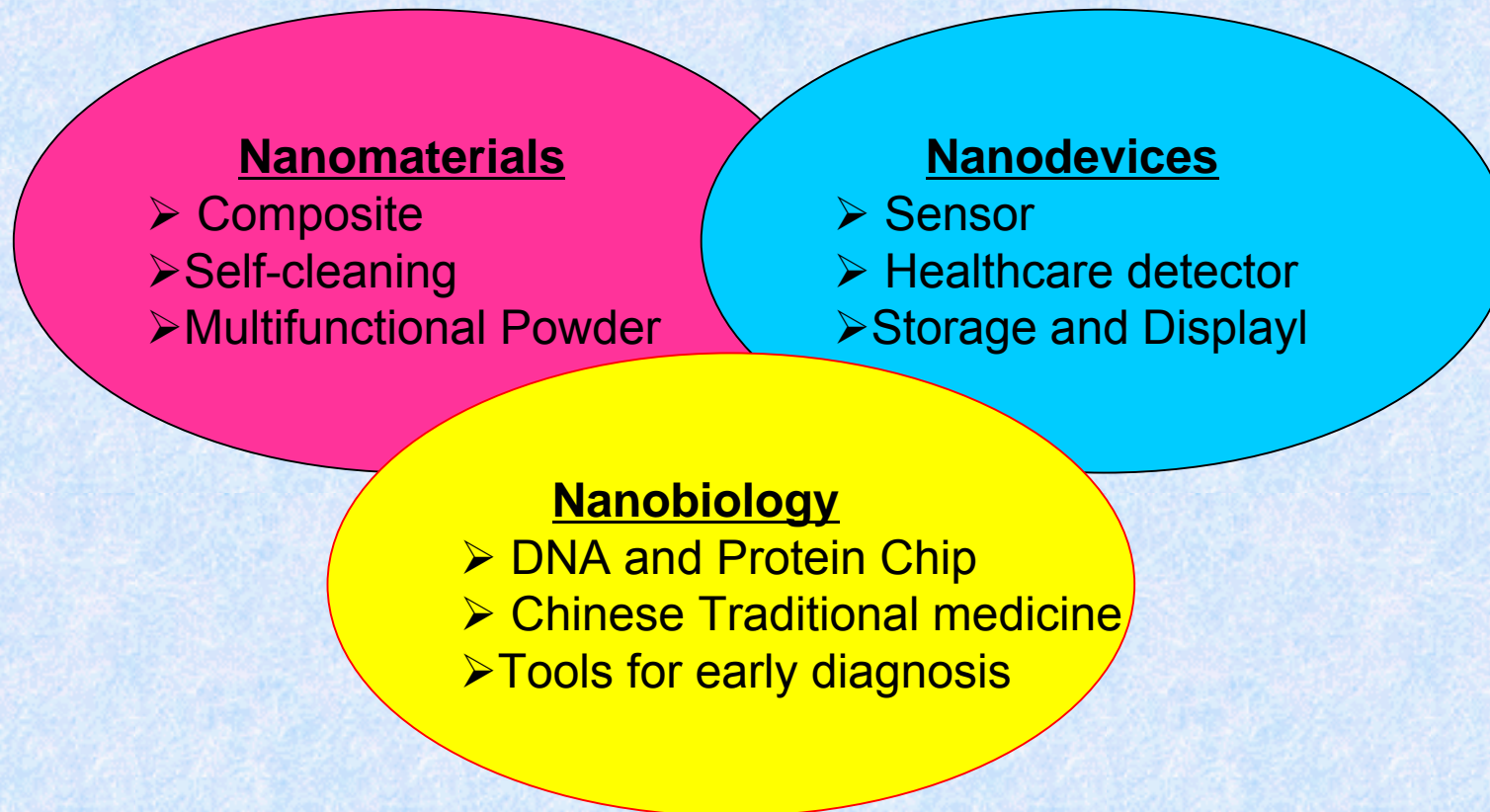
- Limited progress
  - SCI paper number increased a lot, but original Invention very few



- International Patents are very few, only Chinese Patents Increased a lot
- 350 baby enterprises related to Nano were set up, only took small market

# Future Three Major Areas of Commercialization

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## 2. Coordination and Networks

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- Coordination
  - Leader of Coordination: National guide and coordinate of Nanotechnology council (set up in October, 2000 )
  - Duty of Council: Planning, coordinating, consulting nano projects in China
  - Consist :
    - 21 scientists form universities and institutions
    - 7 administrators from Ministry of Science and Technology, State Development and Reform Commission, Ministry of Education, Chinese Academy of Sciences, National Natural Science Foundation of China.



# National developing guide for Nanotechnology

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- National developing guide for Nanotechnology in China
  - Guide of Nano was approved by MOST, In May, 2001.
  - R&D of Nano in China will focus on  
Core Tech. of nanoelectronics and nanobio.  
Creation new functional materials and commercialization:  
From MEMS to NEMS
  - MOST, NSFC, CAS and other agencies established the short term(3-5years) and long term (10-15years) research plans respectively.

## 2. Coordination and Networks

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- Networks

- **Three National Centers for Nanotechnology in China**

National Nanoscience Center, Beijing (250 + M RMB, 14,000 qm)

National Center for Promoting and Developing Nanotechnology,  
Shanghai (350M RMB)

National Nano-Commercialization Base, Tianjun ( 200M RMB, 22,000 qm)

- **22 local and University Centers: Providing local service**

Nanjing, Hefei, Zhoushan, Shandong, Liaoning, ....

- **61 Internet websites**



# National Nanoscience Center

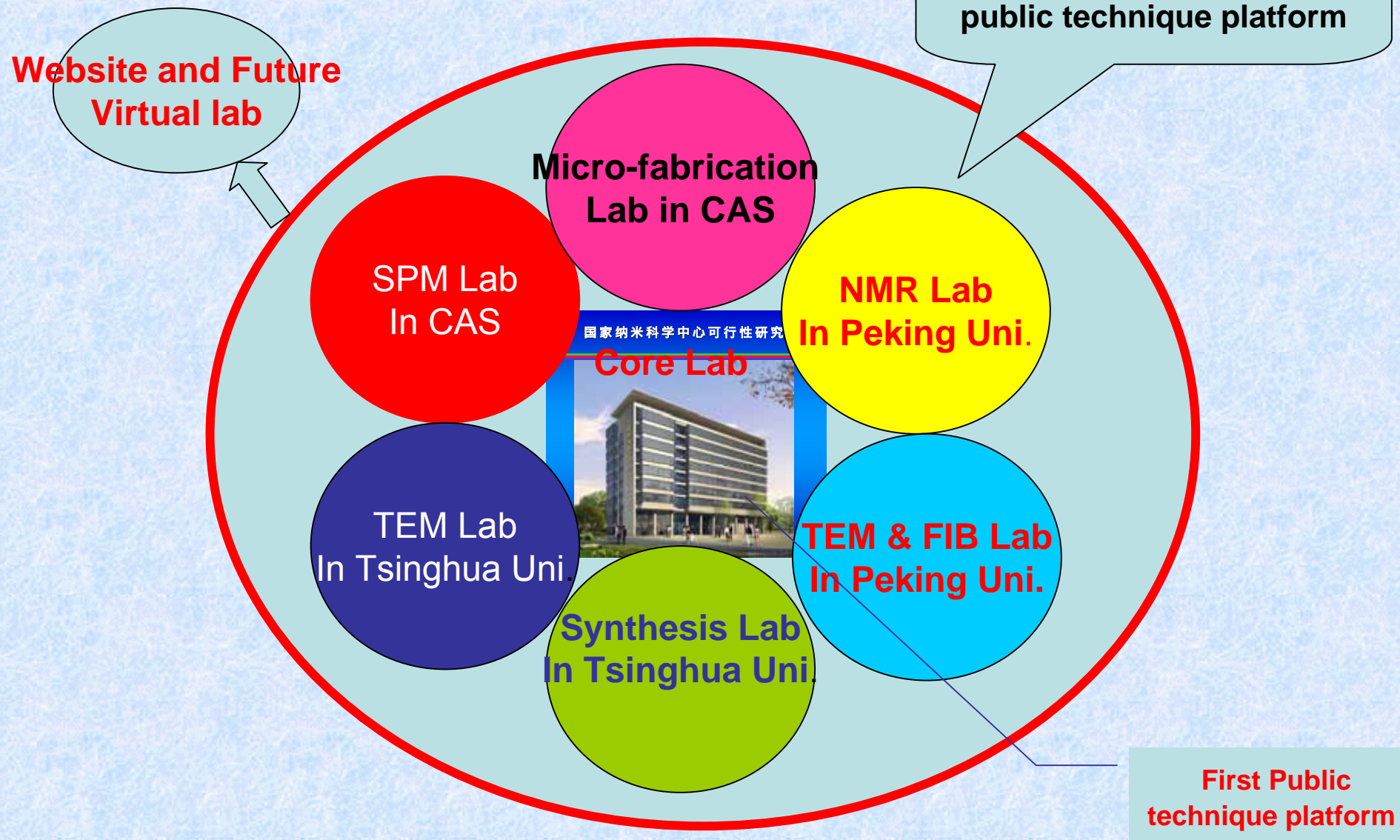
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- **Founder:** CAS Nanocenter, Nanocenter, Peking University, Micro/Nano Center, Tsinghua university.  
Chaired by Prof. Bai Chunli and co-chaired by Professor from University. 170 Staff , 180 Graduate Students and Visiting scholars
- **Duty:**
  - **Nanofabrication and Characterization service– Public technique Platform**
  - Establishment of New Major of Nanoscience
  - **Providing Nano Informations by Website and Database**
  - Consulting to Gov. Industry and Universities
  - **Education and Training of Young Scientists**
  - Gov.- Research-Industry Bridge
  - Windows for International Collaboration
  - Consist: Core Lab and Coordination Lab





国家纳米科学中心可研方案简图 B





# Four directions of National Nanoscience Center-

## long term targets

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- Characterization of nanoscale structures:
  - Developing the more convenient and reliable methods and tools for industry;
  - developing the real time and in situ as well as the high spatial resolution test instruments for research.
- Nanomaterials and their application:
  - developing the functional materials for improvements of the traditional products
  - design and preparing the programmable and smart materials.

## Four directions of National Nanoscience Center- long term targets

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- Nanodevices:
  - developing nanofabrication methods;
  - self-assembling
  - new type devices worked on the basis of quantum mechanism;
  - connecting nanodevices with microcircuits
- nanobiology and medicine:
  - new delivery system of drugs
  - bionics MEMS and NEMS



## Center for promoting and developing Nanotechnology, Shanghai

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- Funding from City Gov., SDRC, and Enterprises
- It consists of 7 universities , Institutions and 9 enterprises in Shanghai,
- 3 areas: characterization, fabrication, and industrialization
- Create New Products and Push them to Market

# National Nano-Commercialization Base, Tianjun

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- Funding from TEDA,
  - Laboratory and Workshop Building: 22,000M<sup>2</sup>
  - Three areas: characterization, fabrication, and industrialization: Materials, Medicine, MEMS and Biochip
  - Technique Transfer to Industry
  - It consists of Institutes of CAS, Universities, Enterprises



### 3. National Projects for nano networks

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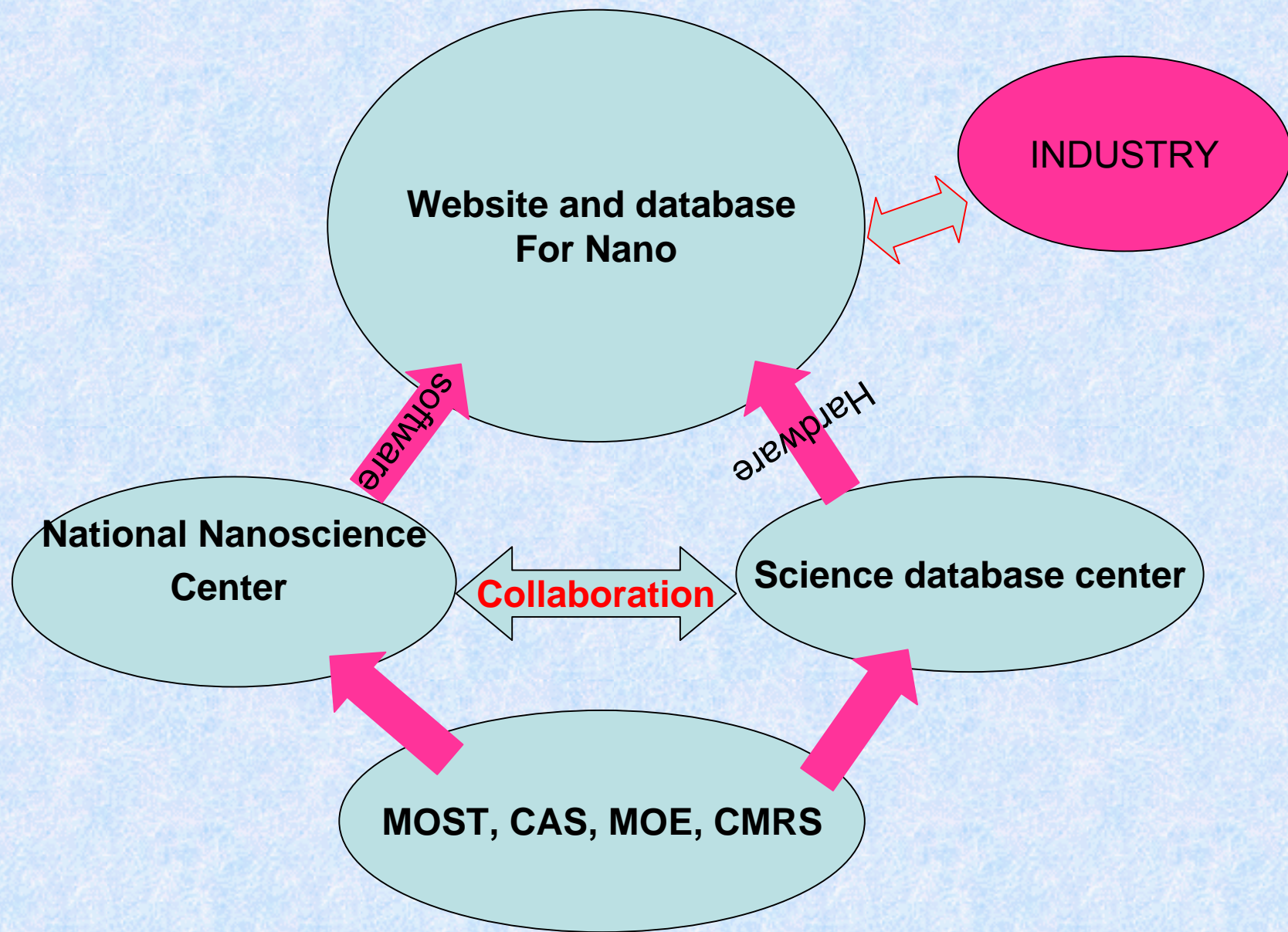
- Digital China and National Projects for nano networks
  - MOST and SDRC initiated a Plan on Digital China in 2002
  - Nano networks is a part of the plan, supported by SDRC, CAS, MOE, and MOST
  - Sharing , reforming and using the information, created in China
- Forming and developing Information enterprises

## 4. Status of website and database for Nano in China

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- 61 websites established since 2001, which distributed in the whole Country
- Database covers all of topics of nano: 60% are related to nanomaterials.
- From CASNANO to CNRNANO, combined CAS, Universities and Industry,  $\geq 700$  access/day





## 5. Conference and Workshop

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- Domestic Conferences and Workshop:
  - 4 for basic research
  - 5 for applied research and commercialization
- International Conference
  - 1 for basic research
  - 2 for applied research and commercialization



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Thanks

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- In order to serve science information, we built the database with the Network Center, CAS together, which supported network environment. The Network Center has a science database center. The access lie in nanoscience and nanotechnology website, CAS (<http://www.casnano.cn>), which contacts with the Internet, keeping the visit quality and information security.



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#### **4. The working of database of nanoscience and nanotechnology**

- The database is supported by network center, CAS.
- Local area network is 100M Ethernet network.
- The hardware is Sun Enterprise Server 3500, Netra 3000 and SGI Challenge L.
- The system software is Sun Solaris 7.0 and Redhat Linux,
- The database system administration software is Oracle 8i.
- These databases have served in the network of nanoscience and nanotechnology, CAS (<http://www.casnano.cn>).

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- A large number of data have been collected from the institutes of CAS, Universities in China and outside China.
  - Most of data offered to website by Chinese scientists and engineers are certified by experts.
  - Nowadays, in our database, there are seven subdatabase on nanomaterials, nanoelectronics, nanobiology and medicine, nanosensors metrology and characterization, etc, including the published scientific paper, patents, and related productions.
  - Through it, digital information share will be realized step by step. In total, the database has 10Gb.
  - It provided nanoscience and nanotechnology researchers with data information and promoted the development of nanoscience and nanotechnology in China.



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- Hardware platform: a high capability server is main server and other PC servers have been taken as intranet data project and modified server. If it isn't enough, the large memory device will be collocated.
  - Software platform: The operation system is Unix. The web server is Apache. The database administration software is Oracle 8i.

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## **5. the administration of nano database**

- To promote the society effect of database, the database was maintained by three staff in the center. Three staff is in charge of the data collection and checking, the data environment.