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# What is NISTEP?

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- An institute affiliated with the Ministry of Culture, Sports, Education, Science, and Technology (MEXT)

## Our mission

- To lead planning of government S&T policies by **conducting S&T policy research with a comprehensive and long-term perspective**
- **To provide the result of the research to the society**, and support the firms and the other related organizations for their setting up their strategies for R&D and innovation management
- **To promote an international policy research** by integrating worldwide the institutions with human resources, and educate R&D planners in private sector, the policy researchers in academia and the administrative officials

# History

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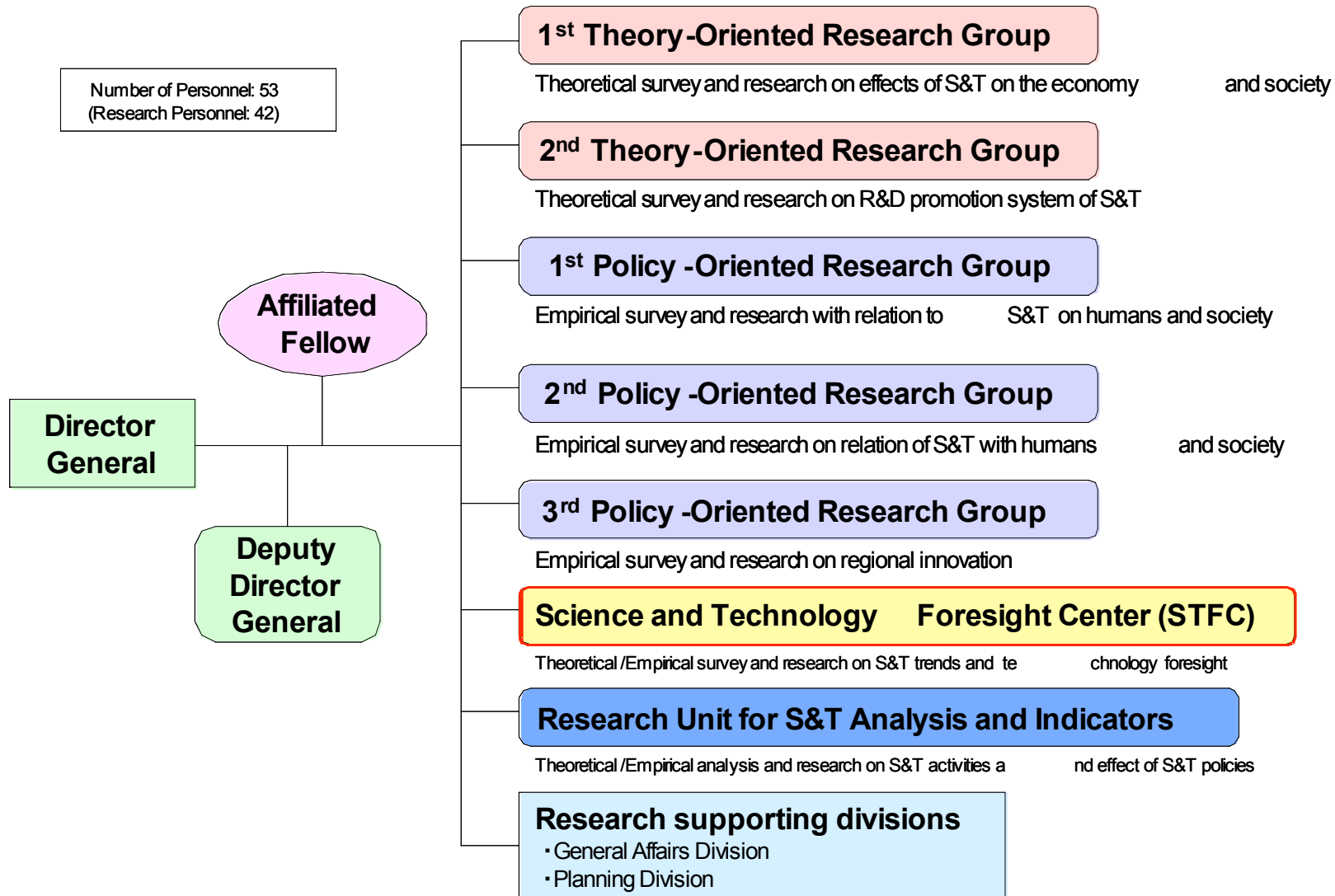
- 1985, the Ad hoc Council for Promotion of Administrative Reform noted the importance of S&T policy research as a process to strengthen the functions of S&T policy planning .
- July 1, 1988, NISTEP was founded as an affiliated research institute under the Science & Technology Agency (STA)
- January 2001, the central government system was drastically reformed.
- NISTEP became an institute affiliated with the Ministry of Education, Culture, Sports, Science and Technology (MEXT)
- July 1, 2008, 20<sup>th</sup> anniversary of the foundation

# Members of the NISTEP





# Structure



# Research Unit for S&T analysis and indicators

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- Science and technology indicators
- Expert survey on Japanese S&T system
- Survey of scientific, technological and academic activities in the universities
- Bibliometrics analyses
  - Scientific literatures
  - Patents
  - Science Map 2002, 2004 and 2006

# Science Map 2006

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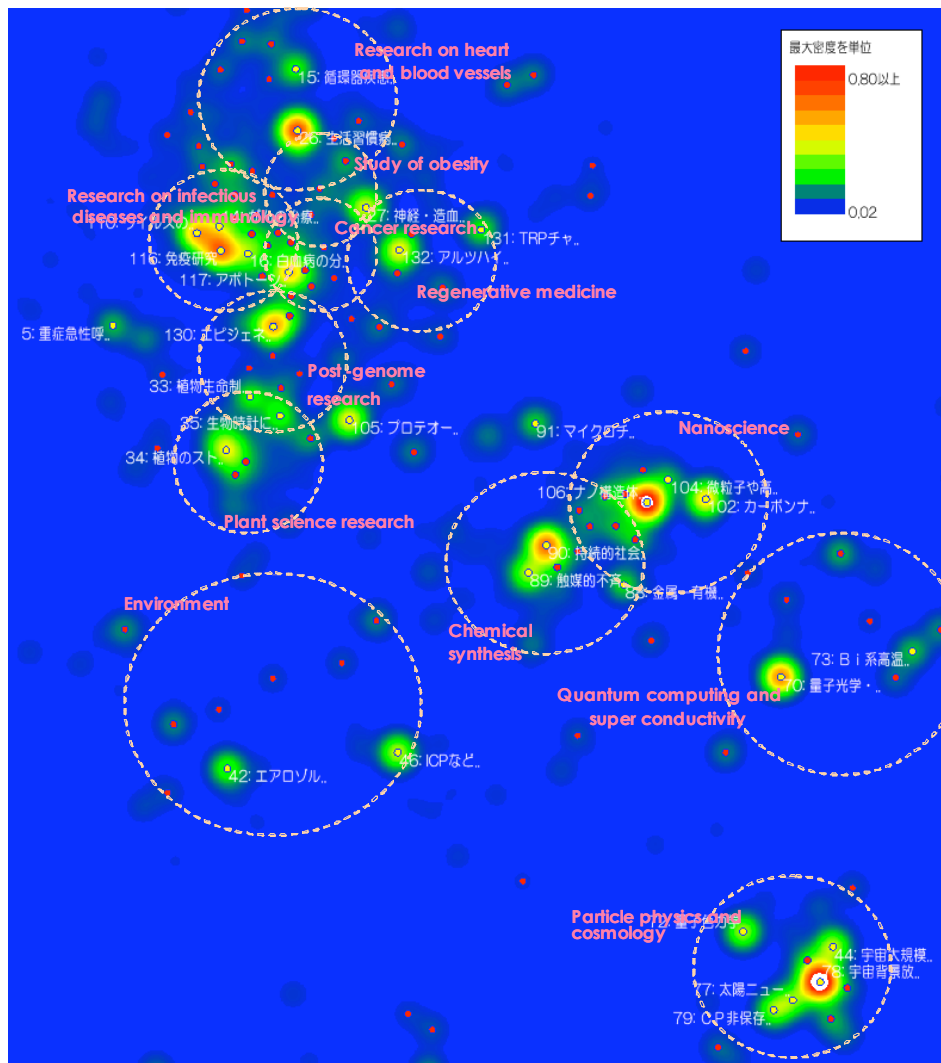
- will be published in next April. But, in Japanese.

## What's new

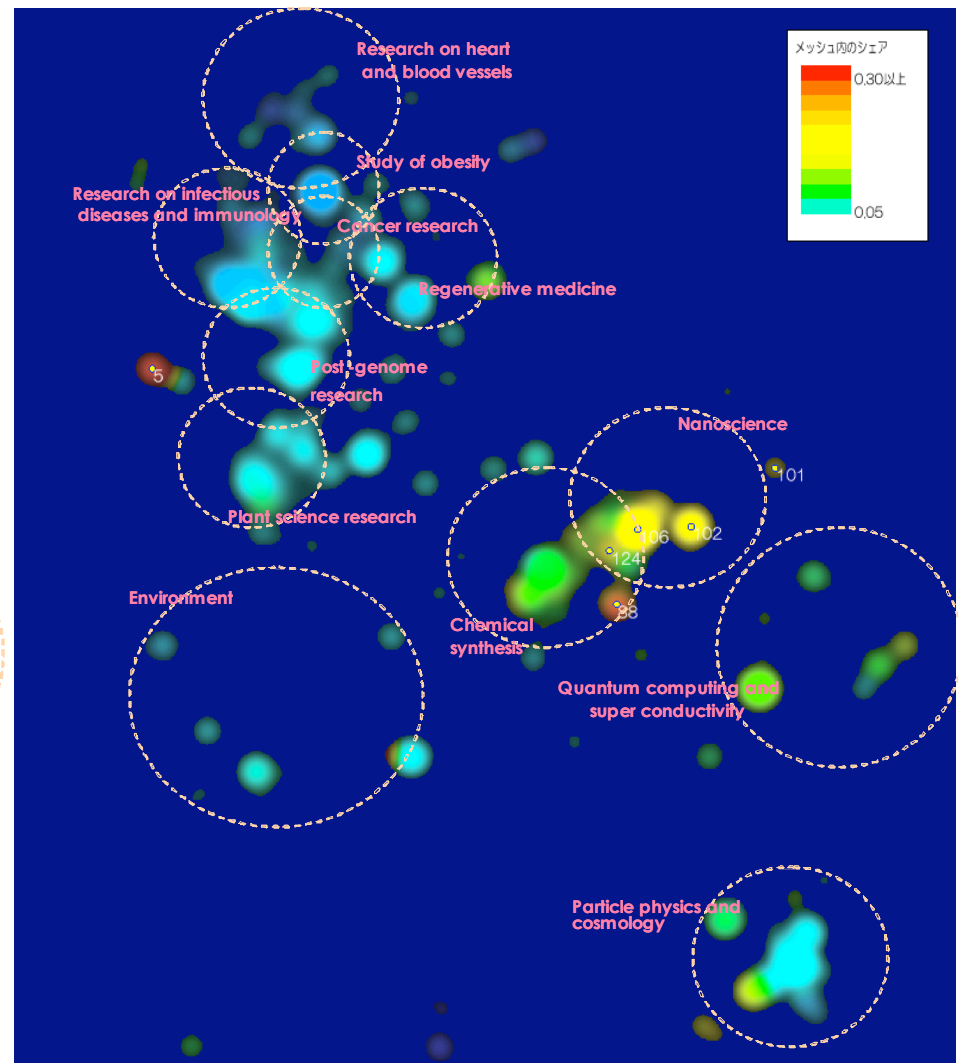
- New visualization tool
- New mapping technique enabling to track the evolution of science, co-mapping of science map 2004 and 2006
- Interview survey to scientists
  - Is our science map reliable? (Location of research areas..)
  - If we had a science map of 5-10 years ago, how would it differ from the science map 2006?
  - If we had a science map of 5-10 years later, how would it differ from the science map 2006? (Emergence of new research areas, Convergence of research areas..)

# Density Plot of Science Map 2004

Density of core papers



Share of China in citing papers





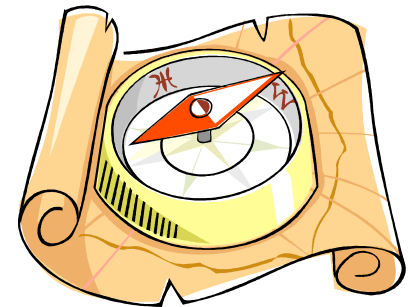


# Science Map 2004

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## Purposes of our study

- Identify “hot” research areas in science
- Track the changing nature of research areas
- Assess interactions between disciplines



- Science Map 2004 -Study on Hot Research Areas (1999-2004) by Bibliometric Method- (NISTEP REPORT No.100 Jun. 2007)
- Capturing the Evolving Nature of Science, the Development of New Scientific Indicators and the Mapping of Science (STI Working Paper 2007/1) Masatsura Igami and Ayaka Saka

# Our Method for Mapping of Science

- Constructing research areas from scientific literatures
  - Clustering of papers by co-citation
  - Top 1% highly cited papers in 22 fields (1999-2004)
  - Highly cited papers → research fronts → research areas (133 areas)
  - Research Front database in Essential Science Indicators (Thomson Scientific)



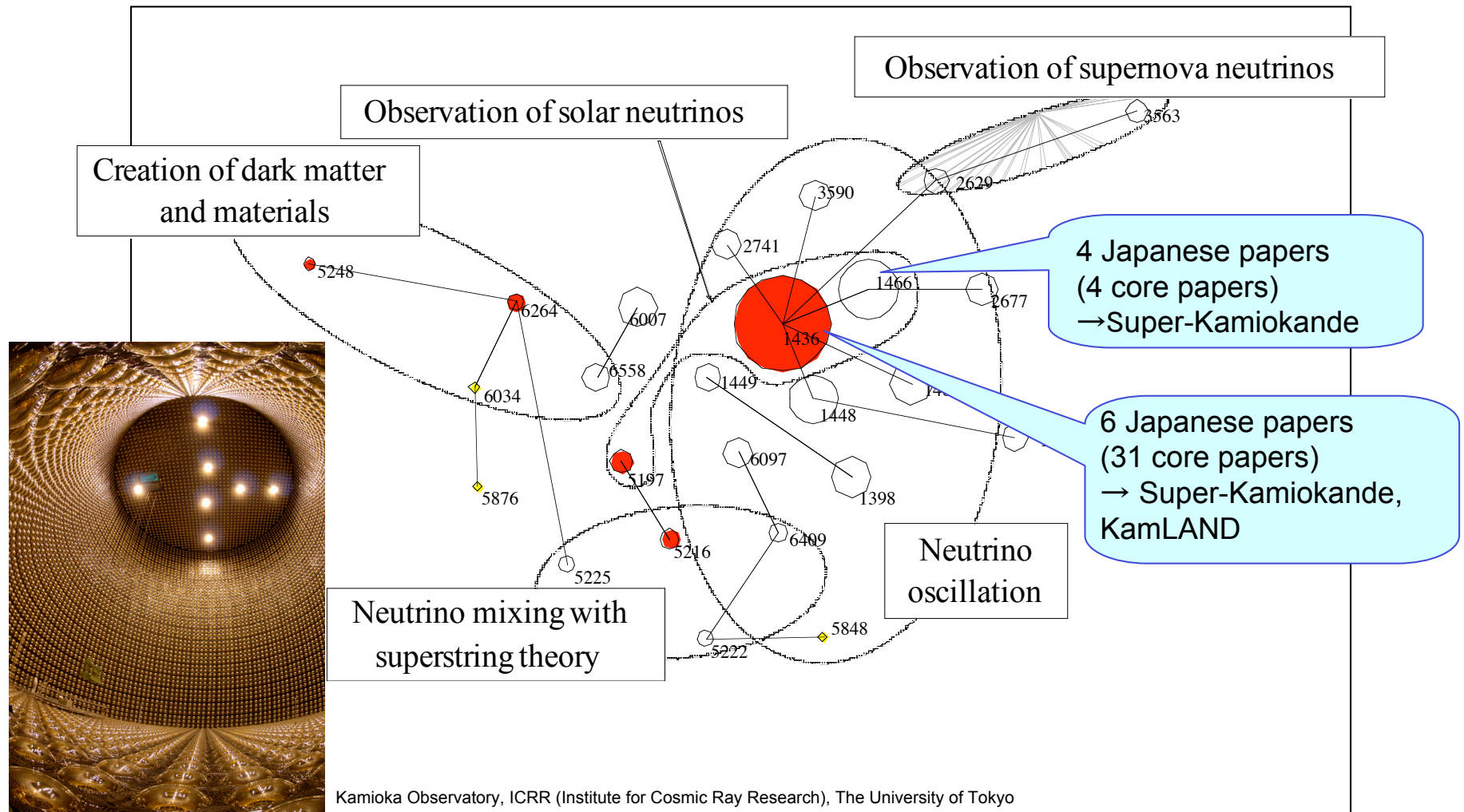
- Content analysis by experts
  - Detailed analysis of RAs by staffs of STFC@NISTEP
  - Comments from experts (STFC: Expert network, ...)



The following three maps were developed concerning 133 RAs:

- ✓ ■ **Individual RA map**, showing what research themes each of the 133 RAs consists of
- **Relation map with traditional discipline**, showing how 133 RAs are related to traditional disciplines
- **Correlation map**, depicting the strength of the relationship among 133 RAs

# ID77\_Neutrino oscillation and creation of universe



Research fronts (Hot RFs)	Core papers	Citing papers	Citations	Mean publication year
25 (5)	135	2712	11639	2001.6



# Mapping of patent applications based on citation

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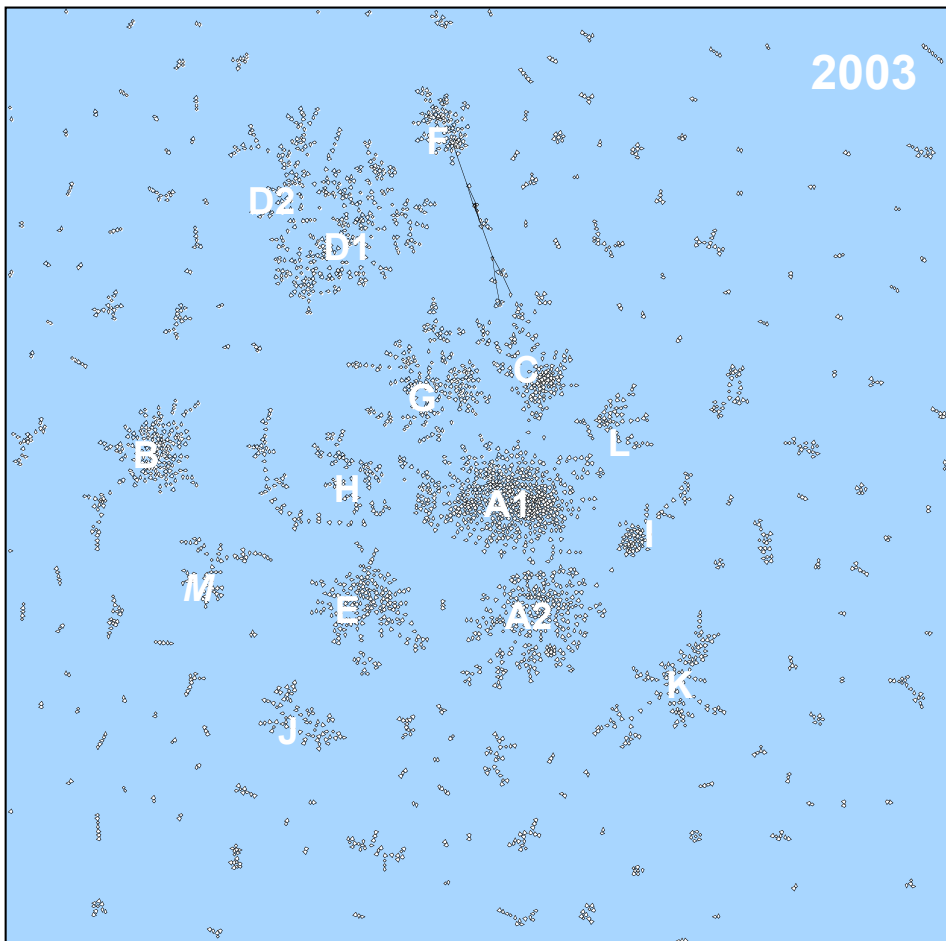
- Identification of large technological domains in nanotechnology based on citations among patent applications filed to the EPO.

## Methodology

- A gravity model. Each patent application is treated like an atom in a molecule.
- A patent application feels attractive and repulsive forces that are caused by interactions with other patent applications.
- Attractive forces only act on a pair of patent applications which are directly linked by citations.
  - Citations among nanotechnology patent applications designated to the EPO are only considered.
- Repulsive forces act on all pairs of patent applications.

# A map of nanotechnology patent applications

- Fifteen domains are found in 2003.
- Mutual interactions among technological domains are small.
- “Sensing and actuating technologies on the nanometre scale” play a vital role.



A1	Sensing and actuating technologies on the nanometre scale
A2	Technologies related to carbon nanotubes
B	Technologies related to cyclodextrin
C	Manufacturing and application of thin films
D1	Optical devices
D2	
E	Spintronics
F	Drug delivery
G	Manufacturing and measurement for biotechnology
H	Semiconductor devices/Single electron devices
I	Electron emission devices
J	Lithography on the nanometre scale
K	Photonic crystals
L	Semiconductor nanoparticles and nanocrystals
M	Application of nanoparticles as pigments