



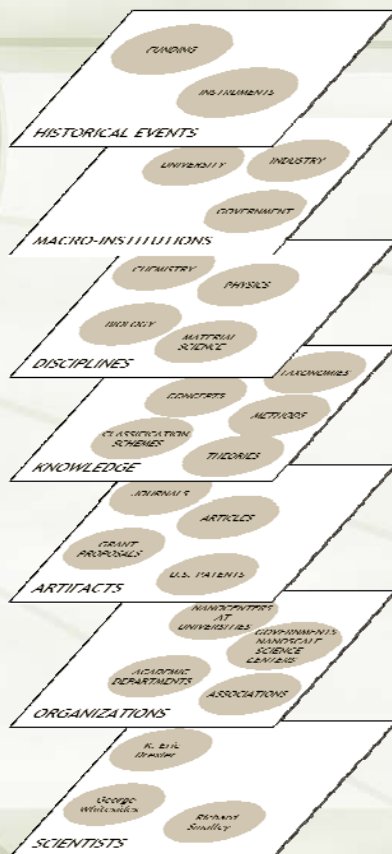
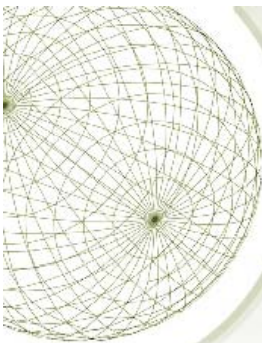
# “Modeling and Mapping Science”

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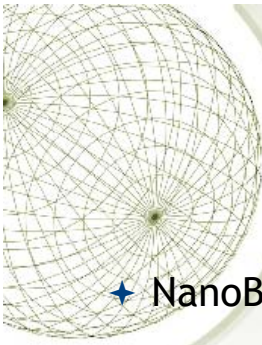
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*An ecology of knowledge*

Adapted from: Akera, A. (2007) Constructing a representation for an ecology of knowledge: Methodological advances in the integration of knowledge and its various contexts. *Social Studies of Science*, 37(3), 413-441

# Data

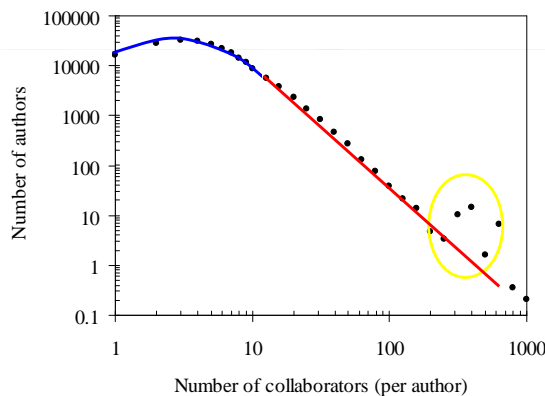


**Nanobank**  
documenting nanoscience & technology

- ★ NanoBank, a digital library of:
  - ★ 580,710 articles written by 466,602 different authors published in 8,300 journals from 1970 to 2006
- ★ Articles have been selected from *ISI Science Citation Index*, *Social Science Citation Index*, and *Arts & Humanities Citation Index* using two methods:
  - ★ search for 379 predefined terms
  - ★ probabilistic procedure for the automatic identification of additional terms

## 3 types of collaboration modes

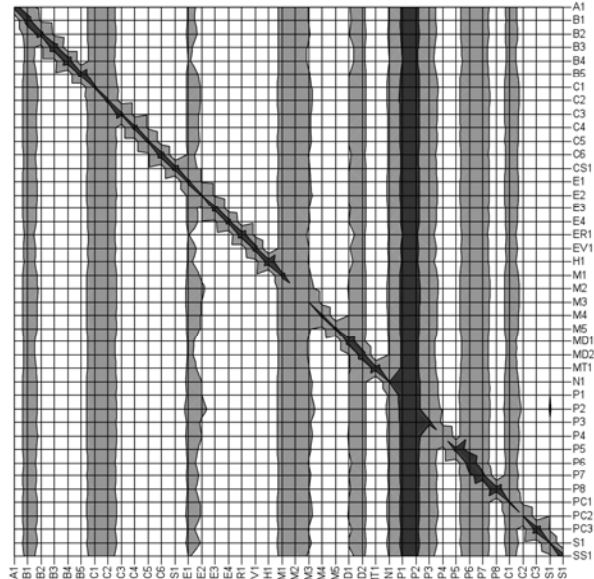
- ★ Nanoscience collaboration distribution
  - ★ The log-normal “hook”
  - ★ The power law tail
  - ★ The anomalous peak



= co-authorship network node degree distribution

# Collaboration between nano subfields

CODE	TOPIC
A1	Agriculture - all
B1	Biochemistry and molecular biology; cell biology; microbiology; biotech
B2	Biophysics
B3	Pharmacology
B4	Biosciences other (e.g. biology, zoology, plant science)
B5	Biomedical engineering
C1	Multidisciplinary chemistry
C2	Analytical chemistry
C3	Inorganic chemistry
C4	Organic chemistry
C5	Electrochemistry
C6	Chemistry other
CS1	Computer science general
E1	Electrical engineering
E2	Metallurgy
E3	Chemical engineering
E4	Engineering other
ER1	Earth sciences all (geology, oceanography, meteorology...)
EV1	Egology, environment, safety
H1	Humanities all
M1	Polymer science
M2	Multidisciplinary materials science
M3	Materials science - coatings & film
M4	Materials science -ceramics
M5	Materials science - other
MD1	Radiology
MD2	Medicine other
MT1	Mathematics; statistics general
N1	Nanoscience & nanotechnology general
P1	Multidisciplinary physics
P2	Condensed matter & applied physics
P3	Optics/microscopy
P4	Crystallography
P5	Mathematical physics
P6	Astronomy & astrophysics; Physics of particles and fluids
P7	Nuclear science/nuclear physics
P8	Physics other (e.g. mechanics)
PC1	Physical chemistry; chemical physics; spectroscopy
PC2	Surface science
PC3	Physics and chemistry other (e.g. geochemistry & geophysics)
S1	Science multidisciplinary works
SS1	Social sciences all

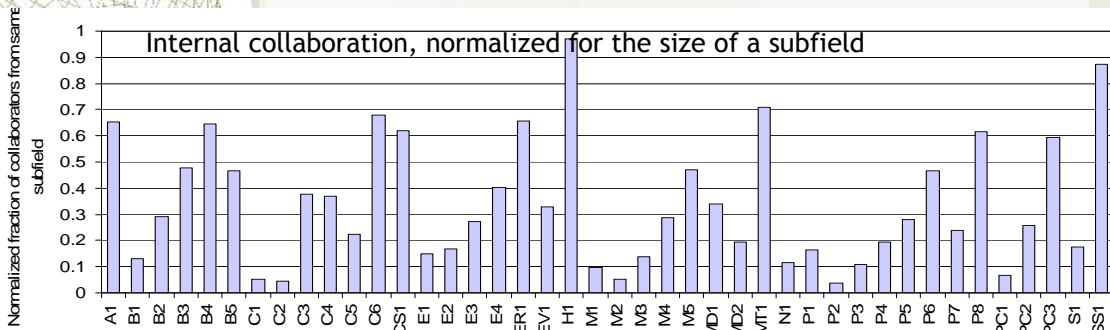


How this nano subfield...

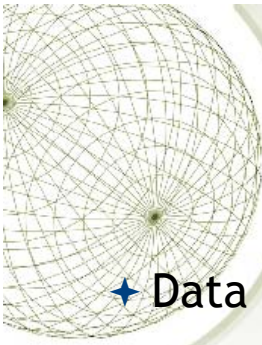
... collaborates with this subfield

Fraction of collaborators belonging to some subfield

# Level of internal collaboration



CODE	TOPIC
A1	Agriculture - all
B1	Biochemistry and molecular biology; cell biology; microbio
B2	Biophysics
B3	Pharmacology
B4	Biosciences other (e.g. biology, zoology, plant science)
B5	Biomedical engineering
C1	Multidisciplinary chemistry
C2	Analytical chemistry
C3	Inorganic chemistry
C4	Organic chemistry
C5	Electrochemistry
C6	Chemistry other
CS1	Computer science general
E1	Electrical engineering
E2	Metallurgy
E3	Chemical engineering
E4	Engineering other
ER1	Earth sciences all (geology, oceanography, meteorology;
EV1	Egology, environment, safety
H1	Humanities all
M1	Polymer science
M2	Multidisciplinary materials science
M3	Materials science - coatings & film
M4	Materials science -ceramics
M5	Materials science - other
MD1	Radiology
MD2	Medicine other
MT1	Mathematics; statistics general
N1	Nanoscience & nanotechnology general
P1	Multidisciplinary physics
P2	Condensed matter & applied physics
P3	Optics/microscopy
P4	Crystallography
P5	Mathematical physics
P6	Astronomy & astrophysics; Physics of particles and fluids
P7	Nuclear science/nuclear physics
P8	Physics other (e.g. mechanics)
PC1	Physical chemistry; chemical physics; spectroscopy
PC2	Surface science
PC3	Physics and chemistry other (e.g. geochemistry & geophi;
S1	Science multidisciplinary works
SS1	Social sciences all



# Cognitive structure of LIS

## ◆ Data

- ◆ 16 LIS journals
- ◆ 20 years
- ◆ 10000 articles
- ◆ 8000 unique title words
  - ◆ Remove common and non-specific
- ◆ Top 100 words
  - ◆ Covers 90% of articles

