

# Mars and Venus: How Europeans and Americans View and Use Science

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American Association for the Advancement of Science

ESOF 2008 – July 20, 2008



# Serena and Venus: Europeans and Americans are in Similar Boats Together

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Science and technology are imbedded in every aspect of modern life:

- For people to prosper in modern society, they need understanding and comfort with S&T
- For science to prosper, the science-society relationship must be positive and strong

## For nations to prosper they need a strong science and technology enterprise

- Correlation between strength of a nation's science infrastructure, its economic strength and quality of life
- Increasing policymaker recognition of the relationship
  - In the US and elsewhere

# RISING ABOVE THE GATHERING STORM

*Energizing and  
Employing America  
for a Brighter  
Economic Future*

NATIONAL ACADEMY OF SCIENCES,  
NATIONAL ACADEMY OF ENGINEERING, AND  
INSTITUTE OF MEDICINE

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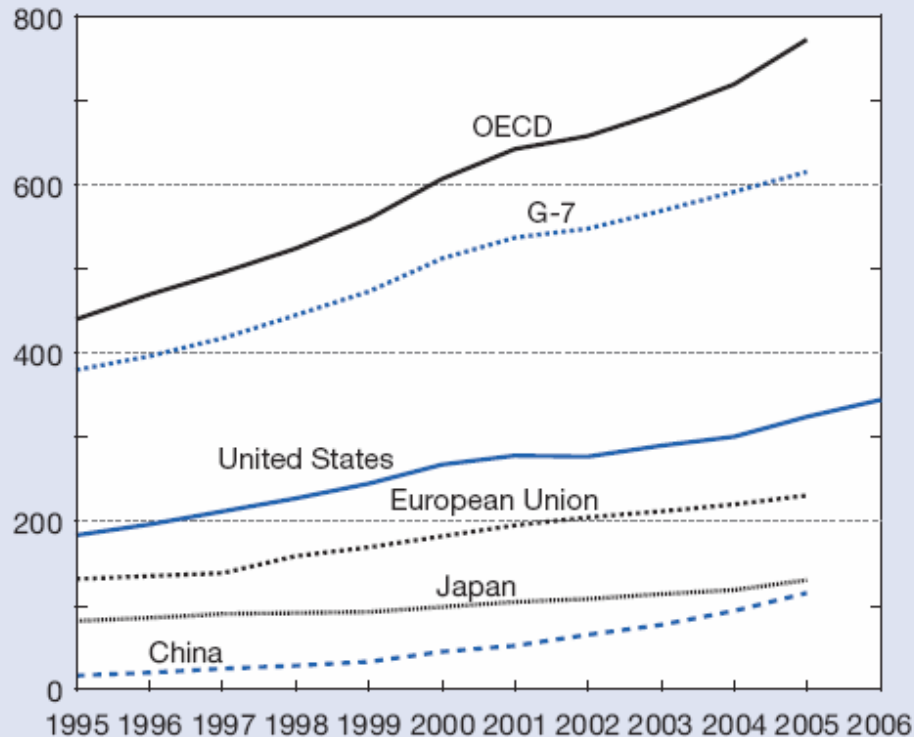
OF THE NATIONAL ACADEMIES

## Many countries are recognizing the science-economy (jobs) imperative

- US
- China
- Canada
- India
- Argentina
- European Union
- Israel
- Japan
- Australia
- Belgium
- Sweden

Figure O-20  
**Gross domestic expenditures on R&D, by selected region/country: 1995–2006**

Current PPP dollars (billions)



OECD = Organisation for Economic Co-operation and Development;  
 PPP = purchasing power parity

NOTE: European Union (EU)-25 from 1998–2000, EU-27 thereafter.

SOURCE: OECD, Main Science and Technology Indicators 2004–07.

*Science and Engineering Indicators 2008*

Other factors are also influencing the climate  
for science

## Major global contextual trends

- World events
  - Terrorism
    - September 11, 2001

## Impacts on science in and with the US

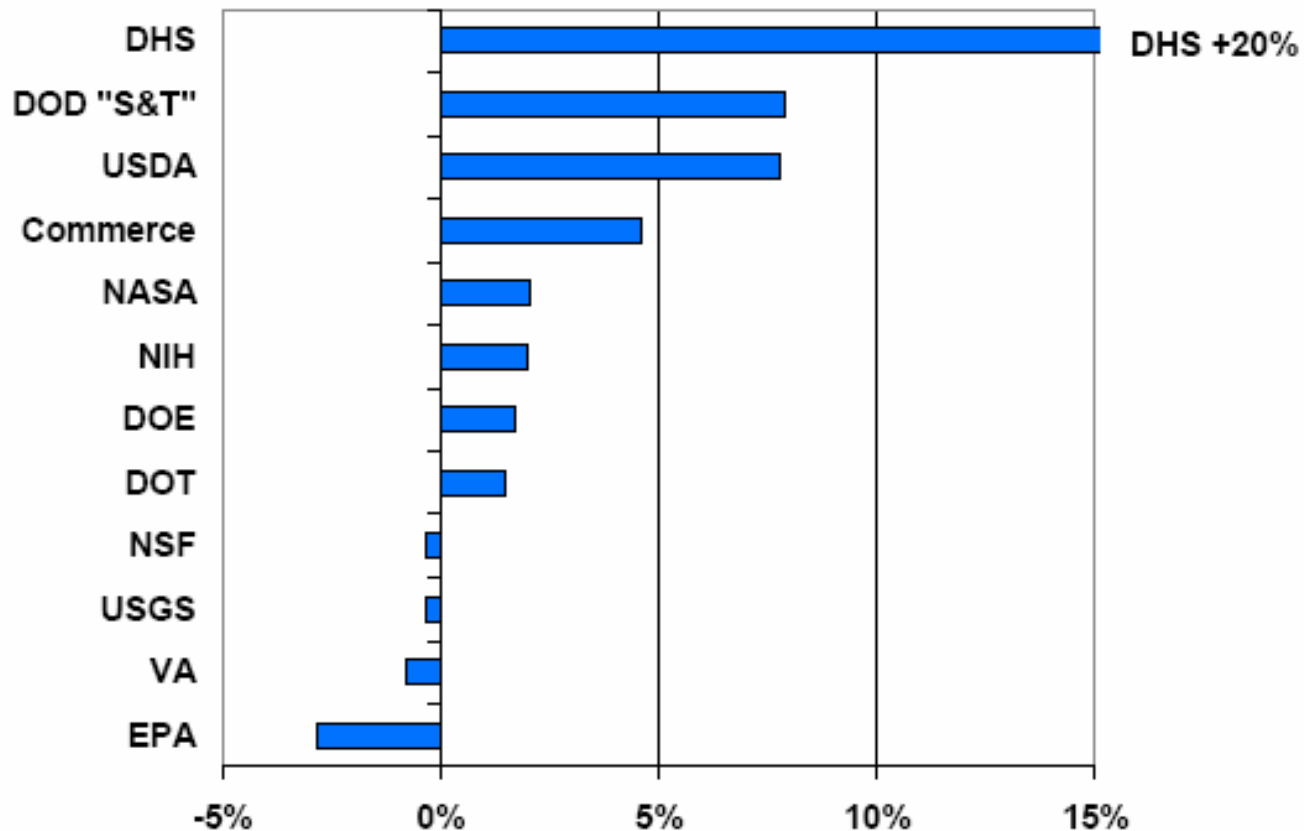
- Visa issues – foreign students & visitors
- Restrictive clauses in grants & contracts (export controls)
- Laboratory security – “select agents”
- Concerns about scientific publication
- “Sensitive but unclassified” information
- New US research priorities

## New research priorities

- Biosecurity
- Energy security
- Transportation security
- Cyber-security
- Safety of the food supply

# FY 2005 R&D FINAL

Percent Change from FY 2004

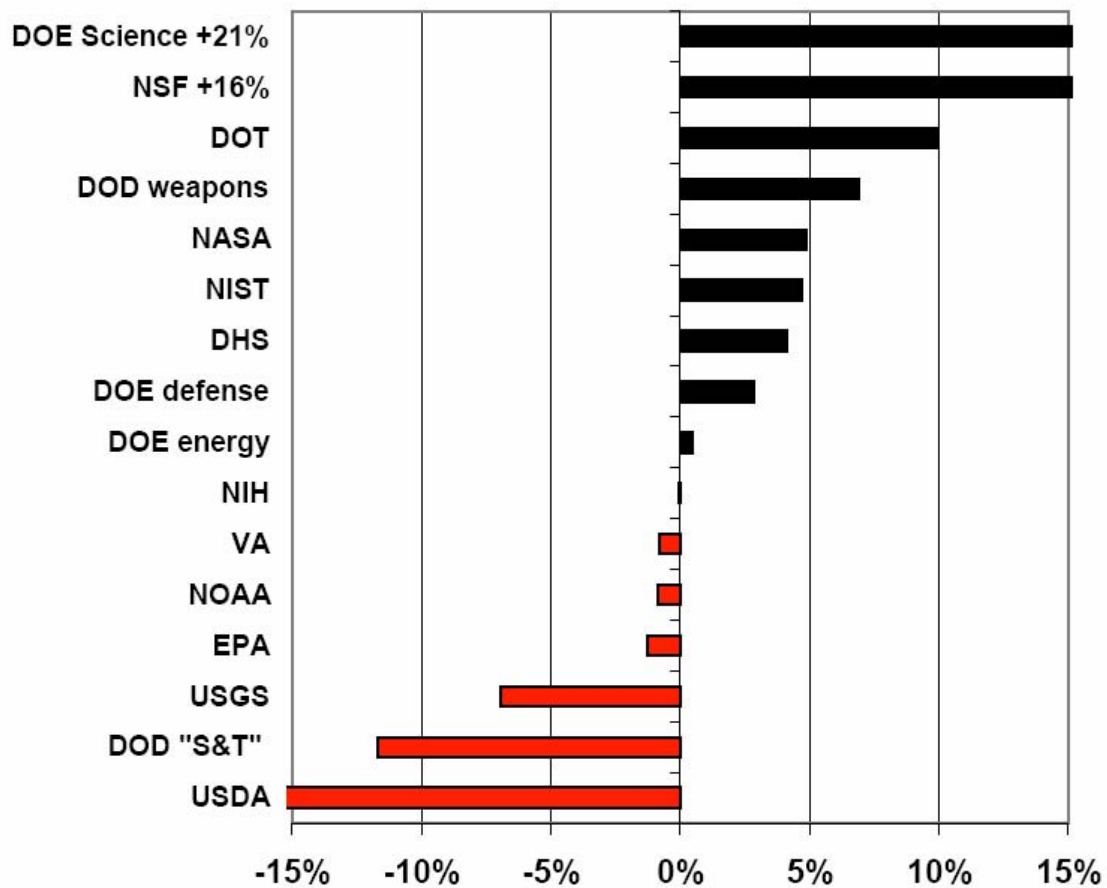


Source: AAAS estimates of R&D in FY 2005 final appropriations bills.  
DOD "S&T" = DOD R&D in "6.1" through "6.3" categories plus medical research.

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## FY 2009 R&D Request Percent Change from FY 2008



Source: AAAS, based on OMB R&D data and agency estimates for FY 2009.  
DOD "S&T" = DOD R&D in "6.1" through "6.3" categories plus medical research.  
DOD weapons = DOD R&D in "6.4" and higher categories.  
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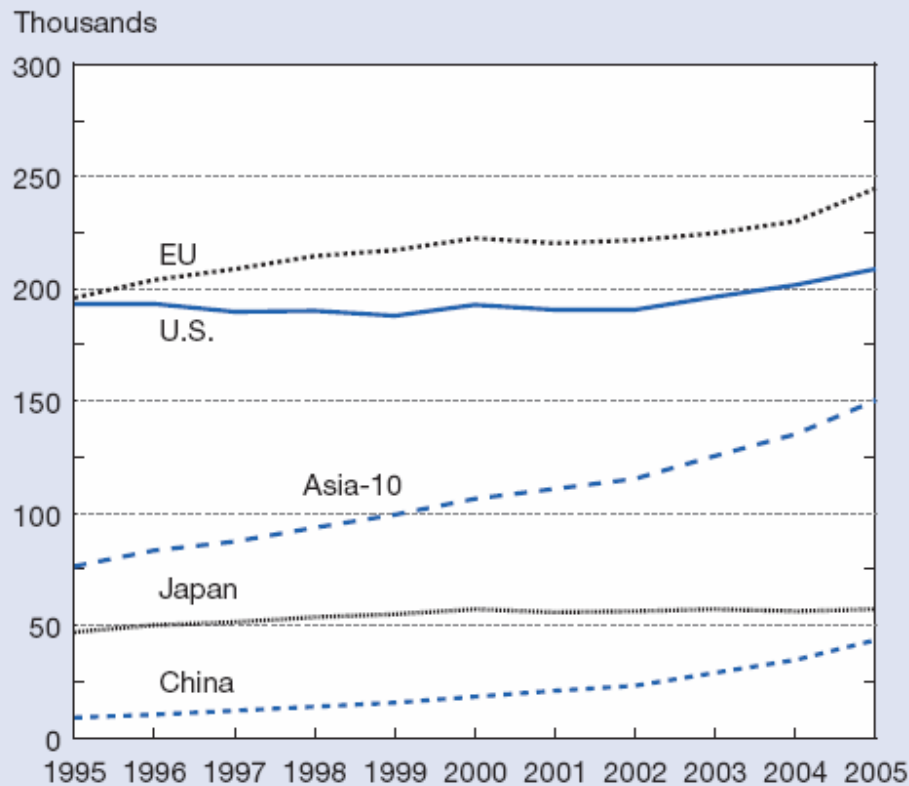
## Impacts: world events

- Have made collaboration much more difficult
- Altered US science funding patterns

## Major global contextual trends

- World events
- Increase in scientific activities around the world
  - Science is everywhere!

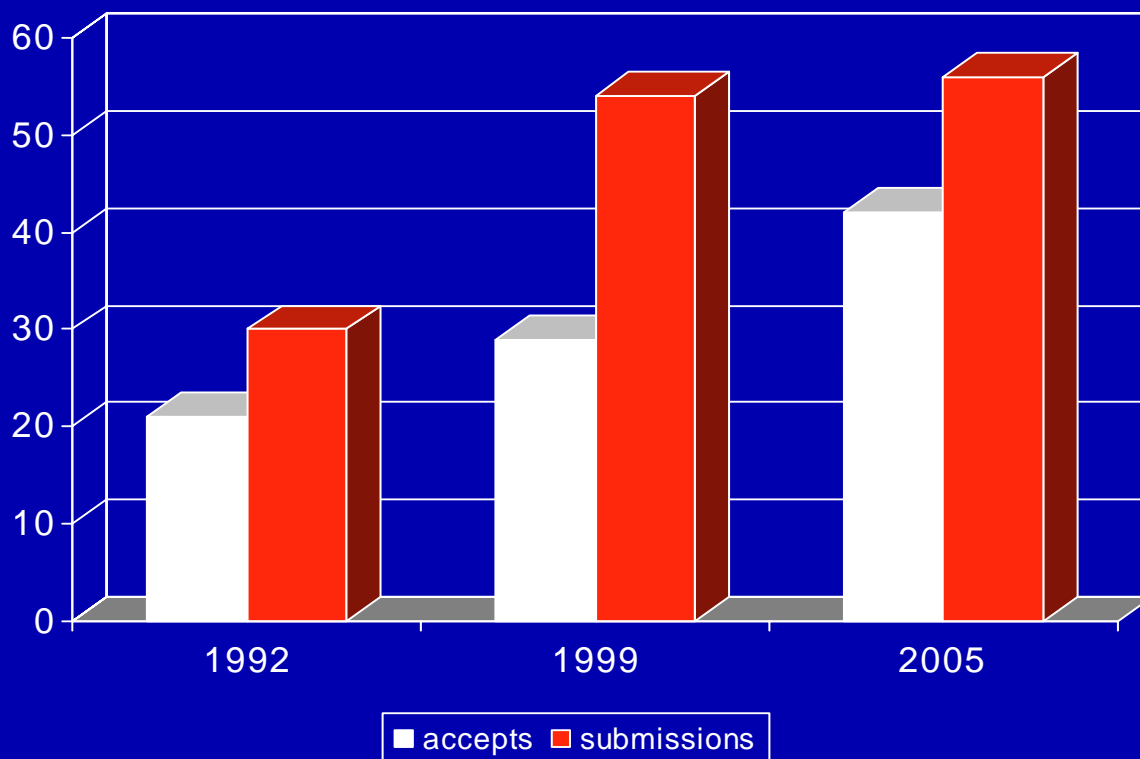
Figure O-18  
**Scientific and technical articles in peer-reviewed journals, by region/country: 1995–2005**



NOTES: Asia-10 includes China, India, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, and Thailand. China includes Hong Kong.

SOURCES: Thomson Scientific, Science Citation Index and Social Sciences Citation Index; iplQ Inc.; and National Science Foundation, Division of Science Resources Statistics, special tabulations.

## Percent international submissions and acceptances at *Science*, 1992-2005

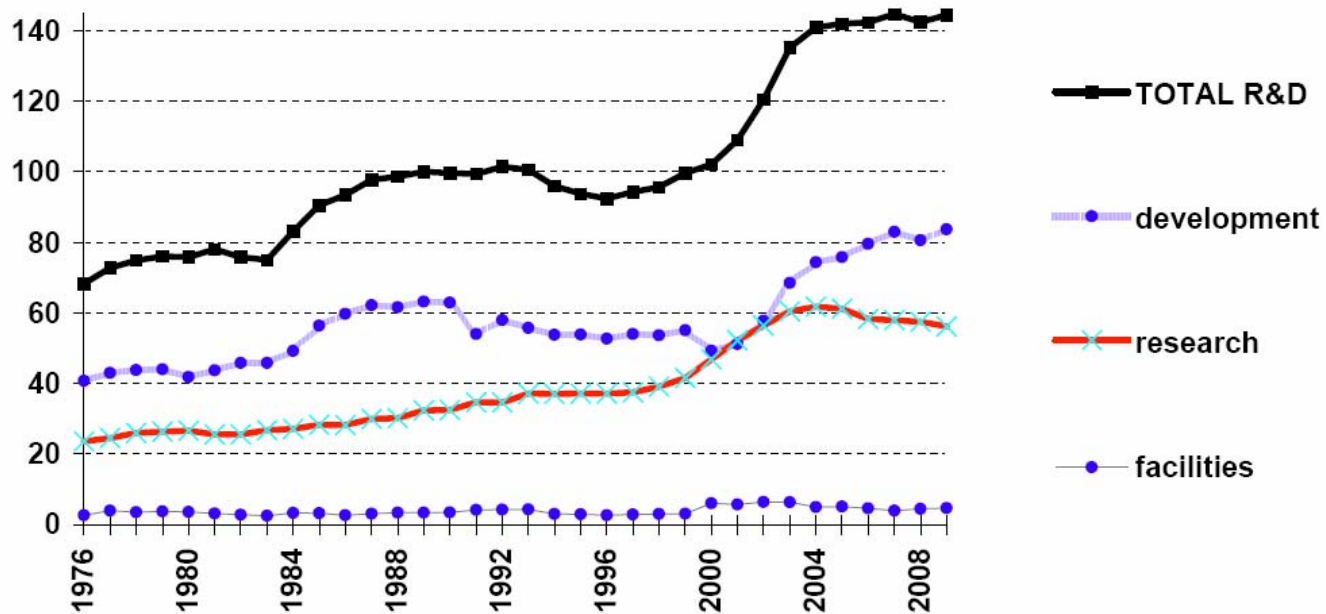


## Some Americans are getting worried

- Will the US no longer be pre-eminent?
- Is the US losing even its eminence in certain fields?

## Trends in Federal R&D, FY 1976-2009 \*

in billions of constant FY 2008 dollars



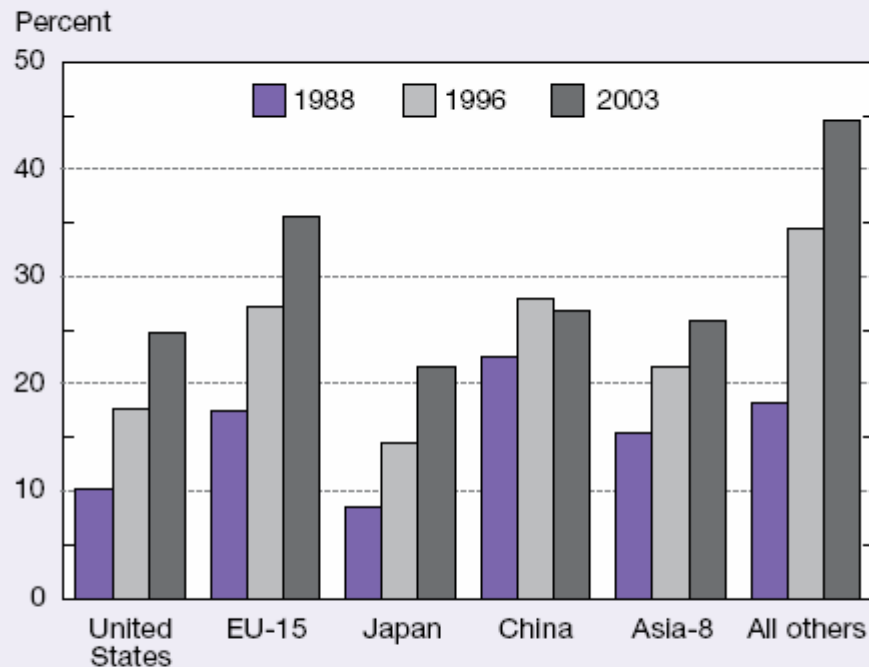
Source: AAAS analyses of R&D in annual AAAS R&D reports. \* FY 2009 figures are latest AAAS estimates of FY 2009 request. R&D includes conduct of R&D and R&D facilities. Data to 1984 are obligations from the NSF Federal Funds survey. GDP figures are from OMB, Budget of the U.S. Government FY 2009.  
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## Major global contextual trends

- World events
- Increase in scientific activities around the world
- Globalization of the research enterprise – international research teams

Figure O-19  
**Share of scientific and technical articles with international coauthorship, by country/region: 1988, 1996, and 2003**



EU = European Union

NOTE: Asia-8 includes South Korea, India, Indonesia, Malaysia, Philippines, Singapore, Taiwan, and Thailand.

SOURCES: Thomson ISI, *Science Citation Index* and *Social Sciences Citation Index*, <http://www.isinet.com/products/citation/>; iplQ, Inc.; and National Science Foundation, Division of Science Resources Statistics, special tabulations. See appendix tables 5-47, 5-48, and 5-49.

The broader, societal context for science  
and its uses is equally (or more) important

## *We have a problem*

- The science-society relationship is experiencing significant tension
  - Not just in the US

On the one hand

*We are living in the best of scientific times*

On the other hand....

Other issues within science are not going so well

- Incidents of scientific misconduct
- Human subjects concerns
- Animal welfare issues
- Conflict of interest problems

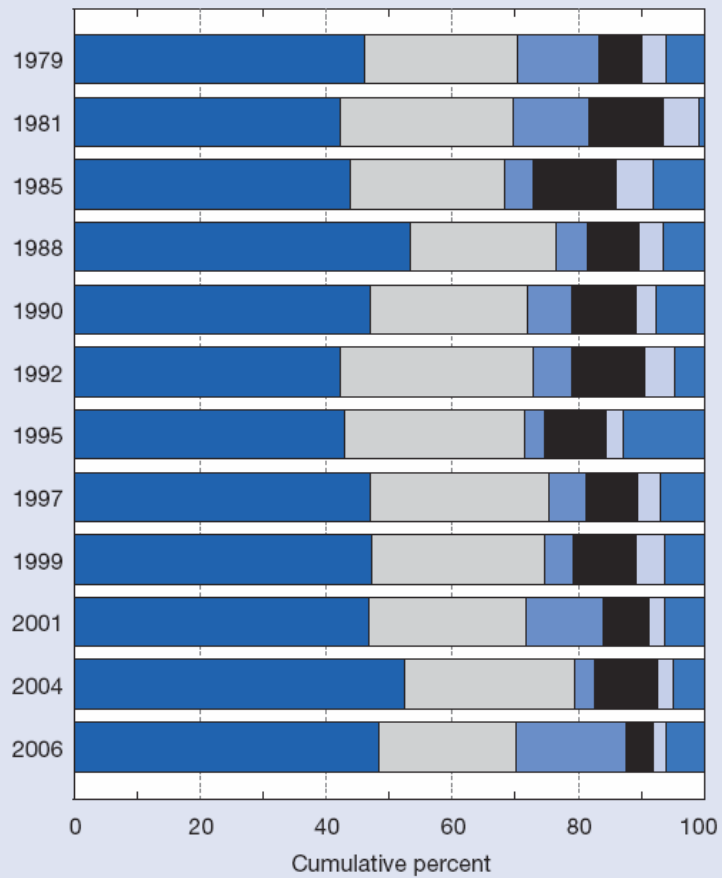
These are factors internal to science

- There are problematic external factors as well

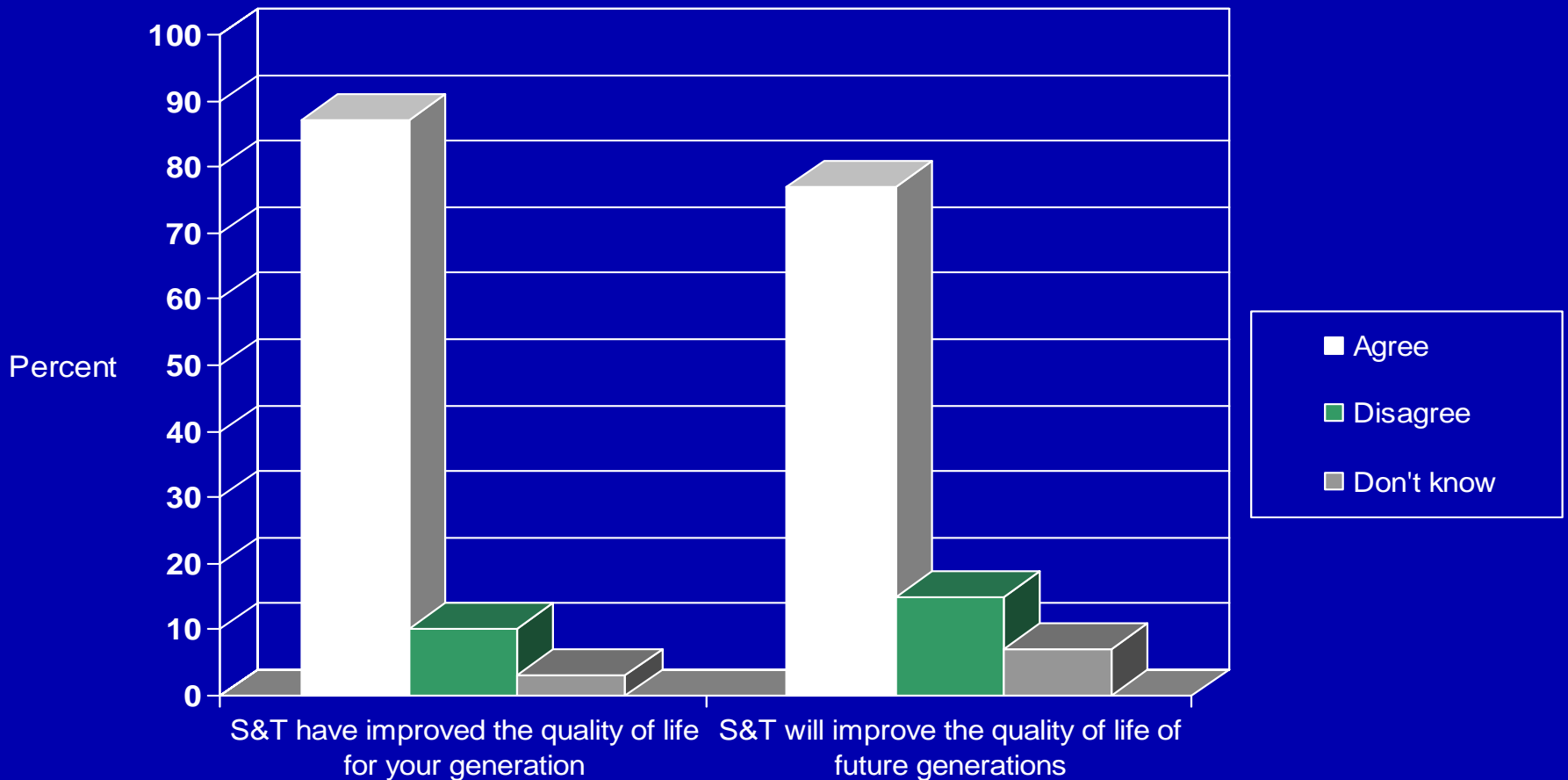
People generally still respect science and  
technology....

Figure 7-10  
**Public assessment of scientific research: 1979–2006**

- Benefits of scientific research strongly outweigh harmful results
- Benefits of scientific research slightly outweigh harmful results
- Benefits of scientific research are about equal to harmful results
- Harmful results of scientific research slightly outweigh benefits
- Harmful results of scientific research strongly outweigh benefits
- Don't know



## European Optimism Regarding Contributions of S&T to Quality of Life



Source: Eurobarometer, 2005

## They have little understanding of what is and is not science

- 60% of Americans believe in extrasensory perception
- 41% think astrology is somewhat scientific
- 47% still do not answer “*true*” to the statement: “Human beings developed from earlier species of animals”

## What do Europeans consider as scientific?

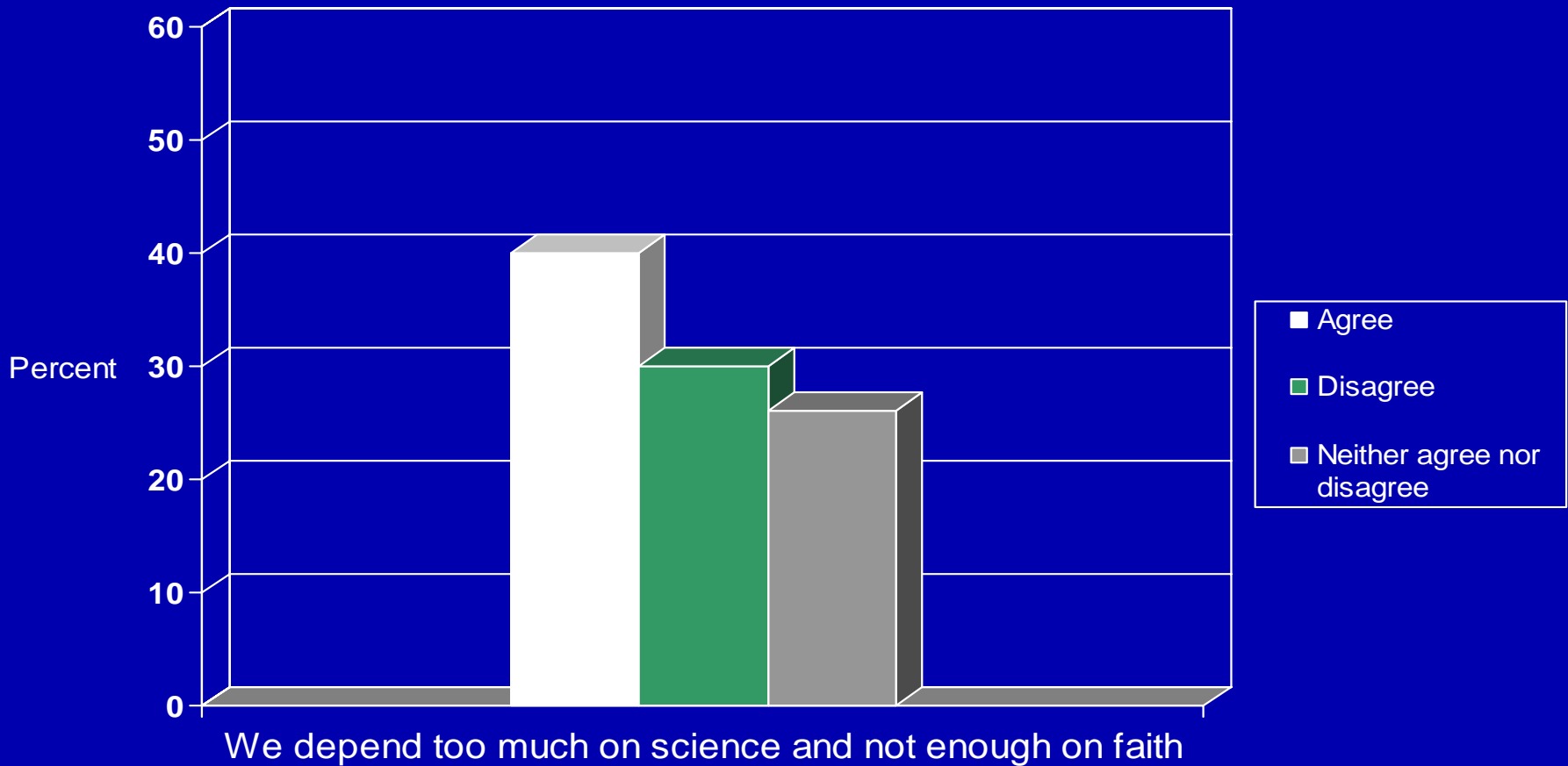
- Medicine – 89%
- Physics – 83%
- Astronomy – 70%
- History – 34%
- Astrology – 41%
- Homeopathy – 33%

Source: Eurobarometer, 2005

## Some Americans have reservations about science

	<u>Agree</u>	<u>Disagree</u>
	%	%
We depend too much on science and not enough on faith	50	45

## European Views of Science and Faith



Source: Eurobarometer, 2005

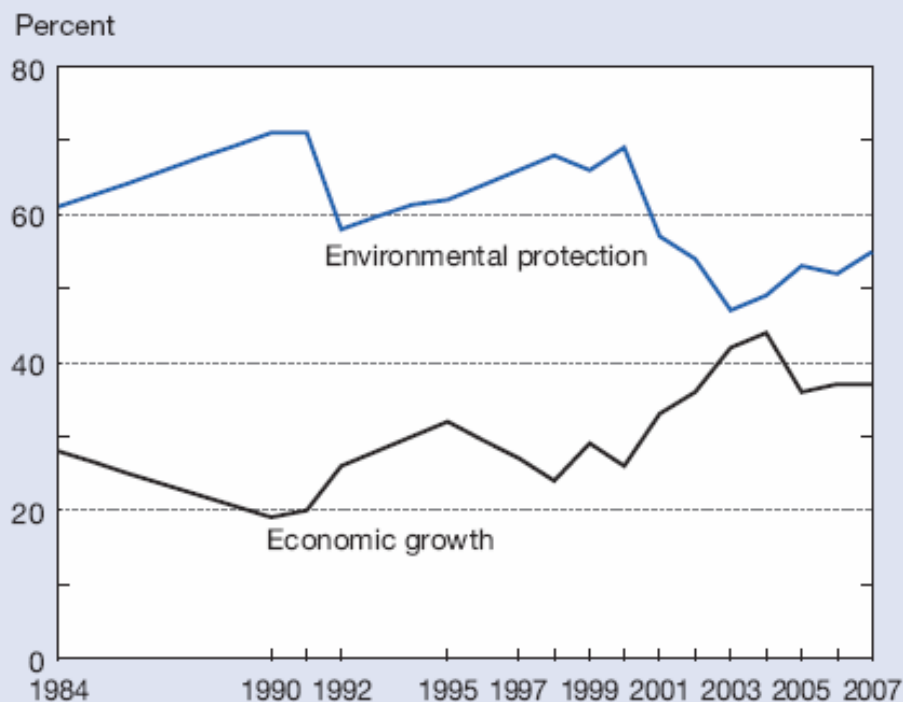
Much science-society tension results from conflicts between scientific findings and

- Political/economic expediency
- Core human values

## Political/economic issues

- Climate change
- Alternative energy sources

Figure 7-15  
**Public priorities for environmental protection  
versus economic growth: 1984–2007**



NOTES: Responses to: *With which one of these statements about the environment and the economy do you most agree—protection of the environment should be given priority, even at the risk of curbing economic growth (or) economic growth should be given priority, even if the environment suffers to some extent?* Poll conducted in 1984, 1990–92, 1995, 1997–2006; other years interpolated.

SOURCE: Gallup's Pulse of Democracy: Environment, Gallup Brain, <http://brain.gallup.com/content?ci=1615>, accessed 24 May 2007.

*Science and Engineering Indicators 2008*

## Current scientific issues that abut against core values

- Embryonic stem cell research
- Studying “personal” topics
  - Sex
  - Genetics of behavior
- Neuroscience – mind/body issues
- Teaching “Intelligent Design” versus evolution in science classrooms

“Conflict” with politics and values has  
consequences for the science-society relationship

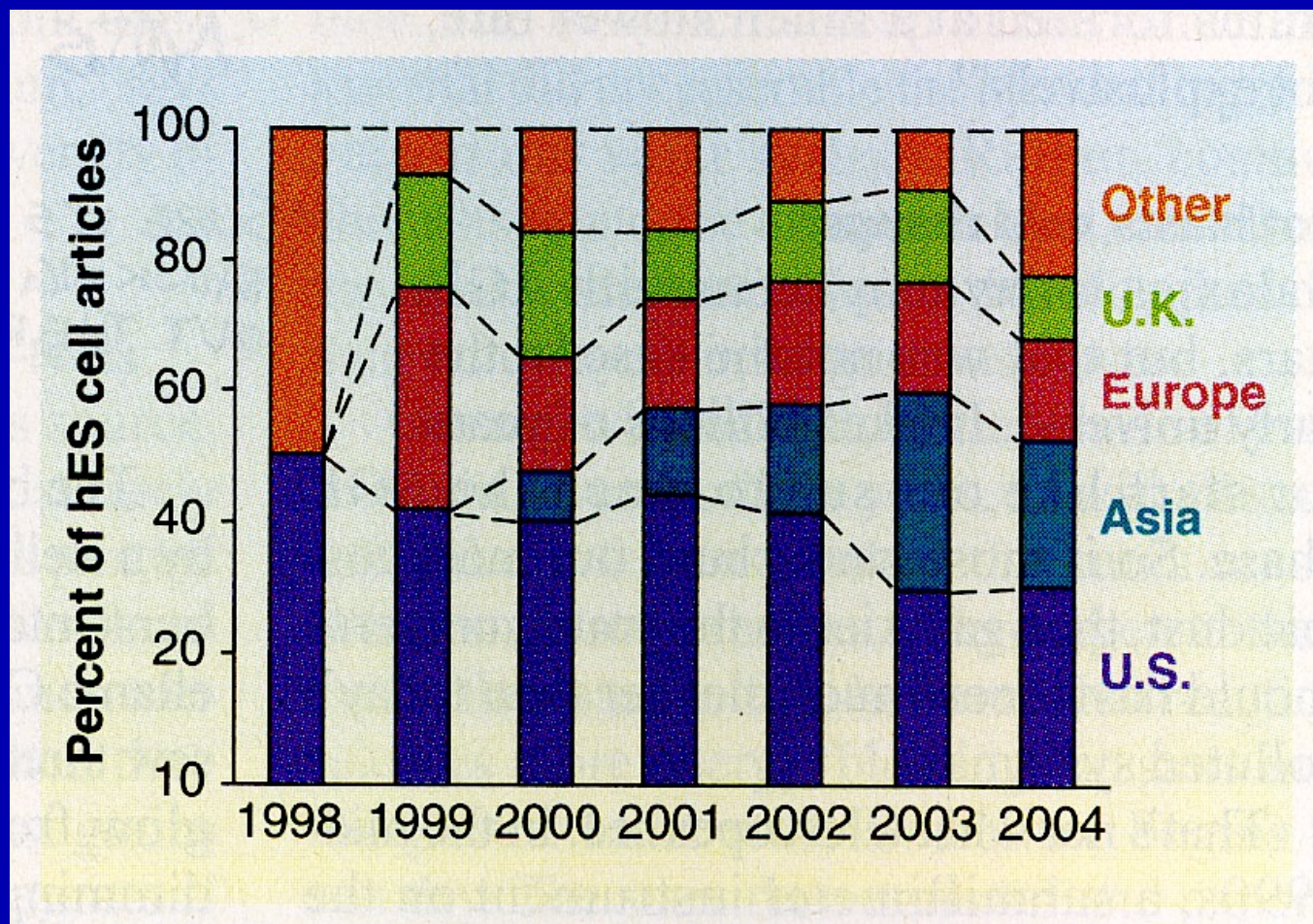
- Creating a growing divide between science and the rest of society
- Society wants to influence what science is done

Why do/should we care?

## Scientific agenda can be significantly skewed or constrained

- Inadequate research on alternative energy sources
- No US Federal funding for embryonic stem cell research
  - Limits ability of US scientists to do research

## Origin of Embryonic Stem Cell Papers



Source: Levine, A., Politics and the Life Sciences, Sept. 14, 2005.

The purpose of science is to tell us about the  
nature of the natural world

- Whether we like the answer or not

Cong. Rush Holt, AAAS Carey Lecture, 2005

## Only scientists are stuck with what science says/shows

- The public and/or policy makers can ignore or distort science at will

## Ignoring or distorting science undermines public policy

- Environment
- Energy
- Health care

If governments choose to ignore scientific  
advice, they do so at the peril of their people.

Sir David King, Science Adviser to UK Government  
at AAAS, Sept. 2005

Ignoring or distorting science undermines the general public's ability to use science for their own benefit

- Science is imbedded in every issue of modern life
- Lower quality US science education can mean a weaker labor force

## What is the prospect for the future?

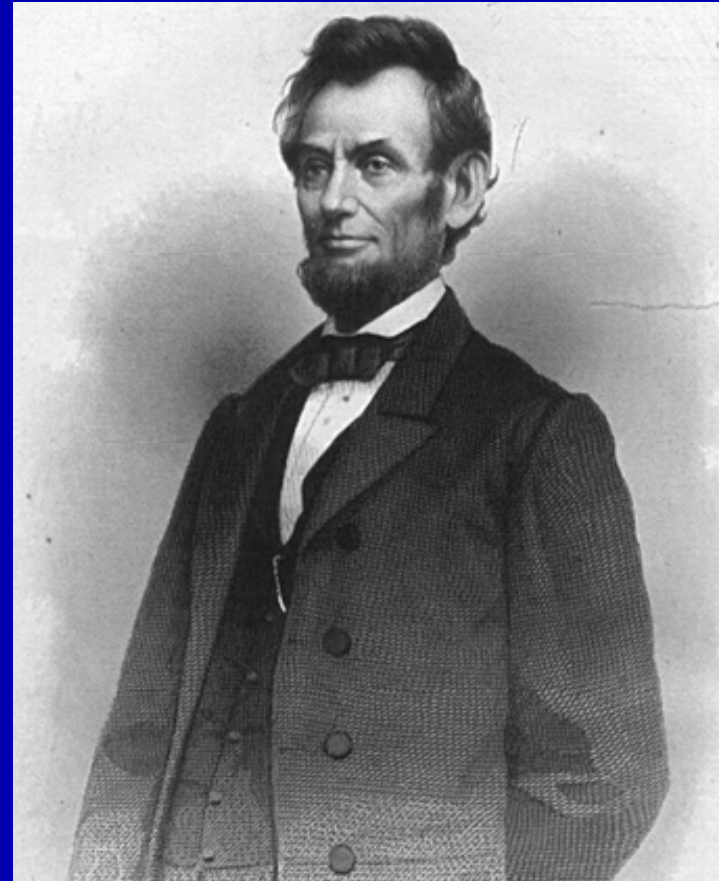
- US will have a new Administration
  - Will have to face a very broad array of science-related issues
  - Both Obama and McCain seem “science friendly”
    - Climate/energy policy
    - Space policy
    - Science and math education
    - Embryonic stem cell policy
    - Agriculture issues
- Funding?
  - Depends on both Administration and the Congress

## AAAS and others are working on the broader science-society relationship

- Moving from public understanding to public engagement strategy
  - Catching up with Europe
- Dialogues between science and religion
  - Environment
  - Teaching evolution in the schools

Public sentiment is  
everything. With public  
sentiment, nothing can fail;  
without it, nothing can  
succeed.

Abraham Lincoln



## AAAS and Europe have wonderfully close ties

- Serve the globalization of science
- Advance the progress of science
- Promote the worldwide science-society nexus

A photograph of a baby with wild, spiky white hair and a grey mustache drawn on its upper lip. The baby has large blue eyes and is looking directly at the camera with a neutral expression. The background is plain white.

Science

You can't start young enough

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