Federal Funding, Physical Sciences Research, China, and the U.S. Congress

APS Advocacy Efforts

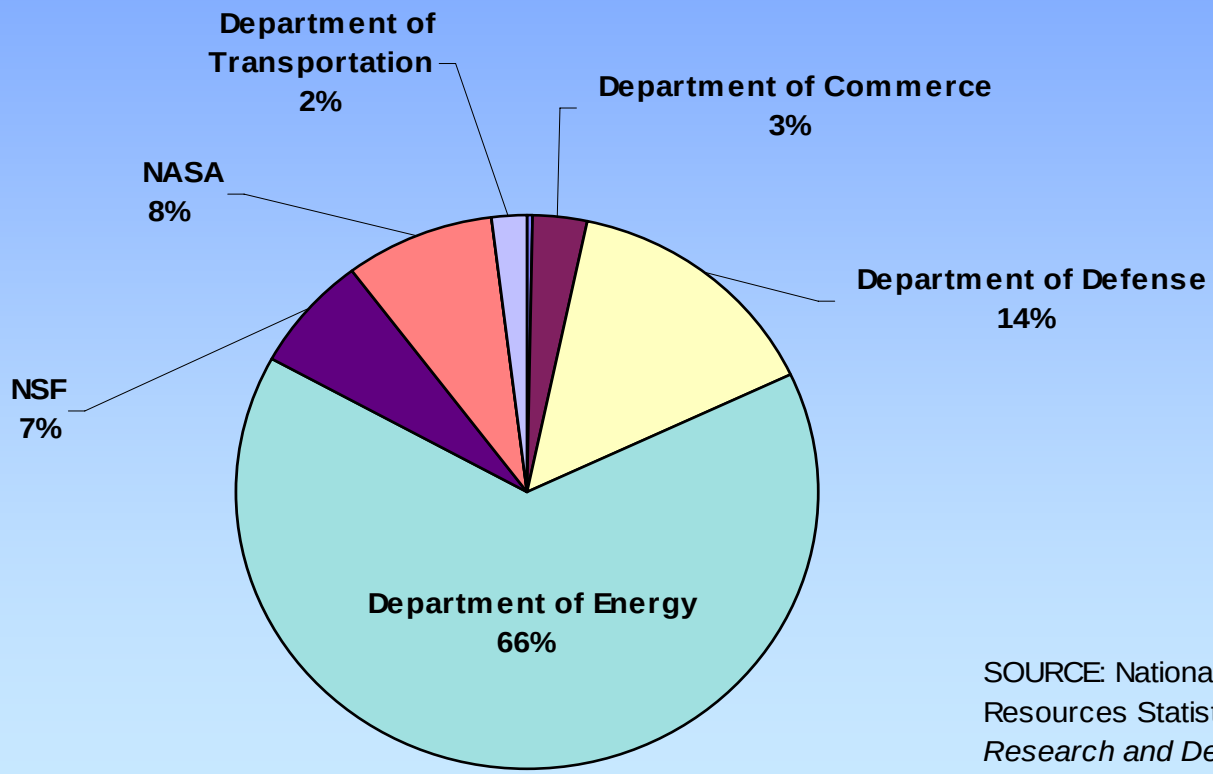
Steve Pierson, Ph.D.

Head of Government Relations, APS

Outline

- Federal Funding for the Physical Sciences
  - Who, how, why
  - Outlook
- World competition for High-Tech jobs & Science Leadership
- Advocacy Strategy

Federal Funding for Physics Research



FY 2001

Total: $2.46 Billion

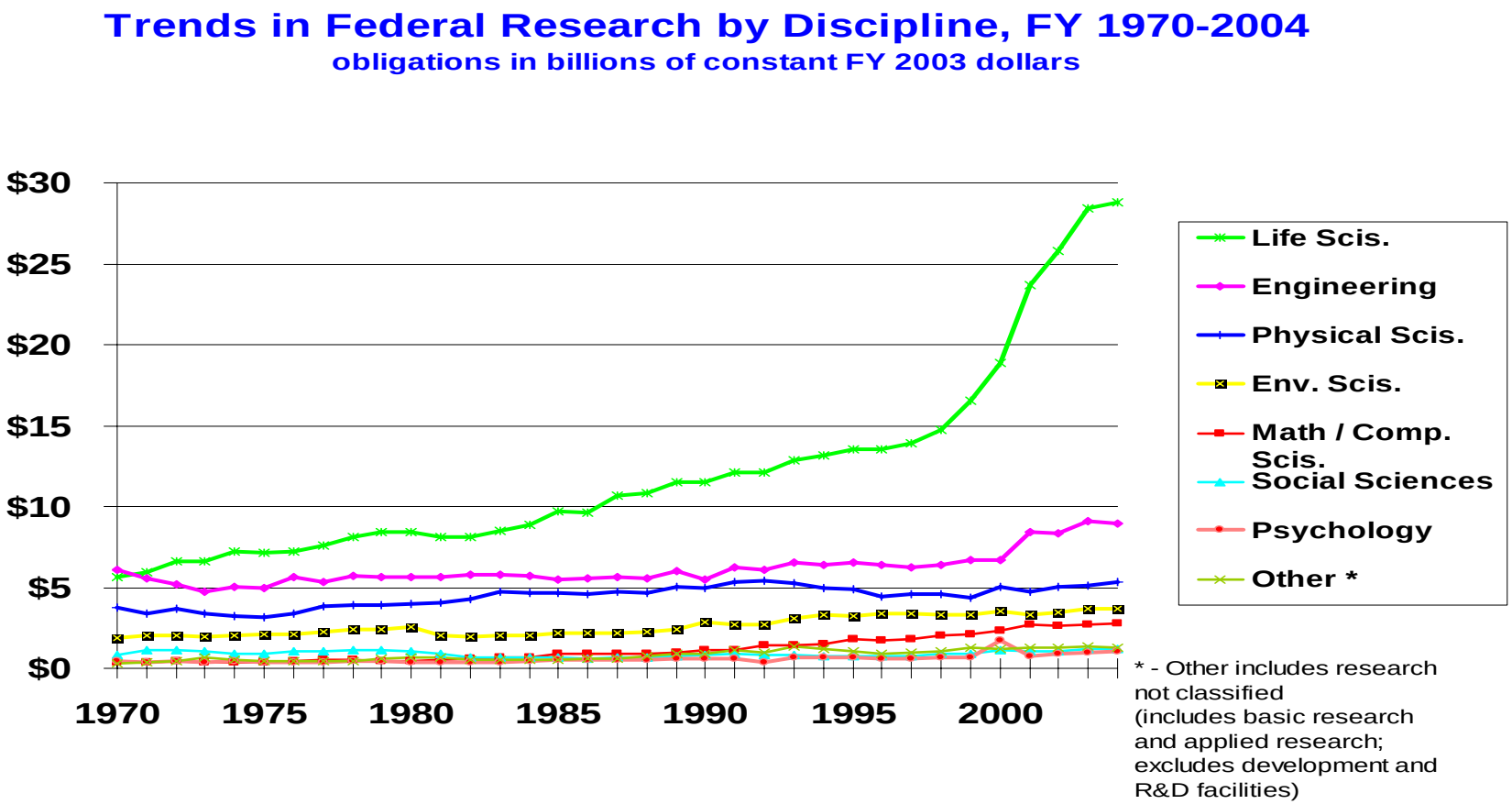
SOURCE: National Science Foundation/Division of Science Resources Statistics, *Survey of Federal Funds for Research and Development: Fiscal Years 2001, 2002, and 2003* , Table C-24.

APS physics

AZ Physical Science Federal Funding

- DOE Office of Science
  - $7.5 million (FY04): U of A, ASU, NAU
  - 115 AZ scientists using DOE Office of Science facilities
- NSF
  - $139 M (FY05)
    - Ranked 11th (out of 50 states)
    - $75 M from MPS, $61 M for AURA
  - 20 Different Institutions

Funding trends

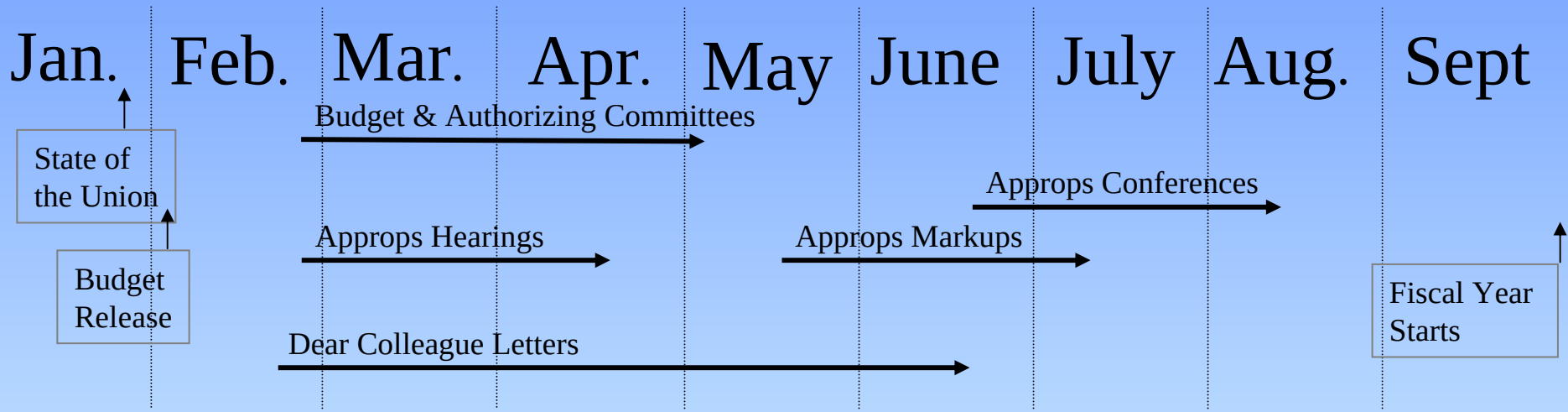


Source: National Science Foundation, *Federal Funds for Research and Development FY 2001, 2002, and 2003,* 2003. FY 2002 and 2003 data are preliminary. Constant-dollar conversions based on OMB's GDP deflators.

American Association for the Advancement of Science

Why the flat funding?

Determining a Federal Budget



President requests budget

House and Senate versions

Conference Committees

➔ House and Senate

Sent to President

Congressional Appropriations

- Appropriations Subcommittees
  - 11 in Senate
  - 10 in House
- Each subcommittee given a fixed allocation
- Commerce, Justice, Science Subcommittee
  - NSF, NASA, NIST, NOAA, FBI, DOC, …
- Energy and Water Subcommittee
  - DOE Office of Science, DOE programs, Water

Why the flat funding?

- Has not been an Administration priority
- Competition within spending bills
- Large deficits
- No strong constituent support
  - NASA
  - NIH
  - Defense

Washington Environment Grim

NEWS OF THE WEEK

ENERGY SCIENCE

Tight Budgets Force Lab Layoffs

15 JULY 2005 VOL 309 SCIENCE www.sciencemag.org

SPACE AND EARTH SCIENCES

Budget Woes Greet NASA Science Chief

www.sciencemag.org SCIENCE VOL 309 19 AUGUST 2005

HIGH-ENERGY PHYSICS

Costs Force NSF to Cancel Brookhaven Project

www.sciencemag.org SCIENCE VOL 309 19 AUGUST 2005

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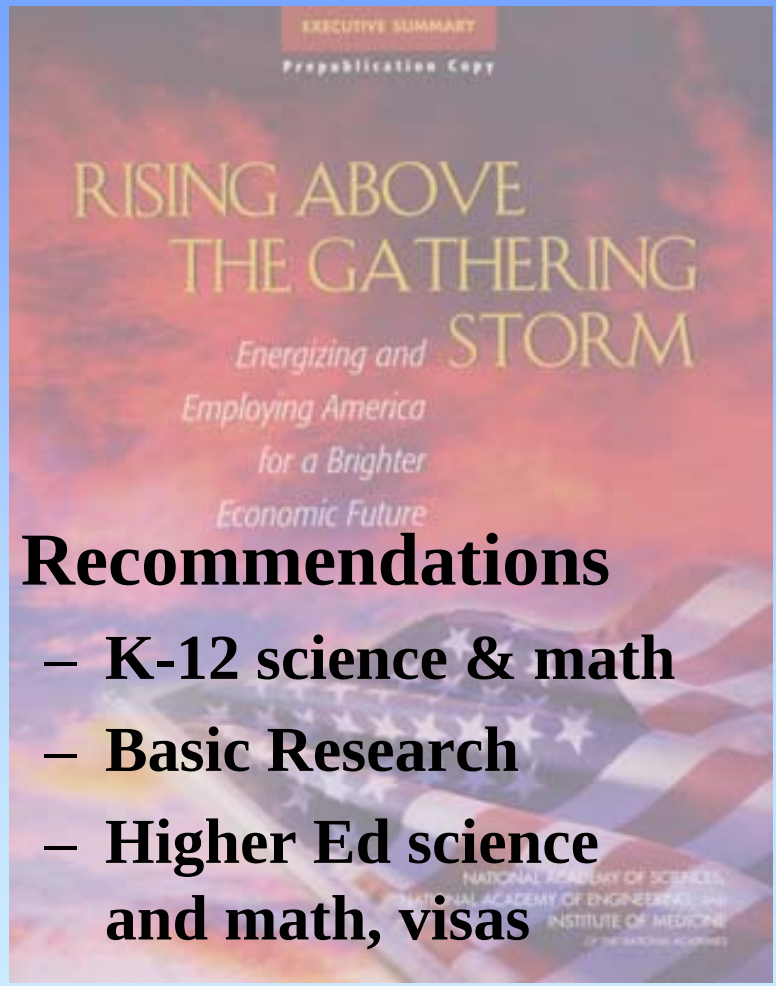
Outlook: Signs of Hope

- Congress
  - Mostly rejects requested cuts
  - 68 Senators sign DOE SC Dear Colleague
  - Wolf's efforts and competitiveness legislation
- Administration
  - Scientist/Engineer at helm of DOE & NASA
  - Rumors of Innovation Agenda
- Press/Media on U.S. Science leadership
  - Articles
  - Reports
  - Thomas Friedman's Book, The World is Flat

Rising above the Gathering Storm

- National Academy Report
  - Chair: Norm Augustine
  - CEO's of Intel, Exxon Mobile, Dupont Merck, Lockheed Martin
  - 7 University Presidents
  - 3 Nobel Laureates

http://www.nap.edu/catalog/11463.html



- **Recommendations**
  - **K-12 science & math**
  - **Basic Research**
  - **Higher Ed science and math, visas**
  - **Policy Reform**

“Competitiveness” Legislation

- Ensign/Lieberman Bills
  - Authorize doubling of NSF
- Protecting America’s Competitive Edge (PACE)
  - Domenici/Alexander/Bingaman/Mikulski
  - DOE Office of Science increases
- Gordon Bills (House Democrat Leadership agenda)

Message

Argument is not why Congress should increase research funding, but why they can’t afford not to.

Message

- Science good for
  - ~~Security~~
  - ~~Health~~
  - ~~Economy~~

Standard

New Jobs & Economic Growth!

Compelling

Message

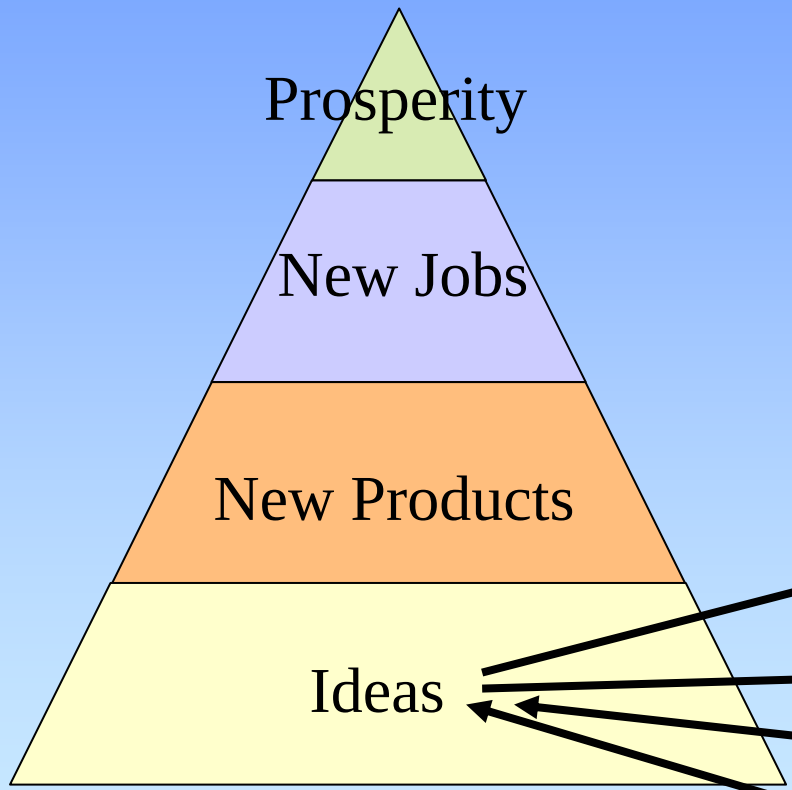
U.S Science leadership challenged, threatening U.S. prosperity and competitiveness.

Chinas and Indias of world rapidly building S&T infrastructure while U.S. remains complacent.

Results seen in:

- R&D Funding
- S&E Degrees (Undergrad & Grad)
- S&E Articles
- Patents
- High-Tech products
- Jobs!

The U.S. Innovation Economy: A Physicist's Model



Need to capitalize on new product before it becomes a commodity and is out-sourced.

Patents

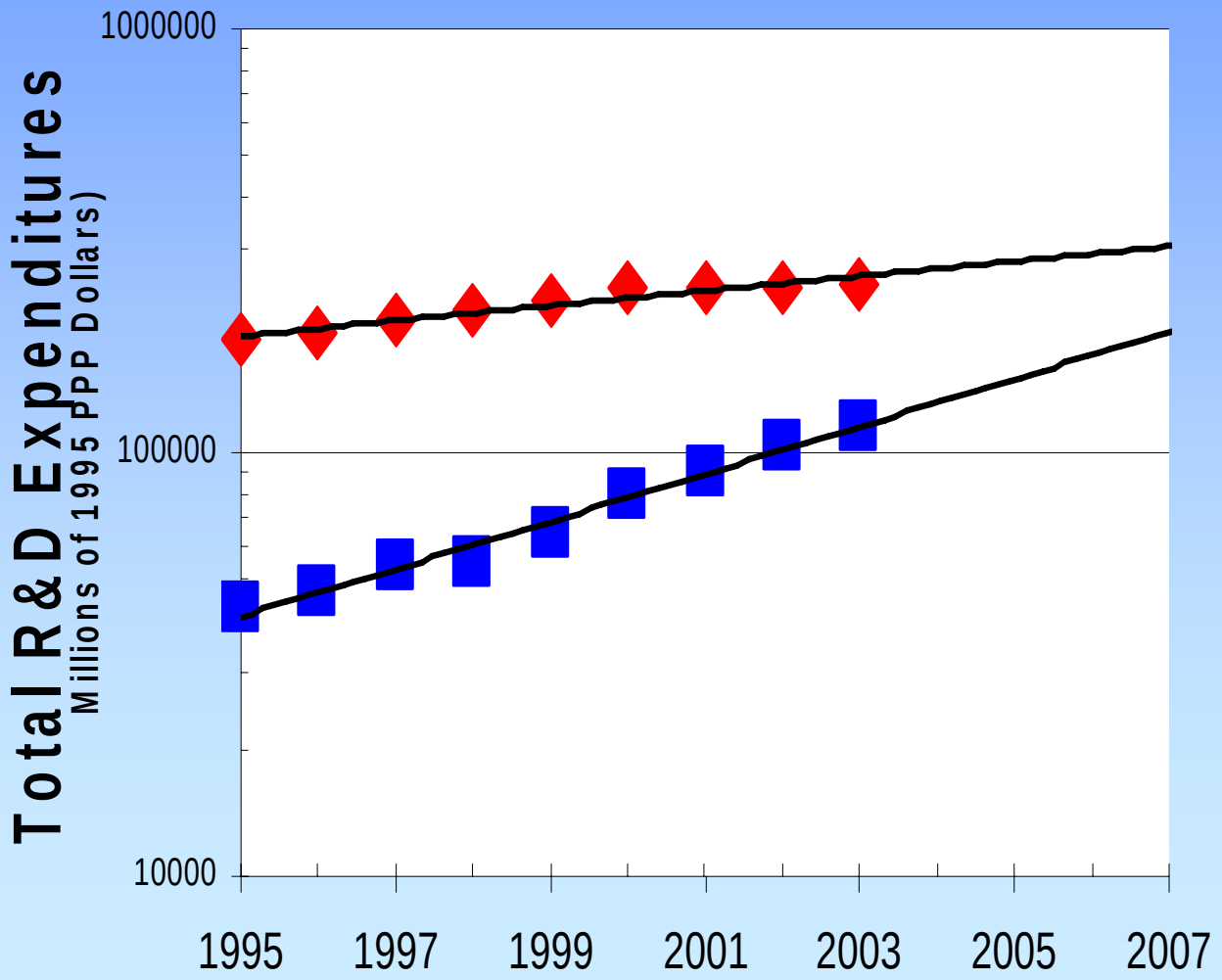
Articles

Scientists/Engineers

Research Investment

APS physics

R&D Investment



United States

Fastest Growing Economies

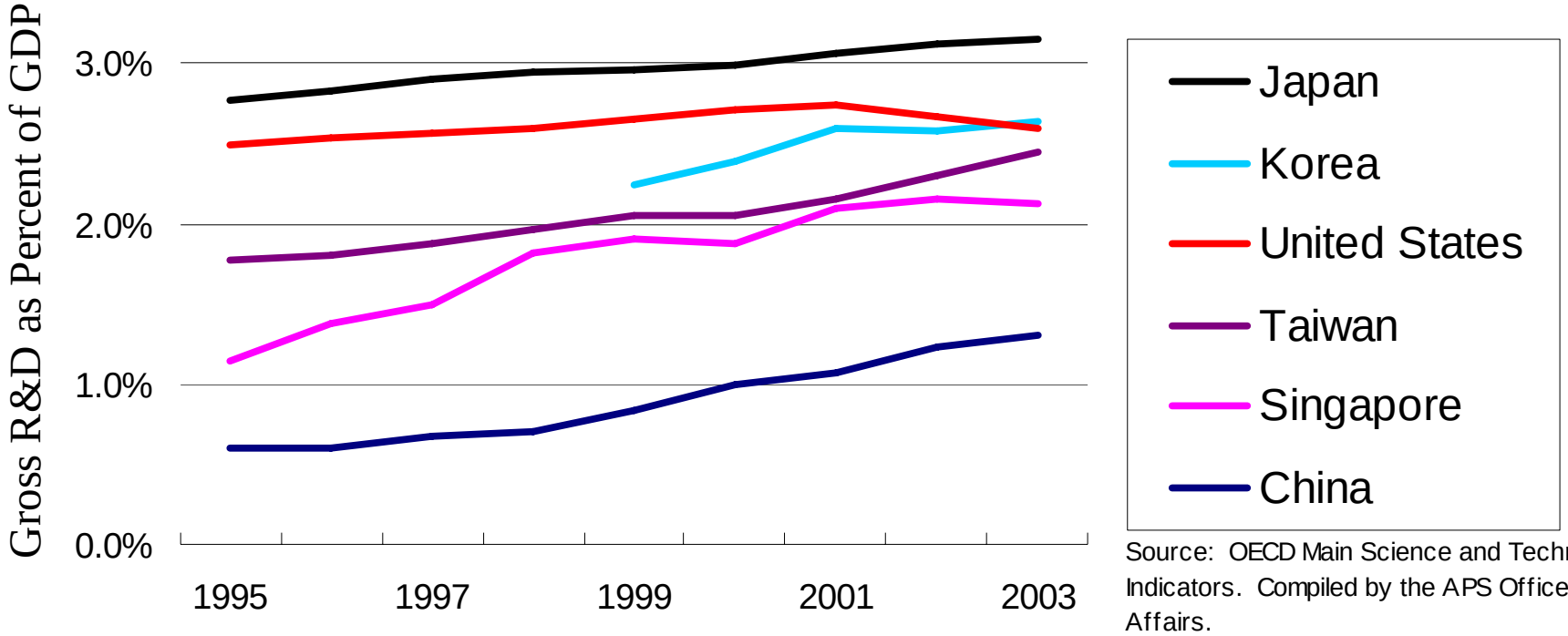
Fastest Growing Economies:
China, Ireland, Israel, Singapore, South Korea, Taiwan *(India and Hong Kong data not available)*

Source: OECD Main Science and Technology Indicators. Compiled by the APS Office of Public Affairs.

APS

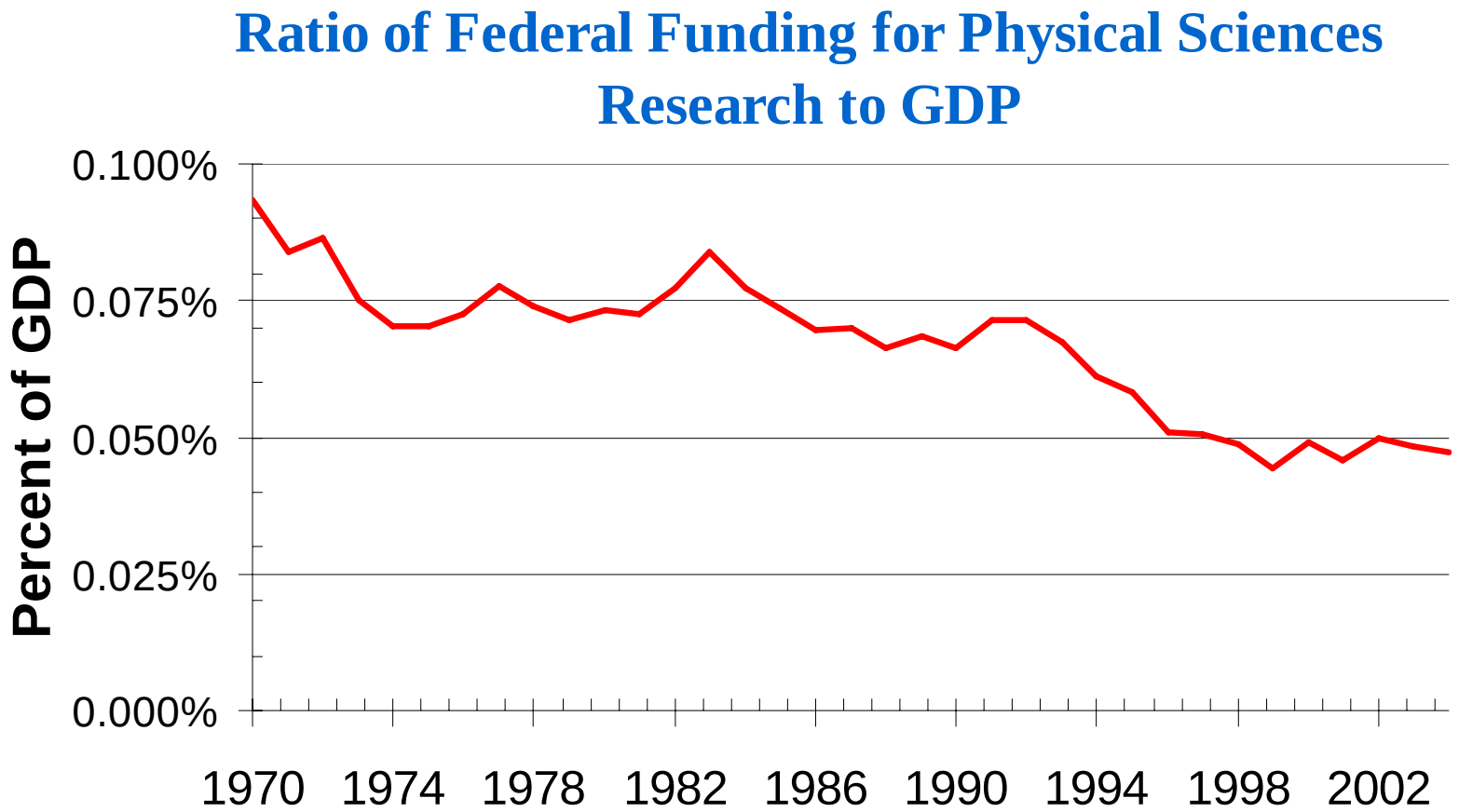
R&D Investment

Asian Countries building their R&D Investments



Source: OECD Main Science and Technology Indicators. Compiled by the APS Office of Public Affairs.

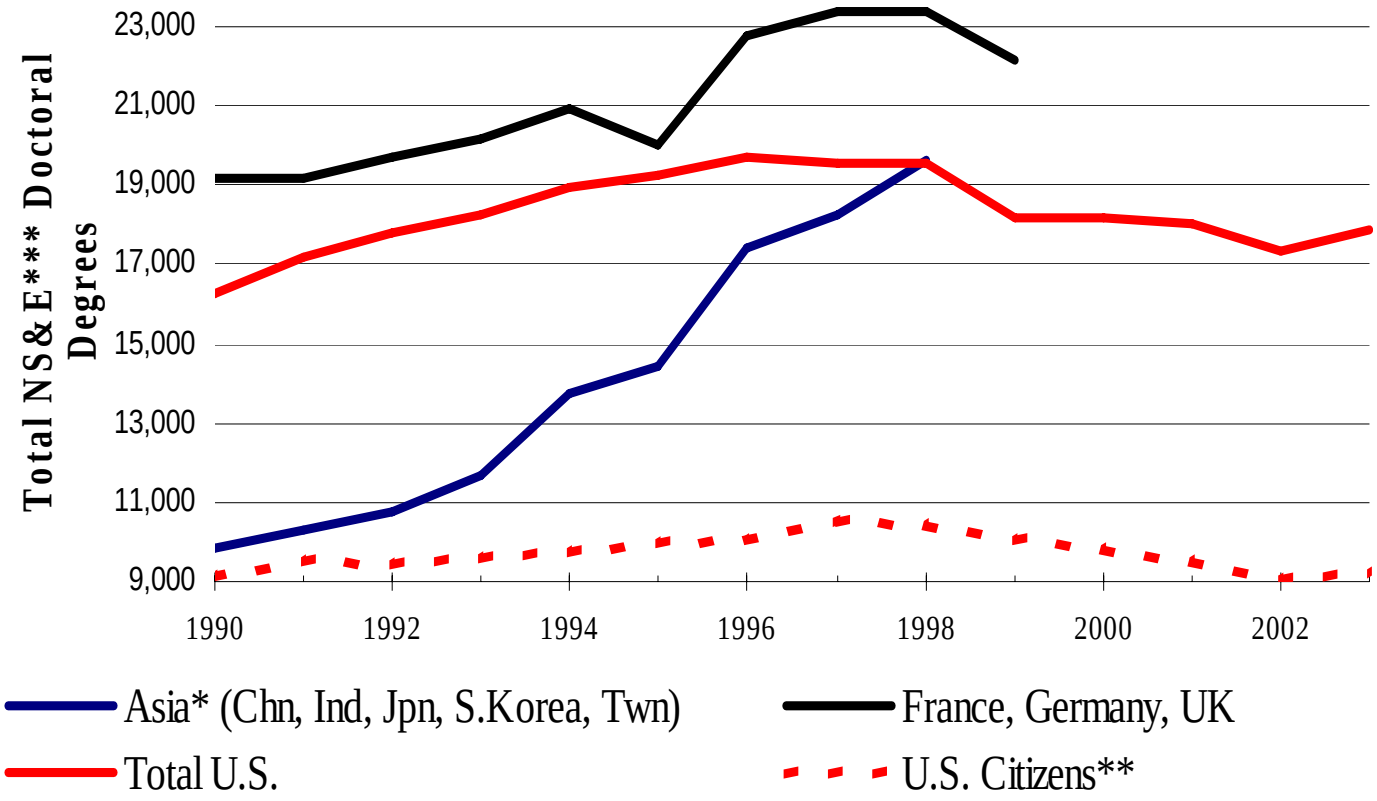
Federal Funding (cont'd)



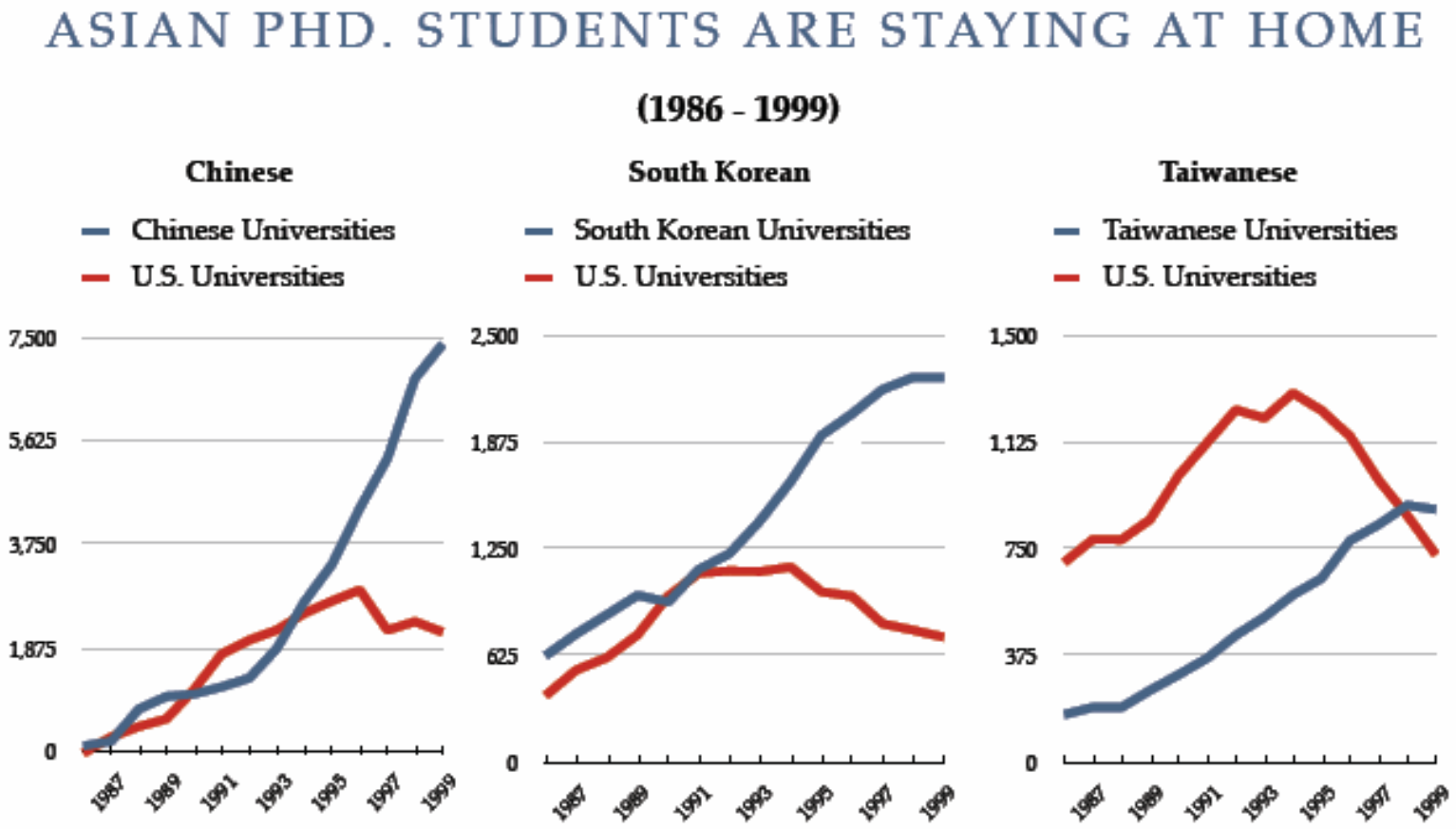
Source: American Asssociation for the Advancemt of Science. http://www.aaas.org/spp/rd/guidisc.htm. Compiled by the APS Office of Public Affairs.

Scientists and Engineers

Science and Engineering Ph.D.'s: U.S. passsed by Asia, trailing Europe

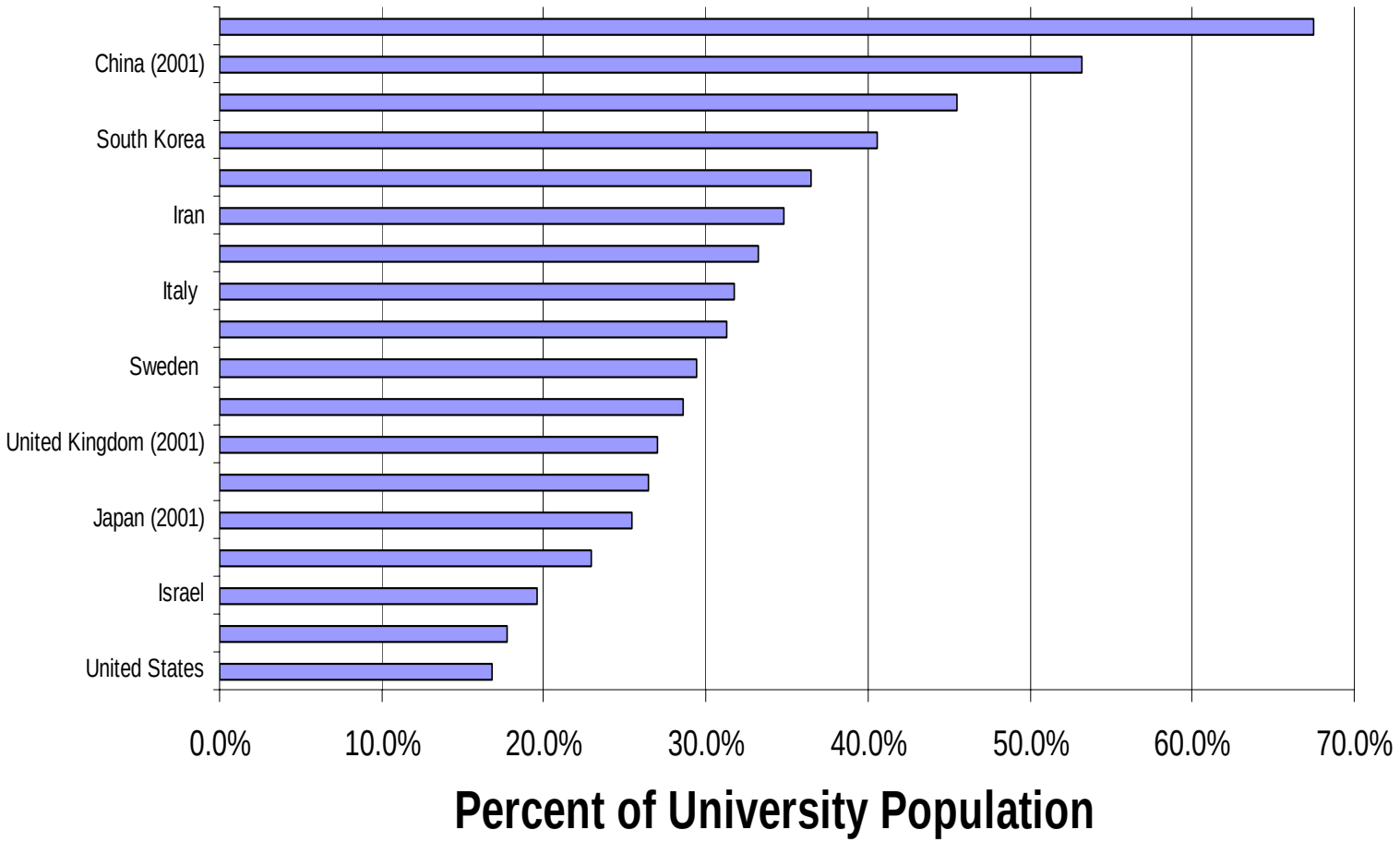


Scientists and Engineers



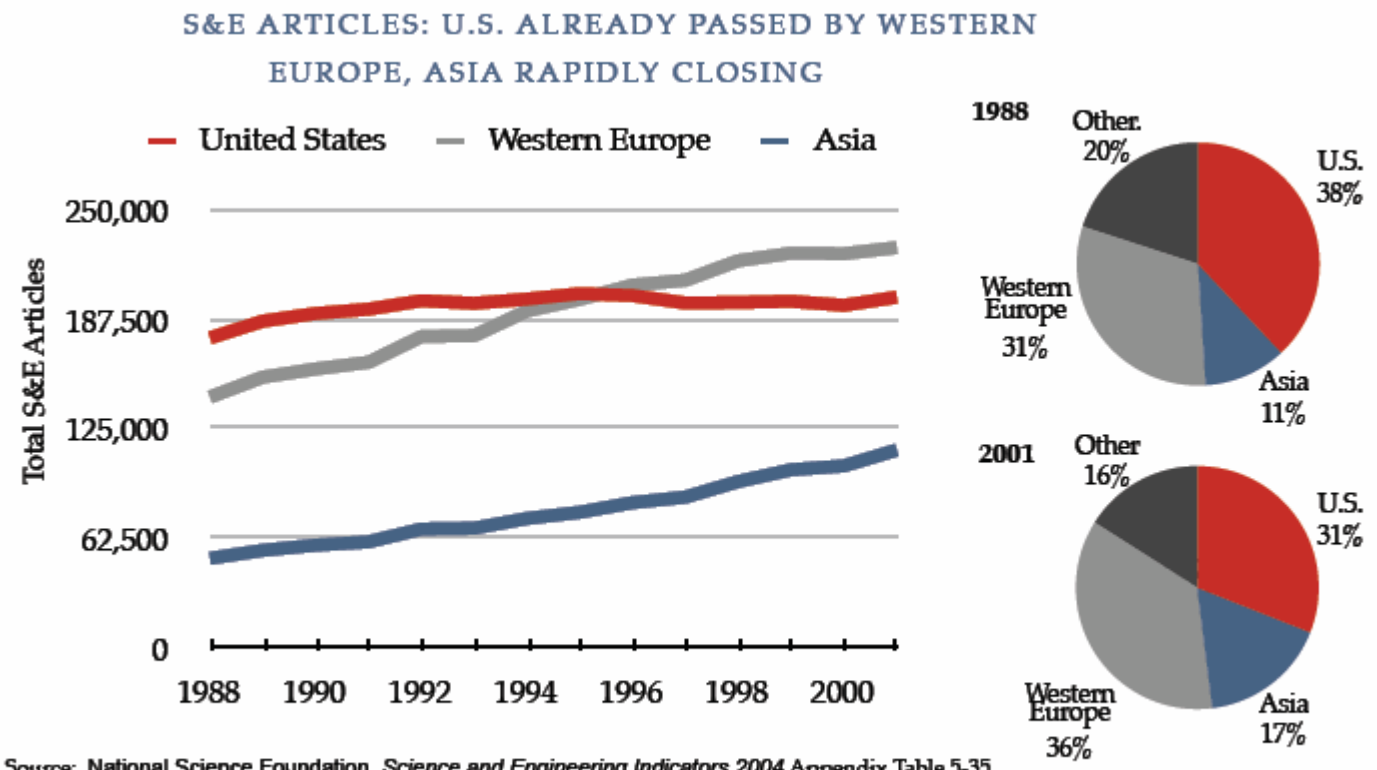
Source: National Science Foundation, *Science and Engineering Indicators 2002*, Appendix Table 2-41.
Adapted from Diana Hicks, "Asian countries strengthen their research," *Issues in Science and Technology*, Summer 2004.
Compiled by the APS Office of Public Affairs.

Science and Engineering Education



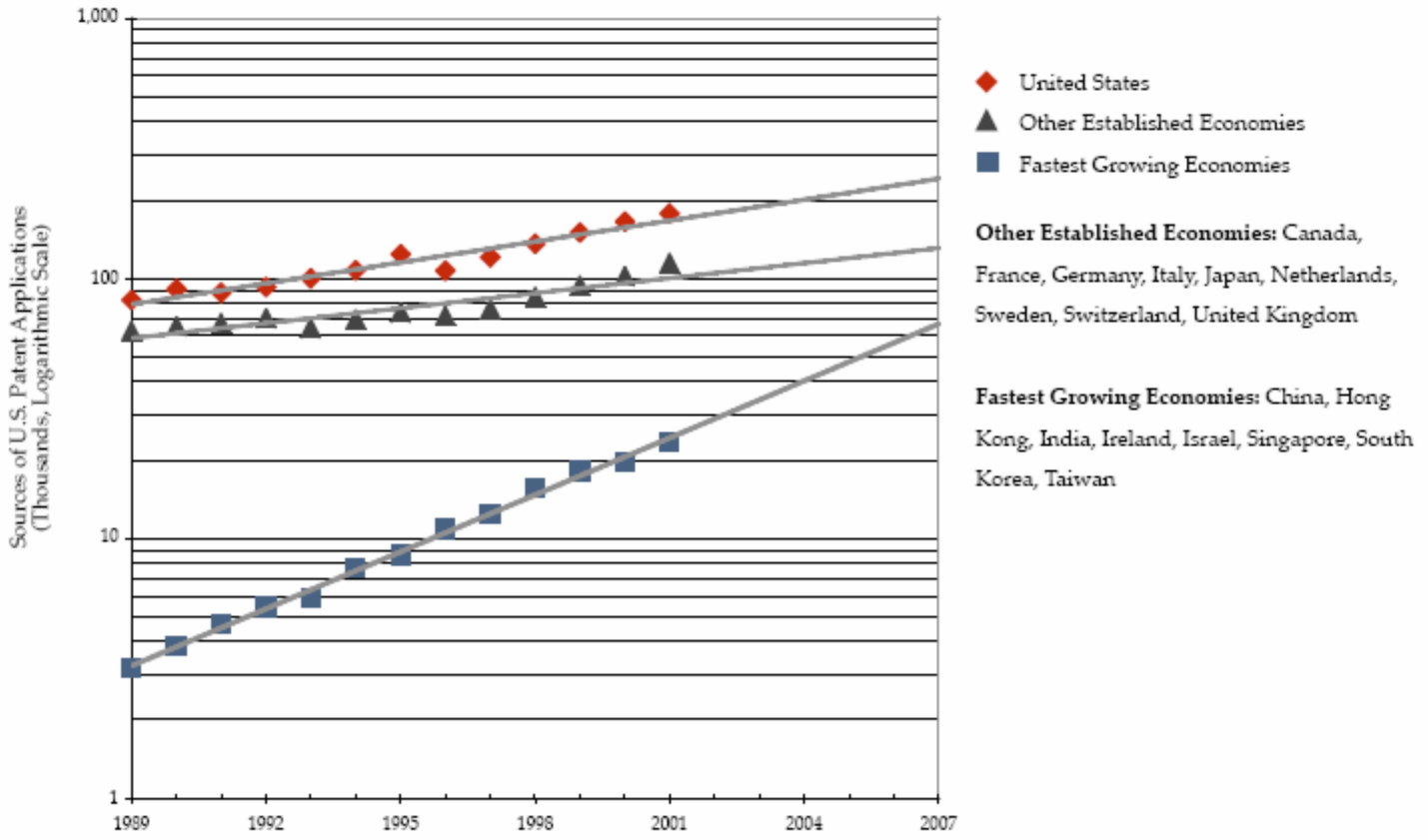
Source: 2004 NSF Science and Engineering Indicators. Appendix 2-33. Compiled by the APS Office of Public Affairs.

Knowledge Creation and New Ideas



Source: National Science Foundation, *Science and Engineering Indicators 2004*.Appendix Table 5-35.
Compiled by the APS Office of Public Affairs.

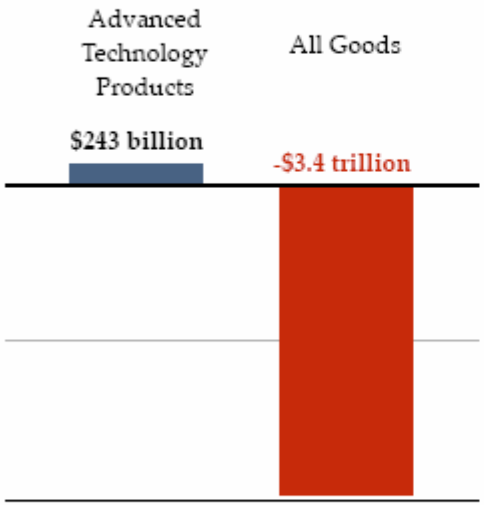
Knowledge Creation and New Ideas



High-Tech Economy

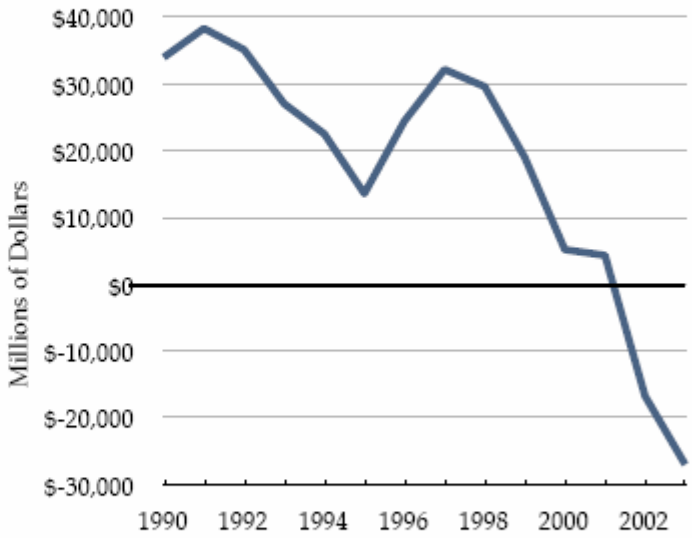
HIGH-TECH HAS DELIVERED FOR THE U.S. ECONOMY …

Cumulative U.S. Trade Balance, 1990-2003



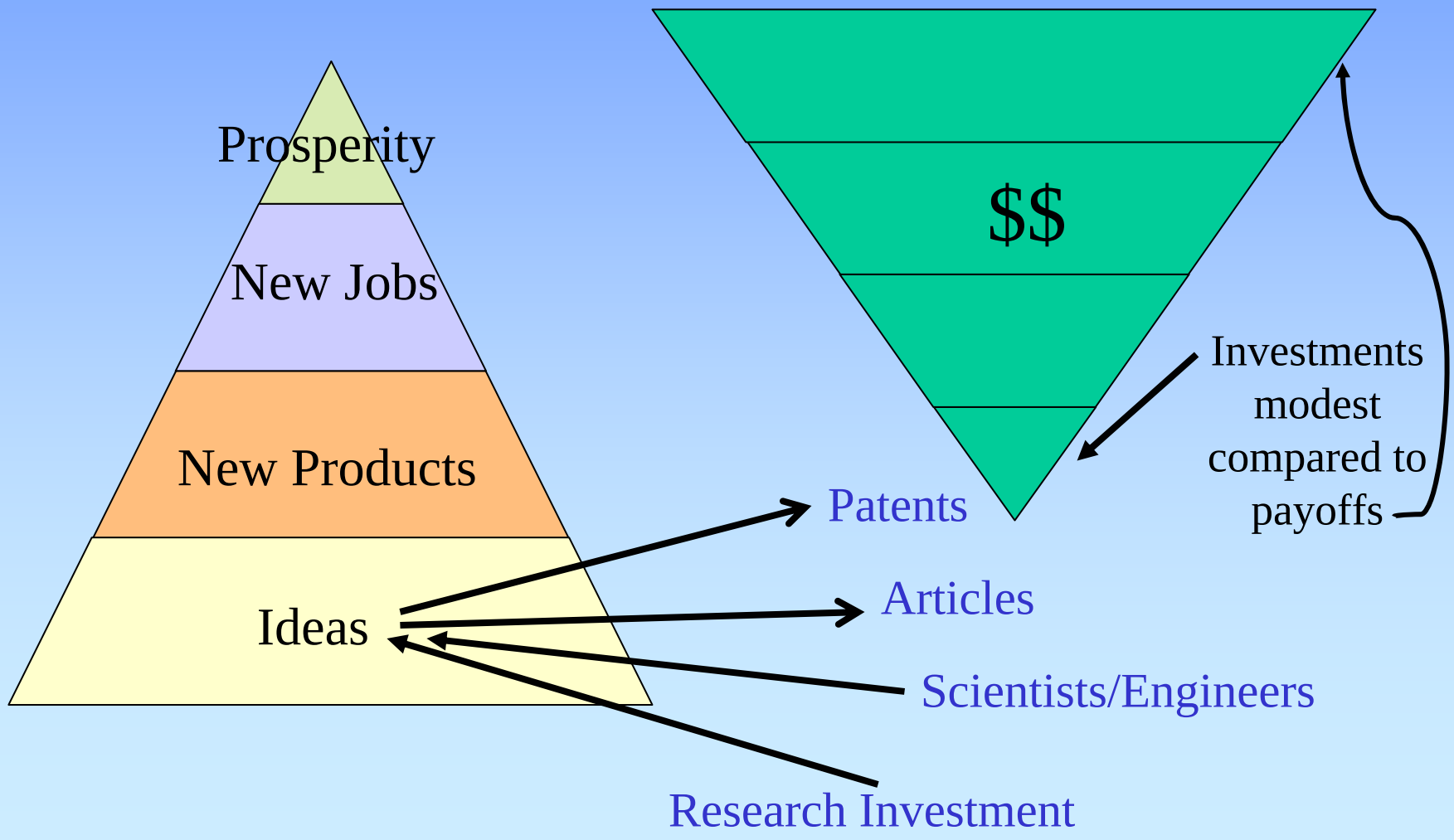
…BUT WILL IT CONTINUE?

U.S. Trade Balance for High-Tech Products, 1990-2003



Source: U.S. Census Bureau Foreign Trade Statistics, *U.S. International Trade in Goods and Services.*
Compiled by the APS Office of Public Affairs.

The U.S. Innovation Economy: A Physicist's Model



SILICON DESERT
LAKE HAVASU CITY
LAKE POWELL
NAVAJO RESERVATION
FLAGSTAFF
Lucent Technologies
www.lucent.com
SILICON MAPS, INC
UNITY SOFTWARE
www.unity-software.com
Camtech
www.camtechelectronics.com
www.st.com
STMicroelectronics
COX Business Services.
www.coxbusiness.com
suntron
www.suntroncorp.com
ON
www.onsemi.com
Microsemi
www.microsemi.com
Microsoft
www.microsoft.com
Wal-Mart
ride the light
Qwest
www.qwest.com
PHOENIX
AVNET
www.avnet.com
SCOTTSDALE
SUPERSTITION WILDERNESS
TPS
www.totalplastic.com
BOEING
Forever New Frontiers
www.boeing.com
hp
invent
www.hp.com
Honeywell
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Insight
www.insight.com
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www.innovacinc.com
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www.mgcpure.com
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www.amkor.com
IBM
www.storage.ibm.com
TUCSON
Raytheon
www.raytheon.com
COMPETITIVE ENGINEERING, Inc
www.ceiglobal.com
UniSource Energy
www.unisourceenergy.com
N
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87
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19

E6 Sunday, August 14, 2005 ...

America's Science Lead Is Dwindling Rapidly

December 21, 2004

U.S. Slips in Attracting the World's Best Students

The New York Times

The New York Times
nytimes.com

MONDAY, MAY 3, 2004

U. S. Is Losing Its Dominance In the Sciences

A26 SATURDAY, MAY 29, 2004 R

The Washington Post

Starving Science

As Other Nations Gain, Virginia Lab Keeps U.S. Out Front

THE WALL STREET JOURNAL.

FRIDAY, AUGUST 12, 2005 B1

SCIENCE JOURNAL

By SHARON BEGLEY

U.S. Science Research Is in Danger of Losing Place on Cutting Edge

CAPITAL JOURNAL

By JOHN HARWOOD

Competitive Edge Of U.S. Is at Stake In the R&D Arena

Singapore

THE WALL STREET JOURNAL. OPINION WEDNESDAY, MAY 4, 2005

Our Ph.D. Deficit

...p-ed page mail address is ...n@abq.journal.com

Op-Ed Page

THE ALBUQUERQUE JOURNAL WEDNESDAY, JUNE 22, 2005 A

U.S. Competitiveness Shrinks With Research Cuts

Influencing Science Budgets

- Congress ➔ Influence appropriators
  - Ask your Congresswoman to lobby appropriators
    - Personal letter/talk
    - Dear Colleague letters
  - Direct interactions with appropriators
    - Constituents
    - VIP's
    - Staff
- Public Relations
  - Press, Op-Eds,…

Dear Colleague Letter

March 30, 2004

Want to Ensure Economic Vitality & National Security?
Invest in Science & Technology

Dear Colleague:

We invite you to join us in signing the attached letter requesting that the VA-HUD subcommittee make the National Science Foundation (NSF) a priority as it deliberates the FY 2005 budget.

Advances in science and technology underpin our ability to meet many of
faces today, including securing the homeland, preventing
development, and educating our children to
economy. As a nation, we must co

Supporting the National Science Fou
and technology. NSF investments ar
advances in fundamental knowledge
education of scientists and engineers a
workers, from office assistants to rock

We believe that the National Science Fo
in the FY 2005 budget, and hope that yo

To sign the letter, or for answers to any q
(x53831) or Marty Sokoloski in Mr. Holt'

Sincerely

Congress of the United States
Washington, DC 20515

May 4, 2005

The Honorable Frank Wolf
Chairman
Subcommittee on Science, State, Justice and Commerce
H-309 Capitol
Washington, DC 20515

The Honorable Alan Mollohan
Ranking Member
Subcommittee on Science, State, Justice and Commerce
H-309 Capitol
Washington, DC 20515

Dear Chairman Wolf and Ranking Member Mollohan:

As supporters of fundamental scientific research and education, we respectfully ask that you make the National Science Foundation (NSF) funding a priority and provide $6.1 billion in your Fiscal Year 2006 Science, State, Justice and Commerce Subcommittee appropriations legislation.

drives our economy. Economists estimate that more than
uted to technological innovation. As
U.S. leadership in

APS grassroots activity part of broader, coordinated effort

Industry

APS Grassroots
- Letters
- Visits
- Phone calls

Professional Societies & Universities

APS Washington Office

Task Force for the Future of American Innovation

APS physics

APS Grassroots Efforts

- Template letters at APS website
  - Contact Congress at APS Meetings (6000+ letters)
  - Email alerts
  - Follow up
- Phone/Email trees (Reactive)
- Visits
- Op-Eds

2005 Letter Writing Activity

Senator John McCain (R-AZ-001)	**31**
Senator Jon L. (Jon) Kyl (R-AZ-002)	**31**
Congressman Richard G. (Rick) Renzi (R-AZ-001)	**0**
Congressman Trent Franks (R-AZ-002)	**0**
Congressman John B. (John) Shadegg (R-AZ-003)	**1**
Congressman Ed Pastor (D-AZ-004)	**1**
Congressman J. D. Hayworth (R-AZ-005)	**8**
Congressman Jeff Flake (R-AZ-006)	**1**
Congressman Raul M. (Raul) Grijalva (D-AZ-007)	**11**
Congressman Jim Kolbe (R-AZ-008)	**9**

Thresholds:

House ~10

Senate ~25

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AZ Congressional Delegation

House Record on NSF and DOE Office of Science Dear Colleague Letters and Authorization Bills, 2000-present

compiled by American Physical Society Office of Public Affairs, 9/12/05

Key: D.C. ==> Dear Colleague; csp ==> cosponsor; * ==> original cosponsor

==> not in Congress

				DOE Office of Science									NSF				
Members of the House	**State**	**District**	**party**	**D.C. 2000**	**D.C. 2001**	**D.C. 2002**	**HR 5270**	**HR 34 * is original csp**	**FY04 Conference D.C.**	**D.C. 2004**	**D.C. 2005**	**Function 250 2004**	**HR 4664 vote**	**D.C. 2002**	**D.C. 2003**	**D.C. 2004**	**D.C. 2005**
Renzi, Rick (R-AZ, 1st)	AZ	1	R														
Franks, Trent (R-AZ, 2nd)	AZ	2	R														
Shadegg, John (R-AZ, 3rd)	AZ	3	R										No				
Pastor, Ed (D-AZ, 4th)	AZ	4	D				csp						Yes				
Hayworth, J.D. (R-AZ, 5th)	AZ	5	R									Yes	Yes		Yes	Yes	Yes
Flake, Jeff (R-AZ, 6th)	AZ	6	R										No				
Grijalva, Raul (D-AZ, 7th)	AZ	7	D								Yes				Yes	Yes	Yes
Kolbe, Jim (R-AZ, 8th)	AZ	8	R			No							Yes				

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AZ Senators

Senate Record on NSF and DOE Office of Science Dear Colleague Letters and Authorization Bills, 2001-present

compiled by American Physical Society Office of Public Affairs, 9/12/05

Key: D.C. ==> Dear Colleague; csp ==> cosponsor; * ==> original cosponsor

==> not in Congress

			NSF		DOE Office of Science									
Senators	**party**	**state**	**D.C. 2001**	**S. 2109**	**D.C. 2001**	**D.C. 2002**	**D. C. 2003**	**S. 915**	**D.C. 2004**	**D.C. 2005**				
Kyl, Jon (R-AZ)	R	AZ												
McCain, John (R-AZ)	R	AZ				No								

Grassroots Network

- Need to increase support for science research

➔Network of District Advocates

  - Local liaisons who lobby a Congressional office
  - APS provides
    - Materials
    - Coordination
    - Recommendations on strategy

Grassroots Advocacy Works!

- 2005 Senate Dear Colleague letter:
  68 Senators signed!
  - …
- Be involved
  - Respond to alerts
  - Be a “DA”
  - Contact us if visiting Washington
  - Host a Congressional staffer
  - Speak at local Rotary club

Conclusions

- Federal support for research needs help
- Message must be compelling
- Congress
  - Supportive but no money
  - Funding dynamics make science funding difficult
- Administration needs convincing (??)
- Grassroots activity
  - Effective and absolutely essential
  - Part of larger, coordinated effort

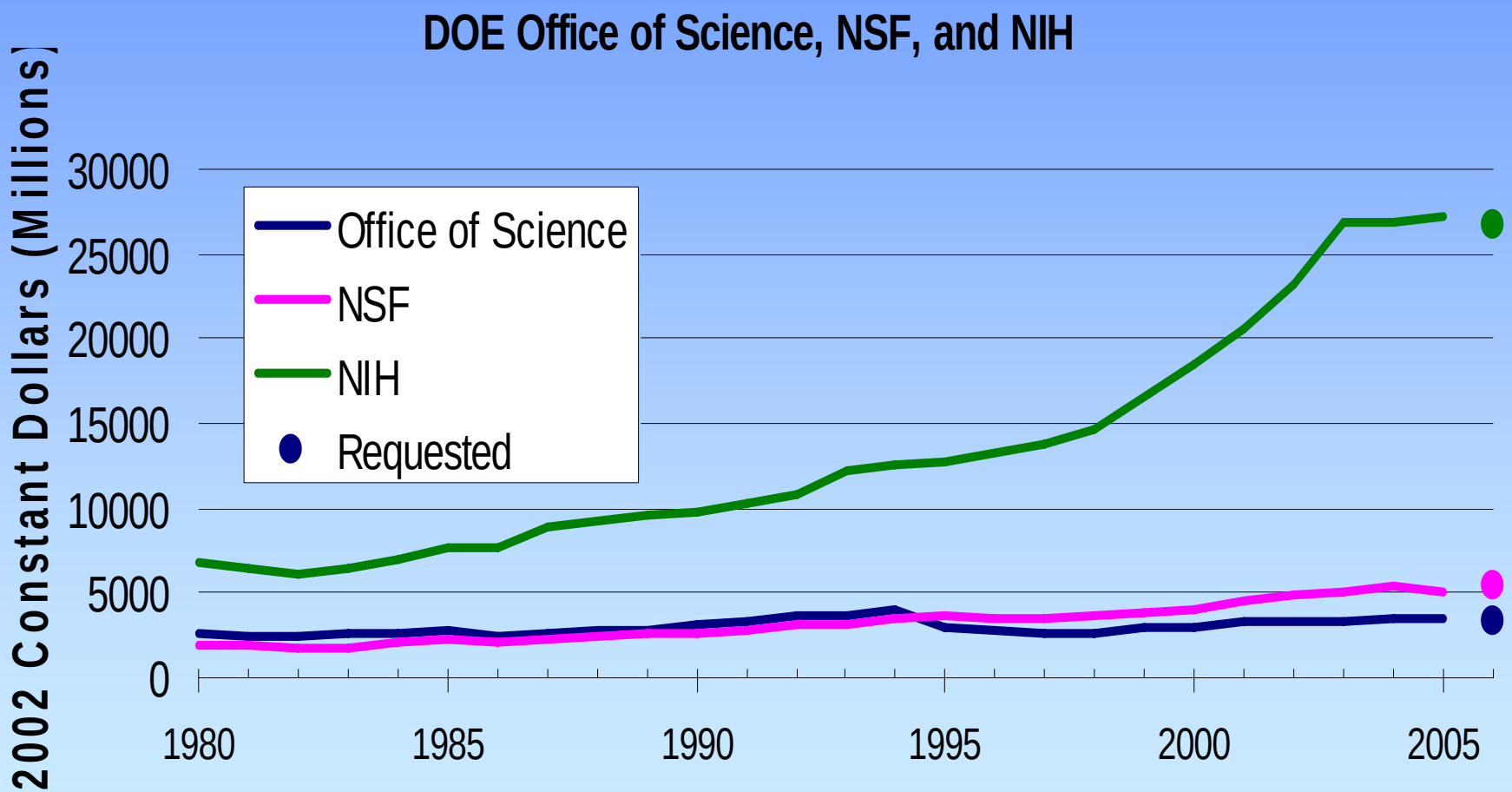
For more info or to participate

- Benchmarks Report
  - http://www.futureofinnovation.org
- APS Office of Public Affairs
  - http://www.aps.org/public_affairs/index.cfm
  - pierson@aps.org
- APS Membership
  - http://www.aps.org/memb/index.cfm

Advocating a Dear Colleague

- Brute force methods
  - Phonecalls, letters, visits
- Finesse
  - Official university contact
  - Using rapport developed with office
  - Department letters

Federal Funding (cont'd)



Compiled by the American Physical Society Office of Public Affairs from OMB, FY03 Historical Tables; DOE Office of Science web pages and Office of Budget, NIH. 2002 constant dollars based on GDP deflator.

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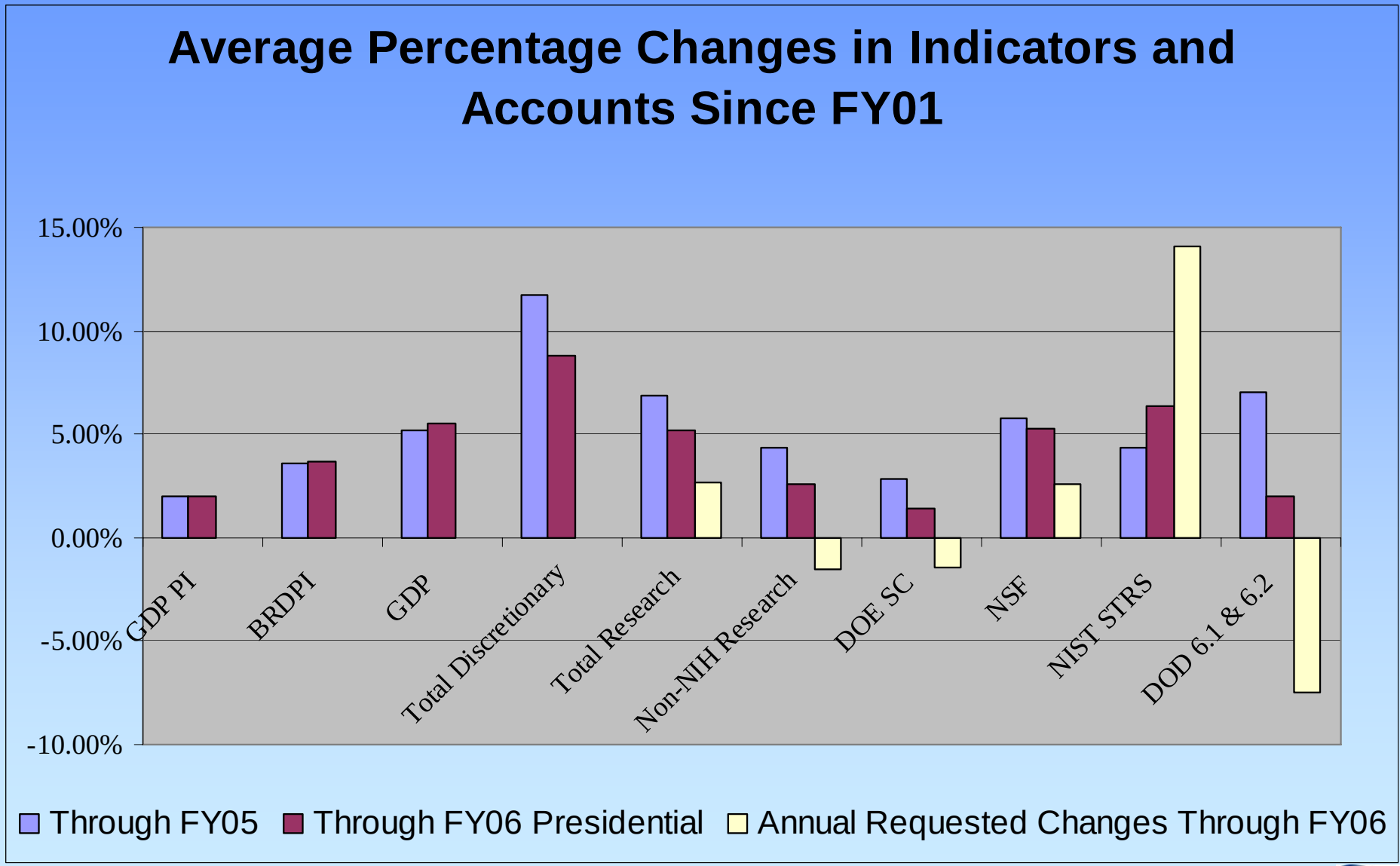
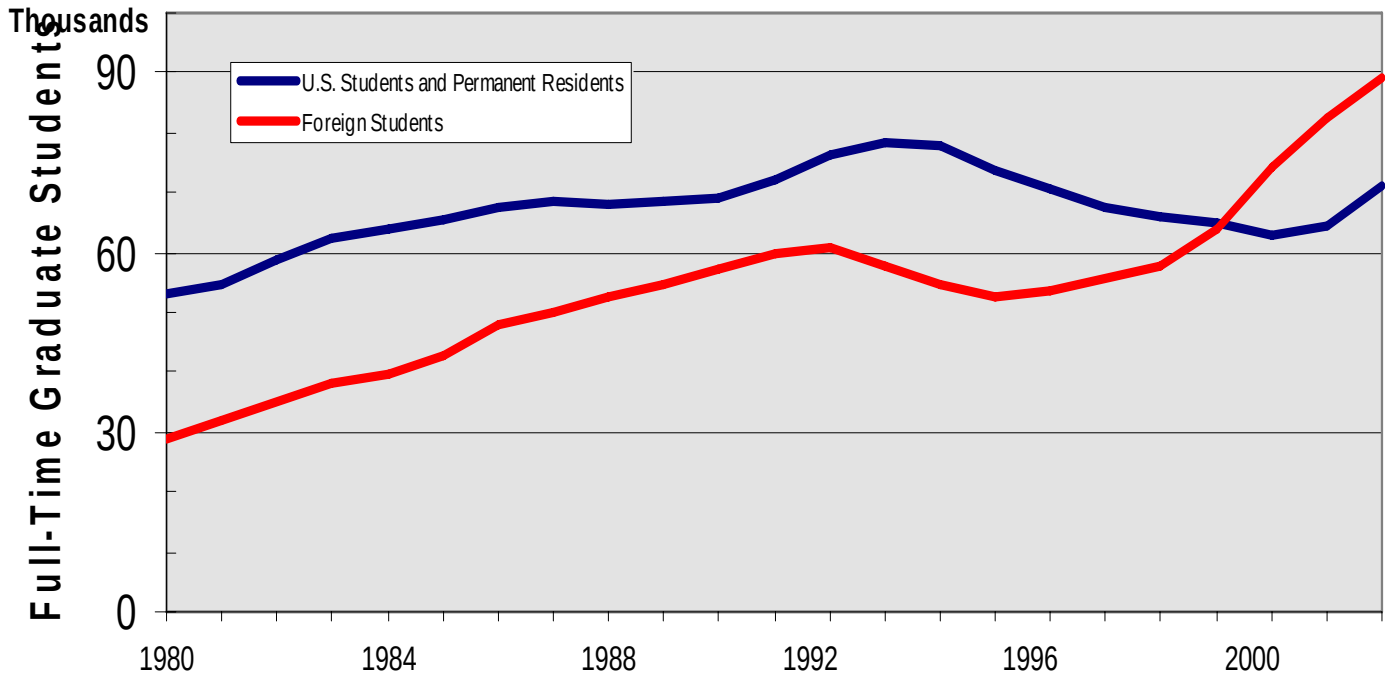
Where's the Administration?



Scientists and Engineers

U.S. Graduate Institutions: Foreign students outnumber U.S students in Physical Sciences* & Engineering

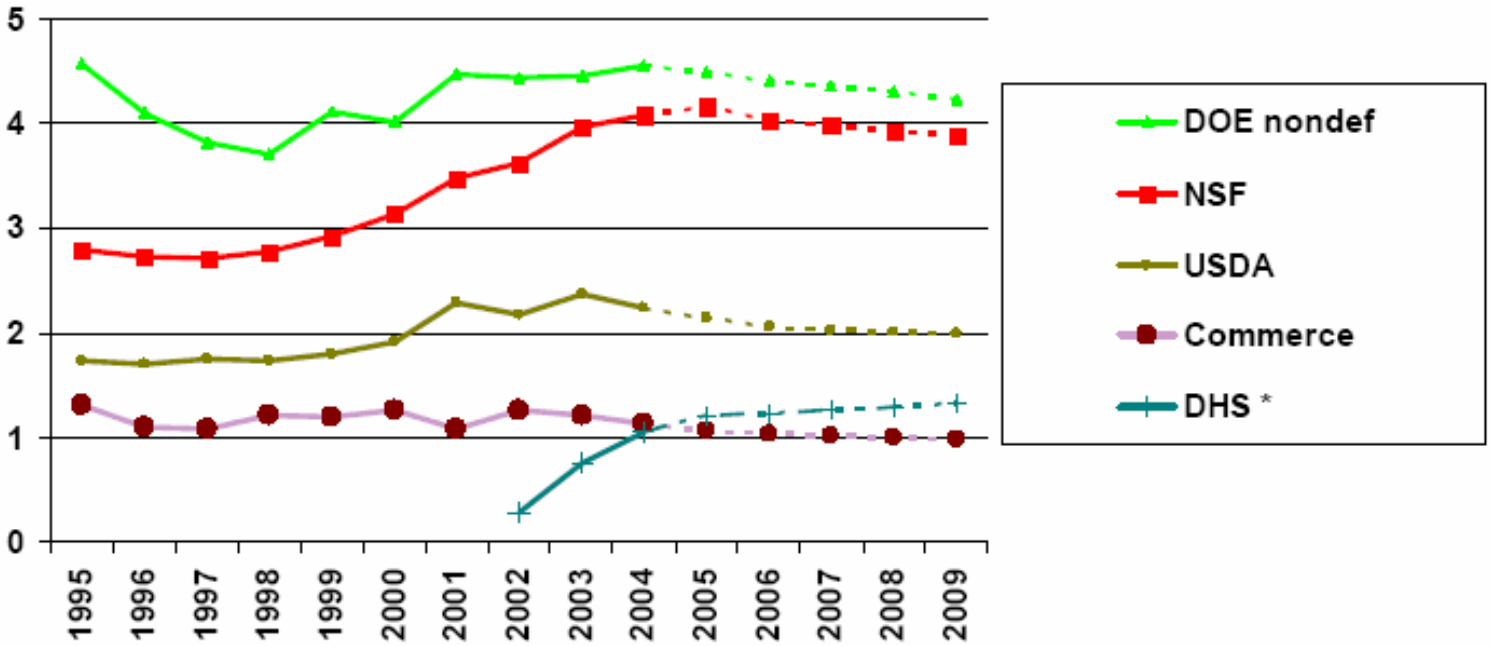


*Mathematical and Computer Science included. Source: National Science Foundation Division of Science Resources Statistics: Graduate Students and Engineering: Fall 2002; Compiled by the American Physical Society Office of Public Affairs.

APS Office of Public Affairs

- Issues
  - Science Research Budgets
  - Defense
  - Energy/Environment
  - Education/Workforce
- Four lobbyists located in downtown Washington

Administration plans to trim R&D



Source: AAAS analysis *Projected Effects of President's FY 2005 Budget on Nondefense R&D* . * - Includes DHS nondefense and defense R&D.
APRIL '04 © 2004 AAAS

AAAS

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