

Thoughts on My Time as NSF AD



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Mathematical and Physical Sciences

Thoughts on My Time as NSF AD



Mission

People

Communication



Mathematical and Physical Sciences

The National Science Foundation



The NSF Act of 1950 (Public Law 81-507) sets forth the mission “to **promote the progress of science**; to advance the national health, prosperity, and welfare; to secure the national defense; and for other purposes.”

Basic research ... provides scientific capital. It creates the fund from which the practical applications of knowledge must be drawn. ... **Today, it is truer than ever that basic research is the pacemaker of technological progress.** ... A nation which depends upon others for its new basic scientific knowledge will be slow in its industrial progress and weak in its competitive position ...

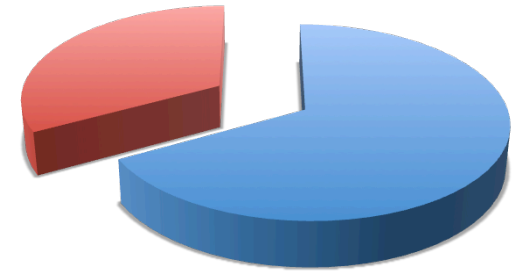


Vannevar Bush, *Science, The Endless Frontier* (1945)



What's So Special About Science (And How Much Should We Spend on It?)

W. H Press, Science 342, 817 (2013)

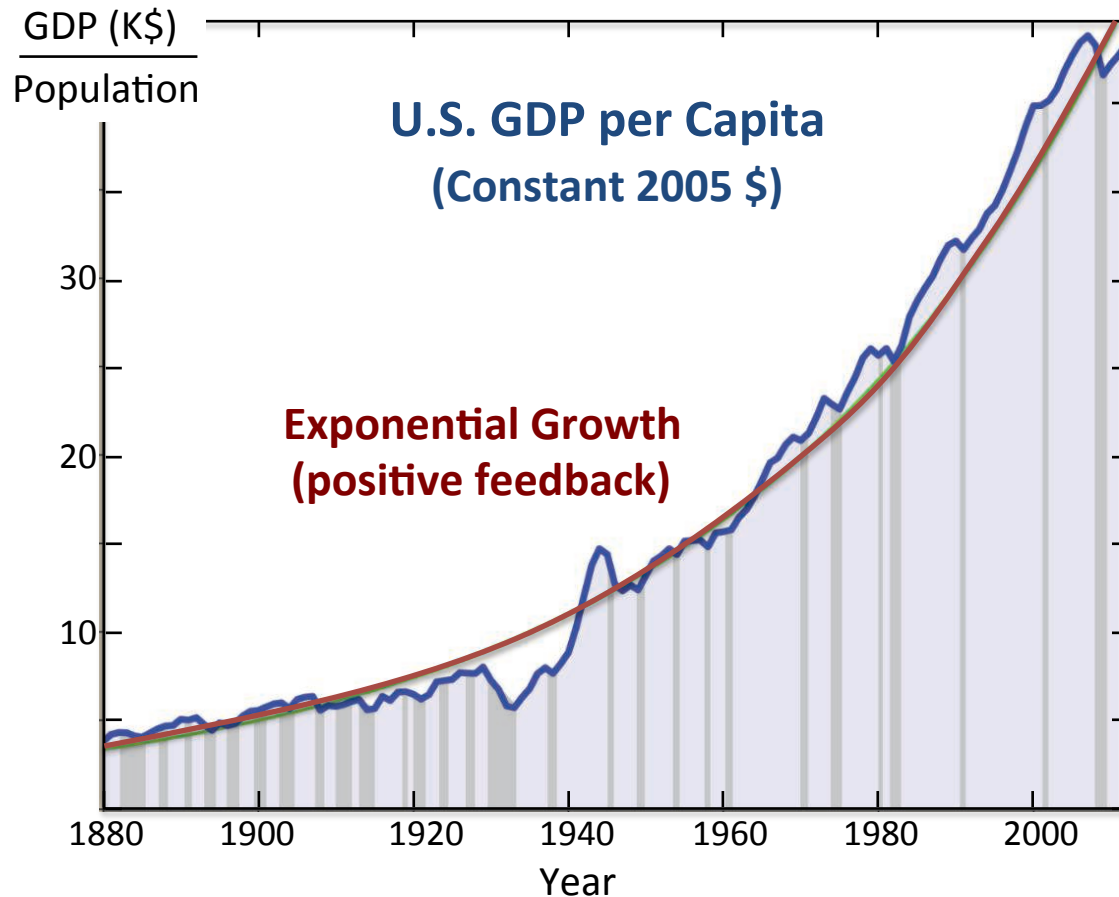


50% – 75% of economic growth from fruits of basic research

“Solow residual”



Investment in fundamental research returns 20% to 60% per year



Mathematical and Physical Sciences

Quest for
Fundamental
Understanding

Pure Basic Research

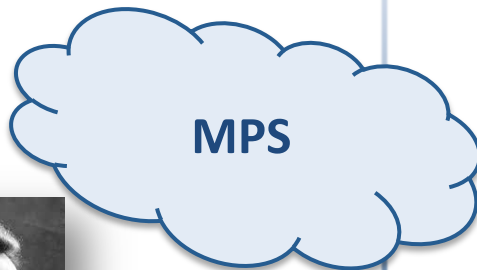
Use-Inspired Basic Research



Bohr



Curie



MPS



Pasteur

Chia Pet



(Thanks to Ivy Kupec)

Pure Applied Research



Carver



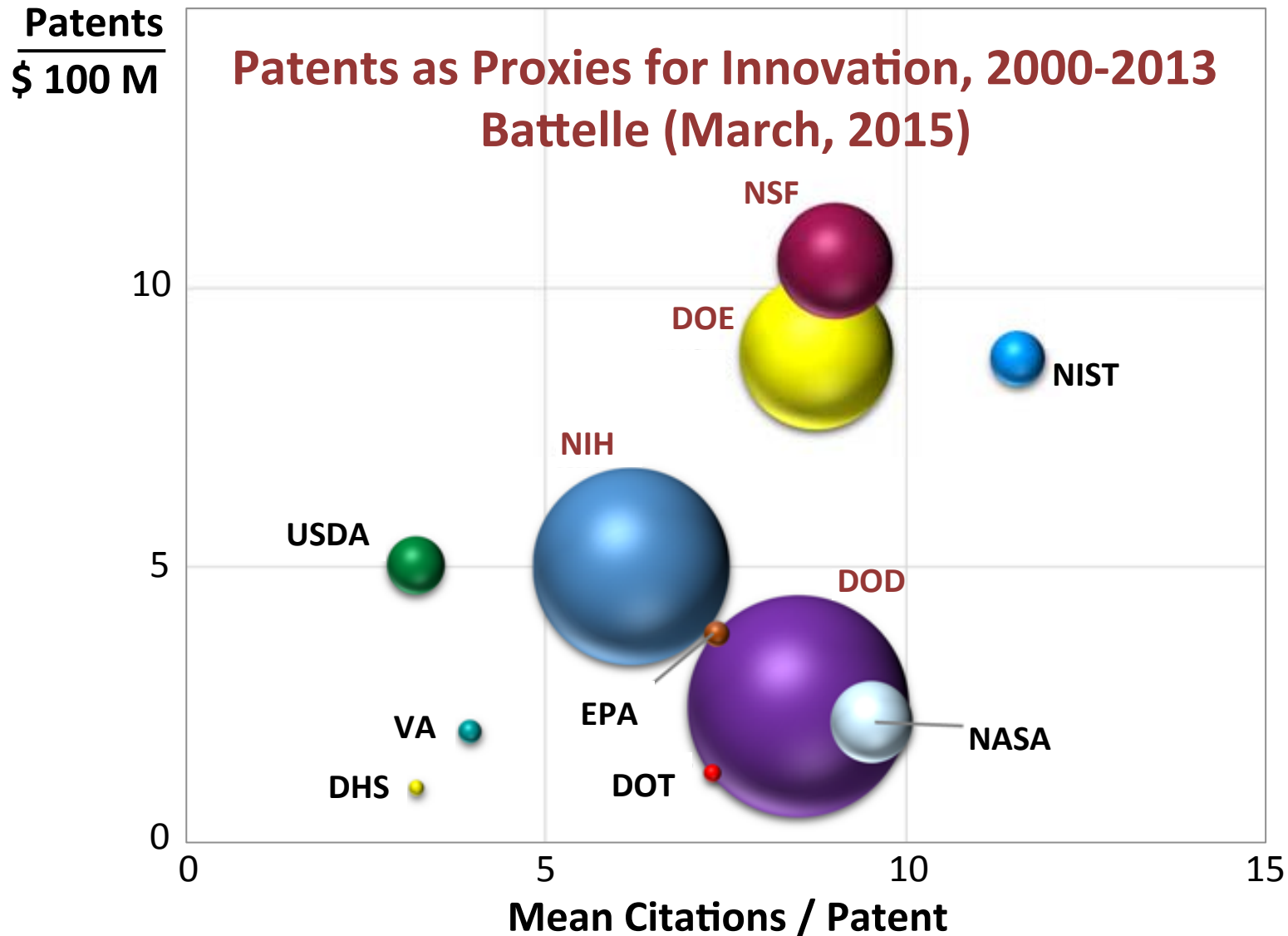
Edison

Consideration of Use



Mathematical and Physical Sciences

Basic Research Drives Innovation



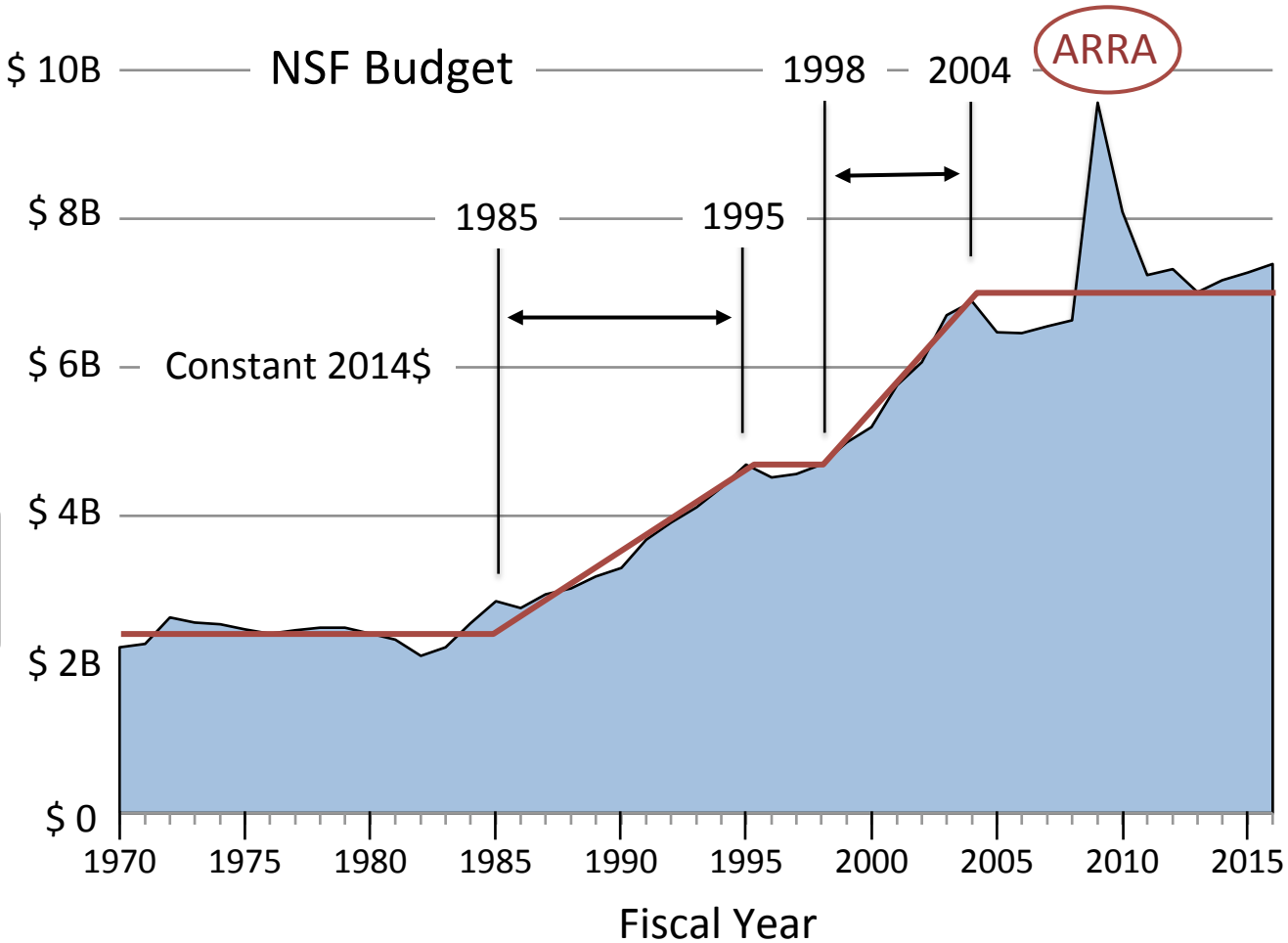
NSF by the Numbers FY 2016

NSF Budget
\$ 7.46 B

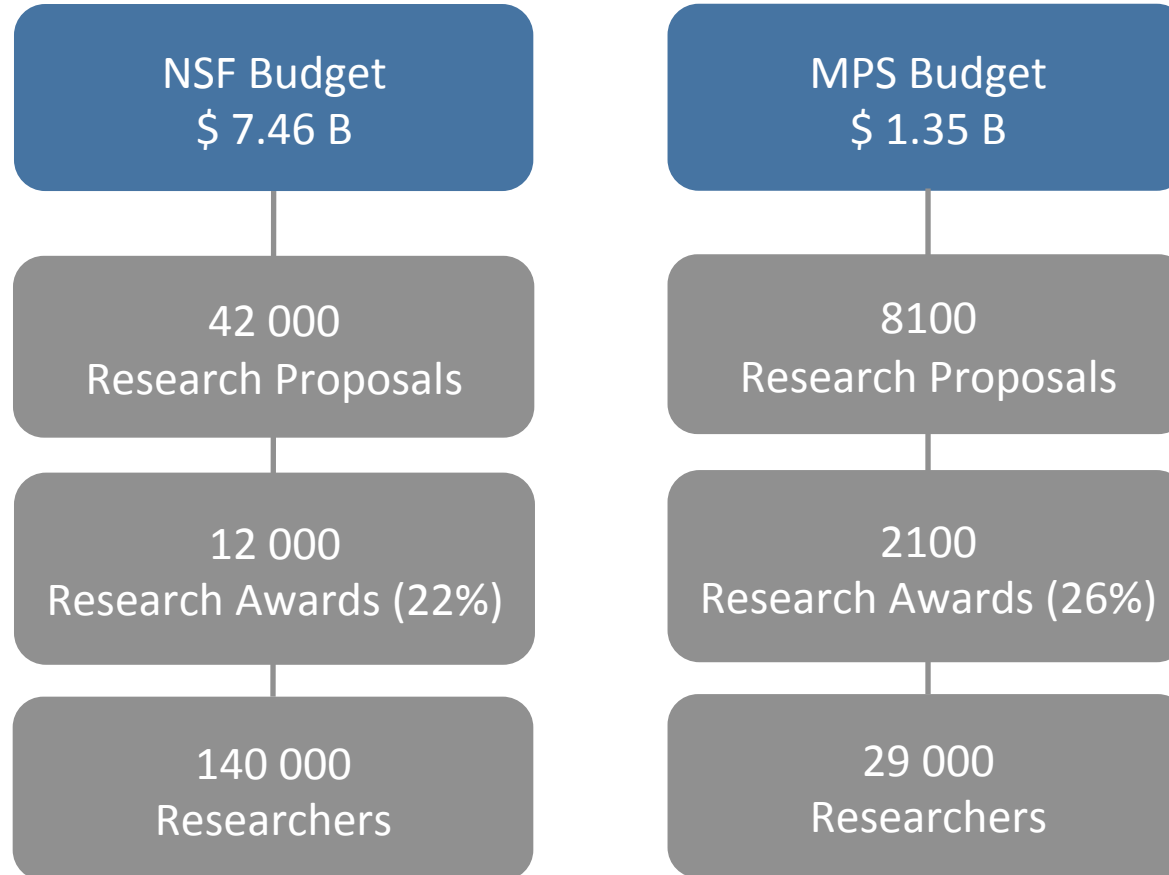
42 000
Research Proposals

12 000
Research Awards (22%)

140 000
Researchers

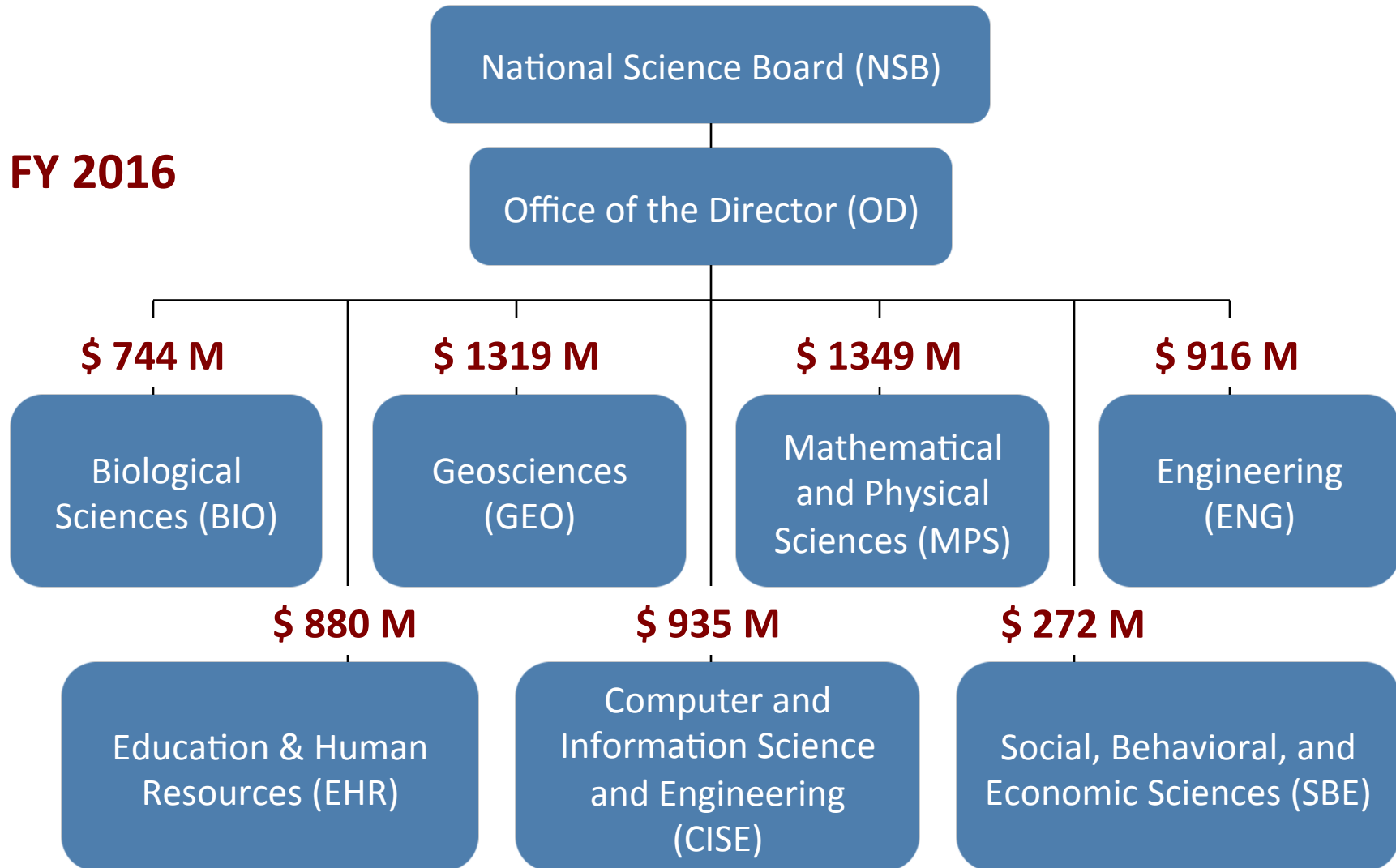


NSF by the Numbers FY 2016



Organization of NSF

FY 2016



Mathematical and Physical Sciences

FY 2016: \$ 1349 M

Mathematical
and Physical
Sciences (MPS)

Office of
Multidisciplinary
Activities (OMA)

\$ 35 M

Astronomical
Sciences
(AST)

\$ 247 M

Chemistry
(CHE)

\$ 246 M

Materials
Research
(DMR)

\$ 310 M

Mathematical
Sciences
(DMS)

\$ 234 M

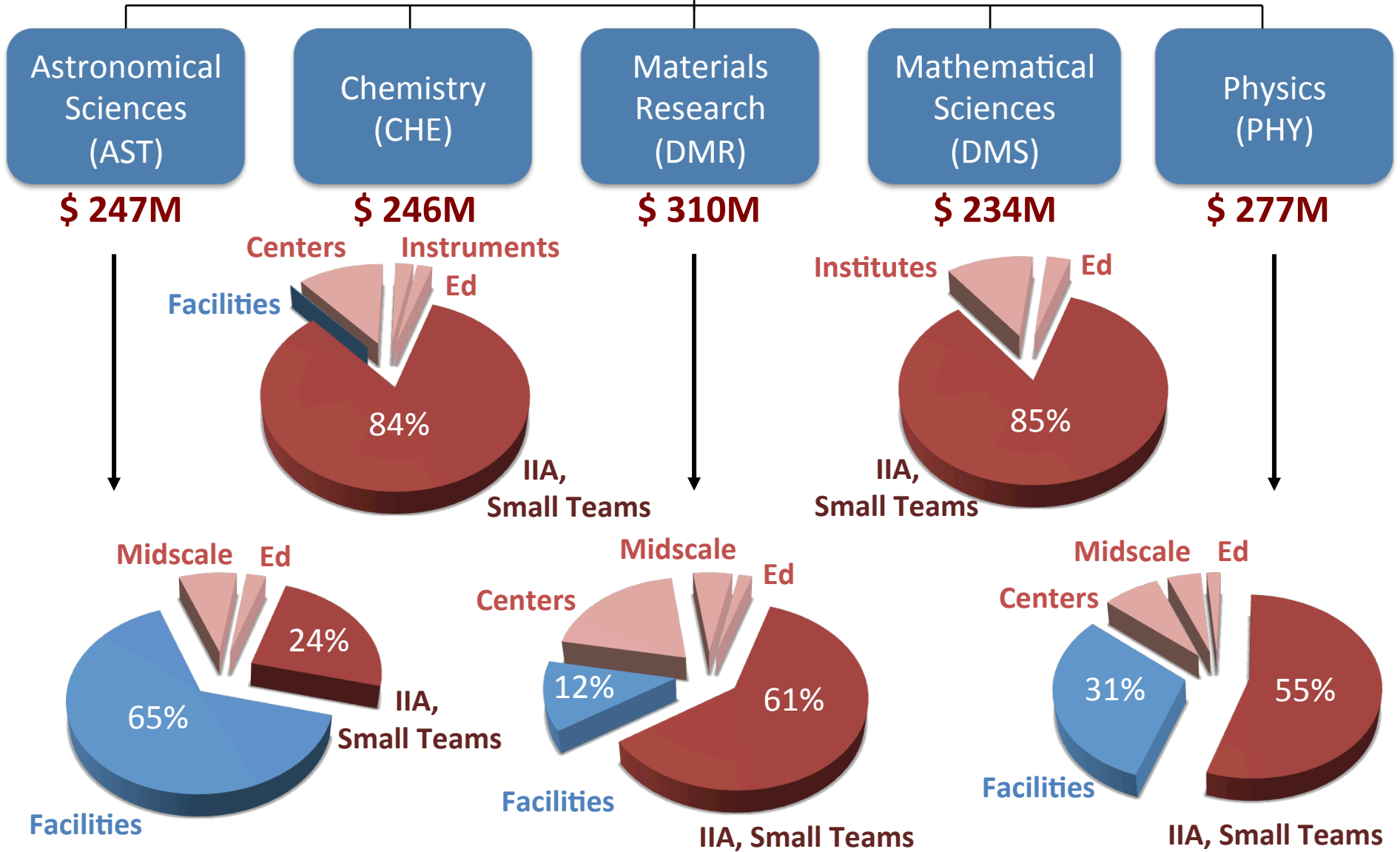
Physics
(PHY)

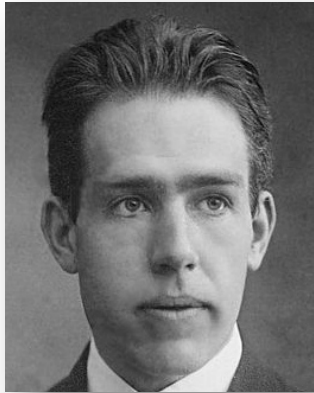
\$ 277 M



Mathematical and Physical Sciences

Mathematical and Physical Sciences (MPS)



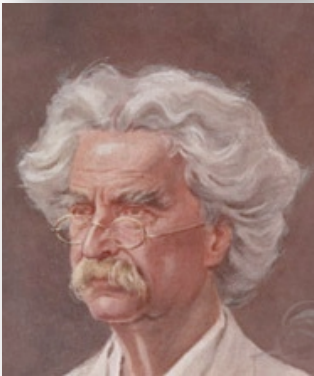


**“It’s difficult to make predictions,
especially about the future”**

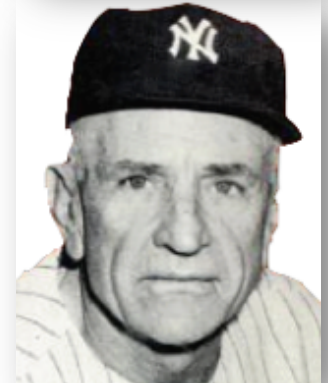
Yogi Berra



Niels Bohr



Casey Stengel



Mark Twain



Groucho Marx



Freeman Dyson

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(Images from Wikipedia Commons)



The Research Landscape



Intellectual Opportunity

Resource Limitations

Global Community

Changing Demographics

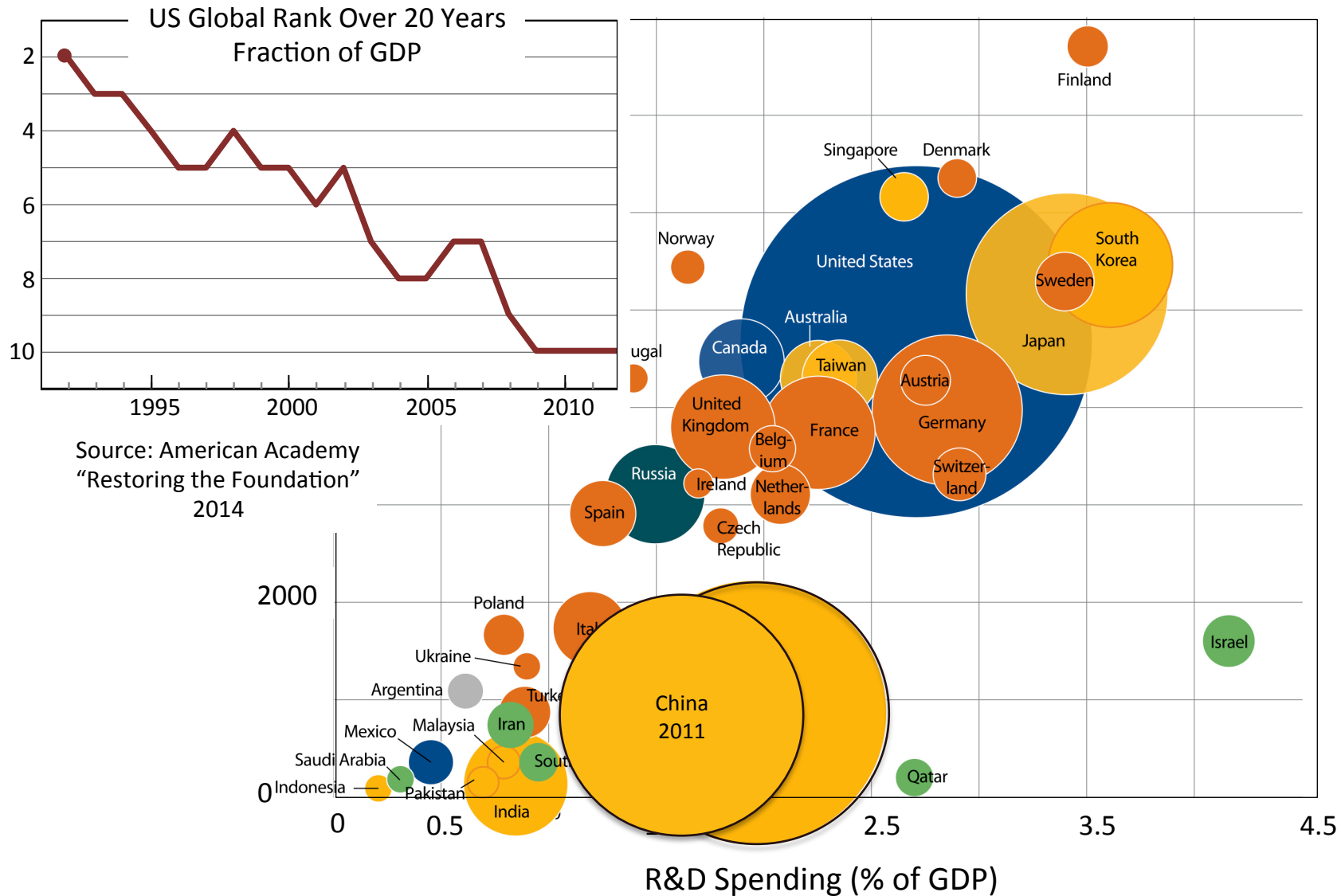
Workforce Challenges

Changing Universities



Mathematical and Physical Sciences

International Investments in Science and Engineering - 2013



Source: American Academy "Restoring the Foundation" 2014

Source: Battelle, R&D Magazine, International Monetary Fund, World Bank, CIA World Factbook, OECD



Some Words for the Wise

House Science Committee Chairman Sherwood Boehlert*
March, 2004

Congress is not besieged by groups asking for money that they describe as necessary to help their own narrow interests in the short run. The argument that science funding is a long-term national investment does nothing to set scientists apart.

All that sets you apart is that scientists are the only group that thinks they're making a unique argument.



We must make a sophisticated and effective case broadly based on more than economics alone

*with thanks to Joel Parriott



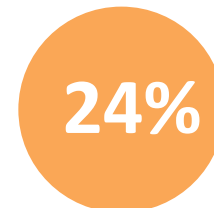
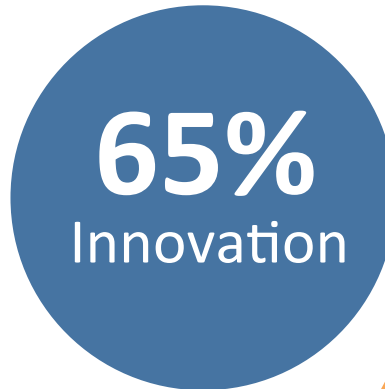
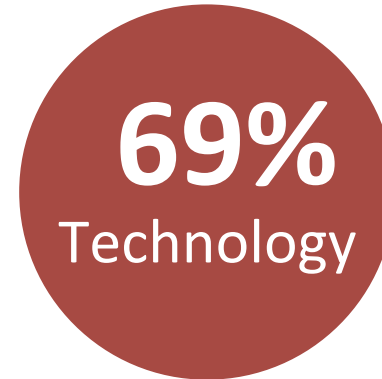
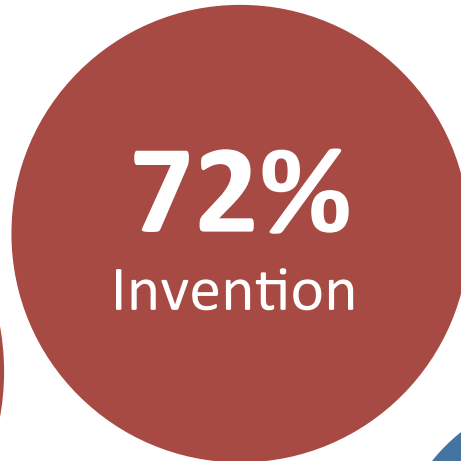


ScienceCounts



Positive Associations for the Public

Using appropriate language
is essential



Mathematical and Physical Sciences

NSF Core Mission: Fundamental Research

Strategic Goals

Investing in Science,
Engineering, and
Education for the
Nation's Future

Transform the Frontiers
Innovate for Society
Be a Model Organization



National Science Foundation

Supporting basic research
to create knowledge
that transforms our future



Drives the economy
Enhances security
Sustains global leadership

"Science is hope"



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