The FY 2011 Federal Budget

- $3.8t total budget, $1.3t unified deficit
- $1.3t discretionary budget (+0.3%)
  - $532b nondefense budget (+1.4%)
- Rescuing the Economy
- A Foundation for Economic Growth and Job Creation
  - Small business initiatives
  - Investing in science and basic research
- Restoring Responsibility
  - Three year non-security discretionary funding freeze
Composition of the Proposed FY 2011 Budget
Total Outlays = $3.8 trillion
(outlays in billions of dollars)

- Defense Discretionary: $661
- Defense R&D: $83
- Nondefense R&D: $71
- Social Security: $730
- Medicare: $491
- Medicaid: $297
- Other Mandatory: $647
- Net Interest: $251
- Nondefense Discretionary: $599
- [Nondefense R&D]: $71

Source: Budget of the United States Government FY 2011.
Projected unified deficit is $1.3 trillion.
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Trends in Discretionary Spending

budget authority in billions of constant FY 2010 dollars

FY 2010-2015 data are budget projections.
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Federal R&D in Context

- The federal R&D investment is spread across over two dozen departments and agencies
  - Only two manage more than 10% of the investment
    - Department of Defense (52.7%)
    - Department of Health and Human Services (21.7%)
- The federal R&D investment is also spread across 11 of the 12 appropriations subcommittees.
- Role of federal R&D
  - Supports federal missions
  - Drives U.S. innovation
Character of R&D

- The Innovation Lifecycle
  - Basic Research
    - Study toward knowledge or understanding of fundamental properties and phenomena without a specific need in mind.
  - Applied Research
    - Study toward knowledge or understanding necessary to satisfy a specific need.
  - Development
    - The application of knowledge or understanding toward the production of materials, devices, systems, or methods.
- Facilities and Equipment (R&D Plant)
Character of R&D, FY 2011
budget authority in billions of dollars

Source: OMB R&D data, agency budget justifications, and agency budget documents.
Defense R&D = DOD + DOE defense.
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Federal R&D Funding by Source
outlays in billions of constant 2008 dollars

Source: NSF, Division of Science Resources Statistics,
National Patterns of R&D Resources (NSF 08-318)
2008 figures are preliminary.
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Character of R&D, 2008
outlays in billions of dollars

Source: NSF, Division of Science Resources Statistics,
National Patterns of R&D Resources (NSF 08-318)
Figures are preliminary.
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The FY 2011 Federal R&D Investment

- Total R&D: $148.1b, -0.3% from FY 2010
  - Basic Research: $30.4b, +4.3%
  - Applied Research: $31.6b, +2.1%
  - Development: $81.5b, -2.9%
  - Equipment and Facilities: $4.6b, +1.3%
- $82.2b for defense R&D, -4.8%
- $65.9b for non-defense R&D, +5.9%
- -1.4% in constant dollars from FY 2010
- +0.7% in constant dollars since FY 2004
  - Peak in FY 2009
Trends in Federal R&D
in billions of constant FY 2010 dollars

Source: AAAS analyses of R&D in annual AAAS R&D reports.
FY 2011 figures are latest AAAS estimates of FY 2011 request.
R&D includes conduct of R&D and R&D facilities.
1976-1994 figures are NSF data on obligations in the Federal Funds survey.
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Total R&D by Agency, FY 2011
budget authority in billions of dollars

- DOD, $78.0
- HHS (NIH), $32.2
- DOE, $11.2
- NASA, $11.0
- All Other, $6.6
- NSF, $5.5
- USDA, $2.4
- DHS, $1.0

Total R&D = $148.1 billion

Source: OMB R&D budget data, agency budget justifications, and other agency documents.
R&D includes conduct of R&D and R&D facilities.
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Trends in R&D by Agency

in billions of constant FY 2010 dollars

FY 2010 and FY 2011 figures are latest estimates.
1976-1994 figures are NSF data on obligations in the Federal Funds survey.
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Trends in Research by Agency
in billions of constant FY 2010 dollars

FY 2010 and FY 2011 figures are latest estimates.
Research includes basic research and applied research.
1976-1994 figures are NSF data on obligations in the Federal Funds survey.
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NASA

- **Total R&D**
  - Request: $11.0b
  - House: $9.7b, +4.1%
  - Senate: $10.5b, +12.4%

- **NASA Reauthorization (S.3729)**
  - International Space Station through 2020
  - One additional shuttle mission
  - Commercial cargo and crew services for near-earth orbit
  - New space launch system and multi-purpose crew vehicle
  - New $500 million Space Research and Technology Program
USDA

- **Total R&D**
  - Request: $2.1b
  - House: $2.2b, +4.4%
  - Senate: $2.2b, +3.9%

- **ARS R&D (Intramural)**
  - Request: $1.1b
  - House: $1.2b, -3.3%
  - Senate: $1.3b, +0.0%

- **AFRI Total (Extramural)**
  - Request: $429m, +63.4%
  - House: $312m, +18.9%
  - Senate: $310m, +18.1%
National Science Foundation

- **Total**
  - Request: $7.42b
  - House: $7.42b, +8.0%
  - Senate: $7.35b, +7.0%

- **R&D**
  - Request: $5.54b
  - House: $5.50b, +8.6%
  - Senate: $5.49b, +8.3%

- **National Innovation Strategy**
- **Workforce Development**
- **Broadening Participation**
Department of Energy

- **Total R&D**
  - Request: $11.2b
  - House: $10.9b, +1.6%
  - Senate: $11.0b, +3.3%

- **Office of Science**
  - Request: $5.1b
  - House: $4.9b, -0.1%
  - Senate: $5.0b, 2.2%

- **ARPA-E**
  - Request: $300m
  - House: $220m
  - Senate: $200m
NIST

- **Total R&D**
  - Request: $705m
  - House: $673m, +16.1%
  - Senate: $734m, +26.6%

- **NIST Labs R&D (STRS)**
  - Request: $521m
  - House: $491m, +9.0%
  - Senate: $521m, +15.6%

- **Competitive Manufacturing and Construction in a Clean-Energy Economy**
  - +$34.6 million
National Institutes of Health

- Total
  - Request: $32.2b
  - House: $32.2b, +3.2%
  - Senate: $32.2b, +3.2%
- Cancer and autism spectrum disorders
- AIDS research - Global Fund
- National Nanotechnology Initiative: +6.0% to $382m
- Therapeutics for Rare and Neglected Diseases (TRND)
- National Synchrotron Light Source-II (NSLS-II): $33m
Department of Defense

- **Total R&D**
  - Request: $78.4b
  - House: $79.3b, -5.1%
  - Senate: $79.3b, -5.1%

- **S&T (6.1-6.3 + medical)**
  - Request: $12.4b
  - Senate: $14.0b, -5.5%

- From major weapons systems to counter insurgency in future years
R&D in the FY 2011 Budget Request

percent change from FY 2010

- NOAA: 22.0%
- NIST: 21.6%
- NASA: 17.8%
- NSF: 9.4%
- DOE Energy: 6.8%
- DOE Defense: 5.0%
- DOE Science: 3.8%
- NIH: 3.1%
- USGS: 2.8%
- EPA: 1.8%
- VA: 1.5%
- DOT: -1.3%
- DOD: -5.2%
- USDA: -5.5%
- DHS: -9.0%

Source: OMB R&D budget data, agency budget justifications, and other agency documents.

* - Lighter colored bars indicate percent change with projected FY 2011 earmarks.

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FY 2011 R&D Budget Request by Function

percent change from FY 2010

- Transportation: 43.0%
- Commerce: 17.3%
- Space: 12.0%
- Environment: 7.4%
- Energy: 6.5%
- Health: 6.5%
- General Science: 6.3%
- International: 0.0%
- Defense: -4.8%
- Agriculture: -5.8%
- Justice: -31.8%

Source: OMB and agency budget data.

Environment includes natural resources R&D © 2010 AAAS
STEM Education

- $3.7b, +$32m from FY 2010
- K-12 Education
  - Dept of Ed: $450m, NASA: $63m, NSF: $41m
- RE-ENERGYSE (Undergraduate)
  - NSF: $19m, DOE: $55m
- Undergraduate Diversity
  - NSF: +14% to $103m
- Graduate Fellowships
  - NSF: +16% to $158m, NIH: +5% to $824m, EPA: +55% to $17m
  DOD: +4% to $40m, DOE: +$10m to $15m
Next Steps

- So far, the House has passed 2 appropriation bills and have subcommittee approval of 9 others. The Senate Appropriations Committee has reported on 11 bills, but none have passed the full Senate.
- Congress passed a CR which extends funding until December 3.
- Fall elections will push budget action back to November, December, or even 2011 and it will likely be in the form of an omnibus bill.
- FY 2012: OMB Memos: 5% reduction; list of low-impact programs totaling 5% of discretionary budget. Initial budget submissions were due to OMB by September 13.
FY 2012 R&D Challenges

- Promoting sustainable economic growth and job creation
- Defeating the most dangerous diseases and achieving better health outcomes for all while reducing health care costs
- Moving toward a clean energy future to reduce dependence on energy imports while curbing greenhouse gas emissions
- Understanding, adapting to, and mitigating the impacts of global climate change
- Managing the competing demands on land, fresh water, and the oceans for the production of food, fiber, biofuels, and ecosystem services based on sustainability and biodiversity
- Developing the technologies to protect our troops, citizens, and national interests
Industry Innovation Initiatives

- S.3839 - SBIR/STTR Extended through January 31, 2011
  - Keeps same percentages (SBIR: 2.5%, STTR: 0.3%)
- R&D Tax Credit Proposal
  - Make the tax credit permanent
  - Increase simple formula credit from 14 to 17 percent
- ARRA Report: $100 billion in innovation
  - $18.7 billion in R&D
- H.R.5297 - Small Business Jobs and Credit Act
  - $30 billion small business lending fund
  - $12 billion in tax breaks
- “Make it in America” Agenda
- Patent Reform
International R&D Investment

- The United States leads the world in R&D investment
  - $369b PPP, 35.7% of world R&D investment
- But, others are quickly increasing their investment
  - Over 1997 - 2007,
    - South Korea, +0.99% of GDP to 3.47%
    - China, +0.85% of GDP to 1.49%
    - Taiwan, +0.81% of GDP to 2.63%
    - Japan, +0.57% of GDP to 3.44%
    - United States, +0.10% of GDP to 2.68%
- President Obama set goal of 3.0% of GDP investment in R&D
Trends in Federal R&D

percent of GDP

FY 2011 figures are latest AAAS estimates of the FY 2011 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 Budget of the U.S. Government FY 2011.
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Total World R&D, 2007

in billions of PPP $

US, $369

Korea, $42

China, $102

Japan, $148

Other EU, $97

U.K., $39

All Other, $186

Total World R&D = $1,054 billion

Source: OECD, Main Science and Technology Indicators, May 2009.
World = OECD members plus Argentina, China, Israel, Romania, Russian Federation, Singapore, Slovenia, South Africa, Taiwan. Calculated using purchasing power parities.
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National R&D Investment
percent of GDP

Source: OECD, Main Science and Technology Indicators, May 2009.
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For More Information...

The AAAS R&D web site is http://www.aaas.org/spp/rd/

Twitter: @AAAS_RDBudget

The FY 2012 AAAS Forum on Science and Technology Policy is May 5-6, 2011 in Washington, DC