

*The National Academies of*  
SCIENCES • ENGINEERING • MEDICINE

# SBIR at the Department of Defense

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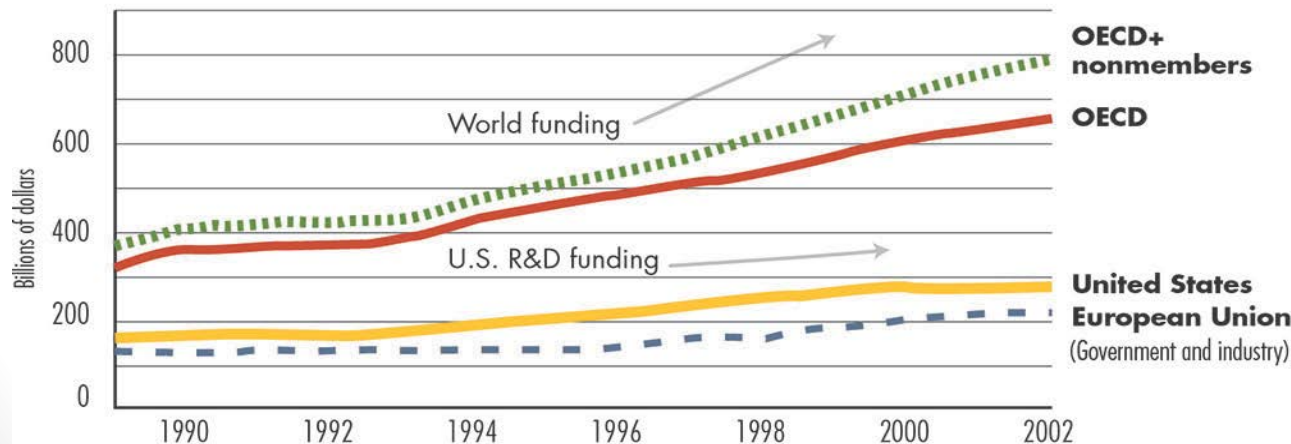
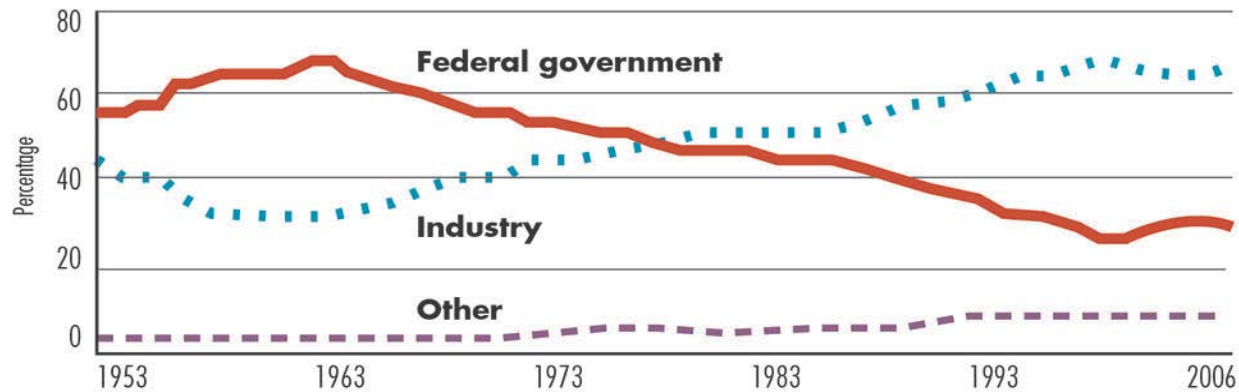
April 12, 2016

# Our National Security depends on Leadership in Technology

- U.S. National Security Strategy from WWII to today has relied on “Technological Superiority”
- U.S. must take advantage of research investments with:
  - Public/private partnerships (Gov./Univ./Industry)
  - Funding for research and commercialization
  - Emphasis on both product and process technology developments
  - Development of high-tech workforce
  - Focus on “dual-use” applications (commercial & government use)

# Research Funding Trends\*

Critical for Economic Competitiveness & Security  
Technological Leadership



Top figure, David Mowery, "Military R&D and Innovation" (University of California Press, 2007); bottom figure: National Science Foundation, "Science and Engineering Indicators 2006," and OECD, "Main Science and Technology Indicators" database, November 2004)

# THE FUTURE POSTPONED

Why Declining Investment in Basic Research  
Threatens a U.S. Innovation Deficit

A Report by the MIT Committee to Evaluate the Innovation Deficit

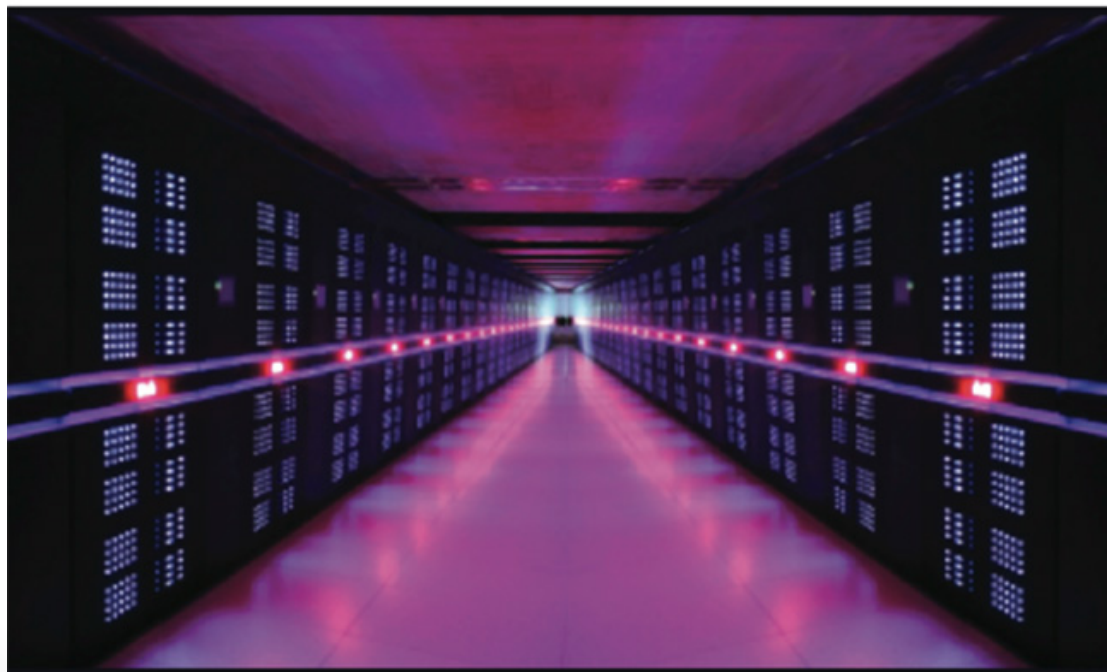
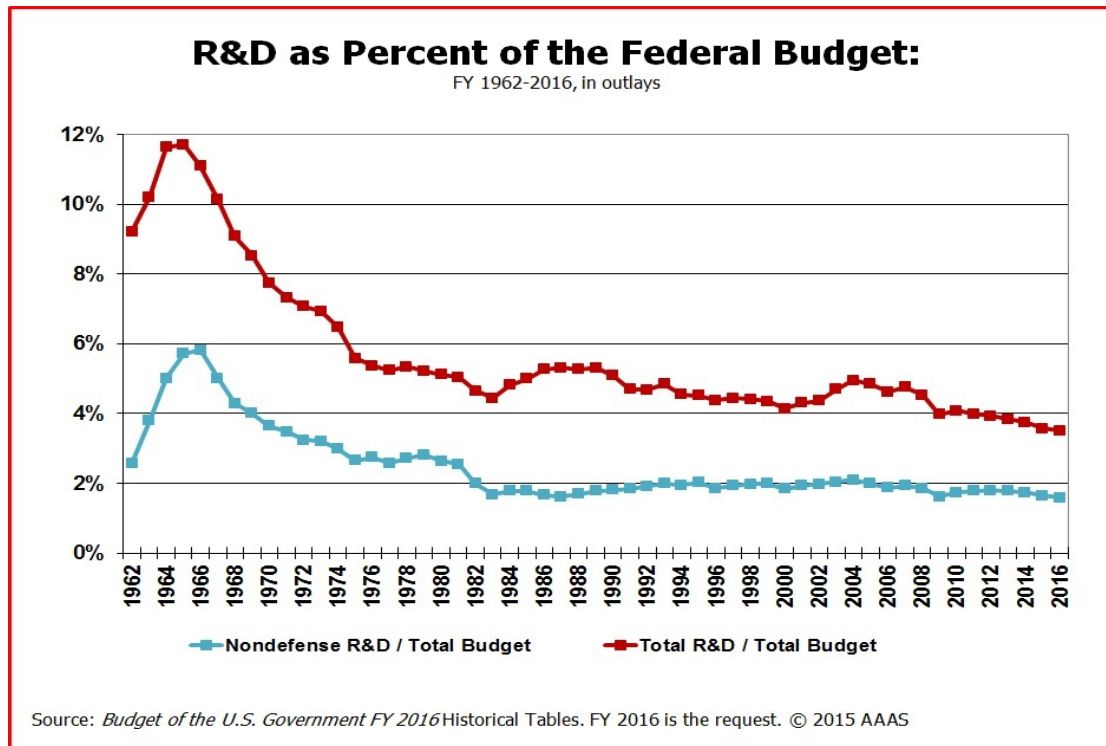


Photo of the  
world's #1  
Supercomputer at  
the Chinese  
National University  
of Defense  
Technology

# Federal R&D Outlays as a share of total federal budget, 1962-2016



- Additionally, NSF has observed that federal funding for science and engineering at universities dropped \$3 billion from 2011 to 2013. Obviously, research has gotten a very low budget priority;
- However, innovation is critical for the nation's security in order to stay ahead and for the economy to grow.

# Example of Potential Benefits of “Buying Commercial” at the Parts level:

For Same Environment and Performance

	COMMERCIAL	MIL SPEC
Semiconductor PART COST		
Bi-polar digital logic	\$1.67	\$15.78
Bi-polar linear	\$0.42	\$11.40
RELIABILITY FAILURE INDEX (ppm)	0.06	1.9 – 4.6
LEAD TIME NEW PART	1-12 months	17-51 months

After seeing this (and other comparable data) on the “Packard Commission”, Defense Secretary Perry issued a Directive for DoD to “use Commercial Specs and Standards” (which has not been followed)

\*Sources: “A Quest for Excellence” - “The President ‘s Blue Ribbon Commission Defense Acquisition;” (from Packard Commission), June 1986

# Joint Direct Attack Munition (JDAM)

## Unit Cost:

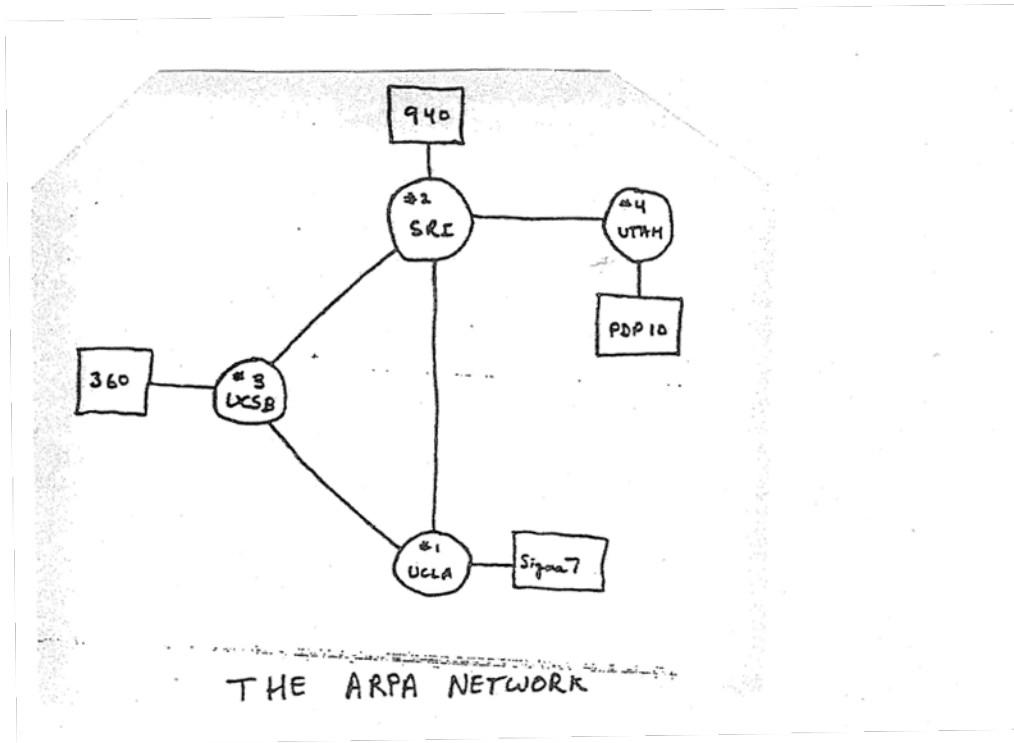
Military Specification parts: \$69,000 each;

Commercial parts: \$18,000 each



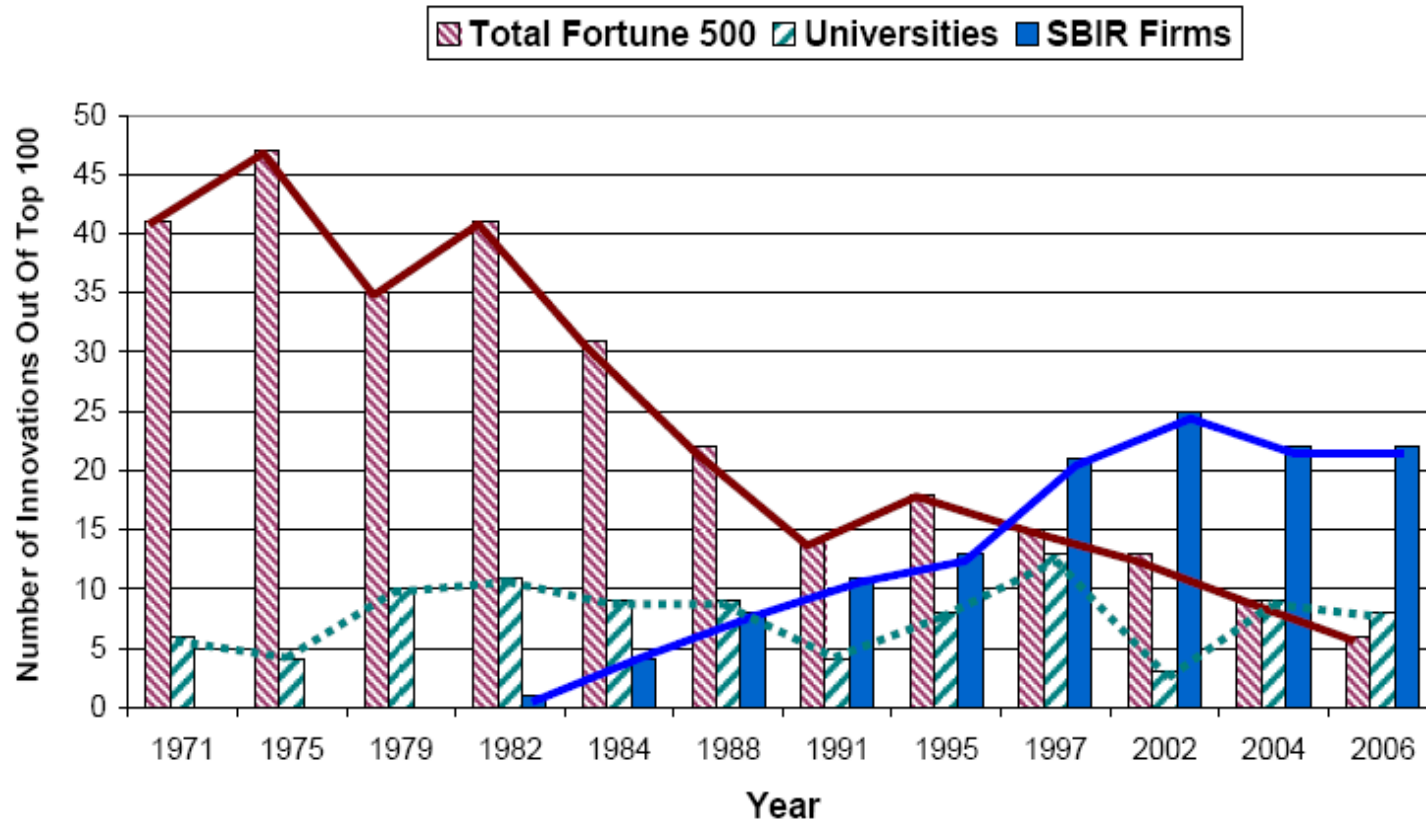


# DoD Investment In Innovation is Critical





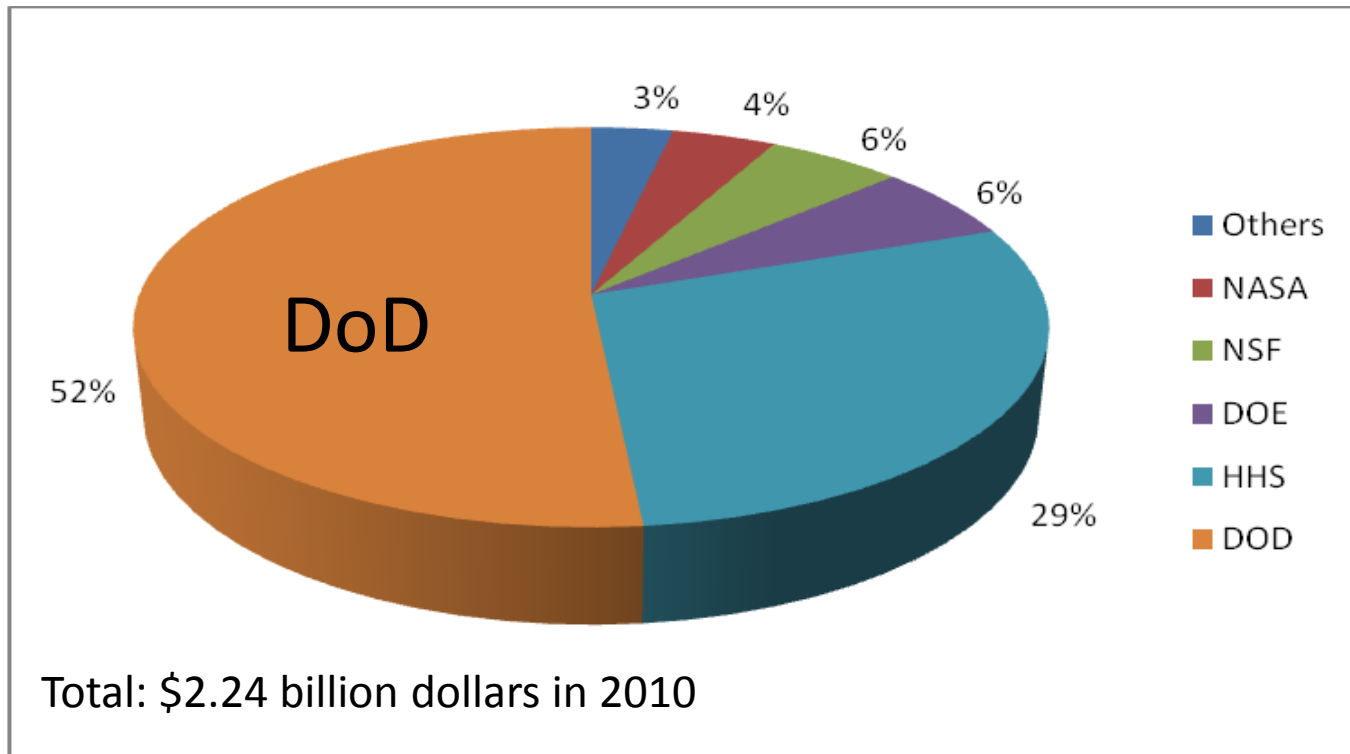
## Where Do Key Innovations Come From?



Source: Block and Keller, Where do Innovations Come From, ITIF July 2008.

Small Companies are Key Players in Bringing New Technologies to Market  
(Audretsch & Acs)

# SBIR remains the single largest innovation program for small businesses.



SBIR/STTR funding, FY2010.

SOURCE: <http://www.sbir.gov>, accessed November 1, 2013.

# Key Findings of the Academies Study

The DoD SBIR Program is meeting 3 of its 4 legislated goals

- ✓ Stimulate technological innovation
- ✓ Use small businesses to meet federal R&D needs
- Foster participation by women-owned and minority-owned small businesses
- ✓ Increase private sector commercialization of innovation derived from federal R&D

- SBIR Projects at DoD Commercialize at a Substantial Rate
  - Over time, about 70 percent of Phase II projects at DoD reach the market. (DoD Commercialization Database)
- SBIR projects at DoD are in broad alignment with the agency's mission needs.
  - There is substantial evidence that outputs from the program are taken up by federal agencies and in particular by DoD and by its primes.
  - Also some outputs have been picked up in civilian markets.

# Current participation of women and other under-represented groups in the SBIR program is low and not increasing.

- Approximately 15 percent of awards went to woman-owned small businesses (WOSB) and 7 percent to minority-owned small businesses (MOSB).
- Black- and Hispanic-owned small businesses are themselves a very small share of MOSB overall. (2011 NRC Survey)
  - Black-owned small businesses accounted for approximately 0.5 percent of all respondents; Hispanic-owned firms, about 1 percent.
- DoD has not made sustained efforts to “foster and encourage” the participation of woman- and minority-owned small businesses.

# Key Recommendations

Improving the DoD SBIR Program

# Encourage Commercialization

- **Encourage Prime Contractors:** Experiment with different kinds of incentives to encourage primes to work more effectively—and more often—with SBIR firms to commercialize new technologies.
- **Brief PEOs:** Use new administrative funding in part to develop better briefing materials for PEOs and PCOs
- **Provide Financial Incentives:**
  - Encourage components to experiment with financial incentives for the adoption of SBIR technologies.
  - Encourage components to add explicit targets to prime contracts



# Address Under-Represented Populations

- **No Quotas:** DoD should not develop quotas for the inclusion of selected populations into the SBIR program.
  - Such an approach is not necessary to meet Congressional intent and is likely to reduce program effectiveness.
- **Outreach and Education:** DoD should develop an outreach and education program focused on expanding participation of under-represented populations.
- **Tracking and Metrics:** The DoD Office of Small Business should improve tracking and metrics against which to benchmark the activities of DoD components.

# Improve Tracking, Data Collection, and Adoption of Best Practices

- **Alignment:** Better align data collection, agreed metrics, and utilization of effective evaluation and assessment tools to guide program management.
- **Annual Report:** A single, more comprehensive annual report could be used to satisfy the reporting requirements of numerous Congressional sponsors.
- **Data Accuracy:** Improve the Federal Procurement Data System (FPDS).

# Streamline Program Management and Agency Mission Objectives

- **Maintain Continuity of Technical Point of Contact (TPOC):** Consider ways to support ongoing engagement by TPOCs in projects after they have formally handed them on at the end of a rotation.
- **Protect Data Rights:** Work with SBA to explore mechanisms that more effectively protect SBIR data rights.
- **Disseminate Best Practices:** Track experimentation within the SBIR program and develop mechanisms to share best practices.

# Improve Contracts and Audits

- **Improve Audits:** Develop less onerous and more effective auditing procedures for small businesses that can be completed in a timelier manner.
- **Improve Contracting Practices:** Provide opportunities for small businesses to raise concerns about contracting practices at the component level.

# SBIR works, but small businesses are being turned off of DoD for 3 reasons:

1. Not a growth market
2. Legislated low profit
3. Excessive regulatory requirements
  - Specifically the 186,000 pages of the "code of federal regulations" which would drive up their overhead - - for example, to satisfy the unique cost accounting system

# Conclusions

The US must regain its “technological superiority” position

Great impact on

- economic competitiveness;
- national security;
- quality of life (e.g. health, energy, employment, trade).

Change requires two things:

- widespread recognition of need for change;
- leadership (with a vision, a strategy and a set of actions).

Clearly resources must focus on innovations

- need to increase research resources;
- must be adequate to maintain competitive designs;
- leadership to focus on innovation;
- Reauthorize SBIR and make it stable

# On Making Change in Government

"It Must Be Remembered That There Is Nothing More Difficult To Plan, More Doubtful Of Success, Nor More Dangerous To Manage, Than The Creation Of A New System. For The Initiator Has The Enmity Of All Who Would Profit By The Preservation Of The Old Institutions And Merely Lukewarm Defenders In Those Who Would Gain By The New Ones."

*Niccolo Machiavelli "The Prince," (1513)*



# Thank you