CRA Career Mentoring Workshop
Research Funding Overview

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Governments Fund Higher Ed

Why?

- Create educated citizens
  - Believed important in a democracy
- Facilitate higher quality of life for citizens
  - Improved health
  - Economic advantages
  - Military advantages
- Cheaply create a consulting capacity for gov

Governments Fund Higher Ed (NSF)

The pioneer spirit is still vigorous within this nation. Science offers a largely unexplored hinterland for the pioneer who has the tools for his task. The rewards of such exploration both for the Nation and the individual are great. **Scientific progress is one essential key to our security as a nation, to our better health, to more jobs, to a higher standard of living, and to our cultural progress**.

-Vannevar Bush, July 25, 1945.

Letter to President Roosevelt

Governments Fund Higher Ed

How?

- Own and pay for universities

-versus-

- Provide funding for students to attend university
  – Educated population
  – Reduces youth unemployment

-versus-

- Provide "research grants" to universities

Industry Funds Research

Why?

- To create an educated workforce
- Incentivize research concerning key problems
  - Seek: enhanced understanding   vs   specific solutions
- Facilitate access to top minds
  - Students (hiring)
  - Work with faculty (consulting)
- Great value (tax credit)

Mechanics: Instruments

- ## Contracts
  - Quid pro quo. Real deliverables
- ## Grants
  - Direction can change. No deliverables.
- ## Gifts
  - No constraints. (Typically very low overhead)

Recipient: Your employer – not you.

- Consequences: portability, control, …
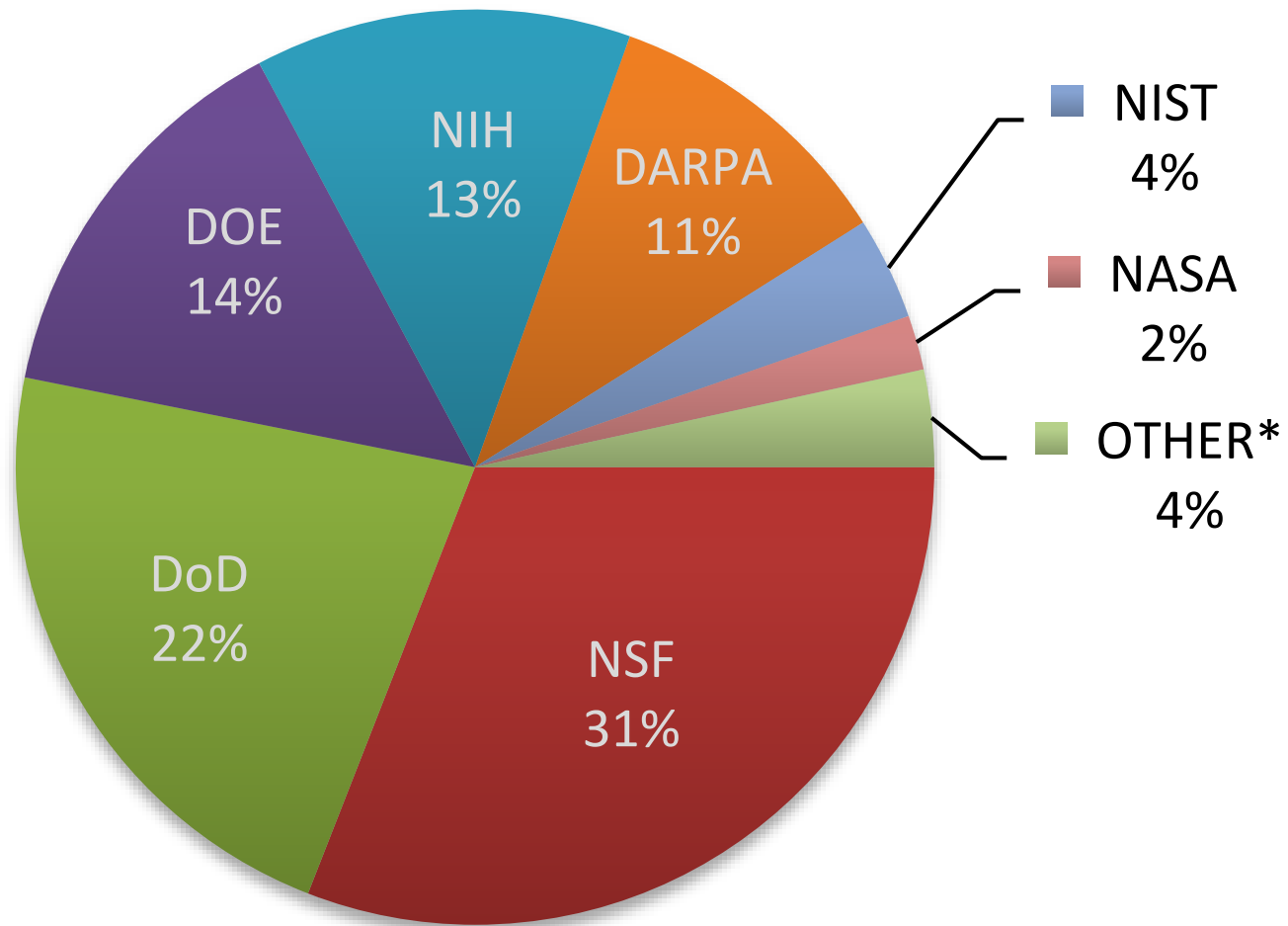
Funding Sources

Government agencies. E.g.,

- DoD-related Agencies (ARO, AFOSR, DARPA, DHS, NSA, ONR)
  - 6.1 = Basic Research
  - 6.2 = Applied Research
  - 6.3 = Advanced Technology Development
  - 6.4 = Demonstration and Validation
  - … [6.5, 6.6, 6.7]
- National Science Foundation (eg CISE)
  - **NSF Funds 86% of University-based research in CS**
- Dept of Energy
- National Institutes of Health

Industry, E.g.,

- Companies: Facebook, Google, IBM, Intel, Microsoft, …
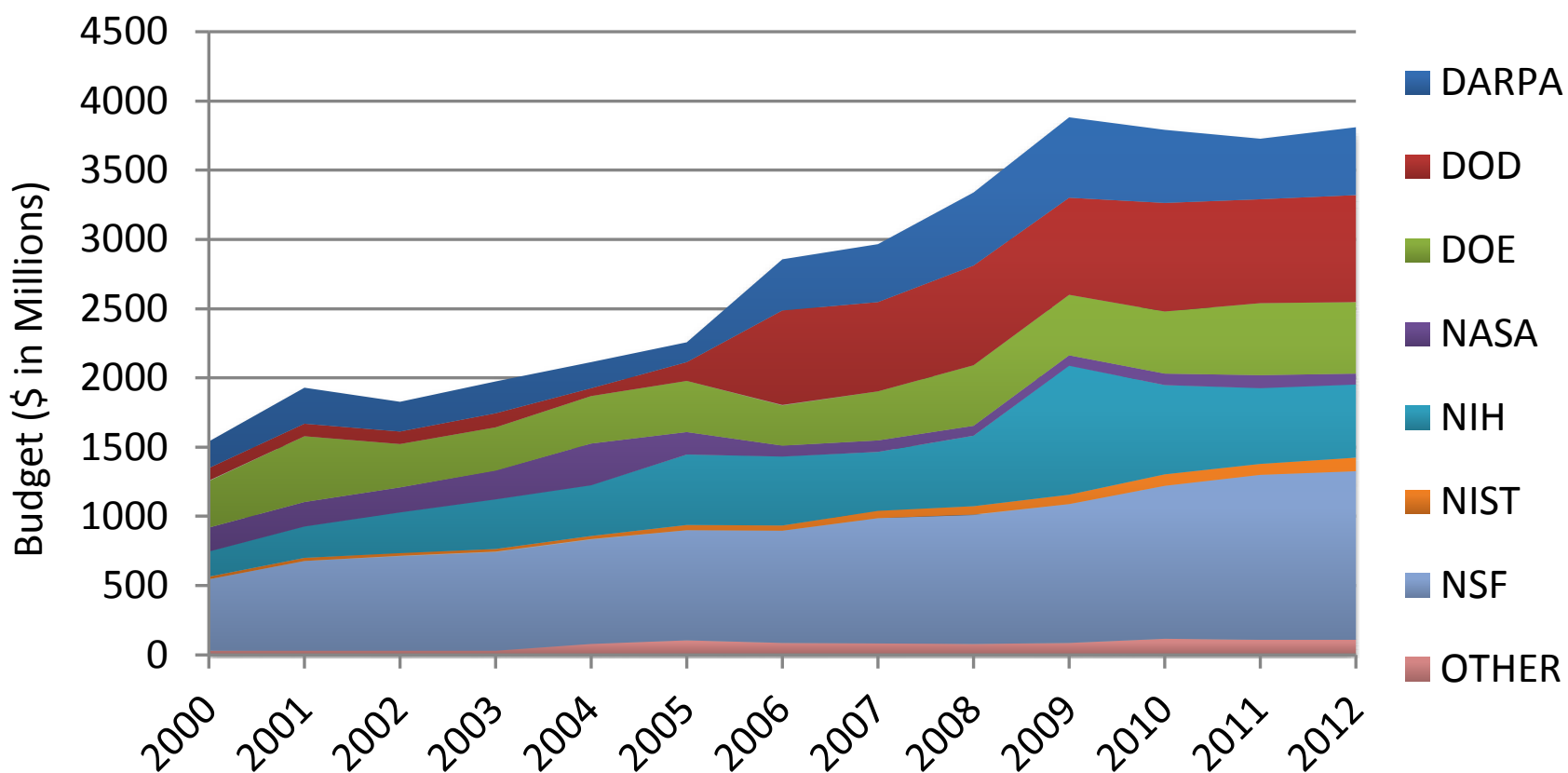- Consortia: Semiconductor Research Corporation (SRC), …

FY 2014 Budget Requests by Agency

NIH 13%
DARPA 11%
NIST 4%
NASA 2%
OTHER* 4%
DOE 14%
DoD 22%
NSF 31%

*Includes AHRQ, DHS, EPA, NARA, and NOAA.

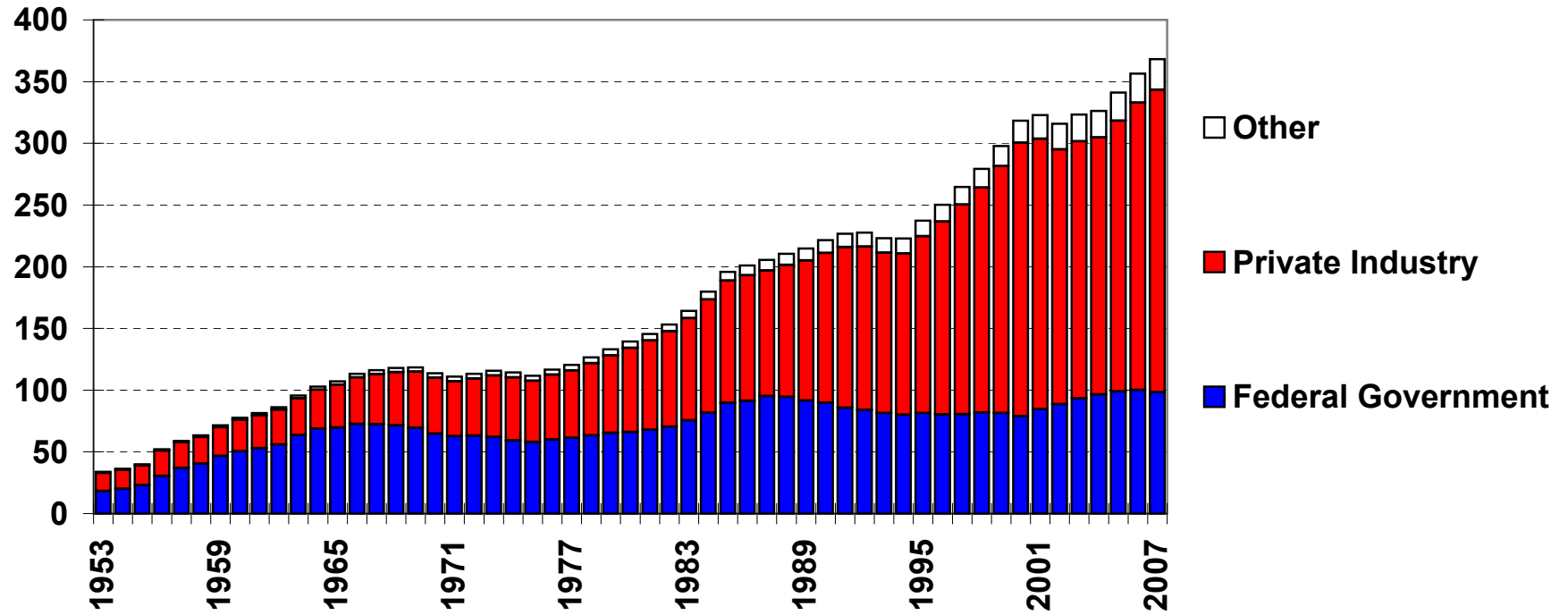*Source: NITRD Supplement to the President's FY2014 Budget Request*

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Budget Trends by Agency

DOD includes OSD, NSA, and DoD Service research organizations. DOE includes DOE/NNSA, DOE/OE, and DOE/SC. OTHER includes AHRQ, DHS, EPA, NARA, and NOAA.

Source: NITRD: Supplement to the President's FY2014 Budget Request

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U.S. R&D Funding by Source, 1953-2007
expenditures in billions of constant 2007 dollars

Other

Private Industry

Federal Government

Source: NSF, Division of Science Resources Statistics. (Data for 2007 are preliminary.)
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Ecosystem of Funding

- Who defines the topic:
  - Individual PI
  - Community driven (e.g., workshops) program defn
  - Program manager driven program defn
- How are funding decisions made?
  - Peer review
    - written reviews   -versus-   panel reviews
  - Gov insider reviewers
  - Program manager alone

PI Obligations

Research, write, plus…

- Include an acknowledgment of funding source in every publication.
- Provide status reports (3 mos, 6 mos, 12 mos)
  - Provide slides so PM can present your work.
- Attend PI meetings (annual)… other meetings.
- Give briefings to PM… To others at agency
- Work and integrate with other funded projects
- Subject work to outside evaluation

Means to an End?

Funding **is** a means to:

- Purchase labor (students, postdocs, staff)
- Purchase equipment (computers, etc)
- Purchase time (PI release time)
- Being active in your research community
  - Travel to conferences, meet with peers, …

Funding **is not** an end:

- Funding level is not a measure of academic success
- Funding can come with obligations that distract from doing research.
- Group size is not a measure of success

Proposal Writing 101

- Follow the directions in solicitation (RFP)
  - Font size, section headings, margins, length, …
  - "Synergistic activities" sometimes are expected [NSF]
  - Collaboration with funder sometimes sought [DoD, Ind]
- Sometimes: White paper→ Full proposal
- A "good" problem is not good enough to be funded
  - Evidence that **you** have basis for solution.
  - Surprises/difficulty that superficial intuition won't get
- What to make of the reviewer comments