

# Cornell Research Report

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## OUTLINE

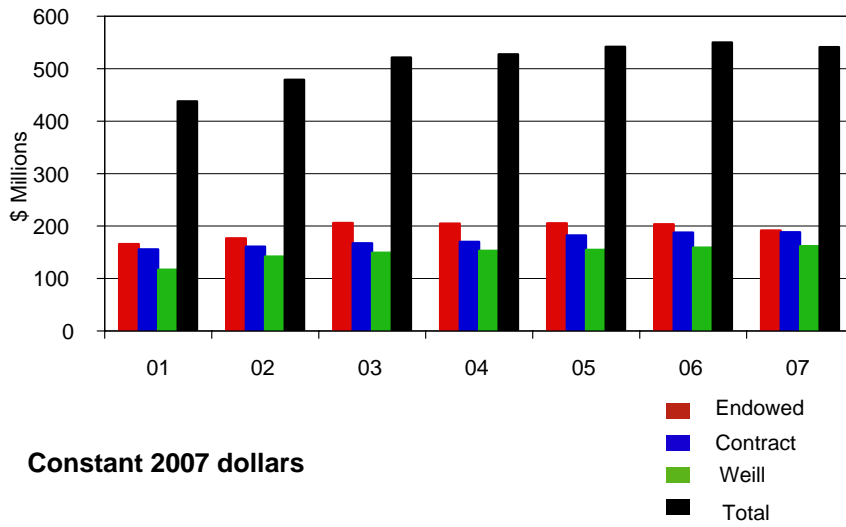
Some Numbers and Trends

Some Recent Developments

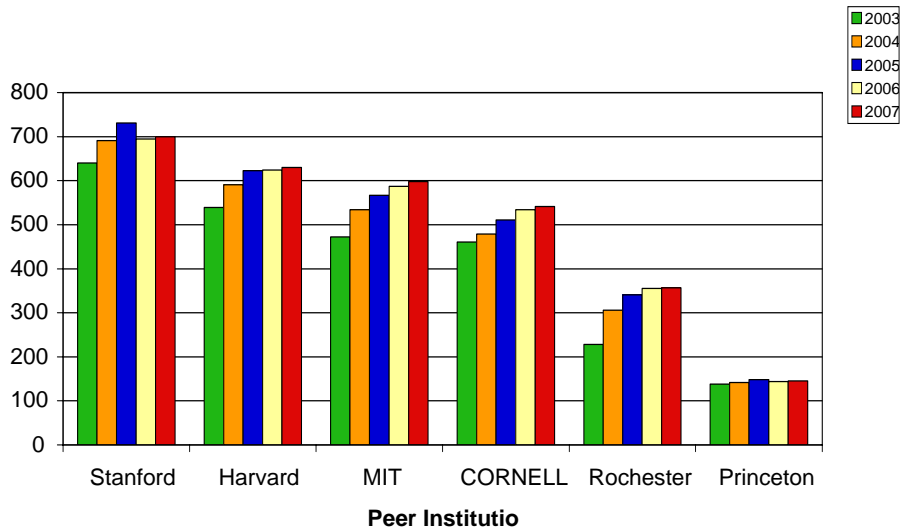
A Few Research Highlights

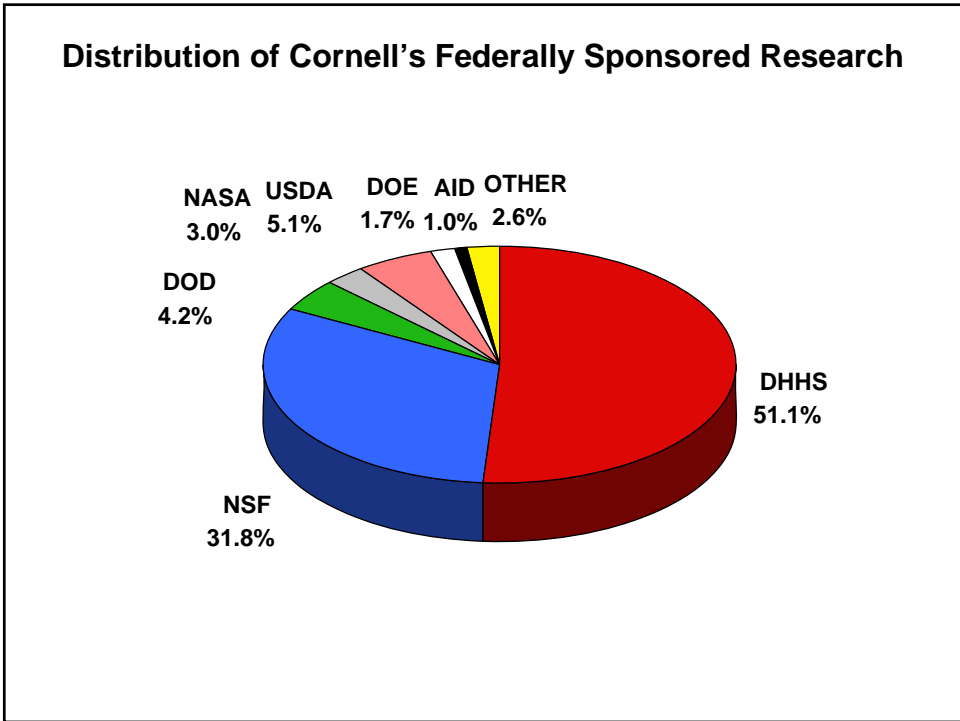
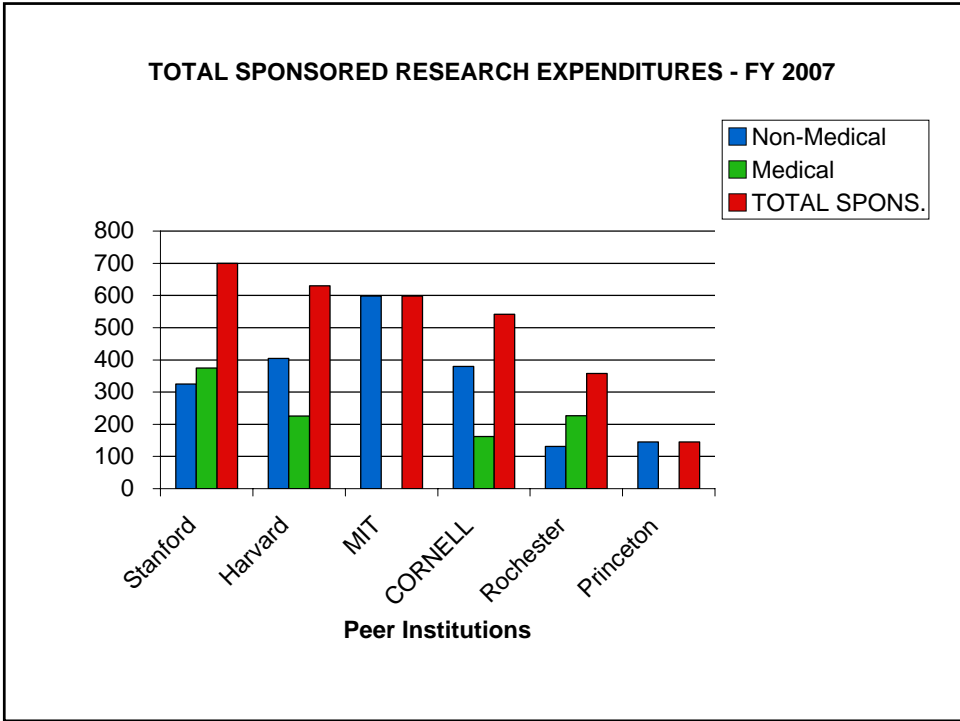
Looking Forward

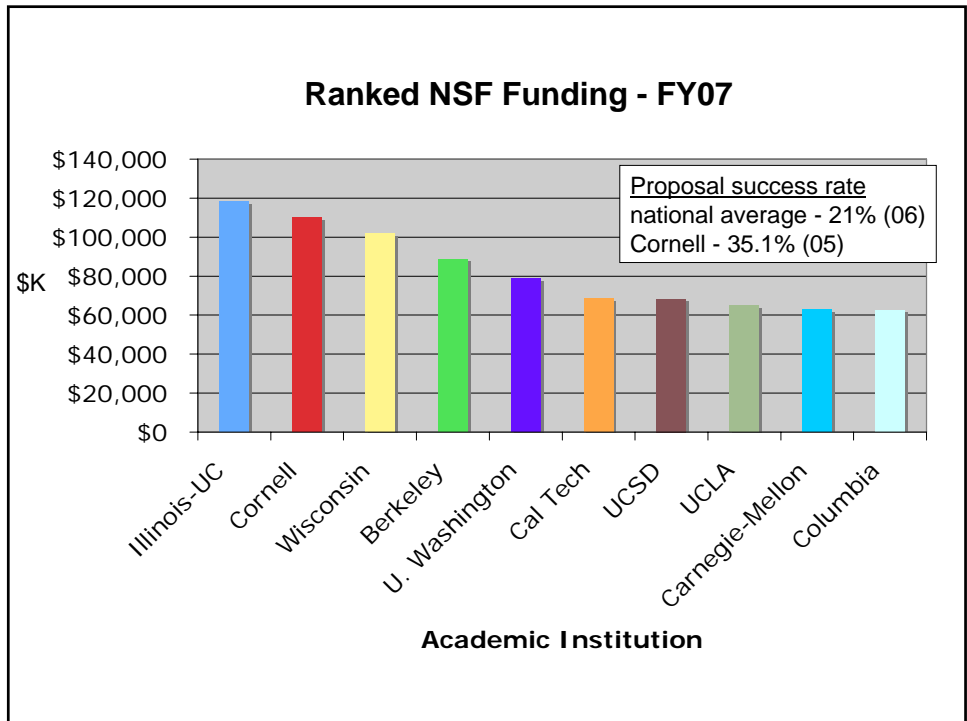
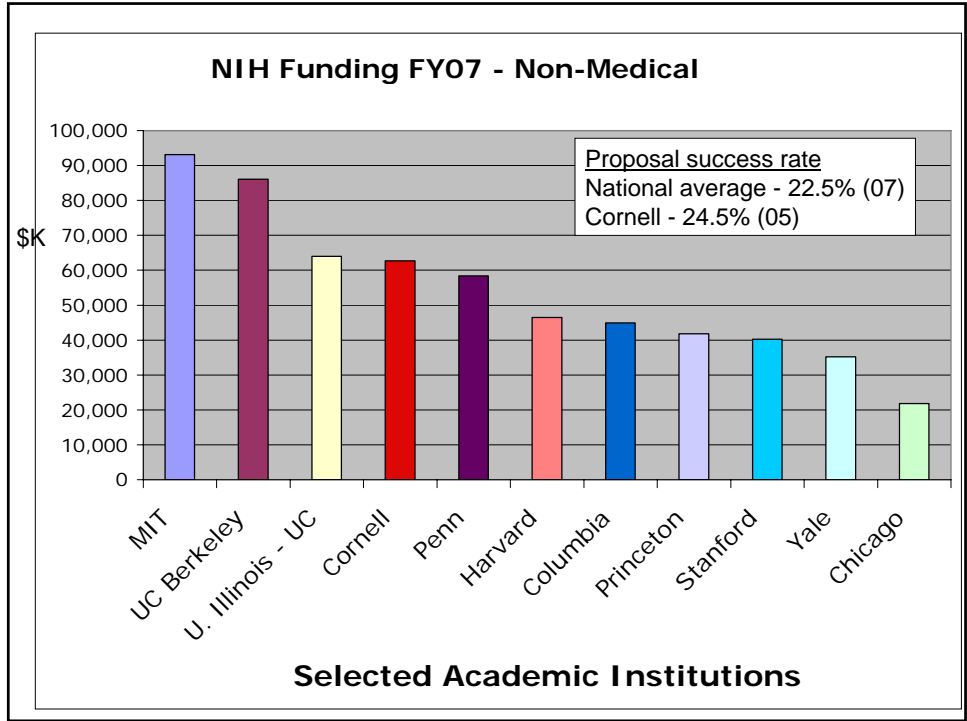
### Sponsored Research Funding

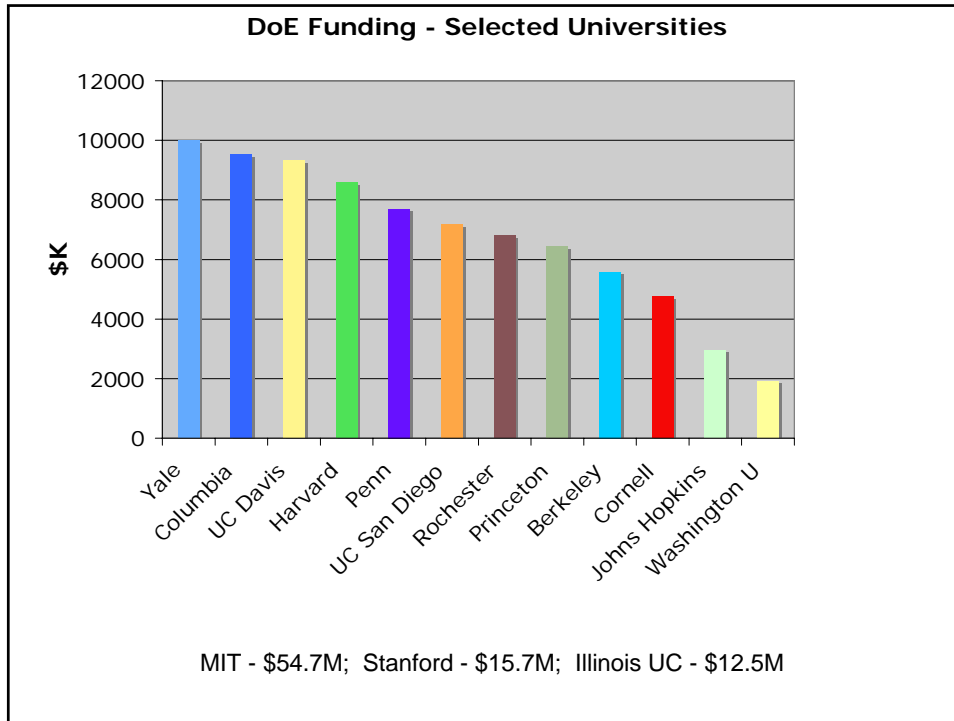


### TOTAL SPONSORED RESEARCH EXPENDITURES - 5 YE.



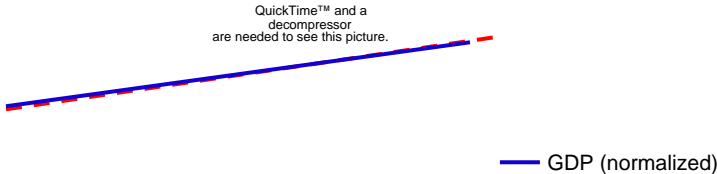






- ### Federal R&D Funding Issues
- The President's proposed FY08 Budget was good for (non-NIH) basic science
    - National Competitiveness Initiative - NSF and DoE major increases
  - Congress's FY08 budget authorization bills were good for basic science
  - The final FY08 Omnibus appropriations bill was very bad for basic science - NSF and DoE were hit hard.

# Federal R&D Funding Trends



# Federal Research Funding Trends

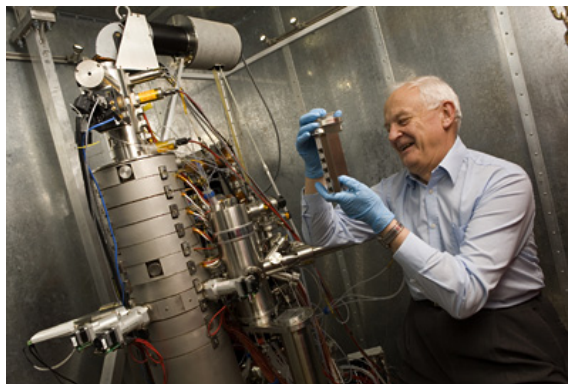
QuickTime™ and a decompressor are needed to see this picture.

President's requested FY09 basic science budget: NIH - flat  
NSF - up 17%  
DoE - up 16.7%

## Some Recent Research Related Developments

- Weill Hall nearing completion - occupancy later in 2008
- Construction has begun for Physical Science Building - completion - late 2010
- Center for Advanced Computing established - evolution of the Theory Center
  - Focus on data intensive HPC
  - NSF Track 2 equipment proposal under review
- Center for a Sustainable Future initiated
  - Three Thrusts: Energy, Environment, Economic Development
- Energy Recovery Linac project continues to move forward
  - Critical year ahead (\$500M capital project - ~\$40M annual NSF funding)
- Office of Sponsored Programs now under the management of the Office of the Vice Provost for Research
- Renewed focus on technology transfer and economic development - CCTEC

## The Cornell SuperSTEM Scanning Transmission Electron Microscope



**Why is John Silcox so happy?**

World's highest resolution analytical electron microscope.  
A ten year journey from concept to reality.

## Seeing Atoms in “Color”

Microscope has 0.1 nm electron beam, can resolve individual atoms

QuickTime™ and a decompressor are needed to see this picture.

- lanthanum
- titanium (Ti)
- manganese (Mn)
- Intermixed Mn and Ti



Muller

← Full “color” image

“Color” images of a thin, ~ 30 atom layer, cross-section of a multi-component material

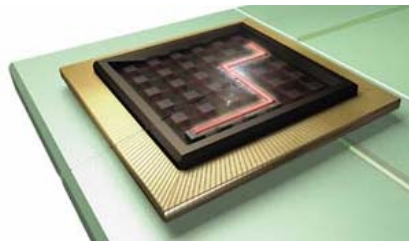
Best performance requires perfect interfaces with no intermixing.

Muller, Silcox et al.  
Science, Feb. 22, 2008

## Photonic Data Processing on a Si Chip



Alex Gaeta - AEP  
Director - CNS



Michal Lipson - ECE

Replace *electronics* with *photonics* for ultra-high-speed processing of data.

Potential for low-power operation at data rates > 1 Tb/s

Gaeta - Nanophotonics group leader - Center for Nanoscale Systems - est. 2001.

Lipson - CNS seed project funding - 2002 - her first research funding.

First joint Lipson-Gaeta paper - 2004

New DARPA award **\$5.4M/4.5 years**



### 2007 NSF CAREER Awards



Wilkins Aquino  
CEE



Garnet Chan  
CCB  
2007 Sloan Fellow



Kavita Bala  
CS



Peng Chen  
CCB



Sunil Bhawe  
ECE



Juan Hinstroza  
Fiber Science

### 2007 NSF CAREER Awards



Uri Keich  
CS



Adam Siepel, BSCB  
2007 Packard  
Fellowship



Robert Kleinberg  
CS  
2008 Sloan Fellow



Julia Thom  
Physics



David Putnam  
BME



Aaron Wagner  
ECE

Twelve 2007 Career Awards - largest number for any university

### 2006 PECASE Awards



Brian Kirby, MAE  
(DOE)



Chekesha Liddell, MSE  
(NSF)



Bruce D. McCandliss, Sackler Institute  
(NIH)

56 awards nationally - in 2006 (announced Nov. 2007)


## THE CURRENT RESEARCH ENVIRONMENT

### Nationally

- Concern about America's economic status - ACI
- Concern about recent decline in NIH funding
- Concern about the energy future, global warming, sustainability

### **Coming Opportunity**

QuickTime™ and a decompressor are needed to see this picture.

 research

**A Challenge: Increased federal scrutiny of, and growing regulatory demands on research universities**

## THE CURRENT RESEARCH ENVIRONMENT

### At Cornell

Improved vision and improving process for technology transfer and for corporate interactions - CCTEC and OSP

Improved position in providing high performance computing for research

Major research facilities on line, in process, and in planning

Duffield, ECRF, Weill, Physical Science Building, Gates, .....

Outstanding cadre of researchers - very strong hiring in recent years

Excellent position in creative, interdisciplinary research

Highly demanding and evolving research environment.  
Cornell will continue to successfully compete and to lead in research