

**Chaire d'innovation technologique**  
**Liliane Bettencourt**

# **Mécanismes d'allocation des ressources humaines et financières**

**Elias Zerhouni**

21 février 2011



**COLLÈGE  
DE FRANCE**  
— 1530 —

# NIH: A Vision of Hope



" Scientific progress is one essential key to our security as a nation, to our better health, to more jobs, to higher standard of living, and to our cultural progress."

*Science, The Endless Frontier....  
(1945)*

**Vannevar Bush (1890 –1974)**

# NIH Mission

Uncover new knowledge that leads to better health for everyone by:

Conducting research in its own laboratories

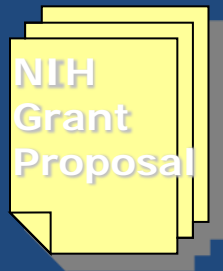
Supporting research of non-Federal scientists in universities, medical schools, hospitals, and research institutions throughout United States and overseas

Help translate research into medical innovations

Helping train research investigators

Fostering communication of medical information

# Researcher



# Scientific Review Panel



# Program Office



Main contact for applicant  
Helps interpret review results



# Institute National Advisory Councils



Assess programs  
Approve applications  
Public members



# Institute Director



Makes final decision  
Allocates funds  
Provides annual justification to Congress



# Congress



Initiates grant proposal:  
• New project  
• Continuing project

Scientists evaluate scientific merit of grant proposal

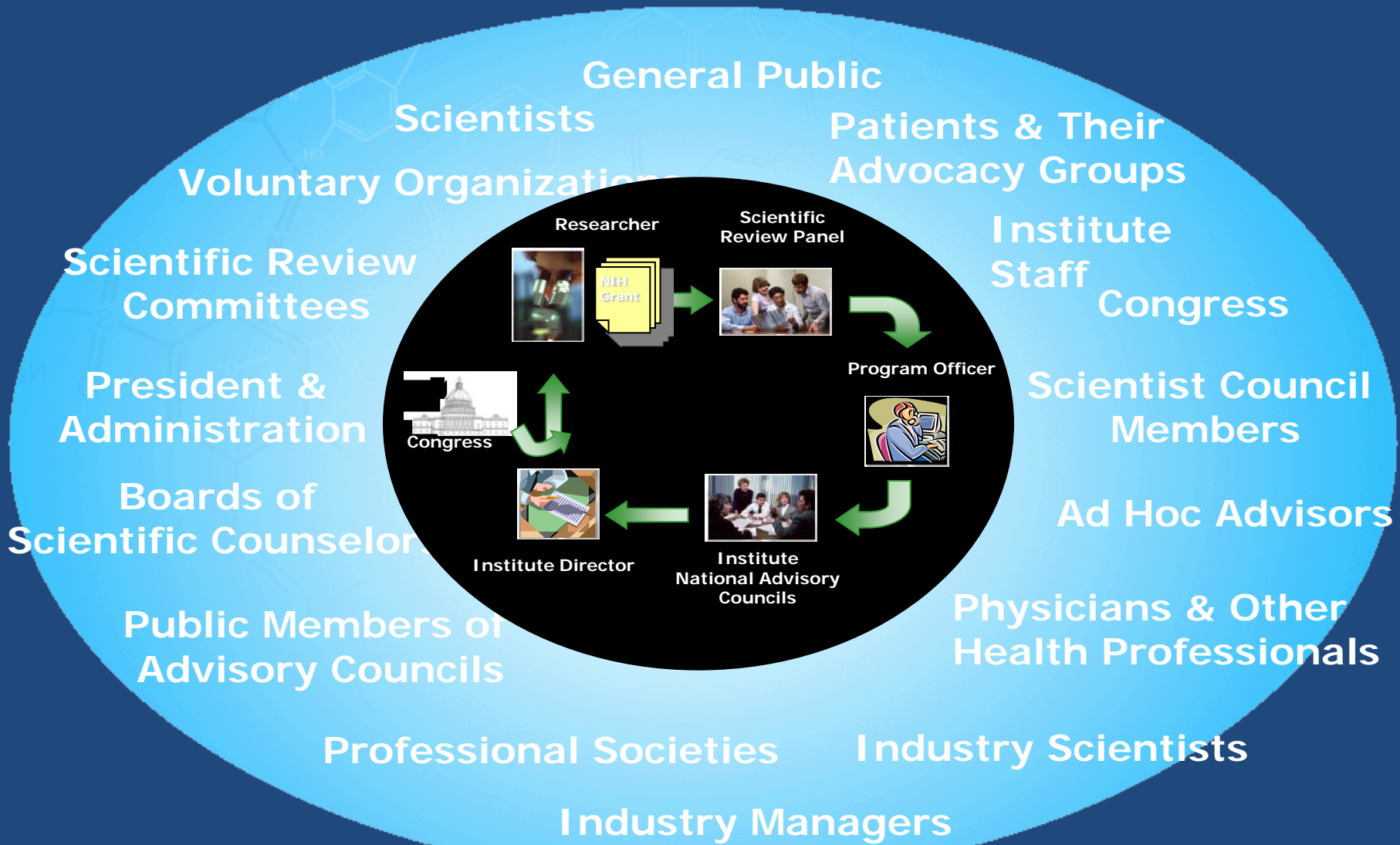
# Important Characteristics

- All grants are awarded to the principal investigator in name.
- In addition to the grant, institutions receive indirect costs ( from 40 to 70% of the grant value for buildings, utilities and administration)
- The grants are fully transferable if the principal investigator goes to another institution
- Consequence: institutions compete for funded scientists by providing them a supporting environment

# The Cornerstones of NIH

- World Class Peer-review Process (Congressionally mandated)
  - Independent- Conducted by outside reviewers
  - Competitive-
- Scientific and Public Advisory Structure
  - Each institute has a statutory council 2/3 scientists and 1/3 public representatives
  - Director NIH is advised by 2 separate committees: Council of public representatives, and the Advisory Council to the Director

# Setting Research Priorities: Every Voice Counts



# NIH and its Partners



**Congress**



**Public**



**Universities**

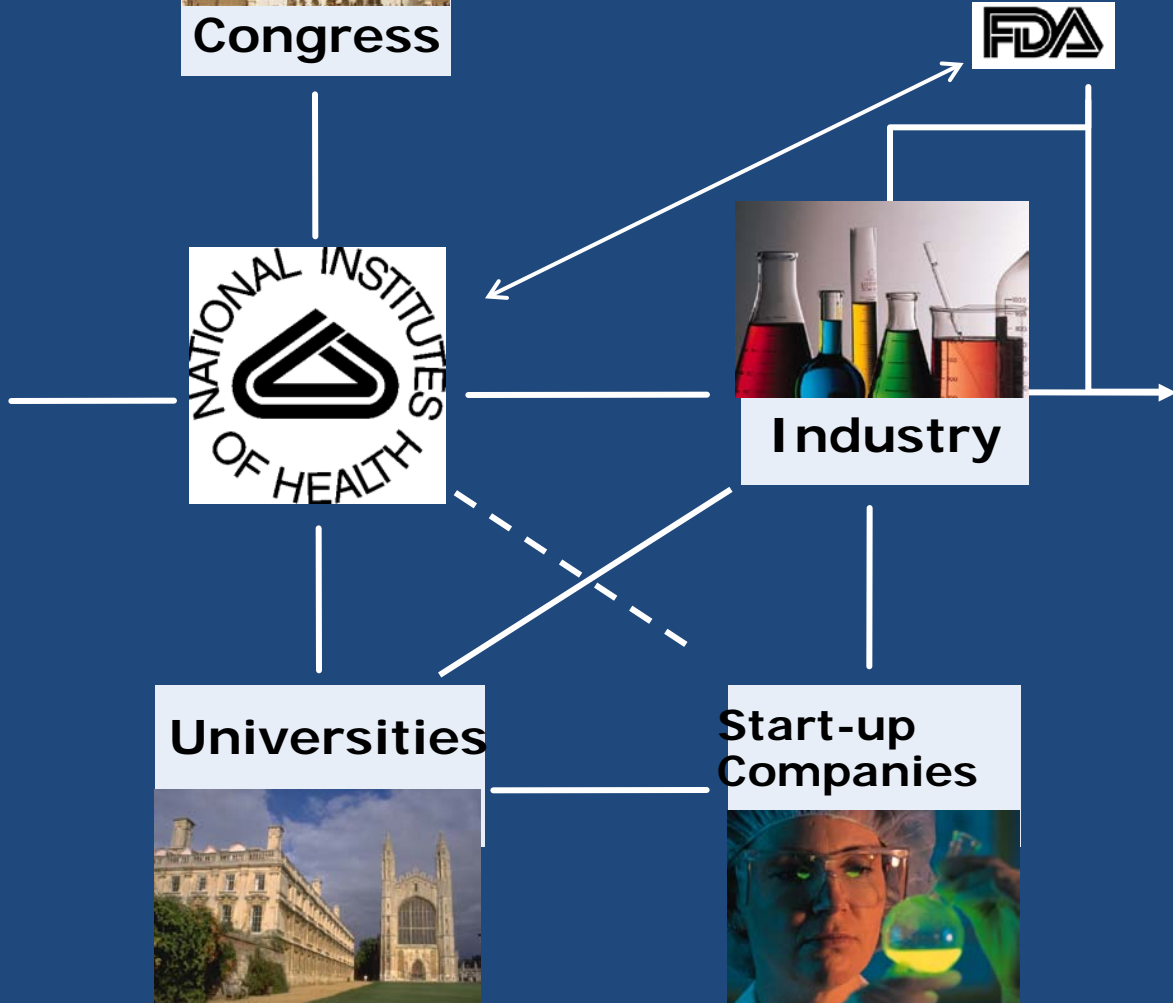


**Industry**

**Start-up Companies**

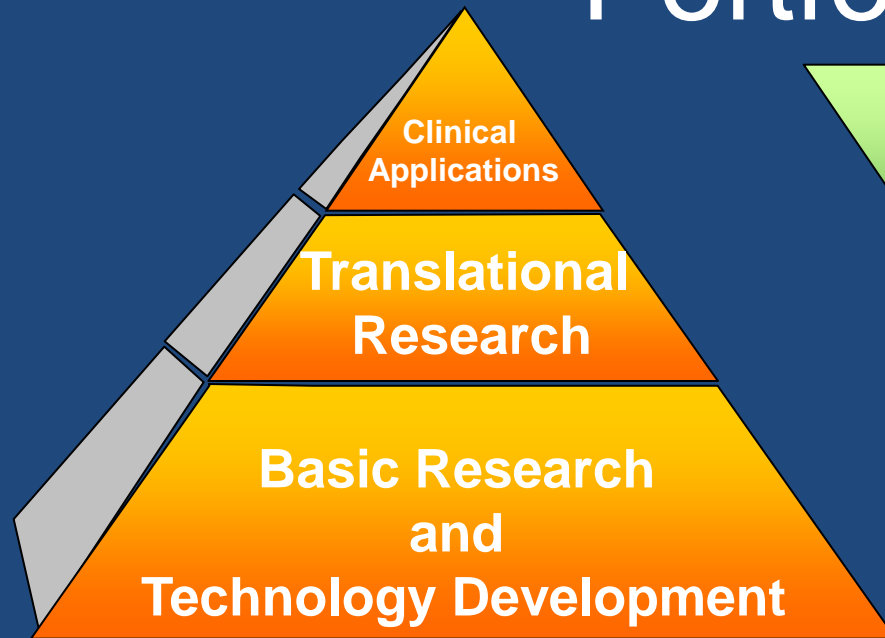


**Products**

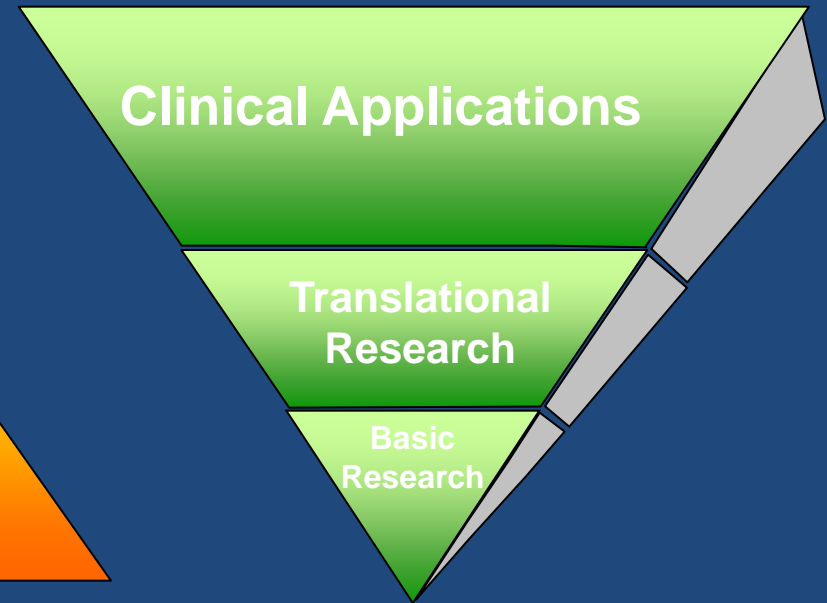




# Balanced National Biomedical Research Portfolio



**NIH**



**Private Sector**

# OTHER MECHANISMS

- The National Laboratories model:
  - CNRS
  - The US national laboratory system
- The academy model
  - Russian and Chinese academies
- The society model:
  - The Max Planck society, the Fraunhofer
- The National Research Council model
- Government driven research programs

# Government driven research programs

- All Governments use direct incentives to support research of national interest
- Defined national priorities: Examples
  - Nanotechnologies
  - New Energy
  - Material Sciences
  - Nuclear Engineering- ITER
- EU-Framework program

# The Max Planck Society

- 1948: Successor to the Kaiser Wilhelm Society
- Funded through States and Federal government with core budget but with autonomy.
- Principles: Outstanding researchers in critical fields of Basic research
- Develop new fields not yet mainstream, and not funded by others
- interdisciplinary research
- Freedom to scientists but rigorous evaluation insuring highest sustained quality

# CNRS

- Founded in 1939 by governmental decree, CNRS has the following missions:
- To evaluate and carry out all research capable of advancing knowledge and bringing social, cultural, and economic benefits for society.
- To contribute to the application and promotion of research results.
- To develop scientific information.
- To support research training.
- To participate in the analysis of the national and international scientific climate and its potential for evolution in order to develop a national policy.

# The Russian Academy of Sciences

- The Academy was founded in Saint Petersburg by Peter the Great, inspired and advised by Gottfried Leibniz and implemented in the Senate decree of January 28, 1724
- The **Russian Academy of Sciences** consists of a network of scientific research institutes from across the Russian Federation as well as auxiliary scientific and social units like libraries, publishers and hospitals.
- The Academy is now incorporated as a civil, self-governed, non-commercial organization
- chartered by the Government of Russia. It combines members of RAS and scientists employed by institutions.

# The National Research Councils

- Examples: UK, Sweden
  - Usually dedicated to a field of science
    - MRC in UK
  - Funding agencies mostly
  - Some councils also operate research centers
  - Mostly investigator initiated research

# Characteristics

- Funding by Governments is essential
- Varying degrees of autonomy
- Combination of Targeted and Un-Targeted research
- Different modes of management and evaluation



# Fundamental mechanisms of resource allocation: Capital Expenditures

- WHO PAYS?
  - Direct pay of full capital expenses by government
  - Indirect pay through Indirect costs recovery on grants
- WHO OWNS?
  - The government itself
  - A chartered semi-autonomous entity
  - An independent entity:
- WHO OPERATES?
  - The government itself thru functionaries
  - Under a charter but employees are not functionaries
  - Independent institution

# OPERATING EXPENSES

- BUDGET AGREEMENTS; GRANTS IN AID OR CONTRACTS
- COMBINATION OF DIRECT RESEARCH COSTS AND INDIRECT COSTS
- THE MAJOR COSTS IS PERSONNEL COSTS
  - SCIENTISTS ARE FULL TIME EMPLOYEES OF THE FUNDING AGENCY
  - FULL TIME EMPLOYEES OF THE INSTITUTION RECEIVING THE GRANTS

# SOME DATA

- HALF LIFE OF FUNDED RESEARCH PROJECTS?
  - 4 YEARS AT NIH
  - 50 percent renewed every 4 yrs
- HALF LIFE OF FUNDED RESEACH SCIENTISTS?
  - 8 years
  - Of 100 scientists about 10-15 % receive competitive funding for over 20 years
- Average duration of « creative » period for scientists
  - 17 years: publications and patent analysis
  - Need to manage careers across the life span and offer bridges from research to industry to education and back

# Human resources management

- Key component of innovation system
- Core question: Are innovators given enough flexibility to explore different paths including career changes without prejudice?
  - Full Time employment systems that are not adapted tend to restrict innovation
  - Career **MOBILITY** between sectors seems essential for technological innovation to occur
  - Consultancy, leave of absence without loss of seniority or pension, going from education to research to business to administration

# Converging Principles

- Separate funding from operating or executing science and innovation programs
- Keep accountability by independent and credible systems of evaluation
- Allow full autonomy with least administrative burden but for periods of time with full review
- Focus resources on scientists during « creative » period but provide alternate career pathways
- Avoid rigid employment system
- Encourage interactions with educational and business sectors

# FY 2005 NIH Extramural Grants by Research Institution

## 3,114 New Technologies Brought to Market

By 185 US Research Institutions (1998-2004)

*Funding to Develop Technologies Provided by  
Both US Government and Private Industry*

## 4,543 New Companies Formed

Around Technologies from  
US Research Institutions (1980-2004)

*2,671 Companies Still in Operation  
as of 12/2004*

