

BRIDGING *the* SCIENCES

Research!America
AN ALLIANCE FOR DISCOVERIES IN HEALTH®

"A balanced research portfolio in all fields of science and engineering research is critical to U.S. prosperity. Increasingly, the most significant new scientific and engineering advances are formed to cut across several disciplines."

Rising Above the Gathering Storm
The National Academies

NORMAN R. AUGUSTINE

Chair, Committee on Prospering in the Global Economy of the 21st Century;
Retired Chairman and CEO, Lockheed Martin Corporation

The Challenge

- Create a balanced U.S. policy for strengthening investment in scientific research and innovation to improve health, increase security and drive economic prosperity
- Foster research at the interface between the biological, behavioral, and social sciences and the physical, chemical, mathematical, and computational sciences
- Minimize the barriers to collaborative partnerships between researchers who work in the government, academic and industrial sectors
- Encourage a long-term vision of innovation and high-risk, high-reward research

Why INVEST

- Fully 50% of U.S. economic growth since WWII arose from developments easily attributable to the scientific enterprise
- A one percent reduction in cancer deaths would be worth nearly \$500 billion, according to a recent study by economists Kevin Murphy and Robert Topel of the University of Chicago Graduate School of Business
- The U.S. still provides the #1 environment for global industries to profit from innovation and will continue to do so only if we remain the undisputed leader in fostering and generating new knowledge

Why COLLABORATE

- The U.S. is the global leader in knowledge creation, but in order to remain competitive, we must "bridge the sciences" and promote cross-cutting research
- We must reinvigorate our educational system to train the next generation of leaders in science

Who's DOING WHAT

"In order to make discoveries that affect human life, it takes collaboration among different scientific disciplines. In my lab at MIT, we do whatever it takes to solve problems and that often requires learning new disciplines or finding someone who understands them."



DR. ROBERT LANGER

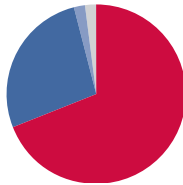
MIT professor and bioengineer **Robert Langer** performs his research at the interface of biotechnology and materials science. His lab is developing new ways to effectively control drug delivery. Langer and a colleague, Omid Farokhzad, are working on a "Cancer Smart Bomb" by packaging chemotherapy drugs in nanoparticles capable of targeting cancer cells and sparing healthy cells.

Langer's lab, like most successful research endeavors, depends on funding from multiple sources including the National Institutes of Health, the National Science Foundation, philanthropic sources such as the American Cancer Society and private investment from venture capitalists and industry.

What AMERICANS ARE SAYING

Various Scientific Fields Impact Discovery

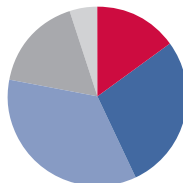
How much do you think research in specific fields impacts scientific advances and discovery in other fields?



Source: Bridging the Sciences Survey, 2006
Charlton Research Company for Research!America

U.S. Performance in Science and Math Education Lacking

Do you think the U.S. is performing well or performing poorly compared to other nations in terms of science and math education?



Source: Bridging the Sciences Survey, 2006
Charlton Research Company for Research!America

A History of Innovation

1704: Sir Isaac Newton publishes *Optica* suggesting the emission theory of light

1822: Napoleon's contemporary, Jean Baptiste Fourier, theorizes mathematically that the movement of molecules can be measured based on temperature

1895: Nobel physicist Wilhelm Röntgen discovers "X-rays"

1946: Two American scientists who were jointly awarded the 1952 Noble Prize in Physics, Felix Bloch and Edward Purcell, independently describe a phenomenon that would become known as "nuclear magnetic resonance" or NMR

1971: Chemist Paul Lauterbur applied NMR in three dimensions to create the first magnetic resonance image or MRI for which he won the Nobel Prize in Physiology or Medicine

1974: Physician and research scientist, Raymond Damadian, is issued the world's first patent to build an MRI scanner as a tool for medical diagnosis

Today: An array of medical imaging technologies (CT, ultrasound, MRI, PET scans) allows health care professionals to "see" and treat disease early, often preventing the need for invasive surgical therapies

Hope for the Future: Early detection and diagnosis of disease using technologies such as imaging and genetic mapping will transform medicine. Imagine a health care system that will find disease in its earlier stage and prevent its ravages without traumatizing the body through invasive surgery, needles, chemotherapy or radiation therapy.

Where RESEARCH IS THRIVING

A Model for Collaboration

- Stanford University's Bio-X initiative supports and facilitates collaboration between researchers in various scientific and engineering disciplines, schools and departments.
- The Bio-X forum is designed to introduce Stanford researchers to corporations and other types of potential collaborators in order to build collaborative public/private relationships.
- Bio-X faculty with expertise in medicine, engineering and education are designing novel courses for cross-disciplinary learning.
- Bio-X benefactor and founder of Netscape, Jim Clark, got his start at Stanford in the electrical engineering department. Clark pledged \$150 million and expressed gratitude for his years as a professor at Stanford when he was allowed to develop technologies that later brought him success in the private arena.