

[excerpt]



**1817 - 2017**

**THE JOSHUA LEDERBERG  
SCIENCE WITHOUT BORDERS  
PROGRAM**

*A PROGRAM OF THE NEW YORK ACADEMY OF SCIENCES*

# The Joshua Lederberg Science Without Borders Program

## Investing in Wisdom, Investing in People, and Investing in Global Partnerships

### Part I. Investing in Wisdom:

#### The Frontiers of Science Program

**The Need:** Nearly every science-literate citizen knows that **cross-disciplinarity is driving progress in science, technology and medicine**. It took physicists and mathematicians to enable biologists to decode the genomes being mined today; it is taking biologists and geneticists to help psychiatrists unlock the secrets of the mind ... and so forth.

Moreover, the days of individual investigators, toiling in isolation only to emerge from their labs with extraordinary breakthroughs, are nearly gone. Today, **breakthroughs reported in our leading scientific journals are produced in collaborations among researchers at multiple institutions, often in cities and campuses across the globe**.

Where do such collaborations begin? Where do the ideas that inspire collaborations emerge? Ever more frequently, new inspiration arises from cross-disciplinary, cross-institutional conversations. And this is why every corporate and academic research director supports mechanisms that draw together researchers from diverse institutions.

Nevertheless, to this day, even our leading academic institutions remain hampered by change-resistant, traditional structures and by insularity. In New York City and its greater metropolitan area—which is blessed by an extraordinary concentration of outstanding investigators working at a plethora of renowned institutions—science has remained fractured by custom and practice ... until recently.

**The winds of change began to blow across New York City's institutions even before September 11, 2001. After it, there is a sense of oneness that has surely never before existed among the science establishment of this city.** Take the case of the partnership in structural biology—led by an investment consortium of New York's investment bankers and supported by all of New York's institutions. About \$40 million was raised to create a world-class nuclear magnetic resonance facility in a former gym at the City University of New York—a facility now being used by researchers from the greater metropolitan area that already is putting New York “on the map” in this important field.

Another version of this landmark success has taken place with the Academy. In 1999, two young and very prominent Rockefeller University investigators in structural biology—John Kuriyan and Steve Burley—concluded that their field might see more

rapid advances if leading researchers from throughout the metropolitan area—and their students and post docs—would come together for seminars graced by globally significant speakers followed by informal conversations over pizza, sandwiches and beer. Hoping to achieve greater breadth of attendance than might happen if Rockefeller acted as host, they asked the Academy to sponsor such events. Quickly, the number of attendees from throughout the city swelled to the point that larger auditoriums had to be borrowed because the Academy's meeting rooms couldn't accommodate the hundreds of participants.

Such experiences are not unique. In some cases, energetic researchers in a new field have started clubs that have even spawned new professional societies. Could the Academy clone this success to the benefit of New York's scientific community? We believe the answer is yes. Indeed, the Academy believes that New York could assume a leading position across the entire range of innovative research without requiring investments in the many millions of dollars required to underwrite the creation of core facilities. We are convinced that, **by simply facilitating—in a comprehensive program—conversations among the extraordinarily talented researchers here in this city, we can trigger a catalytic reaction among New York's brilliant investigators.**

**The Solution:** The New York Academy of Sciences proposes to expand upon two successful programs that were based on the Structural Biology "Discussion Group." Those were in the fields of Vision and in the fields of Bioinformatics and Computational Biology. Now we are planning to develop and nurture a strategically targeted program of a dozen ... and, eventually, a score ... of new discussion groups at the leading edge of science.

Called **The Frontiers of Science Program**, this effort will be composed of leading and visionary scientists located in New York and throughout the world. Leading scientists are already being asked to identify the hottest and most promising areas of investigation. Academy staff members are seeking out bright and energetic young researchers in New York who work in these hot fields. They will compose **The New York Scientific Leadership Council**, whose job it will be to sponsor the creation of conversation groups in each area. From such groups, seminars and meetings will emerge, sponsored by the Academy and, often, organized in partnership with the Academy's partner institutions: foundations, government agencies, and corporations. The products of these inter-institutional events will include:

- **Private exchanges** limited to conversation group members.
- **Recorded seminars** deliverable via the Internet to the Academy's global Membership and capable of catalyzing meetings around the world (see next section).
- **Printed summaries and papers** in *Transactions* and *Annals*.

This program is already well beyond its formative stages. The Academy staff is forming the New York Scientific Leadership Council and is beginning to develop a list of candidate areas for the first set of new discussion groups in emerging infectious diseases,

Alzheimer's and related neurodegenerative diseases, RNAi, genome integrity, neuroimmunology, and nanotechnology. In addition, we are prioritizing the following tempting nominations for new discussion groups:

**Aging**  
**Agricultural Biotechnology**  
**Animal Models for Disease**  
**Biochemical Pharmacology & Drug Discovery**  
**Bioinformatics and Computational Biology**  
**Biological Imaging (including clinical applications)**  
**Bioterrorism**  
***C. elegans* Biology**  
**Cell Engineering (including stem cells, cell therapy, etc.)**  
**Computational Neuroscience**  
**Cognitive Neuroscience**  
**Cytoskeletal Pharmacology**  
**Genome Integrity and Chromosome Biology**  
**Glycobiology – Glycomics**  
**Imaging Analysis and Recognition in Physical & Biological Sciences**  
**Immunomodulation and NeuroEndocrinology**  
**Infectious Diseases**  
**Nanotechnology/Bio-Nanotechnology**  
**Neuroeconomics**  
**Neuroethics**  
**Neurodegeneration & Therapeutics**  
**Neurosignaling and Signal Transduction**  
**Pharmacoeconomics**  
**Pharmacogenetics**  
**Photonics – medical applications**  
**RNAi**  
**Robotics**  
**Skin Biology**  
**Structural biology**  
**Systems Biology**  
**Toxicology (mechanisms & predictive models)**  
**Transcription Factors**  
**Vaccinology and Drug Development**  
**Vision Research**

With seed-funding from patrons who wish to support innovative mechanisms that can foster progress in the frontier areas of research—and with sponsorship by companies wishing to integrate their researchers into the cutting-edge discussions among academic researchers—the New York Academy of Sciences has already begun to establish elite teams of investigators who are creating seminar series in some of the areas noted above. To create a full portfolio of “Discussion Groups” across the spectrum of leading-edge research, we are inviting other sponsors to match gifts provided by charter patrons.

Because all scientists involved in this program will become Members of the Academy, all future costs of this program will be supported “organically” through a combination of Membership fees, publication and dissemination revenues, and corporate sponsorships.

## **The Academy’s Global Dissemination Program**

**—an innovative approach to sharing with researchers the world over highlights of the wisdom emerging from New York’s Frontiers of Science Program.**

**The need:** While scientific clubs have a long and distinguished history in science, their utility—enormous as it has been for those involved—has always been geographically limited. If anything emerged from the wisdom generated in seminar series, it has most often been little more than occasional newsletter-like publications. At best, it has taken the form of publications such as the Academy’s *Transactions*.

While these forms of publication succeeded to some degree in preserving wisdom, they were limited in their capacity to disseminate that wisdom. One important reason is that the audience for such publications is limited by the time it takes for the publications to be issued, by the relatively small budgets for marketing available to their publishers, and by the feeling of information-overload all of us have in our “Information Age.”

A glimmer of hope emerged at the dawn of the Internet age when conference organizers saw the potential of simply Web-casting talks to the huge potential audience that couldn’t physically attend the event. But, in practice, Web-casting has been of limited effectiveness. It takes a truly dedicated person to sit through the entire length of a lecture, watching a talking head and PowerPoint slides.

**The solution:** Enter Columbia University’s Digital Knowledge Ventures group. Created in 2000 to assist Columbia’s professors in digitizing their lectures and creating student-friendly e-classes and e-seminars, DKV has grown into a large enterprise, creating over 100 e-seminars since its inception. DKV’s editors—working in all fields, not only science and medicine—are developing multimedia presentations that capture the spirit and content of a professor’s individual lecture, or entire course, without requiring the student to sit through the actual lecture in real time.

Together, the Academy and DKV have created templates—one presenting a world-class meeting on SARS; the other on Careers for scientifically trained young people in Intellectual Property—for new ways of disseminating knowledge throughout the world to busy individuals, be they in science or in other fields where they need to be briefed on science. Other such e-Briefings are being created by the Academy staff itself—on autism and the roots of adolescent violence, for example. This program—which is being supported by Fortune 500 companies for their scientists—will revolutionize the services the Academy provides to scientifically literate citizens across the globe.

**In this way, the scientific knowledge base of New York will be amplified the world over. Better yet, alliances might be formed with groups that would mount cutting-edge seminars and meetings in other cities and electronically transmit the wisdom of their meetings to New York's scientists and the Academy's global Membership. In this novel way, a global dialogue at the frontiers of research can drive scientific progress and honor Joshua Lederberg's lifetime commitment to making the world a smaller, friendlier place.**

## **Part II. Investing in People:**

### **The Global Science Leaders of Tomorrow Program**

**The Need:** Our fractured world desperately needs organizations that can bring us together. And science itself has never been more global—its very success depends on international collaborations. Yet the trend among many of our young people runs distinctly counter to increased globalization. In the book, *Bowling Alone*, author Robert D. Putnam describes the transformation of attitudes among many of today's young people, their lack of interest in joining institutions, their fierce—some might call it, selfish—individuality. Few organizations can boast that they have increased memberships among young people. In the sciences and medicine, this has been particularly true. Nearly every professional scientific society has seen its young membership decline over the last decade, and the New York Academy of Sciences has been no exception.

Where will our young people be if they inadvertently isolate themselves and forego the invaluable richness of experience that comes from interacting with their peers and elders across institutional, disciplinary and geographical boundaries?

#### **The Solution: The Global Science Leaders of Tomorrow Program**

To reverse the trend, the Academy is facing this challenge head-on by creating two dynamic programs designed to develop Membership incentives for this generation of young investigators. The first program is targeted at the young investigators of New York City and is called **The New York Science Alliance for Graduate Students and Postdocs**. This Alliance has met with unprecedented success: 14 of the Greater New York Metropolitan Area universities, teaching hospitals and independent research institutions have committed funds to ensure that their more than 6,000 graduate students and post docs can regularly exchange ideas and solicit advice at inter-institutional seminars. (*See Appendix C for a listing of Science Alliance member institutions.*)

The rapid acceptance of this program by both scientific leaders and the young investigators themselves has emboldened the Academy to develop, as a core element of the Joshua Lederberg Science Without Borders Initiative, an exciting activity that we call **The Global Science Leaders of Tomorrow Program**.

If it is difficult to enlist the support of today's young people without creating physical events of interest to them, what chance is there of building a global cadre of student and young investigator Academy Members without expending enormous amounts of money in developing local events or in flying people to New York in large numbers?

While this challenge seems daunting in the abstract, the Academy believes it can be addressed by employing a tool long known for its effectiveness: the Affinity Group. What powered memberships in clubs for decades was the notion of eliteness—the

gratification one might feel at being among the chosen—plus the opportunity to interact with a highly select group of one's peers. Can these attractions be developed by the Academy?

Working in partnership with the Academies and funding agencies of other countries, the Academy plans to establish a global standard for selecting and honoring young investigators of special promise on an annual basis. The power of this concept lies in its capacity to:

1. Attract young people into science by developing an annually burgeoning cadre of honored role models in the sciences—role models whose careers could, in turn, be publicized by each participating country to students in the secondary school systems of those countries.
2. Retain the best and brightest by providing them with a special honor that encourages loyalty both to their nation and to their pursuit of scientific breakthroughs.
3. Enhance global collaboration by providing a forum within which the scientific leaders of tomorrow will get to know one another early in their careers and, in some cases, develop ongoing scientific partnerships.
4. Exhibit the greatness of the intellectual capital in each participating country.
5. Provide the participating academies and funding agencies with a special emotional link to young people, many of whom will be future leaders and, in the case of the academies, future members.

The path to all this is though a program that will have at least three components:

1. A peer-reviewed system of selecting the most accomplished young scientists for annual honors.
2. A special Web site hosted by the NYAS, but equally branded by all partner organizations that will provide the young scientists with news, career-mentoring information and special communication links among themselves.
3. At least one annual meeting at which the Global Science Leaders of Tomorrow can meet one another and establish lifelong friendships.



## **Part III. Investing in Global Science Partnerships:**

### **The New York Science Alliance for Global Health**

**The Need:** New York knows better than any city in the United States and most cities throughout the world that our entire civilization is threatened by the implications of disease and poverty as we find it throughout much of the Underdeveloped World. Threatening every global citizen are not merely surging and re-surging diseases, not merely the uncontrolled flow of microbes across our borders, not just the potential of man-made weapons of terror; rather, we are increasingly threatened by the growing populations of the dispossessed, the hungry and the angry—those who feel they have been betrayed by civilization.

The dawning realization of this vulnerability among the leaders of the Developed world—in every sector—has spurred the development of public/private partnerships to meet the challenges of poverty and ill health. And no city on the planet has more headquarters of organizations working on these problems. Consider:

- **The UN Development Bank**
- **UN AIDS**
- **The Global Vaccines Initiative**
- **The International AIDS Vaccines Initiative**
- **The Tuberculosis Alliance**
- **The Rockefeller Foundation**
- **Columbia University's Earth Institute**
- **Columbia's Mailman School of Public Health**
- **The William Jefferson Clinton Foundation**

Moreover, no city has as much research talent, policy expertise, and investment capacity for attacking these challenges. But, not surprisingly, there is today no coordination among the entities dedicated to global problems.

#### **The Solution: The New York Science Alliance for Global Health**

The leaders of many of the prestigious organizations named above have encouraged the New York Academy of Sciences to play a convening role. The goal would be to streamline and improve the response of the Developed World to the Developing World. And, secondarily, to make New York—victim of an act of terrorism—the leader in the global battle to win the hearts and minds of the planet's citizenry before they can acquire weapons of mass destruction.

## Appendix A

<b>BOARD OF GOVERNORS</b>	
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<b>Vice-Chairman</b>	<b>JOHN F. NIBLACK</b> , Vice Chairman (through 9/03) and former President, Pfizer Global Research and Development
<b>Vice-Chairman (after 9/03)</b>	<b>GERALD FISCHBACH</b> , Executive Vice President for Health and Biomedical Sciences, Dean of the Faculties of Health Sciences, and Dean of the Faculty of Medicine at the College of Physicians and Surgeons, Columbia University
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**Paul Marks**, President Emeritus, Memorial Sloan-Kettering Cancer Center  
**Sandra Panem**, Partner, Cross Atlantic Partners, Inc.  
**Peter Ringrose**, Chairman, Biotechnology and Biological Sciences Research Council, UK, and former Chief Scientific Officer, Bristol-Myers Squibb  
**Lee Vance**, retired General Partner, Goldman Sachs & Co.  
**Deborah Wiley**, Senior Vice President of Corporate Communications, John Wiley and Sons, Inc.

### Governors beginning terms in September 2003\*

**Peter Corr**, Senior Vice President, Pfizer, Inc., and Executive Vice President, Pfizer Global Research and Development  
**Wendy Evans Joseph**, President, Wendy Evans Joseph Architecture  
**Robert W. Lucky**, retired Corporate Vice President for Applied Research, Telecordia Technologies  
**David D. Sabatini**, Professor of Cell Biology, New York University  
\* Running unopposed for seat.

### Honorary Life Governors

**William Golden**, Chairman Emeritus, American Museum of Natural History  
**Joshua Lederberg**, Raymond & Beverly Sackler Foundation Scholar, University Professor, and former President, the Rockefeller University

## Appendix B

### CEO's COUNCIL

**David Baltimore**, Nobel Laureate & President, Caltech  
**Etienne-Emile Baulieu**, President, Academy of Sciences, France  
**Eleanor Baum**, Dean of Engineering, Cooper Union University  
**Christian Brechot**, Director General, INSERM, France  
**Sydney Brenner**, Nobel Laureate & Distinguished Professor, Salk Institute  
**Michael S. Brown**, Nobel Laureate & Professor of Molecular Genetics, University of Texas Southwestern Medical Center  
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**Gordon Conway**, President, Rockefeller Foundation  
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**Paul Greengard**, Nobel Laureate & Professor of Molecular & Cellular Neuroscience, Rockefeller University  
**Peter Gruss**, President, Max Planck Gesellschaft, Germany  
**William Haseltine**, Chairman & Chief Executive Officer, Human Genome Sciences  
**Eric Kandel**, Nobel Laureate & Professor, Physiology and Cell Biology, Columbia University  
**Carol Kovac**, General Manager, IBM Life Sciences (to be confirmed)  
**Joshua Lederberg**, Nobel Laureate & President Emeritus, Rockefeller University  
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**Gerald Weissmann**, Professor of Medicine, New York University School of Medicine  
**John Whitehead**, Chairman, Lower Manhattan Development Corp. & former Co-Chairman of Goldman Sachs  
**George Whitesides**, Mallinckrodt Professor of Chemistry, Harvard University  
**Torsten Wiesel**, Nobel Laureate & Chairman, Board of Governors; also Secretary General, Human Science Frontiers Program, France, & President Emeritus, Rockefeller University  
**Ernst-Ludwig Winnacker**, President, Deutsche Forschungsgemeinschaft, Germany

# Appendix C

## ALLIES AND STRATEGIC PARTNERS

### Academia

Albert Einstein School of Medicine  
Cold Spring Harbor Laboratory  
Columbia University  
Cornell University Weill Medical School  
CUNY, Graduate Center  
Memorial Sloan-Kettering Cancer Center  
Mount Sinai School of Medicine  
New York Medical College  
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Pace University  
Princeton University\*  
Rockefeller University  
Stevens Institute of Technology  
SUNY Health Science Center at Brooklyn  
University of Medicine & Dentistry, New Jersey  
Yale University\*

### Government

#### Federal

National Institutes of Health  
National Science Foundation  
U.S. Centers for Disease Control  
Environmental Protection Agency

#### State

Port Authority of New York  
NYS Office of Science, Technology  
and Academic Research (NYSTAR)\*

#### City

New York City Department of Education  
NYC Economic Development Corp

#### International

Chinese Academy of Sciences\*  
Deutsche Forschungsgemeinschaft\*  
European Commission  
French Academy of Sciences  
Max Planck Gesellschaft\*  
Royal Academy of Sciences\*

### Associations

Association for a Better New York (ABNY)  
BioVision  
Nanobusiness Alliance  
New York Biotechnology Association (NYBA)  
New York City Investment Fund  
New York City Partnership

### Corporate Partners

Aventis\*  
Boehringer-Ingelheim  
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Eli Lilly  
GlaxoSmithKline\*  
Human Genome Sciences  
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The Abby R. Mauze Trust  
The Jeffrey Modell Foundation  
The Mushett Family Foundation

\*In discussion