Academy Welcomes 230th Class of Members

Induction 2010 Weekend Celebrates the Arts, the Humanities, and the Sciences

Technology and the Public Good

A Free Press for a Global Society
Lee C. Bollinger

Technology and Culture
Paul Sagan, Robert Darnton, David S. Ferriero, and Marjorie M. Scardino

Cybersecurity and the Cloud
Tom Leighton, Vinton G. Cerf, Raymond E. Ozzie, and Richard Hale

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AMERICAN ACADEMY
OF ARTS & SCIENCES

Calendar of Events

Thursday,
April 14, 2011

Symposium – Cambridge

in collaboration with the National Academy of Engineering, Institute of Medicine, and Harvard School of Engineering and Applied Sciences

Privacy, Autonomy and Personal Genetic Information in the Digital Age

Location: House of the Academy

Thursday,
April 14, 2011

Stated Meeting – Cambridge

in collaboration with the National Academy of Engineering, Institute of Medicine, and Harvard School of Engineering and Applied Sciences

Making America More Competitive, Innovative, and Healthy

Speakers: Harvey V. Fineberg, Institute of Medicine; **Cherry A. Murray**, Harvard School of Engineering and Applied Sciences; **Charles M. Vest**, National Academy of Engineering

Location: House of the Academy

Thursday,
May 5, 2011

Annual Meeting and Founders' Day Celebration – Cambridge

An Evening of Chamber Music

Location: House of the Academy

SAVE THE DATE

Induction Weekend 2011
September 30 – October 2, 2011

For information and reservations, contact the Events Office (phone: 617-576-5032; email: mevents@amacad.org).

Academy Inducts 230th Class of Members

John Lithgow (Los Angeles, California) and Mary Yeager (UCLA), after reading from the letters of John and Abigail Adams

Top: Liev Schreiber '10 (New York, NY); Middle: Alan Alda '06 (New York, NY) and James Leach '10 (National Endowment for the Humanities); Bottom: Council Cochairs Gerald Early (Washington University in St. Louis) and Neal Lane (Rice University)

The American Academy of Arts and Sciences inducted 228 distinguished scholars, artists, and institutional and public leaders on Saturday, October 9, 2010. Among the new members are winners of the Nobel, Shaw, and Pulitzer prizes; recipients of MacArthur and Guggenheim fellowships; and winners of Academy, Grammy, Tony, and Emmy awards.

"The men and women we elect today are true pathbreakers who have made unique contributions to their fields and to the world," said Academy Chair **Louis W. Cabot**. "The Academy honors them and their work, and they, in turn, honor us."

The 2010 Induction weekend began with an evening celebration of the arts and the humanities and included a reading from the letters of John and Abigail Adams by new Fellow **John Lithgow**, actor, author, and recording artist, and his wife, **Mary Yeager**, professor of history at the University of California, Los

Angeles. Lithgow introduced the letters with an impassioned appeal for the support of the humanities: "No nation, no matter how vulnerable or embattled, no matter how much its health is in jeopardy, can afford to turn its back on the arts. In fact, those are the moments when the arts are the most vital, the most important, and the most in need of support."

The evening celebration of the arts and the humanities also featured musical performances. Conductor, pianist, and Fellow **Dennis Russell Davies** and

Academy Launches National Commission on the Humanities & Social Sciences

On February 17, 2011, Academy President **Leslie Berlowitz** announced the creation of a national commission to bolster teaching and research in the humanities and social sciences – fields that are critical to culture, education, and America's economic competitiveness. The *Commission on the Humanities and Social Sciences* is chaired by Fellows **Richard H. Brodhead**, President of Duke University, and **John W. Rowe**, Chairman and Chief Executive Officer of Exelon Corporation, and includes prominent Americans from the humanities, the social sciences, the physical and life sciences, business, law, philanthropy, the arts, and the media.

Richard H. Brodhead

John W. Rowe

Answering a bipartisan request from United States Senators **Lamar Alexander** (R-Tennessee) and **Mark Warner** (D-Virginia) and Representatives **Tom Petri** (R-Wisconsin) and **David Price** (D-North Carolina), the Academy created the Commission on the Humanities and Social Sciences to respond to the following charge:

> *What are the top ten actions that Congress, state governments, universities, foundations, educators, individual benefactors, and others should take now to maintain national excellence in humanities and social scientific scholarship and education, and to achieve long-term national goals for our intellectual and economic well-being; for a stronger, more vibrant civil society; and for the success of cultural diplomacy in the twenty-first century?*

"The humanities and social sciences provide the intellectual framework for the nation's economic, political, and governing institutions," said Commission Cochair **Richard H. Brodhead**. "They enrich our lives and our understanding. Americans already appreciate the importance of math and science to our future; this Commission will remind Americans of the long-term importance of the liberal arts as well."

"Our nation's long tradition of research and scholarship in humanities and social science has been the basis for an informed citizenry that comes from many countries, races, religions, and cultures, but shares a common set of ideals, such as liberty, equal opportunity, and the rule of law. I am pleased that the American Academy is creating this Commission to provide recommendations on the best ways to maintain our nation's excellence in humanities and social science education, from grade-school history classes to graduate-level economic research."

– Senator Lamar Alexander (R-Tennessee)

"I look forward to learning more about how we can further strengthen the arts, humanities, and social sciences throughout the country. Understanding where we are, where we have been, and where we need to go is so important, and I am pleased that the Academy is tackling this challenge."

– Senator Mark Warner (D-Virginia)

Commission Cochair **John W. Rowe** added: "Knowledge of history, an understanding of civic institutions, the ability to use evidence and to think creatively, an aptitude for cross-cultural communication – these are all vital attributes of a twenty-first-century citizen."

"The American Academy, with its long record of stewardship and support for the humanities and social sciences, is well-suited to lead this effort," said **Leslie Berlowitz**. "Scholarship and education in these disciplines enable our citizens and our government to adapt to evolving circumstances at home and abroad. They are critical to our ability to compete in a global economy."

The initial findings of the *Commission on the Humanities and Social Sciences* will serve as a companion to a National Academies forthcoming report on the future of the research university and ways to strengthen the American scientific enterprise.

On March 7, 2011, in a speech at the annual meeting of the National Humanities Alliance in Washington, DC, Leslie Berlowitz described the goals of the Commission: "We have witnessed crises in the past, but too often our responses have been episodic and defensive. It is time to stop talking about a crisis. What we need is a sustained, long-term, deeply collaborative effort to affirm the importance of the humanities and social sciences to the cultural, political, and economic well-being of the nation." (The full text of her remarks may be found on the Academy website at www.amacad.org.)

The American Academy Commission will draw on past research efforts, data from its *Humanities Indicators*, and the experience and expertise of a multidisciplinary group of national leaders to recommend specific, actionable steps to maintain the nation's excellence in the humanities and the social sciences. The Commission will focus on education, research, and the institutions critical to advancing the humanities and social sciences in the nation. The Commission expects to complete its work over the next eighteen to twenty-four months.

The Academy is grateful to the Andrew W. Mellon Foundation for helping to launch the work of the Commission. ■

"To preserve and build on America's traditions and principles, we must have a firm understanding of our unique history, culture, and heritage. Our humanities and social science institutions help to foster that understanding, and the results of this report will guide us as we work to strengthen those institutions."

– Representative Tom Petri (R-Wisconsin)

"As our world becomes more interconnected, building a solid foundation in the humanities is of vital national importance. It is the humanities that ground, inform, and shape our civic, cultural, and intellectual lives. Maintaining a robust capacity for teaching and research in these fields will help provide a context and a framework for the most current and urgent policy debates. I look forward to receiving the Commission's recommendations."

– Representative David Price (D-North Carolina)

Commission on the Humanities and Social Sciences

AMERICAN ACADEMY COMMISSION ON THE
Humanities & Social Sciences

Members of the American Academy Commission on the Humanities and Social Sciences

Leslie C. Berlowitz, President, American Academy of Arts and Sciences

Richard H. Brodhead, President, Duke University, *Cochair*

John W. Rowe, Chairman and Chief Executive Officer, Exelon Corporation, *Cochair*

Danielle S. Allen, Professor of Political Science, Institute for Advanced Study

Kwame Anthony Appiah, Professor of Philosophy, Princeton University

Norman R. Augustine, Chairman and Chief Executive Officer (Retired), Lockheed Martin Corporation

Robert M. Berdahl, President, Association of American Universities

Phil Bredesen, Jr., Former Governor of Tennessee

David Brooks, Journalist, *The New York Times*

Louise H. Bryson, Chair Emerita, J. Paul Getty Trust

Ken Burns, Director and Producer, Florentine Films

Tom Campbell, Dean, School of Law, Chapman University; Former United States Representative

G. Wayne Clough, Secretary, Smithsonian Institution

James Cuno, President and Director, Art Institute of Chicago

Gerald Early, Professor of Modern Letters; Director, Center for the Humanities, Washington University in St. Louis

John Engler, President, Business Roundtable; Former Governor of Michigan

Drew Gilpin Faust, President, Harvard University

Roger W. Ferguson, Jr., President and Chief Executive Officer, TIAA-CREF

Richard B. Freeman, Professor of Economics, Harvard University

Annette Gordon-Reed, Professor of Law, Professor of History, Harvard University

Anthony Grafton, Professor of History, Princeton University

Amy Gutmann, President, University of Pennsylvania

Emmylou Harris, Musician/Songwriter

Robert M. Hauser, Professor of Sociology; Director, Center for Demography of Health and Aging, University of Wisconsin-Madison

F. Warren Hellman, Co-Founder, Hellman & Friedman LLC

John L. Hennessy, President, Stanford University

Kathleen Hall Jamieson, Professor of Communications; Director, Annenberg Public Policy Center, University of Pennsylvania

John I. Jenkins, President, University of Notre Dame

John Lithgow, Actor

George Lucas, Producer, Screenwriter, Director, Founder, and Chairman, Lucasfilm Ltd.

Yo-Yo Ma, Musician

Carolyn "Biddy" Martin, Chancellor, University of Wisconsin-Madison

Anthony W. Marx, President, Amherst College; President-Designate, New York Public Library

James McNerney, Chairman, President, and Chief Executive Officer, Boeing Company

Carl H. Pforzheimer III, Managing Partner, Carl H. Pforzheimer and Co.

Earl A. Powell III, Director, National Gallery of Art

John Sexton, President, New York University

Donna E. Shalala, President, University of Miami

David J. Skorton, President, Cornell University

David Souter, Former Associate Justice, Supreme Court of the United States

Eric Sundquist, Professor of English, Johns Hopkins University

Billie Tsien, Architect, Tod Williams Billie Tsien Architects

Charles M. Vest, President, National Academy of Engineering

John E. Warnock, Chairman of the Board, Adobe Systems, Inc.

Diane P. Wood, Federal Judge, United States Court of Appeals for the Seventh Circuit

Pauline Yu, President, American Council of Learned Societies

pianist **Maki Namekawa** performed "Four Movements for Two Pianos" written by Fellow Philip Glass. Violinist and new Fellow **Arnold Steinhardt**, accompanied by pianist Maki Namekawa, performed Mendelssohn's "Sonata for Violin and Piano in F major" (movement 2).

The program also included readings by new Fellows **Henri Cole**, poet and Professor of English at Ohio State University, and **Marilyn Robinson**, novelist and professor at the Writers' Workshop at the University of Iowa, as well as by longtime Fellow **Denis Donoghue**, University Professor and Henry James Professor of English and American Letters at New York University, who discussed "The Blue Swallows" written by the late Fellow Howard Nemerov.

During the Induction Ceremony, actor, director, screenwriter, and new Fellow **Liev Schreiber** read a selection of acceptance letters written by Academy members George Washington, Thomas Jefferson, Alexander Hamilton, John Stuart Mill, Martin Luther King, Jr., and Mary Leakey. The ceremony also included presentations by five new members. **G. Wayne Clough**, Secretary of the Smithsonian Institution, spoke on the need for improved scientific literacy ; **Susan Desmond-Hellmann**, Chancellor of the University of California, San Francisco, discussed translating scientific breakthroughs for clinical gains ; **Robert L. Gallucci**, President of the John D. and Catherine T. MacArthur Foundation, spoke about the benefits of an interdisciplinary approach to problem-solving ; **James Leach**, Chairman of the National Endowment for the Humanities, alerted members to the looming crisis in the humanities ; and **Roger W. Ferguson, Jr.**, President and Chief Executive Officer of TIAA-CREF, explained how business should serve society.

In his address, **Robert Gallucci** shared his vision for America : "America and the world face challenges that demand our best intellectual efforts. My aspiration is for shared intelligence, an ongoing exchange between our best conceptual thinkers, sharpest researchers, and most accomplished policy-makers."

Susan Desmond-Hellmann spoke about the challenges to improving human health : "Our goal of improving human health cannot be achieved solely through disease prevention. We must do everything we can to capitalize on the ongoing explosion of scientific knowledge in order to innovate and, ultimately, to decrease pain and suffering."

The Induction weekend concluded with a program on Technology and the Public Good. **Lee C. Bollinger**, President of Columbia University, gave a keynote address on "A Free Press for a Global Society." He noted : "The world is undergoing momentous changes through the forces of globalization. We need a free press that is suitable to this new world. To achieve that goal, we must change our basic concepts and develop our laws and policies to deal with

James Leach (National Endowment for the Humanities), Roger Ferguson, Jr. (TIAA-CREF), Susan Desmond-Hellmann (University of California, San Francisco), G. Wayne Clough (Smithsonian Institution), and Robert Gallucci (John D. and Catherine T. MacArthur Foundation)

Henri Cole (Ohio State University), Marilyn Robinson (University of Iowa), and Denis Donoghue (New York University)

Maki Namekawa and Dennis Russell Davies '09 (Bruckner Orchestra Linz and the Linz Opera ; Basel Symphony Orchestra)

Lee C. Bollinger (Columbia University) and Leslie Berlowitz

Panel on Technology and Culture: Robert Darnton (Harvard University), David Ferriero (U.S. National Archives and Records Administration), Marjorie Scardino (Pearson PLC), and Paul Sagan (Akamai Technologies)

Panel on Cybersecurity and the Cloud: Raymond Ozzie (Microsoft Corporation), Vinton Cerf (Google Inc.), Tom Leighton (MIT and Akamai Technologies), and Richard Hale (U.S. Department of Defense)

the serious issues of access, censorship, and the capacity of the press to provide the information we need. Only then can the press do its part to help shape a world that will work for ends we believe in."

Bollinger's address was followed by two panel discussions on technology. Fellow **Paul Sagan**, Chief Executive Officer of Akamai Technologies, moderated a conversation on "Technology and Culture," which included presentations by Fellow **Robert Darnton**, Carl H. Pforzheimer University Professor at Harvard University and Director of the Harvard University Library, new Fellow **David Ferriero**, Archivist of the United States, and new Fellow **Marjorie Scardino**, Chief Executive of Pearson PLC.

Tom Leighton, Professor of Applied Mathematics at MIT, Co-founder and Chief Scientist at Akamai Technologies, and member of the Academy Trust, moderated the second panel discussion on "Cybersecurity and the Cloud." The panelists included Fellow **Vinton Cerf**, Vice President and Chief Internet Evangelist at Google Inc., new Fellow **Raymond Ozzie**, Chief Software Architect at Microsoft Corporation, and **Richard Hale**, Chief Information Assurance Executive at the Defense Information Systems Agency at the U.S. Department of Defense.

Speaking on personal privacy and security on the Internet, Cerf said, "We are now in an environment where security is hard to come by and privacy is equally beleaguered. . . . In the end, I think we all have discovered that it is still the individual computer or programmed component that has to defend itself, because you can walk around the firewall with a virus-infected USB memory stick and thereby infect the interior of what should have been a protected perimeter. I think we have to build much more robust and resistant systems that are capable of protecting machines and their content. We cannot rely strictly on any external defense that is not implicit in the design of the devices themselves or their software."

Moving from the discussion of individual to corporate security, Ozzie noted: "Our entire infrastructure is under constant attack by a number of different classes of actor; that is something we just have to deal with as the nature of the environment. We cannot delude ourselves into thinking that we can achieve perfection, and we will have to find ways to channel resources systematically to keep the threat level down and to rally together to address emergencies as they come along."

Video highlights of the 2010 Induction weekend are available on the Academy's website at http://www.amacad.org/events/Induction2010. ■

Top: Andrea Bertozzi '10 (University of California, Los Angeles) and Laurence Senelick '10 (Tufts University); Howard Fields '10 (University of California, San Francisco) and Ronald Hoy '10 (Cornell University); Bottom: Martin Gruebele '10 (University of Illinois at Urbana-Champaign), Yitzhak Apeloig '10 (Technion-Israel Institute of Technology), William Goddard III '10 (California Institute of Technology), Samuel Gellman '10 (University of Wisconsin-Madison), Joseph Francisco '10 (Purdue University; American Chemical Society), Jerrold Meinwald '70 (Cornell University)

Top: Louise Bryson '10 (J. Paul Getty Trust) and James Jackson '10 (University of Michigan); Bruce Walker '10 (Harvard Medical School; Massachusetts General Hospital) and Brian Stock '10 (University of Toronto); Middle: Robert Darnton '80 (Harvard University), Carl Pforzheimer '02 (Carl H. Pforzheimer and Co.), and David Ferriero '10 (U.S. National Archives and Records Administration); Joseph Polisi '09 (The Juilliard School) and David Robertson '10 (St. Louis Symphony Orchestra); Bottom: Christiane Amanpour '10 (ABC News) and David Brooks '10 (New York Times Company); Arnold Steinhardt '10 (New York, NY)

Challenges Facing Our Global Society

On October 9, 2010, the American Academy of Arts and Sciences inducted its 230th class of Fellows and Foreign Honorary Members at a ceremony held in Cambridge, Massachusetts. **G. Wayne Clough**, Secretary, Smithsonian Institution; **Susan Desmond-Hellmann**, Chancellor, University of California, San Francisco; **Robert L. Gallucci**, President, John D. and Catherine T. MacArthur Foundation; **James A. Leach**, Chairman, National Endowment for the Humanities; and **Roger W. Ferguson, Jr.**, President and Chief Executive Officer, TIAA-CREF, addressed the audience. Their remarks appear below.

G. Wayne Clough

Secretary, Smithsonian Institution

Improving Scientific Literacy

As I was thinking about what I might say on this auspicious occasion, the phrase "we live in a time of rapid change" kept coming into my mind. I kept batting it away, trying to get it out of my mind, but I came to a point of inertia. So I did what I do these days: I went to Google. I typed "we live in a time of rapid change" into the search field, and in 0.29 seconds, Google returned 7,520,000 examples of recent speeches and publications in which that phrase has been used.

And so my mind turned elsewhere for another topic. It took me to the year 1780 – 230 years ago – when this institution was founded by John Adams, James Bowdoin, John Hancock, and others. I don't know of any way to compare precisely the pace of change between centuries, but we do know that the time in and around 1780 was transformative, coinciding not only with the Revolutionary War but also with new ideas about individual rights and the roles of government. Scientific and technological discovery was coming in waves. Indeed, the very changes that were occurring in 1780 led to the philosophical basis for the institutions that we love and that support us today – institutions like this Academy, our great universities, and our museums. What is even more important, I think, is that such institutions have a vital role to play in our nation's future – especially when it comes to the notion of scientific literacy for the general public.

Unlike the eighteenth century, today it is no longer possible for one person, as Thomas Jefferson could, to comprehend the whole of scientific knowledge. We live in an era of exponential expansion of scientific specialties. Research and development is a worldwide enterprise now funded to the tune of $1 trillion. It is estimated that 1,200 exobytes of data are being created each year. (If you don't know what an exobyte is, it's a lot.) This situation has significant implications that we need to think about, and to its credit, the Academy is doing just that.

In 1780, as the colonies fought for their independence, Benjamin Franklin worked feverishly as our top diplomat to engage our allies to help. But as the foremost American scientist, he also found time to invent bifocals and discover the Gulf Stream. Earlier, he had created the American Philosophical Society, the first organization designed to disseminate scientific findings.

Another of our founding fathers who I mentioned earlier, Thomas Jefferson, was serving as governor of Virginia in 1780. At that

Scientific literacy has become a major challenge, and the politicization of issues like evolution and climate change further lessens the possibility for constructive action.

time, he sought to force his alma mater, William and Mary, to include more science in its curriculum. He didn't succeed, but he got his revenge by creating the University of Virginia two decades later. Within a three-year period around 1780, Jefferson wrote the Virginia Statute of Religious Freedom, which he later used in the design of his university and which predicates how we operate public universities today. He also completed *Notes on Virginia*, the first natural history document to be published in the United States.

And of course, as I mentioned, John Adams, James Bowdoin, and John Hancock forged the idea for the Academy during the American Revolution. They wanted to provide the right forum for scholars to exchange views on the arts and sciences.

At the same time, in England and Europe, science and technology entered an age of expansion, the age of wonder. William Hershel developed a new kind of telescope and saw the vastness of the Milky Way and beyond. Scientists traveling with Captain Cook on his voyages discovered botanical and geologic wonders. The first human flight

occurred in balloons, the steam engine was invented, and the first flush toilet was designed. Science was changing life in all its aspects, in ways citizens could still understand.

Out of this exciting time not only was our nation born, but also came the rise of public universities, public museums, and scientific societies. The great Smithsonian Institution is a child of this period, arising from a gift made by an eccentric English scientist, James Smithson, who never set foot in this country. All the new institutions of this time share the principles of knowledge and discovery and embrace the importance of the scientific method. They reinforce the Jeffersonian ideal that for the new republic to succeed, education should be widely available, and that a complete education includes a working knowledge of science.

The very power of digital communications that threatens to overwhelm us with information should be turned into a potent tool to help us solve our problems.

As opposed to a few scientific and engineering disciplines of those days, today's hyperspecialization means scientists know more and more about smaller and smaller parts of our universe. We struggle to teach science in a compelling way to our students in K-12, and too many of our students in universities and colleges take no science at all. Scientific literacy has become a major challenge, and the politicization of issues like evolution and climate change further lessens the possibility for constructive action.

Fortunately, organizations like the American Academy are concerned about these challenges. Others, too, are working on the problem, but I believe it is time for a concerted, concentrated effort by all of us who represent science institutions. The very power of digital communications that threatens to overwhelm us with information should

be turned into a potent tool to help us solve our problems. No one can or needs to know it all. Rather, we should be able to access what we need when we need it.

What is required is a rethinking of our institutions within the context of our time. The primary values from the 1780s are still valid, but the way institutions serve the public and how they deliver information must change. While we are very good at delivering specific knowledge to people who gather in our buildings, how do we address the gap in general knowledge for those who do not come to us? This is a question for our time, and it will take a coordinated national effort from all of us to answer it.

The Smithsonian looks forward to joining all of you in addressing this issue. It is a challenge worthy of great minds, and one that is critical to our nation's future. ■

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Susan Desmond-Hellmann

Chancellor, University of California, San Francisco

Imagine What's Possible

I want to talk about a topic I'm very passionate about: the unprecedented opportunity that we have today to better utilize our rapidly expanding knowledge of human biology to improve human health. The health care dialogue that we are having in this country today is especially resonant for those of us who have chosen careers as physicians. Health care is a right. Access to care, especially preventive care, is essential. We certainly need to emphasize the adoption of appropriately tested and proven prevention modalities: childhood vaccinations, smoking cessation, exercise, and a healthy diet. But we cannot stop there.

Our goal of improving human health cannot be achieved solely through disease prevention. We must continue to push ourselves to do everything we can to capitalize on the ongoing explosion of scientific knowledge in order to innovate and, ultimately, to decrease the pain and suffering of those who, despite best efforts, are diagnosed with maladies for which we still do not know the cause or have an effective, preventive intervention. The list of such ailments is long and includes breast and prostate cancer, lupus, multiple sclerosis, Alzheimer's disease, Parkinson's disease, and type I diabetes mellitus – I could go on. The suffering of those affected is substantial.

In the early 1990s, I spent several years working as a community oncologist, or, as my parents say, "a regular doctor." My experience treating cancer patients at that time taught me that there were in fact some forms of breast cancer that were too aggressive to cure and some forms of lymphoma for which the toxicity of the therapy so greatly outweighed the benefits that "watch and wait" was the standard of care for many patients, despite knowing that the disease would ultimately progress and debilitate that patient. Every time I had to tell a patient, "I'm sorry, you have this disease, and we have nothing to treat it," it felt like a personal failure.

Our goal of improving human health cannot be achieved solely through disease prevention. We must do everything we can to capitalize on the ongoing explosion of scientific knowledge in order to innovate and, ultimately, to decrease pain and suffering.

And then everything began to change. The biotechnology industry was maturing, and molecules that had started as brilliant, early-stage research experiments – conducted by visionary scientists in the 1970s and 1980s who were determined to solve the mysteries of human biology – were now showing promise in a clinical setting. These molecules ultimately – wondrously – provided hope for thousands of patients.

In the five years between 1997 and 2001, several breakthrough cancer therapies were approved by the U.S. Food and Drug Administration (FDA). These therapies sprouted from our expanded comprehension of certain biological puzzles, and they uniquely targeted specific protein or receptor abnormalities in cancer cells. Finally, physicians were able to tell patients with certain types of cancer, "You have this disease, and now we have something for it – perhaps even hope for a cure."

No longer was cancer therapy solely dependent on drugs that broadly targeted the most rapidly dividing cells in the body, including both malignant cells as well as healthy human tissue, such as precursors of blood cells, hair follicles, and the lining of the gut and intestines. The substantially deeper understanding of the biological basis of disease pathogenesis and cellular biology had suddenly made several fatal conditions controllable, and even potentially curable.

This hope of "personalizing" or targeting our cancer therapy using molecular bio-markers to select those patients most likely to benefit was becoming a reality. While these therapies aimed against specific targets and cancer cells were not without side effects, we were able to avoid common side effects often most feared by patients, including hair loss and nausea. We now had remedies in our arsenal that allowed us to offer a more promising future with less pain and suffering for patients and their families.

Where are we today, almost a decade later? Additional, dramatic scientific breakthroughs continue to occur that further expand our knowledge of human biology. However, potential barriers are also multiplying that can limit our ability to translate magnificent scientific discoveries into therapies that offer a greater benefit without attendant unacceptable risk. Concerns exist about conflicts of interest between industry and academia, potentially increasing barriers to beneficial and necessary collaborations. Required clinical trials for regulatory approval are growing in complexity and expense. The increasingly high regulatory hurdles create unpredictability in the approval process and engender frightening labels for drug development – "the valley of death," for example – that diminish investors' willingness to finance new life-sciences innovations. The reality today is that it is more challenging than ever to translate scientific breakthroughs into transformational medicines with sufficient evidence to allow for the FDA to approve these medicines.
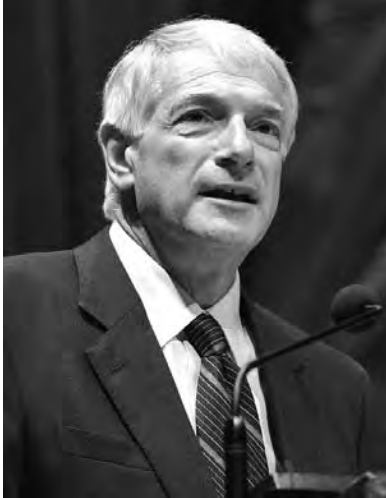
These are the challenges that are faced every day by those individuals we call translational, clinical, and regulatory scientists.

The reality today is that it is more challenging than ever to translate scientific break-throughs into transformational medicines with sufficient evidence to allow for the FDA to approve these medicines.

In the face of such challenges, it is essential for scientists at academic medical centers to push ourselves to innovate in translational science by increasing our ability to predict what will happen in the clinic; to innovate in clinical science by designing more efficient and effective clinical trials to provide greater confidence in our ability to measure clinical benefit; and to innovate in regulatory science by using novel approaches to ensure that we have greater confidence in safety and efficacy and that we can more effectively communicate our findings to the public. In each of these areas, I want to challenge us to set the bar high – to imagine what's possible, and then make it happen.

Ladies and gentlemen, patients are waiting. These patients and their families deserve a sense of urgency around using all our scientific and medical knowledge to allow each human being the best chance possible to live a full life without pain and suffering. ∎

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Robert L. Gallucci

President, John D. and Catherine T. MacArthur Foundation

Shared Intelligence

The trouble with weapons of mass destruction is that they occupy a space in the data set somewhere between rumor, silence, and apocalypse. Working on nuclear non-proliferation, as I have, one has to make hard decisions based on slender, incomplete, and often unreliable information. But to keep the peace, decisions have to be made and acted upon. It is a practical craft, and I think an honorable one. What, you may ask, does that dilemma have to do with the social sciences? A great deal, in fact. Let me explain.

Nation-states, understandably, have to take a position on the most destructive force available to humanity. Their decisions to acquire, or dispose of, or renounce nuclear weapons are also understandably at the center of our global security concerns. There are almost two hundred sovereign states, each with its own aspirations, fears, internal politics, and regional relationships. It is not possible for us to know enough about every country, about every leader, or about every nuance of interstate rivalry to assess how they are likely to act. We have to make assumptions – intelligent assumptions. In short, we need theory.

For my first job, I was Kenneth Waltz's teaching assistant as a graduate student at Brandeis University, direly underprepared to work with one of the most profound thinkers in political science. But that predicament has a way of concentrating and enlarging the mind; it did mine. From Ken Waltz, I learned the power of theory, or, perhaps better, "systematic thinking." (He also made me a member of the realist school of international relations, but that is another narrative.) Systematic thinking about how humanity behaves has been the core contribution of the social sciences since economics emerged from ledger books and counting houses. The Physiocrats and political economists rose above everyday epiphenomena and found, among myriad transactions, rule-governed patterns. It was a process of radical simplification and also of intellectual liberation. Having a clear mental image of a social system allows us to see and then to isolate causes and variables, testing our model in the laboratory of history and events.

> *Effective security analysis depends on a dialogue between what seems to be empirically established and how we understand the world to work.*

How does that help us better grasp international relations? In *Man, the State, and War*, Waltz directs us away from the nature of the human subject or the internal organization of particular states. Instead, he advises us to look at the internal dynamics of the international system in which nations interact, to use a common analogy such as billiard balls. Their color does not matter; the force and direction they carry decide the game. We have no world government. The international system is organized on the principle of anarchy. And in that context, autonomous nation-states tend to make rational decisions: to survive, to deter others from attacking them, to make alliances with stronger powers.

Similarly powerful states will act in similar ways. The United States and the USSR, though quite different societies, built vast armories, recruited client states, conducted covert operations in tandem throughout the Cold War. In this paradigm, it makes sense for North Korea, a state which is weak and failing, to seek the trump card of nuclear capability – as it makes sense for our allies to accept American protection or a democratic South Africa to dismantle its nuclear arsenal.

> *My aspiration is for "shared intelligence," an ongoing exchange between our best conceptual thinkers, sharpest researchers, and most accomplished policy-makers.*

What does this all mean in practical terms? Simply, robust theory serves as a necessary corrective to the stridency of facts. If we do not have a clear grasp of what is likely to be the case, we may act on what is improbable. Nowhere is this more important than in questions of national security.

As I said at the start, intelligence can be cryptic – or plain wrong, as we have learned to our cost. Effective security analysis depends on a dialogue between what seems to be empirically established and how we understand the world to work. When we are clear about our assumptions, we gain clarity about the assumptions of those who disagree with us. We can cultivate empathy as an aid to understanding. We are more able to guard against misperception and deflect the arguments of interested parties. Clear assumptions can be challenged, tested, and debated.

This conversation between theory and practice, deduction and induction, characterizes any discipline or pursuit that is both mature and complex. And those who are practiced in it develop what Aristotle called *phronesis*, or "practical judgment." Practical judgment grasps the big theoretical picture, has an eye for relevant detail, and has a developed instinct for when either side of the equation should be called into question. We need more of it. We need it now in situations festering in the Middle East, Northeast Asia, and South Asia, in particular.

Modern government could do with a large dose of good social science. Politics, necessarily, is governed by rhetoric and short-term calculations. It should be balanced by policy discussion that is theoretically sophisticated and empirically rigorous.

When I left the State Department for Georgetown's Walsh School of Foreign Service, I made it a priority to encourage more interaction between academia and government. At the MacArthur Foundation, I was pleased to find an institution that had for decades valued research into persistent social problems, fostered interdisciplinary research networks in neglected areas, and funded demonstration projects that had implications for government policy. But we need to do more to close the gap.

It is time for more adventurous academic programs for our students, with broader or permeable disciplinary boundaries, and an emphasis on developing practical judgment. We need to rethink our system of tenure and academic incentives, giving credit not only for specialized research in publications but also for engagement with policy-makers and the public.

The MacArthur Foundation funds (and I participate in) a promising collaborative adventure, the Tobin Project, "an alliance of the nation's leading academics united by a belief in the power of ideas and a shared commitment to using ideas to improve the lives of their fellow citizens." It is based right here in Cambridge, Massachusetts. America and the world face challenges that demand our best intellectual efforts. My aspiration is for "shared intelligence," an ongoing exchange between our best conceptual thinkers, sharpest researchers, and most accomplished policy-makers.

But in this I am preaching to the choir. The American Academy has helped pioneer interdisciplinary thinking, links between policy and research, and attention to large social issues. That is one reason, among many, that I feel honored to be admitted to the Academy with the other inductees in this class today. This is a choir I am glad to sing in. ■

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James A. Leach

Chairman, National Endowment for the Humanities

A Looming Crisis in the Humanities

A half-century ago, the English physicist and novelist C. P. Snow delivered a controversial lecture at Cambridge University called "The Two Cultures" in which he lamented the gulf between scientists and a group he described as "literary intellectuals." He cited several examples: scientists who had hardly read Dickens and humanists who couldn't define the second law of thermodynamics.

At the risk of exaggeration, the gulf might be described as illiteracy matching innumeracy in the citadels of academia. But however defined, Snow held that the breakdown of communication between the sciences and the humanities hindered solutions to social problems. Assuming some legitimacy to Snow's contention, what is the situation five decades later?

In many ways the science–humanities division is more extreme today, as physics has become more math dependent, biology and chemistry more complex, and scientific inquiries more abstract. Nevertheless, from a methodological perspective, the technological revolution that began with the digital computer allows the humanities and sciences to share an increasing portion of common ground.

Digitization of myriad objects and billions of pages of books and manuscripts enables the application of scientific methods to vast amounts of social-science data. Just as computers have accelerated the mapping of the human genome, they allow humanities scholars to trace the changing meaning of written phrases over time, to see the evolution of a melody from a Greek chorus, and even to build a virtual world that re-creates the Temple at Karnak. Likewise, digital technology and the Internet give scientists an open window into the humanities.

From a methodological perspective, the technological revolution that began with the digital computer allows the humanities and sciences to share an increasing portion of common ground.

As a consequence, the social hallmark of our times is the emergence of a New Digital Class, characterized less by occupation, birth, geographic location, and the science–humanities divide than by an individual's degree of curiosity, diligence, and access to digital technology. The important division in the new communications age is no longer the one between science and the humanities. It is in the first instance the growing gulf between those who have crossed the digital divide and those who by choice, lack of access, or capacity have not; and in the second, between those who seek information from diverse sources with an open-minded perspective and those who choose to rely on single-dimensioned purveyors of views.

The question of whether a Twittering world will cause greater understanding and social integration at the community and international level or lead to greater intolerance and social splintering is yet to be resolved. What is clear is that few revolutions in history can match the democratizing consequences for individual learning of the development and spread of digital communication devices.

Since the Enlightenment, the issue of equality has been looked upon as a political ideal tied to techniques of social organization and governmental policies of the moment. But in the modern world, access to knowledge is becoming as central to advancing social equality and opportunity across the globe as access to the ballot box has proven to be the key to advancing political rights.

Unfortunately, mastery of certain kinds of knowledge involves the most sobering quandary ever presented: whether the results of scientific inquiry will serve the interests of man or jeopardize the existence of mankind. After all, for the first time in history the capacity exists not only to wage war but to destroy life on the planet. As Einstein so presciently warned, splitting the atom has changed everything except our way of thinking.

Whatever differences may exist between the capacity of scientists to explore the unknown in nature and the ability of scholars in the humanities to address life's enduring questions, science and the humanities are unalterably entangled.

The sciences cannot ignore the humanities any more than the humanities can ignore what science has wrought. Whatever differences may exist between the capacity of scientists to explore the unknown in nature and the ability of scholars in the humanities to address life's enduring questions in tandem or in the wake of scientific advances, science and the humanities are unalterably entangled.

Just as scientific endeavor is changing life on the planet and affecting the course of man's relationship to man, so studies in the humanities and the creative arts are reference points, stimulating the imagination and providing contextual and ethical perspective to scientific inquiry and its consequences.

What is so sobering about Einstein's warning is the reminder that our way of thinking may be a stubborn constant in a world of unprecedented change. If the most recent century, the bloodiest on record and the one wracked by unprecedented "isms" of hate, is a guide, human nature has a dueling rational and irrational dimension: a vulnerability to self-centered Hobbesian beastliness and a contrasting selfless capacity to stand up for shared values and the common good.

The power of a few to commit acts of societal destruction as well as the power of a committed few to bring about uplifting change in the world has been underestimated throughout history. Today, civilization is on trial from two extremes: the possibility that proliferating weapons of mass destruction could be unleashed, and the reality that the more advanced and open a society, the more vulnerable it is to global terrorism. In this context, mutual understanding – the bridging of cultures, near and far – is the requirement of our age. Civilization may be embellished by science, but it requires civility to survive.

Whether violence is an integral element of the human condition or a learned response is a matter of conjecture. But non-violence is almost certainly a practice that must be learned. From an academic perspective, the most relevant disciplines for developing social perspective are the humanities: history, literature, philosophy, linguistics, comparative religion.

Today America leads the world in almost every academic field, but a crisis is looming in the humanities. This crisis is reflected in federal programming where research dollars for the natural sciences have tripled since the mid-1990s but have been held in check in the social sciences. More consequentially, in an increasing number of American universities the disciplines that are most associated with giving an individual the imaginative capacity to put himself or herself in another's shoes are under pressure relative to disciplines perceived to be more vocation-oriented.

There is every reason to honor the sciences and support investigations into the unknown, be they related to the beginnings

The humanities are obligated to embrace the challenges that emerge from science and advance a fuller understanding of our times and a deeper grasp of human nature.

of the universe or the extending of human life. Yet in the end, dark matter and dark energy may be easier to understand in the physical sciences than dark motives are in the social arena.

Impelled by the implications of what Rutherford once described as the "heroic" age of science, the humanities are obligated to embrace the challenges that emerge from science and advance a fuller understanding of our times and a deeper grasp of human nature. There is no rational option except to change our way of thinking, beginning with greater tolerance. What is required is a greater willingness to consider – respectfully – diverse views, recognizing that we all are connected and rely on each other.

Seldom is there only one proper path determinable by one individual, one country, or one political party. Public decision-making does not lend itself to certitude. Everyone can learn from somebody else. That is why humility is a valued character trait and civility a central ingredient of a free society and a safer world. ∎

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Roger W. Ferguson, Jr.

President and Chief Executive Officer,
TIAA-CREF

Leadership in the Public and Private Sectors during a Time of Crisis

Leadership, in any organization, requires a clear understanding of the purpose of the organization, importantly defined as the *mission* it serves in society. Government agencies, philanthropic institutions, and most nonprofits have written into their DNA a requirement to improve society, whether through advancement of education, alleviation of poverty, treatment of disease, or another noble purpose. But what is the purpose of business in today's society? In particular, what is the purpose of for-profit business?

Traditionally, the role of business is to maximize profit and shareholder returns. This formulation indicates that the drive to maximize profits tends to maximize efficiency. Scarce resources are allocated to their most economically productive purposes. In turn, this produces tangible benefits to individuals and society in the form of jobs, wealth, and tax revenue. By this formulation, serving shareholders equals serving society.

Yet there has long been a tension between the bottom-line values of for-profit businesses – along with a strictly economic definition of social benefit – and the belief that a company, because of its ability to harness and direct resources, can and should make productive contributions to society beyond the bottom line.

In the past two or three decades, a theory of business has emerged which holds that companies should maximize value not just to shareholders, but also to *stakeholders,* including employees, suppliers, neighbors in the communities in which businesses operate, and other members of society who are affected by decisions companies may make. As business has become more globalized, these questions have taken on even greater significance. What allegiance does a company owe to the country in which it is headquartered? Should it keep all its jobs at home? What responsibility does a company have for improving working and living conditions in the many places it operates? How should it think about its so-called supply chain?

Efforts to reconcile the traditional view of a shareholder-focused company with the more modern idea of a stakeholder-focused company are rooted in the notion that maximizing shareholder value depends on efforts to maximize stakeholder value. By this formulation, serving society serves shareholders.

> *I believe that one way to rebuild trust is for companies to reignite their sense of public mission by using their resources and expertise to make headway in solving pressing social problems.*

In recent years, we have seen companies that fail to take this broader view of their social responsibility lose substantial shareholder value. Some, such as British Petroleum, may have an opportunity to rectify their mistakes, but at a great cost. Others failed and can never make amends.

> *The opportunities for businesses to drive ambitious social advances are endless because businesses have the capacity to join entrepreneurial thinking and capital.*

In the aftermath of a financial crisis and years of corporate governance scandals, companies have been spurred to rebuild trust with customers, employees, communities, policy-makers, and other stakeholders. I believe that one way to rebuild trust is for companies to reignite their sense of public mission by using their resources and expertise to make headway in solving pressing social problems. My own company, which is in many ways your company, TIAA-CREF, is focused on helping individuals achieve a safe and secure retirement, a mission that involves not only providing products and services but also promoting financial literacy.

We work with many nonprofit organizations – some of which are represented here today – that are contributing to the long-term financial security of their employees, which is itself a laudable social purpose that should be a priority for all employers. Other companies and institutions are engaged in market-driven projects that will have significant long-term implications for the way that we live: increasing the fuel efficiency of automobiles, figuring out how to bring alternative energy sources to market, developing lifesaving advances in health sciences, and using technology to deliver education in exciting new ways to a diverse student population.

The opportunities for businesses to drive ambitious social advances are endless because businesses have the capacity to join entrepreneurial thinking and capital. The financial crisis, and many that came before, taught us that companies that pursue short-term gains without considering a broader set of social perspectives may ultimately
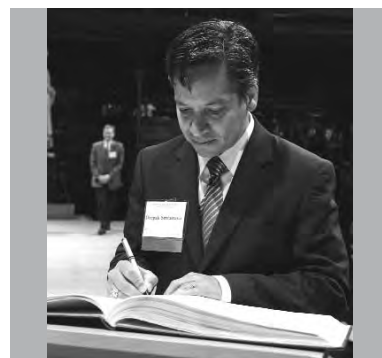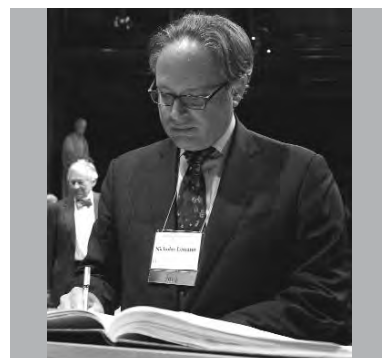
destroy the shareholder value they are trying to create. Therefore, all business leaders must make decisions with the broader interest of stakeholders, not just shareholders, in mind.

As members of the Academy, and as socially responsible leaders in our nonprofit and for-profit endeavors, we in Class V can cultivate and advance these efforts. Working within our specialties, and collaboratively, we can identify ways for businesses to enrich the life of the nation, while also delivering bottom-line returns.

We can enhance business leaders' abilities to recognize the broader implications of their decisions – and make clear that the health of the economic, political, and cultural environments in which a business exists is essential to its ability to thrive. By helping advance a broad social purpose for companies, we can help shape how business is conducted in the twenty-first century, and thereby reflect well the founding ideals of this Academy. ■

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New Fellows Sign the Book of the Academy

Row 1: Samuel J. Palmisano (International Business Machines Corporation); Kimberly Prather (University of California, San Diego); Row 2: Robert Gibbons (MIT); Nicholas Lemann (Columbia University); Row 3: Karla Kirkegaard (Stanford University); Deepak Srivastava (University of California, San Francisco; Gladstone Institute of Cardiovascular Disease); Row 4: William Rawn (William Rawn Associates, Architects, Inc.); Luis Ubiñas (Ford Foundation)

Induction Symposium : Technology and the Public Good

A Free Press for a Global Society

Lee C. Bollinger
Introduction by Neal Lane

The 1960th Stated Meeting, held at the House of the Academy on October 10, 2010

Introduction by Neal Lane

Malcolm Gillis University Professor, Professor of Physics and Astronomy, and Senior Fellow of the James A. Baker III Institute for Public Policy at Rice University. A Fellow of the American Academy since 1995, he currently serves as Cochair of the Academy's Council.

The American Academy's Induction weekend is a powerful reminder of the Academy's potential as an intellectual force and of the responsibility we all share to participate actively in its work. Our program this morning is an example of the Academy's capacity to enhance understanding of tough societal issues and advance pragmatic solutions.

Today, a group of distinguished Academy members will speak to us about Technology and the Public Good. (It is worth noting that today's date, 10/10/10, only occurs once a century and reflects the binary code on which the Internet is based.) It should be no surprise that at two-and-a-half centuries old, the Academy is examining issues at the forefront of new technology.

It is my great honor to introduce our first speaker, Columbia University President Lee Bollinger. After earning his law degree from Columbia, he served as clerk for Judge Wilfred Feinberg of the U.S. Court of Appeals for the Second Circuit and for Chief Justice Warren Burger of the U.S. Supreme Court. He later joined the faculty at the University of Michigan Law School, becoming Dean in 1987. He served as Provost of Dartmouth College in 1994, and then returned to the University of Michigan in 1996 to become President. In 2002, he was named the nineteenth President of Columbia, an institution that, like the Academy, was established before the founding of the country. While presiding over these large and complex academic institutions, Lee has remained an active scholar of the First Amendment and freedom of press issues. He has authored numerous articles and four books, including his newest, *Uninhibited, Robust, and Wide-Open : A Free Press for a New Century*. This morning he will discuss the formation of a free press for a global society.

Lee C. Bollinger

Lee C. Bollinger is President of Columbia University and Professor of Law at Columbia Law School. He has been a Fellow of the American Academy since 1992.

Presentation

The need to build a system of free press that is suitable (from both U.S. and global perspectives) to the conditions of globalization is a subject of intrinsic importance. It is also an example of how the extraordinary forces of globalization are reshaping intellectual fields. (Universities, in my view, should be thinking much more systematically about this challenge, but that's a larger subject for another day.) Today, the system of free press that prevails in the United States blends constitutional law, public policy, the specific conditions of markets – with respect to daily newspapers, in particular – and the development of journalism as a profession. All these elements emerged in the twentieth century. Like universities, the press is one of the central institutions of a democratic society. At its best, the press serves the public good by disseminating information and analysis and by functioning as a public forum for discussing issues of importance to soci-

ety. Perhaps its greatest contribution lies in its capacity for calibration : that is, the ability to judge what is important and why.

In the twentieth century, the nation became less an assemblage of states and regions and more a national entity. The structure and institutions of the society shifted accordingly. The growth of the economy ; the rise of issues with national scope, such as civil rights ; and the development of new communications technology – broadcasting, in particular – that enhanced national discussion : all contributed to the need for a free press that could function on a national level and was appropriate for a rising, robust, and dynamic national society. To that end, a complex ecology of First Amendment public policy and journalism evolved. The Supreme Court initiated a series of landmark decisions that ultimately provided a unified national approach. Those decisions pushed

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the boundaries of free speech and press beyond what any nation in history had done before. They also articulated the important public role performed by the press, locating the rationales for extraordinary protection in the political and social interests of democracy, reason, and tolerance.

Meanwhile, public policy intervened in the new broadcast media. With the Supreme Court's blessing, the federal government organized a blend of private ownership and public-interest regulation to expand the range of voices. It also launched a public broadcasting system with guarantees of editorial autonomy. Finally, the print media used its revenues, especially the monopolistic profits of daily newspapers, to deepen and expand its expertise to cover the news. Journalism began to look more and more like a profession, with standards of behavior that transcended interest, profit, and partisanship. Private enterprise, market conditions, state policy, and constitutional cases – none of which could have given rise to a free press all on its own – combined to create the best press in the world.

* * *

In our current century, the conditions undergirding the system have shifted. Free markets have gone global, driving changes of enormous significance throughout the world. Some changes are good, such as im-

Perhaps the press's greatest contribution lies in its capacity for calibration: that is, the ability to judge what is important and why.

proved standards of living and better health for hundreds of millions of people; others are bad, like climate change, or problematic, like the fragility of the international economy, the tensions of multiculturalism, or conflicts between modernity and other ways of life. Ours is a world driven by business and finance, aided as always by new communication technologies; in this case,

the Internet and satellite broadcasting are especially influential. It is a world that moves with extraordinary rapidity and that often resists the sunshine provided by a responsible press. It is a world in desperate need of the kind of information that only institutions of journalism can provide. We therefore need a system of free press suitable to this new world.

I fear that the United States does not grasp the full degree to which we are becoming integrated and interdependent with other countries. Half of the revenues of S&P 500 companies are generated outside the United States. Half the goods consumed by wealthy nations are manufactured in emerging economies. Half of U.S. government debt is in foreign hands. What happens to this world? How does it evolve? What choices do we need to make to create the best of all possible worlds? At the least, we should think carefully and systematically about what kind of press system will provide us and others with the journalism we need to address these questions. As form is sometimes said to follow function, so free press follows issues – and the issues are increasingly global.

Three major areas require particular attention. First, the balance of interests that produced our First Amendment jurisprudence is starting to shift. For example, when *The Washington Post* obtains classified documents or information, we can count on its journalists and editors to feel the force of patriotic considerations in deciding what to publish; this is not the case for those behind WikiLeaks. Today, when an unknown pastor in Florida threatens to burn the Koran, the hostile audience that will be aroused, and the violence that might ensue, is not within the same control, or on the same scale, as the threatening mob in Illinois that prompted one of the Supreme Court cases of the last century. For these reasons, the Pentagon Papers case may not look quite the same today. One thing is for sure: the Secretary of Defense's call list will get very long. My point is not that the case law should change, but rather that the resolution we have reached will to some extent need to be reconsidered.

At the moment we need more and better international press coverage; the current financial crisis has caused budgets for foreign bureaus and correspondents to contract.

Second, to design this system of free press on a global scale, our basic perspectives and assumptions must change. To the extent that we need information about what is happening in the world, the working distinction in our minds between domestic and foreign press must recede; indeed, much of what we need to know will come from the foreign or international press. This reality has implications for policy. For example, access for members of the press is crucial. Restrictions on foreign journalists that exist today in virtually all countries, including the United States, and are justified on grounds of foreign policy or sovereignty become problematic. Visa and travel restrictions on international journalists, or decisions by cable companies not to carry certain international media, will need rethinking.

Censorship on a global scale is a third matter of enormous concern. Nations throughout the world have very different ideas about the role of the press and the scope of freedom it should be afforded. In a world of global communication, the reality increasingly is that censorship anywhere is censorship everywhere. In the United States during the twentieth century, state laws restricting speech and press eventually gave way to a set of national norms, with *New York Times Co. v. Sullivan* being the primary case in point. A similar transformation must unfold globally. A speech or essay in the United States can get its speaker or writer in trouble in Italy, Turkey, China, or Britain. Again, our fundamental perspective must change. This is no longer a matter of nobly securing human rights for the rest of the world; rather, it is a practical matter of securing the basic flow of information and ideas required to accompany and complement the free flow of goods and services.

"It is worth noting that today's date, 10/10/10, only occurs once a century and reflects the binary code on which the Internet is based."

We seem hardly prepared for this new world, and our shortcomings will not be corrected by advances in technology alone. Those of us who believe in the virtues of a very open and free press system must develop new rationales and arguments to persuade those who do not share our intuition. For example, we might emphasize the relationship between openness and sustainable and stable economic growth, the latter being something nearly all societies now seem to want. We will have to work toward stronger international legal norms. Texts such as Article 19 of the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights, World Trade Organization guidelines, and other regional treaties provide a place to begin.

Finally, besides problems of access and censorship, we must focus on the capacity of the press to cover the dynamic, fast-moving, and somewhat secretive forces of globalization. It is unfortunate that at the moment we need more and better international press coverage; the current financial crisis has caused budgets for foreign bureaus and correspondents to contract. Even without this troubling state of affairs, however, we would

We would benefit from a more focused discussion of the role public policy might play in bringing more independent and objective journalism to the world – and more of it back home to us.

benefit from a more focused discussion of the role public policy might play in bringing more independent and objective journalism to the world – and more of it back home to us.

* * *

The American population must be better educated than we are about global issues. Other nations, certainly, are engaged in international events. New public service broadcast systems are reaching out to the world from France, Russia, the Middle East, and China, joining the traditional institutions such as the BBC World News and BBC World Service. I believe the world would

benefit from more American-style journalism and I have suggested the formation of an American World Service modeled on the BBC.

At present, the United States has a dual system of publicly supported broadcasting. On the one hand, there is an editorially independent press with a domestic mission, namely NPR and PBS. On the other is a government press with an international mission, which includes Voice of America, Radio Free Europe, Radio Free Asia, and several other news organizations. In yet another example of how the world has changed while our policies lag behind, a 1947 statute bars these government propaganda outlets in the international arena from rebroadcasting back into the United States. Whatever one thinks of these media, they will always be viewed as the voice of the American government. The best of free and independent American journalism needs to join these and other institutions, many of them private, in the new global public forum. A good method to achieve such integration, for example, would be to augment the funding and mission of NPR.

A Free Press for a Global Society

For Americans who are skeptical about public support for the press, I should reiterate that neither theory nor experience suggests that a free market alone can create the conditions necessary for an independent, global press to arise. Certainly, editorial autonomy is essential to any free press. There are ways to establish that reality in practice and in First Amendment law. By comparison, at universities, where we care as much about academic freedom as journalists do about editorial freedom, we have long maintained our autonomy in spite of significant state and federal funding. Journalism, I believe, can do the same.

The world is undergoing momentous changes through the forces of globalization. We need a free press that is suitable to this new world. To achieve that goal, we must change our basic concepts and develop our laws and policies to deal with the serious issues of access, censorship, and the capacity of the press to provide the information we need. Only then can the press do its part to help shape a world that will work for ends we believe in.

Visa and travel restrictions on international journalists, or decisions by cable companies not to carry certain international media, will need rethinking.

Question

Could you comment on online journalism and whether you believe that a robust, open, and balanced forum could be Internet-based?

Lee Bollinger

This is a very large subject. The Internet is bringing enormous amounts of new information, opinion, and analysis to discussion of global and national issues. I think this development is a huge plus. However, the Internet will not replace the institutions that are devoted to the spread of information and analysis on an independent and objective basis. That is the domain of journalism. While it is typically thought that the citizen journalist is one of the great new advances of the Internet age – a view that I share – I do not think it replaces the need for large organizations that have a unique range of capacities to go out and report on the world.

I think the other point to be made, which I offer up tentatively, is that the type of "journalism" that is not of the traditional media tends to contain more opinion than objective reporting. Journalism is a profession, just as scholarship is a profession, meaning that professional journalists are committed to certain norms in the way they pursue information and truth. By the same token, we might ask, could the courses, discussions, or sources of information that we have access to at universities be replaced by Internet alternatives? Taking a basic economics course online does not connect a student to an institution devoted to the development of knowledge about economics or laws. I think that is a huge loss.

Question

Previously, newspapers could hire robust editorial staffs because they had the revenue. How will we replace that capacity in the Internet age? How will we accrete enough mass, gravitas, and editorial staffing to supplement at least the blogosphere?

Lee Bollinger

The answer I'm giving in op-eds, essays, speeches, and my book is: through public funding. We have a mix that balances private institutions, publicly funded media, and hybrids that incorporate some public policy. I would shift the nature of that balance to devote more public funding to journalism, in part to make up for the economic losses we are experiencing.

Where we are is completely unsatisfactory. From informal conversations with members of the American press, I understand that, apart from the financial press employed by Bloomberg News, we may have only two dozen full-time foreign correspondents covering all of China. A handful has been there long enough to have acquired a deep

Nations throughout the world have very different ideas about the role of the press and the scope of freedom it should be afforded.

knowledge of the society. Perhaps five or six journalists have a sense of how China evolved, what is going on in China, what the leadership is really like, and China's views on topics we care about, such as openness. Do they believe that the emergence of a free press is inevitable, or do they believe that a closed society is consistent with sustained economic wealth?

Those kinds of questions are immensely significant to the United States and the world. It seems that we would want to have many more journalists trying to understand them, as well as more university faculty and student investigators. We in the universities have not adjusted our fields and our array of expertise to really try to understand what is going on in the world, China being a particular example. Again, I would use public funding.

I have followed the press for many decades, and I have asked editors of major daily newspapers to give me a sense of the history of the press in this country. Leading newspapers started making substantial profits in the late 1970s and early 1980s, when they came to dominate the market. That's when they hired economists, lawyers, scientists, and other experts to cover subjects like the court or the economy. Today, newspapers are in the process of losing a good deal of that range of expertise. Allowing it to unfold without a careful public policy review is a mistake.

Question

My impression is that the First Amendment was originally intended to provide freedom of speech to the press so that it could criticize the government. But in the course of the last two hundred years, it seems we have morphed that right into the freedom for in-

dividuals to express themselves in a variety of ways. The Internet offers a megaphone for a good deal of objectionable speech. Is it your sense that the intent has morphed, or do you believe that freedom of speech originally was meant to apply not only to the press but also to individuals?

Lee Bollinger

I think the provision was intended to apply to individuals, but we know stunningly little about how the First Amendment was interpreted by the people who drafted it. There has been very little effort to unravel that mystery. The first Supreme Court case to interpret the First Amendment was in 1919. Thus, freedom of speech and press as we know them today are an invention of the twentieth century.

And as I point out in many places, it was not an auspicious beginning. Oliver Wendell Holmes wrote for a unanimous court in three early decisions, upholding convictions against people who had protested for various reasons prior to World War I. One of the individuals whose conviction was up-

Besides problems of access and censorship, we must focus on the capacity of the press to cover the dynamic, fast-moving, and somewhat secretive forces of globalization.

held by the Supreme Court was presidential candidate Eugene Debs. He gave a speech in Ohio in which he praised people who resisted the draft. That was held to be a crime sufficient for a presidential candidate to go to jail. While he was there, he received a million votes for president in the 1920 election.

Then the law changed. Holmes oversaw a ruling on the First Amendment and religion that resulted in strong protections for individuals. During the McCarthy period, however, as people were jailed for speaking about overthrowing the government, the court fell victim to the traditional notion that in a new period, threatened by international conspir-

acy, the government must be allowed to take action.

In the 1960s, everything changed again, with cases like *New York Times Co. v. Sullivan* and *Brandenburg v. Ohio*. Our current jurisprudence really derives from that period, rooted in some fine decisions of the 1920s and 1930s. None of those cases is based on an understanding of what the framers wanted, largely because, as I mentioned, there has been virtually no historical analysis of what the framers' exact vision might have been. Yet we should not readily accept the idea that the framers had a vision that we have altered over time.

Why do we take freedom of speech so far in the United States? Why were neo-Nazi speakers allowed to march in Skokie, Illinois, in 1977? Four thousand Holocaust survivors lived in that community, and half the population was Jewish. We take free speech further than any other society in the world, and that includes neighbors such as Canada and Britain. We are now in a position where our exercise of free speech rights are not just domestic issues; they are published globally, and an American can end up being prosecuted, as has happened, in Italy or Turkey.

This is the beginning of a whole new era, a whole new century. *New York Times Co. v. Sullivan* was pivotal in recognizing that Alabama could not have a rule that allowed people to sue freely for libel; it undermined *The New York Times'* ability to publish a national edition because it could face libel cases in the least protective areas of the country. Now, we are facing that problem on a global scale.

For most of my professional career, I have struggled with the question of why we have such extreme protection. I think it is rooted in a strategy to test our limits of tolerance in the area of speech as a lesson or symbol of the need to bring tolerance to every area of social interaction. I think we bend over backward to be tolerant because that's the kind of character we want to have. But other societies have reached very different judgments about what individuals can say publicly. Germany, for example, does not allow neo-Nazi speech; we can understand why certain societies might establish different rules.

While it is typically thought that the citizen journalist is one of the great new advances of the Internet age, I do not think it replaces the need for large organizations that have a unique range of capacities to go out and report on the world.

We are now in a global discussion about defining the parameters of free speech on an international scale.

Question

Liberty is inseparable from responsibility. How can we institutionalize responsibility and protect the citizen from slander and libel?

Lee Bollinger

I think we look to universities. Quality journalism is a major responsibility of universities and journalism schools. Under Nick Lemann, Dean of the Graduate School of Journalism, Columbia is working closely on these projects and others, strengthening the journalism school as a place for professional development. I also think the participation of people who exhibit the best qualities of a professional journalist, to serve as a kind of model or example for how we should speak and behave, is extremely important.

We should value enormously the quality of the free press that has been achieved in this country; it's an astonishing institution. Nurturing it, helping reshape it through this difficult period, and building a free press on a global scale are great goals. In these efforts, we can work toward a culture in which debate is conducted on the highest possible levels. ■

Technology and Culture

Robert Darnton, David S. Ferriero, and Marjorie M. Scardino
Paul Sagan, Moderator
Introduction by Neal Lane

The 1960th Stated Meeting, held at the House of the Academy on October 10, 2010

Introduction by Neal Lane

Malcolm Gillis University Professor, Professor of Physics and Astronomy, and Senior Fellow of the James A. Baker III Institute for Public Policy at Rice University. A Fellow of the American Academy since 1995, he is Cochair of the Academy's Council.

The first of two panels this morning will consider Technology and Culture. Leading this panel is Paul Sagan, Chief Executive Officer of Akamai Technologies. Before joining Akamai in 1998, he served as Senior Advisor to the World Economic Forum and was President and Editor of New Media at Time, Inc. He also was founder of two successful high-tech start-ups : Road Runnner, the world's first broadband cable modem service, and Pathfinder, one of the pioneers of Internet advertising. Mr. Sagan began his career in television news, and is a three-time Emmy Award winner for broadcast journalism. He was elected a Fellow of the American Academy in 2008.

Paul Sagan

Paul Sagan is Chief Executive Officer of Akamai Technologies. He has been a Fellow of the American Academy since 2008.

It is a pleasure to help coordinate this panel on Technology and Culture and to be here with our distinguished panelists. Our first speaker is Robert Darnton, Director of the Harvard University Library. He will address the future of the book in a digital age and

the tension between maintaining broad access to information sources and commercial interests that seek to monetize that access. Bob has been outspoken about the impact of Google's plan to digitize books. He became a Fellow of the American Academy in 1980.

David Ferriero, our second panelist, is the Archivist of the United States. He will speak on how digital technology affects our ability to archive history and, in turn, what happens to our collective memory in a digitized world. He was inducted into the Academy yesterday.

Our final panelist, Marjorie Scardino, is the Chief Executive of Pearson PLC, an international media company with leading businesses in education, business information, and consumer publishing. The Pearson media empire spans from the Penguin brand to the *Financial Times*, which is noteworthy for its success online as well as in print. She will share her thoughts on how digital technology has affected the media in general, and publishing specifically, and how shifts in media brought about by digitization are changing the way the information needs of a democracy in the Internet era are being served. She, too, was inducted into the Academy yesterday.

More than a billion people around the globe access the Internet on a regular basis. As we think about the impact of technology on culture, and perhaps about the impact of culture on technology, there are a few developments to keep in mind. If websites and countries were ranked by population, then

Soon, Internet use via mobile devices will outpace use by personal computers. This shift indicates that access to information is about to expand globally to levels that have never before been seen in human history.

Facebook, with about five hundred million users worldwide, would be third, behind China and India and ahead of the United States. E-book sales represent only about 1 percent of book sales worldwide, but Amazon recently reported that its e-book sales now lead hardcover book sales in the United States. Fifteen years after the introduction of consumer broadband services, video consumption over the Internet is about 1 percent of video viewing in the home. But

only in the past few years has the average home in almost every developed part of the world been able to access the Internet at speeds capable of supporting video quality equal to that of television. Just this summer, for example, the BBC reported that 5 percent of World Cup viewing on television in Britain was done over the Internet – five times the average – even though the event was free to watch on television in every pub, not to mention every home, in the country.

The digital age is creating an information and communication renaissance, but it is not serving all people and communities in an equal way.

We will discuss the risks of having all content digitized and controlled by a few centralized entities, public or private. But it is also true that digitization of records and Web access have made more information available to more people than at any other time, at least for now. Soon, even if that access becomes limited in some ways, Internet use via mobile devices will outpace use by personal computers. This shift indicates that access to information is about to expand globally to levels that have never before been seen in human history.

At the same time, this flood of digital information is not washing across the landscape in an even manner. A year ago, I served as a member of the Knight Commission on the Information Needs of Communities in a Democracy. We held hearings across the country, heard testimony from a very wide array of groups and individuals, and concluded that the time had come for new thinking and aggressive action to improve the information opportunities available to the American people. We wrote that America is at a critical juncture in the history of communications. Information technology is

changing our lives in ways we cannot easily foresee, and as dramatic as the impacts have been already, they are just beginning. The digital age is creating an information and communication renaissance, but it is not serving all people – certainly not all Americans – and communities in an equal way. It is not serving the democratic process fully. How we react individually and collectively to this democratic shortfall will affect the quality of our lives and the very nature of our communities.

As humans, we have some habits that are hard to break. Some are useful because they create patterns that we can recognize and that help us sort out our world. As we turn to Bob Darnton, we should consider how the digitization of information affects our trust in what we see, read, and hear. It is one thing to examine a scientific text, for example, or to hold a researcher's log book in our hands, but what happens when that authoritative work is transformed into bits that can disappear online or perhaps be changed without our knowledge? What happens not just to our notion of the library in the digital future, but to our notion of access to information?

Robert Darnton

Robert Darnton is the Carl H. Pforzheimer University Professor and Director of the University Library at Harvard University. He has been a Fellow of the American Academy since 1980.

In preparing for this panel discussion, we were instructed to think of three wishes that, if granted, would in some way improve the current situation with regard to technology, culture, and the public good. My top wish is for the creation of a national digital library. I think this country needs a digital library that would be the equivalent of or greater than the Library of Congress. This resource would take our entire cultural heritage into living rooms, community colleges, and small institutions, everywhere in the country and everywhere in the world.

The basic idea is straightforward: to give people access to our cultural heritage and to close a gap that has existed, certainly, since the invention of the printing press – that is, the gap between those who have access to books and knowledge and those who do not. This is not a utopian fantasy; a conference held at Harvard last weekend discussed the real possibilities and modalities for creating a national digital library. We can get the job done. A coalition of foundations could easily cover the costs; a coalition

My number-one wish is that all the material in all our libraries (and not just print materials, but other forms as well) would be made available to American people everywhere.

of research libraries could provide the material; and a coalition of leaders from our cultural institutions, especially in Washington, could mobilize support. Thus, my number-one wish is that all the material in all our libraries (and not just print materials, but other forms as well) would be made available to American people everywhere.

Wish number two is for open access. It is easy to say that we are in favor of the democratization of knowledge, but the fact is that knowledge is very unevenly distributed throughout the country. An ideal handed down to us from our founding fathers (granted, we don't know what their exact intentions were when they developed the Bill of Rights and the Constitution) is to create a republic of letters. In this republic, everyone would have access to the printed word, and everyone would exchange ideas without inhibition.

In my view, Ph.D. theses should be published online rather than as books.

Open access is a way to make that ideal possible. In the current system, we face a major problem: we, the scholars, produce the research. We write it; we serve on the editorial boards of journals that publish it; we act as referees for those journals; and then we buy back the product of our own labor at ruinous prices. Of course, we don't pay for it ourselves – our libraries do. But the result is a tremendous disequilibrium in the world of knowledge. Many journal subscriptions cost libraries $20,000 a year;

a yearly subscription to the chemistry journal *Tetrahedron* is $40,000. The economic imbalance is simply impossible for libraries to sustain. We have a major crisis, not just in library budgets, but a crisis that reverberates throughout the world of learning. It affects university presses in particular because libraries are cutting back on the purchase of monographs in order to maintain expensive journal subscriptions. The result is that postdoctoral scholars cannot get their work printed in some subjects.

Open access publishing of scholarly journals is a way to correct this basic imbalance. At Harvard, we passed an open access resolution whereby all Harvard professors are committed to making their scholarly articles available in an online, open access repository. They can opt out; nevertheless, the scholarly production coming out of Harvard is now available free of charge around the world. We are also subsidizing professors' publication costs up to $1,000 a year. We hope to create a new kind of journal, whose expenses will be paid at the production end rather than at the consumption or subscription end. We want to change the equilibrium in scholarly publishing, certainly for journals, and maybe even for books.

I have a third wish that may in part be fantasy. For many disciplines, our Ph.D. programs are broken. It no longer makes sense to follow the nineteenth-century model we inherited from Germany, which requires Ph.D. candidates to publish a dissertation as a book. In Germany, scholars are still digging into their pockets to publish books that sit unread on shelves in German libraries. We have a similar system here, and it needs rethinking. In my view, Ph.D. theses should be published online rather than as books. University presses should not be making de facto tenure decisions; in fact, the tenure system needs to be restructured as well. By reimagining Ph.D. programs, we might open up career possibilities to younger scholars in a way that is no longer feasible given the economic and institutional realities of academic life today.

David S. Ferriero

David S. Ferriero is Archivist of the United States at the U.S. National Archives and Records Administration. He has been a Fellow of the American Academy since 2010.

Many of you may not know what the Archivist of the United States does, so I will start by telling you exactly what my responsibilities are. The Archivist is the record keeper of the government and has been performing that function since F.D.R.

Attempts to save our collections, and thus our history, have a checkered past.

created the National Archives. The Archives are located in forty-four facilities around the country, from Anchorage, Alaska, to Atlanta, Georgia, and include the thirteen presidential libraries. We have a collection of more than ten billion pages of paper, forty million photographs, miles and miles of film, and growing terabytes of electronic information. We are governed by the Federal Records Act and the Presidential Records Act, which determine exactly what kinds of materials come into the Archives.

Attempts to save our collections, and thus our history, have a checkered past. At the end of the Continental Congress, Jeremiah Clark of New York was one of a number of delegates who suggested that the journals of the Congress be destroyed, lest they fall into the wrong hands. Wiser minds prevailed and left the decision up to General Washington, who decided that we should preserve those journals for posterity. But it was not until F.D.R. came into office that the Archives was established as an institution. Roosevelt appointed Robert Connor, a historian at the University of North Carolina at Chapel Hill, to be the first Archivist of the United States.

Connor's job was to create the National Archives. He assessed the situation in Washington and discovered that the records around the government had not been well preserved. They had been stored in depositories fraught with hazards and exposed to dirt, rain, sunlight, theft, and fire. Some were infested with silverfish, cockroaches, rats, mice, and other vermin. In one depository crowded with government archives, Connor described the most prominent object in the room: the skull of a dead cat protruding from under a pile of valuable records. If a cat with nine lives to risk could not survive the conditions of research in the depositories of our National Archives, Connor remarked, surely the poor historian with only one life to give to his country might be excused if he declined to take the risk.

I am happy to report that when I took over in November 2009, I did not face the same scenario. But I would posit that I am in a very similar position with regard to the migration to electronic records. Every agency in the government, along with the White House, is using electronic records in a variety of modes, leading me to wonder whether we are losing our memory. I think it is safe to say that we are, just as Connor inherited a situation where much of our national memory had been lost.

As of 1996, the Presidential Records Act has recognized electronic information as record. Since then, we have collected all the email messages from the White House, including, for instance, 220 million messages from the George W. Bush administration. The Federal Records Act, however, has not acknowledged electronic information. The first bill to do so, introduced into the House in 2010, is dead. For all 254 agencies within the federal government, if you can believe it, the current guideline for preserving records is "print and save." Electronic mail and electronic records systems are utilized, of course, but the legislation is not in place to require their use.

Every agency in the government, along with the White House, is using electronic records in a variety of modes, leading me to wonder whether we are losing our memory.

At the National Archives, we are creating the Electronic Records Archive. This facility will ingest all of the electronic records and email messages from government agencies and the White House. It will make those records available in perpetuity, just as the paper collection is, and open and available to the public twenty-four hours a day, from anywhere in the world. It is being tested now by thirty-five agencies and will be in full use by those agencies next year. My wish is for the agencies to recognize the importance of both the records they are creating and the systems by which that information will be saved.

Having grown up in university environments, I can tell you that the situation in the agencies is very similar to the situation on campuses, where records management is usually assigned to the most junior person in a department. It's a part-time job, or it's tacked on to a full set of other responsibilities. The

person in the position is poorly trained; there is a lot of turnover. In other words, not much attention is paid to the records. In the federal government, there is no job description for a records manager. The Records Management Council – the poor folks saddled with this responsibility – have never met with their counterparts on the information technology side, the Chief Information Officer (CIO) Council. The Records Management Council and the CIO Council might as well be in two different cities.

The very first joint meeting of those groups, to take place on October 20, 2010, at the National Archives, is a collaboration between the Chief Information Officer of the United States and me. I am confident that we will make progress. That said, a report the Archives released at the end of September, which was based on a self-assessment by government agencies, showed dismal results. Of 254 agencies asked to respond to a set of questions about where they are in terms of electronic records development, 80 percent reported that they are at moderate to high risk of not being able to save electronic records adequately.

Marjorie M. Scardino

Marjorie M. Scardino is Chief Executive of Pearson PLC. She has been a Fellow of the American Academy since 2010.

Given that the more learned members of this panel have discussed the arc of history and its preservation, I want to focus my remarks on what I see as history's first draft: newspapers. Over the life of this republic, newspapers have played an important part in educating us as citizens. The impact the digital world is having on citizenship relates to the way newspapers themselves are transforming.

It used to be said that freedom of the press belonged only to those who owned one. Now, a large portion of the world does.

The last couple of years have witnessed a feverish amount of talk about the death of the newspaper. Though possibly a little premature, I think that prediction is pretty solid. If you are referring to that thing on paper that's folded and presented to you every morning without fail, then I agree with the prediction. But if you mean the function of the newspaper, the idea of a newspaper, is becoming obsolete, then I can't agree.

But if you try not to call it a newspaper, if instead of calling it the pejorative "newspaper," you call it "a report of everything that has happened in the world and what it means to you today," then that sounds pretty crucial. In fact, it seems to me it's never been more important. It's just that it has changed form.

It used to be said that freedom of the press belonged only to those who owned one. Now, a large portion of the world does. With access to a computer hooked to a network, we have virtual printing presses. We have the ability to create our own newspapers – our own reports of what is happening in the world that is meaningful to us. We can blog it. We can tweet it. We can put up our views for our thousand friends on Facebook. We can make videos and podcast them or post them on YouTube. We can send broadcast email messages with curated links. There is an astonishing number of ways for people to create their own newspapers.

I believe we choose such a path for our news, as many people have, because we trust our circles of friends, our informal networks, and our particular sets of sources. We trust our friends and acquaintances because we have experienced their level of expertise and can take a bead on what they do or do not know. We trust some bloggers we have read for a while because we know they aren't raving loons. In short, we have chosen who to trust and who interests us.

Individually created networks and aggregations can be effective. They can give us a multidimensional view of the world that might not be available to us otherwise. They are arguably much better than having just one source, even if that source is *The New York Times* or the *Financial Times*. They also force us to roam around and test views.

Yesterday I was speaking with Jim Leach, Chairman of the National Endowment for the Humanities, who mentioned a study showing that people who create their own news services by looking at various sources click on not only the sources sympathetic to their views, say, the right-leaning websites, but also the left-leaning ones. We don't

often see this kind of experimentation by citizens today.

But is this sort of news gathering adequate to inform citizenship? For that, I think they have a couple of problems being able to sustain democracy, help construct a national story, and provide information we can trust:

We have to work hard to figure out which sources to trust, and that requires either longitudinal experience with a source or a lot of digging.

1) News in that form – with many voices and inconsistent protocols for reporting – leaves all the refining and authentication to us, the individual consumers of news. We have to work hard to figure out which sources to trust, and that requires either longitudinal experience with a source or a lot of digging. It's probably a good exercise for us as citizens to validate our own information.

2) But the fact is, most of us don't have those skills, that kind of time, or the right perspective. For instance, almost all the reports and analysis we can gather are pure opinion, not fact. Democracy is based on the idea that all opinions have equal weight. But the ones that generally enlighten us, that underpin and convince us to approve of those opinions, are based on facts, which are much harder to come by than opinions.

a) First of all we have to find them, and then confirm them, often at their primary sources.

b) Then we have to look for the patterns in that kaleidoscope of information. The facts may be nothing more than amusements if they can't be mapped into a concept – a useful context – to help us solve problems or take action.

c) Then there's the publishing piece – disseminating our conclusions to others, because networks demand to be fed as well as to be consumed. At one time, distribution was costly. But getting material out to others has become very easy to do.

Independent news-gathering works if we take seriously the job of confirming what is trustworthy, and if we take the time to discern meaningful patterns. But there is a higher hurdle to clear, and a much more complicated one. That is, are the individual networks that we create and that define our news able to achieve their task? Are they able to scrutinize the power structure and the people who inhabit it? Can they goad us into action and help us bring reforms to our society and our government – the type of reforms that have taken us along as a democracy for so many years? That is the fundamental task because that, most of all, is the power of citizenship: to be free, able, and willing to start a movement that fundamentally changes the premises of a government.

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In a recent article in *The New Yorker*, Malcolm Gladwell posed the question: can Internet-devised services help create a political movement? He concluded that the loose ties made through Internet sources are not strong enough to inspire social movements that truly change governments and policies. He centered his story on the 1960 lunch counter sit-ins in North Carolina, which began when four good friends decided in their student dorm room one night that they were going to create a movement for civil rights; they were going to sit in at the Woolworths in Greensboro until they were served.

That protest started a monumental change around the country. Within two weeks, those four young people had inspired similar sit-ins by seventy thousand people, primarily in the South. Gladwell's premise was that the four people who undertook the first

sit-in knew it would be physically, emotionally, and intellectually dangerous, but they also could be certain that they would support each other. They had strong ties and knew they all were committed to the concept; therefore, they were able to bring about the sort of change that took courage. Gladwell interviewed many of the people who had participated in the movement. Roughly 25 percent had joined merely because they heard about the idea, and that 25 percent generally checked out of the movement fairly early. His point was that while social networks are good at creating participation, they do not create the strong, cohesive motivation needed to drive an important movement.

Gladwell's article also talked about recent network-based political movements in Moldova and Iran that reportedly were sparked by online or mobile Internet connections. According to his work and to others who have reported on the topic, what happened in those movements, particularly in the Iranian movement, was that American and English-speaking journalists sorted through the blogs and tweet posts, most of which were in English, and picked out what was going on. However, if the movement's co-ordinators were using Twitter to mobilize, the posts should have been written in Farsi. Gladwell concluded that the movement within Iran in fact had little to do with social media.

Gladwell's message, and the message I propose, is that when the status quo absolutely must be changed, loose connections don't work very well. Members of these kinds of networks don't have the real motivation to put their lives and livelihoods on the line. There are enough ties to pass the word, but those ties are not strong enough to get people to mount the barricades.

Gladwell stated it this way: "The instruments of social media are well suited to making the existing social order more efficient. They are not a natural enemy of the status quo. If you are of the opinion

Information and understanding about the world is what provokes us to sacrifice. Public journalism exists to help people who themselves can't scrutinize power structures with much effect.

that all the world needs is a little buffing around the edges, this should not trouble you. But if you think that there are still lunch counters out there that need integrating it ought to give you pause."

Information and understanding about the world is what provokes us to sacrifice. Public journalism exists to help people who themselves can't scrutinize power structures with much effect.

I was not told to have three wishes; I was told I had to have three solutions. But what I have are merely a few general suggestions:

1) First, information and understanding about the state of the world – the world of our immediate circumstances – mostly provokes us to sacrifice, and it ought to be considered when we think about citizenship. We must educate people to be citizens. In Britain, the schools teach citizenship as part of the required curriculum. Perhaps citizenship learning should start in earnest in the sixth grade. It should be aligned to history; it should talk about the effects of citizenship on history; and it should address the rights and responsibilities of citizenship, tell how citizens can get help and information, and how they can connect with other citizens to create a movement. We rarely refer to ourselves as citizens, yet we should begin to believe that of all the goals we have in life, being a good citizen is near the top of the list. Talk about it, use the word, exalt it.

2) Second, we should teach technology education for older citizens. Some people who are over a certain age tend to be defensive
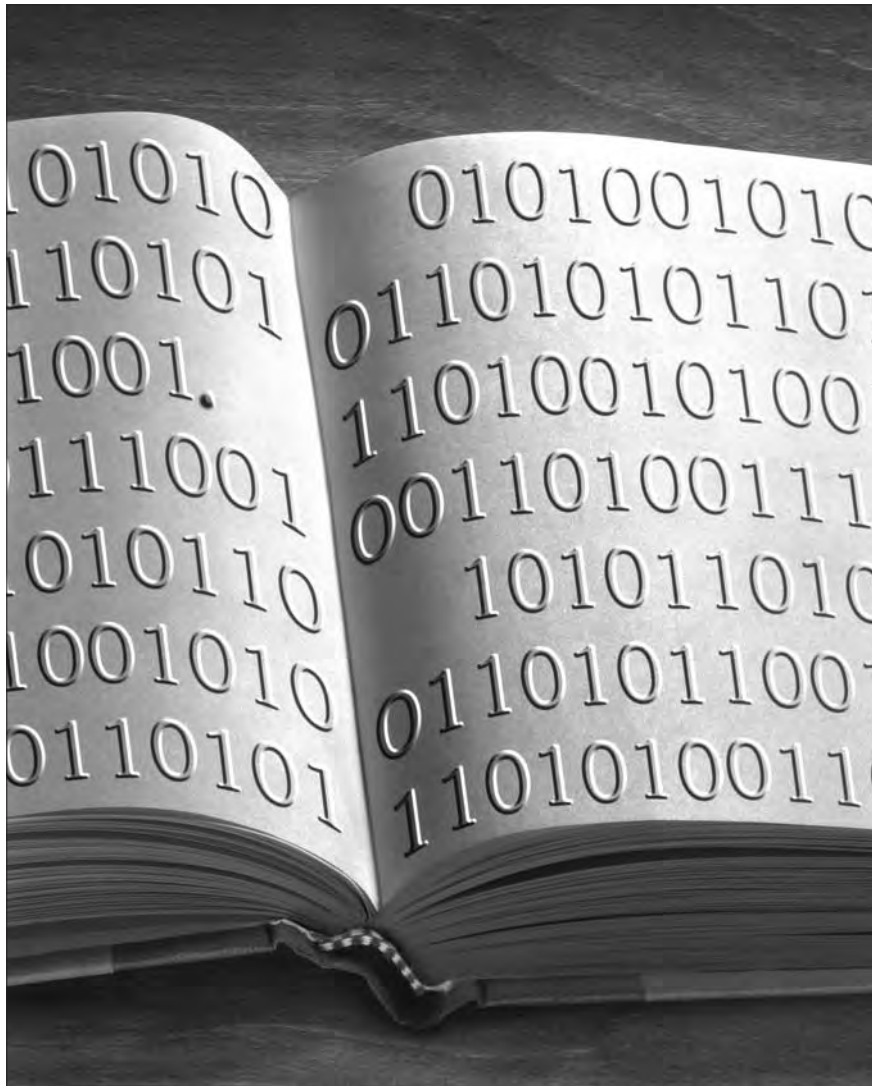
Image © Lester Lefkowitz/Corbis

Discussion

Paul Sagan

David, you talked about losing our cultural memory. On the other hand, in a world of social media, almost everything we do seems to be recorded and may never go away. Legal scholar Jeffrey Rosen wrote recently in *The New York Times Magazine* on the fear of the end of privacy. How do you reconcile those two sides?

David Ferriero

I am often asked this question, especially with regard to presidential email. The theory is that only those email messages that are declared records – the official business of the White House – are true records that

The world of professional news-gathering is changed. We need to look for ways to authenticate that news-gathering, for newspapers, which are not immune to prejudice and subjectivity, as well as for all the sources we find on the Internet.

about the fact that they are not on Facebook, or that they don't want to use a BlackBerry. The statement "I don't use a computer" is generally stated in a righteous tone, and I hear many people say it. But we need to boost those people over the digital divide, because there are benefits. It is not always a divide between the rich and the poor; it is a digital divide among the generations. Helping citizens access all of the available technology, and helping them use it better, will make it more useful for everyone.

3) Finally, the world of professional news-gathering is changed. We need to look for ways to authenticate that news-gathering, for newspapers, which are not immune to prejudice and subjectivity, as well as for all the sources we find on the Internet. In the

United Kingdom, we have the Media Standards Trust, a small organization that has been funded by a couple of the foundations represented in this room. The website journalisted.com, a project of the Trust, posts journalists' stories by point of view and topic to make transparent journalists' outlooks or prejudices. The Trust is also authenticating stories with its own version of the Good Housekeeping Seal of Approval. If we hope to make sense of all available information, we need to have this kind of help in sifting through the many sources of news. Teaching citizenship; initiating technology education for citizens; and developing means to determine quality and objectivity: those are my three, if not solutions, then at least wishes.

should be saved. I would argue that we should save all email messages. Everyone who uses email knows that it combines personal and business correspondence. Why force a human, or a machine, to make decisions about what should and should not be considered a record?

I am concerned about the research scholar one hundred years from now who wants to know how technology was being used in the White House during past administrations. If we do not have access to all that content, then we will not be able to provide an answer. We should keep as much as we can.

Paul Sagan

We have a different method in Massachusetts. All executive branch email messages are kept, and what happens in the legislature is not subject to disclosure and can be deleted. The legislature voted and decided

I would argue that we should save all email messages. Everyone who uses email knows that it combines personal and business correspondence. Why force a human, or a machine, to make decisions about what should and should not be considered a record?

that while the governor and the executive branch should be held completely to task, it is important for legislators to be able to have private discussions. Be that as it may, this arrangement may or may not be fair.

Bob, you have made a very bold proposal for creating access to everything. There are others who would subsidize access through advertising, or perhaps some other model in the future. Can both initiatives evolve at the same time – and let the best one win – or, if we do not move more quickly on the academic and the public initiatives, is there a risk of being overtaken by commercial endeavors?

Robert Darnton

Certainly, academic and commercial digitization projects can be developed simultaneously. Every major research library has important digital projects. Research at Harvard found that twenty-one countries are developing a national digital library that is at least in its embryonic stage. We even

found one about to be born in Mongolia. Digitization is a major development; it is not, as I put it, a utopian fantasy.

Meanwhile, of course, the ground is being occupied by commercial enterprises. Public and commercial fronts do coexist, but there is indeed a risk that the commercial enterprises will simply take over. They have the money, the technological skill, and some wonderful enterprises, but the basic goal and responsibility of, for example, Google Book Search is to make money for its shareholders. If you look carefully at the settlement that was developed between Google on the one hand, and the authors and publishers who sued Google on the other, you will find that it is full of all kinds of clauses that are going to restrict access to information. I'm a great admirer of Google, but I simply do not think that Google Book Search adequately fulfills the need of the citizenry to be informed and to have access to its cultural heritage. I think we need to digitize texts ourselves.

What is striking is its feasibility. One great thing about Google Book Search is that Google has shown it can be done. Certainly, all the foundations that gathered at Harvard last week seem to agree that a digital library could be financed. The technology is there; the money is there. Is the will there? That is the major question we face.

Paul Sagan

Marjorie, I'm sure, is concerned about responsibility to shareholders. In his talk on "A Free Press for a Global Society," Columbia University President Lee Bollinger referred to the monopoly business model that subsidized much of journalism for fifty years. Alex Jones at Harvard has referred to it as the subsidy for journalism, which has been shattered, if you look no further than Craigslist. What business models will dominate the next period of journalism?

Certainly, a digital library could be financed. The technology is there; the money is there. Is the will there? That is the major question we face.

Marjorie Scardino

Let me start with what I know best. *The Economist* and the *Financial Times* share one basic belief: that is, simply, the reader's money should always be balanced with the advertiser's money. We should never be more dependent on advertisers than we are on the people who read the publication. That policy has given us a wide space in which to work. In a challenging environment for advertising, we have found other ways to be more dependent on our readers. The premise is that if your news organization or blog is something that people really want or need, and you need money in order to sustain it, then they will pay you for it. We've certainly found this business model to work with the *Financial Times*.

I don't believe that public funding is a viable model. The government that we have is the media's main object of scrutiny. If the government is funding journalism, I do not believe the media will be able to preserve its objectivity.

Other models that have worked over time are those that set up a trust. The Poynter Institute, for example, owns controlling stock of the St. Petersburg Times Company. The newspaper changes hands without any kind of formal gain, and money is directed toward training journalists at the Institute. The trust is a good model, but it's not sustainable if the newspaper doesn't make enough money to keep it going. Similarly, *The Economist* has a trust so that no one can fire the editor – not the chief executive or the board. Only a few trustees who do not have any economic interest at stake can

make that decision. That model works for independence, but depends on the free market to sustain it. Those are the markets I'd bank on.

Paul Sagan

Speaking as a former newspaper reporter, I do not see the economics of traditional print journalism as sustainable. I think you agree, the blogosphere is wonderful in many ways, but it lacks professionally trained reporters who do investigative journalism. As much as I admire the *Financial Times* and *The Economist*, I think we are moving into a digital world in which the professional journalist is (at risk of) becoming extinct. At the same time, we need some form of investigative, independent journalism. How will the free trade work, given that revenue-earners such as the want ads, which used to overwhelmingly finance newspapers, have now gone online?

If the government is funding journalism, I do not believe the media will be able to preserve its objectivity.

Marjorie Scardino

Our journalists do a lot of investigative work, and some put their work on blogs as well as on paper and online. We try to produce a dynamic paper that allows you not only to read the summary in the paper but also to read deeply into contributors' blogs or other sources. Everyone in the paper is involved in working on creating this, and then using electronic means to disseminate it. Commercially, it would be preferable not to have to print a pink paper and deliver it to a half-million people around the world every day. We certainly could sustain investigative journalism via electronic dissemination.

One of the problems with newspapers and journalism is that monopoly proprietors took all of the margin they made; they did not reinvest it in anticipation of the next wave of journalism. That said, there is plenty of professional journalism to be had as long as we can pay people to do it.

Question

Marjorie, you mentioned that government needs to be scrutinized by the media, but it seems more and more that business, which often has a significant role in government activity, needs to be scrutinized as well. Yet it is business that, through advertisements, funds much of the press. How do you balance this reality if you would prevent the government from helping fund journalism?

Marjorie Scardino

The journalist's job has always been to afflict the affluent in one way or another, and I agree business is more often the target than government right now. But the basic tenet of every great journalistic organization is to be indifferent to the reaction of advertising. I don't know any great newspapers that have failed to stand by that tenet. A big IBM advertising spread in the middle of the newspaper doesn't mean that the paper will refrain from criticizing IBM on the front page.

Government has more power. Government has the power to strike your license; in theory, it has the power to stop your delivery. It has all kinds of powers that the law would withhold from private business. In that way, I think that newspapers were initially set up to scrutinize government, and I think that is still their largest and most difficult job.

Question

Two factors seem to have led to the huge growth of redundancy in email correspondence. One is the Listserv, which sends the same message to maybe hundreds of thousands of people. The other is that when you hit the reply button, you often send not only your message, but the preceding four hundred messages. These exchanges make the idea of saving everything seem counterproductive. Is it feasible to find a way to preserve only the nonredundant information?

I think we are moving into a digital world in which the professional journalist is (at risk of) becoming extinct.

Paul Sagan

Software actually solves that problem through de-duplication technology. It keeps one copy of each thread because it is expensive to store things, despite decreases in storage costs. It keeps the original pieces and deletes the redundant pieces.

David Ferriero

The more complicating factor is email attachments. We started collecting email messages in the Reagan White House, and the software to read those attachments doesn't exist anymore. In the Electronic Records Archive, we have created the facility for the system to recognize the nature of the attachment and use a plug-in that will translate the file into something that can be read today.

Question

I have two questions for Bob Darnton regarding academic publishing. The first relates to quality. Today, there are two modes: the open access mode and the traditional pay-for-access mode. My experience with the latter is that some of the long-standing journals commit a great deal of time and effort to upholding the quality of the journal through heavy edits of articles and modern authentication technology like CrossCheck to eliminate plagiarism. Plagiarism is be-

coming an increasingly important issue, as plagiarists are able to download articles online, cut and paste from them, and submit them to journals. We are seeing this phenomenon on editorial boards.

Second, with regard to open access, you mentioned transferring the cost to publish the article from the consumer to the producer. For scholars who work at Harvard, that may be easy to do, but how would the system work at a university that is not well funded, or in a country where the cost of, say, $1,500 to publish an article in an American journal may be prohibitive for some people? Can you address those issues?

Robert Darnton

The most successful open access journals, notably those in medicine, such as the archive PubMed Central, have funds set aside for contributors who cannot pay the publishing fees, including provisions for scholars in other countries. The economic cost varies from discipline to discipline. Many scientists automatically receive a publishing component in research grants.

The basic tenet of every great journalistic organization is to be indifferent to the reaction of advertising.

The point is that this model should travel, and it is traveling. We've created an organization known as CORE, to which quite a few universities now subscribe. The transition cannot happen overnight, but as the number of open access journals increases, the center of gravity begins to shift. With a cooperative effort, we can cover the costs of subsidizing the production end, as is happening in fields like physics and the health sciences. As this model becomes widespread, the whole terrain will likely shift so that monopolistic price gouging will gradually disappear.

Newspapers were initially set up to scrutinize government, and I think that is still their largest and most difficult job.

Now, that may sound pious and far-fetched, but when we look at hit rates for open access journals, it becomes clear that they are consulted so widely that the sheer prestige attached to famous journals like *Cell* and *Nature* will not be enough to sustain them. We have to address this problem as well, but the solution is not simply that such resources will be a luxury for the more well-endowed universities. The collective effort that is already being made shows considerable promise.

As to quality, we need top experts to serve on the editorial boards of open access journals. We need more advocates like Harold Varmus, who has led the way in obtaining support from top scientists for open access journals. There is a ways to go, but it is happening. ■

Cybersecurity and the Cloud

Vinton G. Cerf, Richard Hale, and Raymond E. Ozzie
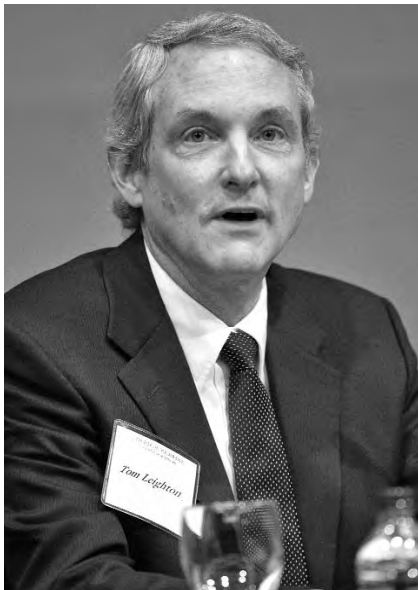*Tom Leighton, Moderator*
Introduction by Neal Lane

The 1960th Stated Meeting, held at the House of the Academy on October 10, 2010

Introduction by Neal Lane

Malcolm Gillis University Professor, Professor of Physics and Astronomy, and Senior Fellow of the James A. Baker III Institute for Public Policy at Rice University. A Fellow of the American Academy since 1995, he is Cochair of the Academy's Council.

Tom Leighton, Cofounder and Chief Scientist of Akamai Technologies, will lead our panel discussion on Cybersecurity and the Cloud. He is also Professor of Applied Mathematics at MIT and has been a member of MIT's Computer Science and Artificial Intelligence Laboratory since its inception in 1996. A preeminent authority on algorithms for network applications, he holds numerous patents involving content delivery, Internet protocols, cryptography, and digital rights management. From 2003 to 2005, Dr. Leighton served on the President's Information Technology Advisory Committee, during which time he chaired the Subcommittee on Cybersecurity. He is a Fellow of the National Academy of Engineering and the National Academy of Sciences, and he has been an active Fellow of the American Academy since his election in 2003. He serves as a member of the Academy's Trust.

Tom Leighton

Tom Leighton is Professor of Applied Mathematics at the Massachusetts Institute of Technology and Cofounder and Chief Scientist of Akamai Technologies. He has been a Fellow of the American Academy since 2003 and serves as a member of the Academy's Trust.

Here to discuss cybersecurity are senior leaders from three of the most powerful institutions in the world : Google, Microsoft, and the Pentagon. Both Al Gore and our first panelist, Vint Cerf, are Fellows of the American Academy ; only one of them invented the Internet. Vint is well-known as a father of the Internet because of his pioneering work on the architecture and basic protocols that make the Internet what it is today. In recognition of his contributions, he has received every possible prize, including the Turing Award, the National Medal of Technology, the Presidential Medal of Freedom, and the Japan Prize. Vint is currently Vice President at Google, where he also has the title Chief Internet Evangelist. He was elected a member of the American Academy in 1995.
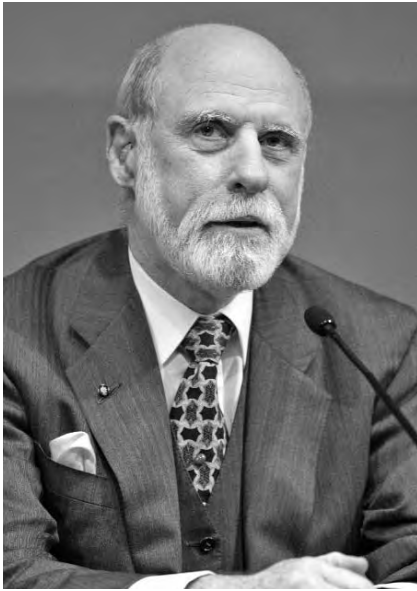
Next to Vint is Richard Hale. When it comes to cybersecurity, Richard is fighting on the front lines. As the Chief Information Assurance Executive for the Defense Information Systems Agency, Richard oversees cybersecurity for the agency that runs all the networks for the Department of Defense (DOD) and the military. He is responsible for coordinating the design and implementation of a defense-in-depth strategy to ensure that DOD communications and information remain secure against cyberattack. So when the bad guys are trying to steal our country's secrets, Richard's job is to make sure they are not successful. This is obviously an enormous, and enormously important, task.

The third member of our panel, Ray Ozzie, has founded and led several successful high-tech companies, including Iris Associates, where he created Lotus Notes and led the development team. He now serves as Chief Software Architect at Microsoft, where he directs technical strategy, product architecture, and development of the company's next-generation software services platform. He was elected a member of the American Academy in 2010.

We have decided to divide our discussion into two parts : the first will deal with individual privacy and security ; the second will focus on corporate and government security, with particular attention to military uses of the Internet, both offensive and defensive. We will start each topic with a brief statement from the panelists, then we will have a discussion with questions from the audience.

Individual Privacy and Security

Vinton G. Cerf

Vinton G. Cerf is Vice President and Chief Internet Evangelist at Google Inc. He has been a Fellow of the American Academy since 1995.

Maybe I should start by reminding everyone what Scott McNealy, cofounder of Sun Microsystems, said some time ago: there isn't any privacy anymore; get over it. I hope that is not true. But I think we are now in an environment where security is hard to come by, and privacy is equally beleaguered.

On the security side, I tend to think of the current Internet environment as comparable to a very complex ecosystem. It is not centrally controlled; it is made up of a wide range of organisms and institutions. The equivalent of DNA, the software that allows the Internet and its components to interwork is also quite varied; it is not all stemming from the same source. As a consequence, assuring any kind of security is difficult.

When Internet design was first being formulated, I was not thinking much about the future enterprise use of it. At the time, I thought every computer would have to defend itself, not unlike the telephone system, whereby any instrument can call any other instrument. I foresaw a similar system for computers on the Internet: any computer would be able to send traffic to any other computer on the Internet, but if one computer did not want to communicate with another, then it did not have to. That view did not anticipate the denial-of-service attack, which is the classic problem of someone overwhelming your computer, not with anything subtle but simply with too much traffic. On the other hand, it seemed like a reasonable tactic that you could use cryptographic means to authenticate the originator of the traffic and then reject it on the grounds that it did not match anything you recognized.

We have to build much more robust and resistant systems that are capable of protecting machines and their content. We cannot rely strictly on any external defense that is not implicit in the design of the devices themselves or their software.

As the Internet evolved, and as it entered the enterprise environment, the notion of firewalls and perimeter defenses came along. Yet in the end, I think we all have discovered that it is still the individual computer or programmed component that has to defend itself, because you can walk around the firewall with a virus-infected USB memory stick and thereby infect the interior of what should have been a protected perimeter. I think we have to build much more robust and resistant systems that are capable of protecting machines and their content. We cannot rely strictly on any external defense that is not implicit in the design of the devices themselves or their software.

Richard Hale

Richard Hale is Chief Information Assurance Executive at the Defense Information Systems Agency of the U.S. Department of Defense.

I will begin by telling a quick story. My father-in-law is retired from the military, so my in-laws get their health care through the military health insurance program. That also means they often receive health care at military facilities. When they have problems, we can visit any military-run hospital in the Washington area because the military has put medical records into the cloud. We can go into any of these hospitals, and all their test results over the last ten years are graphed. This centralization of test data is a fantastic development for care because you can spot trends.

From a privacy point of view, I want the people who are caring for me to have access to that kind of information. If we can broaden access, then there is an incredible amount of data for researchers to figure out what correlates with what, what works, and what does not.

At the same time, one of my jobs, and of my colleagues at the DOD, is to try to keep a secret. It turns out, when everything is connected to everything else, keeping a secret is an extremely hard task. What we are trying to do is figure out how to keep information within some community that needs access to that information. Yet it is difficult to define *community* with any precision because, in the example of health care, that could be anyone involved in my care or any legitimate researcher who needs access to my health information.

It is very hard to guarantee that private data will not be exposed. The tension between access, privacy, and security is a real challenge at the moment.

Given the technology fertility that Vint mentioned, and given the large number of people involved, it is very hard to guarantee that private data will not be exposed. And once exposed, whether by accident or maliciously, it is gone. The tension between access, privacy, and security is a real challenge at the moment.

Raymond E. Ozzie

Raymond E. Ozzie is former Chief Software Architect at Microsoft Corporation. He has been a Fellow of the American Academy since 2010.

Privacy and security are such nuanced topics, and in many cases, we become confused as to whether we are talking about the privacy of data – the information that we create and that we consume – and traffic analysis: looking at metadata or at the patterns surrounding how we do things and what we do. Both aspects are extremely valuable in different contexts and in different forms.

Many of us came into the PC industry before there was all this information flowing around on wires. Early on, many of us were very idealistic about how personal computing could lead to empowerment and how we could use technology to help individuals.

In the early PC era, we brought norms from the physical world into the PC world. Whether it was Apple with Macintosh, Microsoft with Windows, or Linux, we brought the feelings of trust and privacy from physical file cabinets onto your desktop. So even though Windows Update connected to Microsoft's services to keep Windows

functioning optimally, and even though every word you typed (if you were using our software) might have gone into Microsoft Office, we established a trust relationship that our software, even though it was connected, was not monitoring your keystrokes. As a result, users did not have to worry about what traffic analysis we were performing on the desktop, or what leakage of data may have been occurring.

For some reason, that basic relationship changed in a services world. As an industry and as users, we made a conscious choice to throw all that out the window, even though we could have brought the privacy and security norms from the earlier PC era into the service environment. Right now, we are moving into a world where everything that you believe you have exclusive custody of is being shared; indeed, you are putting it into joint custody with a service provider. This

Right now, we are moving into a world where everything that you believe you have exclusive custody of is being shared.

development raises two questions: What trust relationship do you want to have with your service provider? What are the regulations and who are the stakeholders that your service provider is subject to that you may or may not like?

For example, many people are unaware of the fact that Microsoft, as a service provider, is required to scan the images that are stored in our service. Even if we do not use the traffic or the data, we are obligated to monitor for such things as child pornography and to act accordingly if discovered. However, once we have built these monitoring capabilities into our services in order to fulfill one regulation, other regulators can come along, anywhere worldwide, and say, "Since you've already built it, why don't you use it for this other purpose?"

It is an interesting and different world that we are entering. For some reason, we feel that it is permissible in this world (right now, at least) to allow service providers, such as Microsoft, to change their terms of use by simply changing an end-user license agreement on a Web page somewhere. We are in only the early stages of creating the norms that will take us forward for many, many years. In my opinion – and it is a very unusual thing to say – we need to start thinking

Whether as a business or an individual, you should be suspect of putting all your data in one place or in one tool.

more about compartmentalization. Whether as a business or an individual, you should be suspect of putting all your data in one place or in one tool, of putting all your data online versus in a collection of duplicated memories, such as USB memory devices. In our current situation, you cannot implicitly trust any emergent online service.

I think we also need to become much more aware as a society of what we are walking into from a tracking perspective. Everyone probably is beginning to realize that every website he or she visits is leaving a trail of golden crumbs that entrepreneurs and businesses want to monetize in one way or another. But I do not think that people have an understanding of the degree to which, at least in the United States, webcams or security cameras are monitoring them. Recently it was estimated that in the United States, you are exposed to roughly two hundred recording cameras per day.

People do not talk about the fact that Bluetooth phones are being tracked. There are many tools and sites in existence that track shoppers through malls, from store to store. These tools know when you are a repeat visitor just browsing. These new mechanisms are creeping up on us, and I think we all could do society a favor by increasing the level of conversation about them.

As an industry, service providers are being required to put ports in our systems to implement snooping as a service for a variety of third parties. I would encourage open dialogue about how we implement such things, and conservatism in how quickly we race forward, because there are unintended uses of these systems and tools. Once they are integrated, insiders or other governments might use them. We do not yet know exactly how these tools will be used at the metadata or data level.

Tom Leighton

The privacy conversation involves the needs of the individual versus the needs of some collective, whether it is government or some entity trying to sell you a product. We all like personalization; for example, the location-based services on an Android phone, an iPhone, or a BlackBerry are very cool. The phone knows where you are, and it tries to tell you about what is around you. Sometimes it tells those people around you about you. In either case, the goal is to provide you with a better experience or to sell you something more efficiently.

Snooping as a service, including the business of wiretapping, stimulated a great deal of debate some years ago in terms of whether the government ought to have a snooping port in commercial cryptography. The technology had been the old clipper chip that some of you will remember, but wiretapping does not mean the same thing that it used to. Today when government or law enforcement wants to figure out what a bad guy is doing, it asks Microsoft to build monitoring into its system. Then, for a variety of reasons, that monitoring could be used by someone else for some other purpose. That other entity may not be a government, Microsoft, or even a Microsoft insider; there may be weaknesses that allow that monitoring to be used by almost anyone in the world. We need to consider what bounds we should set in enabling these kinds of services.

Vinton Cerf

The point here is that mechanisms that are well-intentioned, but that may not have adequate access control, can be used by others than those for which the devices were intended. The electronic cookie is a good illustration of how a tool can start out with good intentions and then morph into something more threatening.

Cookies, at least as used in the Internet context, started out as a very practical business issue. When I was at MCI in the early 1990s, we began to explore the use of the World Wide Web, and we built something called the MCI Mall (which ultimately was not a commercial success). We approached Netscape Communications to license their servers and browser software, which we then distributed so that people could access this shopping mall service.

Snooping as a service, including the business of wiretapping, stimulated a great deal of debate some years ago in terms of whether the government ought to have a snooping port in commercial cryptography.

I realized even then that I did not know how many people would use the service, and I was worried about the fact that the Web is a kind of stateless engine. I was concerned that people would get partway through transactions and then things would break, or they would abandon a transaction only to come back later. I did not want to have my servers swell with huge amounts of information, some of which might have no longer been of any use. Instead, I wanted to store whatever the state of the transaction was on the machines that people were using in order to access the service.

So John Klensin and I debated how to store the state of these transactions on the client's machine as an efficiency measure, because

Cybersecurity and the Cloud

Image © Lester Lefkowitz/Getty Images

everyone who came to the system brought with him a computer with memory, storage, and communication capacity. That is where the idea of cookies came from. I certainly did not anticipate the uses that we now see with various forms of cookies and tracking mechanisms.

Tom Leighton

You raise a fascinating challenge, and I would like to push you to suggest possible solutions. Ray and Vint represent companies that, because of their pervasive software and services, are capable of capturing a tremendous amount of knowledge and tracking by the individual user. In some cases, they use these abilities for the purposes of advertising or generating search results. The government,

of course, is not without its own power to collect information, and it does so for different reasons. As you made clear, there are unanticipated consequences of these abilities. How do we set up rules for use? Moreover, how do we set up rules in an international environment where other governments may have very different views about what is permissible in this regard?

Vinton Cerf

One aspect that often does not receive much recognition in discussions like this is that the decision to protect privacy is not merely a technical one; it is sometimes a decision made as a corporate policy. For example, a telephone company collects a huge amount of information for billing purposes: which

numbers were called, how long each call lasted, when the call was made, and so on. Such details are treated as protected information, but that is a corporate decision (one that may be backed by legal precedent).

In the case of Google, we consider much of the information we have to be private, thus we do not share it with anyone. We certainly use it, but as I have often tried to point out to people, we do not care about who you are. We care about patterns and about trying to match the patterns we see with the advertisements that may be of interest. Our theory is that advertising that is actually of interest is more likely to be perceived as information rather than annoying advertising.

Mechanisms that are well-intentioned, but that may not have adequate access control, can be used by others than those for which the devices were intended.

A company has to make a decision about what to do with the information it accumulates. Google considers that information to be private; therefore, we do not transfer it to third parties. Transparency – making sure that people know what kind of information is accumulated, what is done with it, and what they can do about removing it – becomes a very important element in the debate, resulting in the privacy dashboards and similar tools that Google and others are building. Emphasizing transparency is very important because it relates to the question of trust. You cannot have this kind of business unless you can establish a trust relationship.

Raymond Ozzie

The single biggest thing we can do is increase transparency. We need to explain how the tools we use work – how websites work in general – in terms that regular people can understand.

As an example of the challenge we face in improving transparency, consider Microsoft's Internet Explorer 8. The group that built the browser put in a feature that showed, very plainly, all the entities that had some degree of tracking ability when a user visited a particular Web page. The user could bring up a page, and the browser would concurrently show you, for example, multiple advertisers, an advertising network, a third-party tracking company, and an analytics company. The browser could provide this information for every page visited. This transparency is extremely scary because it overturns people's view that when they go to a website, it is only the brand of that website, and the site is taking responsibility for its actions. Instead, they see that there are many companies getting little golden crumbs from them.

Advertisers did not want this level of transparency, so there ended up being a middle ground, a private browsing mode that provides some of this information and allows you to block things – but it is not the default setting. As this example makes clear, the defaults and norms that we end up with regarding transparency will always be decided through some combination of what citizens want, what governments want, and so on.

There is a lot going on that people do not understand, but much of it is not for ill will; there are economic motivations, for example, behind certain actions. Still, there is a lot of data being accumulated, and many of the companies accumulating it are not as stable as, say, Microsoft or Google. When a company is in financial stress, suddenly it can relicense, changing the terms on the data that it has already accumulated and doing things with it that might not have been in the scope of their original intent.

Vinton Cerf

Furthermore, when a company goes into bankruptcy, some things are treated as assets that were not thought of as assets before.

Richard Hale

A lot of money can be made by understanding us better as consumers and citizens, so we are being tracked like crazy. The developments that allowed these tracking capabilities to flourish have sprung up very rapidly, and as yet there are no norms for them.

The DOD is tiny on the scale of the Internet, but it is still a big place. As we try to keep secrets, we try also to have some notion of accountability for access to information. Even though the DOD is maybe four million people, our task is easier within our smaller structure than in the vastness of the Internet. But extending our scope to include even just coalition partners, we increase the chance that secrets will not be properly kept.

Accountability, therefore, becomes imperative. It involves first coming up with norms and methods to evaluate the trustworthiness of an organization or individual. Then it requires transparency – being able to see exactly what is going on – in order to hold someone or some entity accountable to those norms. For individuals, we have implemented cryptographic identity credentials that are much stronger than things like passwords so that we can hold individuals accountable for access to private or secret information. Without getting into arguments about national ID cards and similar measures, I do think we somehow need to increase and improve accountability.

Vinton Cerf

However, I cannot help but observe that even agencies with the most secret of information run into the basic problem of needing to trust individuals. Some of the most serious security breaches have been a consequence of individuals choosing to release information: WikiLeaks, for example. No matter how hard you work on the technology side, you still have to trust people, which sometimes does not work.

Question

My question is not about access to secure data – data that are classified or ITAR (International Traffic in Arms Regulations) restricted data – but rather access to nonsecure data for academic and similar researchers working on 6.1 contracts with the DOD. I

Accountability involves first coming up with norms and methods to evaluate the trustworthiness of an organization or individual. Then it requires transparency in order to hold someone or some entity accountable to those norms.

have had a lot of experience with this in the last ten years, and I find that there is often an internal political barrier in terms of access to information. For example, JIEDDO (Joint Improvised Explosive Device Defeat Organization) might own sets of data (historical data) on insurgent activity, and it is willing to give the data to researchers who are directly connected to the organization. The Army Research Office might be funding a project to study the same kinds of activity, but it cannot get access to the data to put it in the hands of researchers it supports. I have seen this problem with the Defense Threat Reduction Agency and the National Geospatial Intelligence Agency. It is compartmentalization of unclassified data, and the barriers that are set up are impediments to those of us trying to do basic research. Could you comment on that?

Richard Hale

I have faced that problem as well, and it can be very situational. Often, data are thought to be somehow sensitive, and therefore are not made entirely public. What happened with the Internet is that everything began to be published by anyone in the world, with

everyone seeing everything. We frequently have debates about whether we would put anyone at risk by revealing information. With some of the data we collect – as we monitor the DOD networks for people trying to cause mischief, for example – we simply do not have the authority to give that data to anyone.

I do not have a good answer for you except to say that the government (at least the times I have been involved) struggles in good conscience with the question of whether it can release information. We all want to get better eyes on our problems, and thus releasing information is generally in the government's interest.

Vinton Cerf

I want to make another related observation; it is not specific to your problem, but it is related to the notion of privacy. We treat court records as public records, and there are a number of other things that we treat as public records. In my view, we have been satisfied to call them public records because, in the past, it has not been all that easy to access them. You had to show up at a particular building, get access to a filing cabinet, and maybe get somebody to reproduce the public record. When you put records in digital form and they are widely and instantaneously available on the Internet to two

Our concept of "public record" could easily morph, simply as a consequence of the environment in which those records now exist.

billion people, it is possible to argue that maybe they should not be public records because, for example, court cases have personal information in them, such as addresses and phone numbers. Our concept of "public record" could easily morph, simply as a consequence of the environment in which those records now exist.

Question

You talked about the importance of establishing a trust relationship with these large companies and the role that transparency plays in that. I think that is only part of the story, however, because the consumer has very little power here. When you turn on the browser and have this scary experience of discovering what is really happening, you have the choice as an individual to opt out of the game. But that has a tremendous disadvantage: the individual has no bargaining power. It seems to me that if we care at all about this trust relationship, it is going to take more than transparency.

If you go to a site like dictionary.com and look up a word, dictionary.com will tell the people trying to develop a behavioral model of you what word you just looked up. That is the degree to which you are being tracked by what I will call this conspiracy of websites. Should we worry about this situation, and if so, how could the debate be institutionalized, because we as individuals have no bargaining power?

Vinton Cerf

You mentioned one thing that I think is very helpful, and that is, it is not just the search engine companies that do this kind of tracking. Any website you go to is capable of putting a cookie on your machine and using it.

The fact that Internet activity is tracked does not necessarily translate into what is being done with that information. I would respond by saying that maybe we need to think seriously about how users can say, "I don't want to be tracked." Google is experimenting with just that, with private browsing modes and tools of that nature. People should not have to know so much in order to remove their "trackability."

Raymond Ozzie

Ultimately, there are some personal benefits for individuals, not just advertisers, that arise from tracking. I'm not sure how many of you have used the new version of the

Kindle, but if you highlight a given passage as you are reading an electronic book, it shows you that, say, thirty-five other people highlighted the section. At first, you wonder why that little squiggly has shown up under the text. But after a while, you come to appreciate the feedback that it is giving you. We are contributing that information and getting value out of it.

Ultimately, there are some personal benefits for individuals, not just advertisers, that arise from tracking.

This is a balancing of equities, and I think that transparency is step one. If people realize there is something going on, then they may become curious and want to know more. For example, if people knew there was as much Bluetooth tracking as there is, would there be legislation dedicated to this issue? I do not know the answer, but I think a general awareness of something like this would be the first step in determining actions or outcomes.

Corporate and Government Cybersecurity

Tom Leighton

Let's move on to our second topic, corporate and government cybersecurity, with time for more questions at the end. This topic is important to each of our panelists because every major corporation and branch in the military is the target of cyberattacks designed to steal its confidential information. Perhaps even more frightening is the recent Stuxnet virus, which affects control systems for utilities – nuclear power plants in particular. It has been speculated in the press recently that Israel and/or the United States may have been behind the Stuxnet virus in an attempt to derail Iran's nuclear program.

Every major corporation and branch in the military is the target of cyberattacks designed to steal its confidential information.

This speculation raises several interesting questions. For example, is the offensive use of cyberattacks by governments legitimate during peacetime? If so, what are the consequences? Are treaties and regulations needed, or even technically possible? Perhaps more important, now that a virus that affects control systems for nuclear power plants has been unleashed, how comfortable can we be that utility operations in this country are safe? Is a devastating cyberattack against the United States now really possible? If so, what can we do about it?

Raymond Ozzie

We are in the beginning of a significant transformation for all organizations. As I said before, with regard to individuals, we fairly rapidly brought the norms from the physical world, and a viewpoint of how we compartmentalize our information, to the online environment. Businesses are just beginning to embrace the notion of cloud computing: that is, taking many of the things they have done within their data centers and putting it online, relying on service providers to take care of it. They are putting their data in the custody of some other entity.

Each time that you analyze the risk model associated with how to manage the data in your systems, it becomes a bit more nuanced when you involve more and more third parties or more jurisdictions. For example, Microsoft, as a cloud computing provider, was well aware of threat models related to people watching and snooping online when data were flowing among our data centers. In the initial designs of our data centers, however, we were not thinking too much about the threat model that would require

us to protect our employees in countries where they, their employers, or their families could be threatened if they did not provide physical access to data to some local official who desired access. Many of these challenges can be addressed – for example, by using technology that makes data centers as disposable as possible or by using encryption technology – but the fact is we are in the early days of transition to these kinds of models.

There are differences in regulations between various countries: in terms of where their citizens' health records must be kept, where companies must keep their financial records, and so on. In many ways, this asymmetry resembles the asymmetry in crypto-regulations that existed a number of years ago. Some of it will simply take time to iron out, but we need to have more conversations around the issues.

Our entire infrastructure is under constant attack by a number of different classes of actor; that is something we just have to deal with as the nature of the environment. We cannot delude ourselves into thinking that we can achieve perfection, and we will have to find ways to channel resources systematically to keep the threat level down and to rally together to address emergencies as they come along.

The Stuxnet virus is a very interesting case. The nature of the virus is such that it assumes it is targeting systems that are not connected to the Internet. It assumes that the infection will somehow get to the intended device by someone casually taking something from a USB memory drive and then using it on a disconnected logic controller machine. Viruses are traveling by that model, but as an industry, we have not conceptualized updating our software so that it can transmit fixes to patch the systems by that same model. Stuxnet is causing a number of us to rethink the fact that everything really is connected: the keyboard controllers in the keyboards, the systems themselves, the firmware that is in them. There is no such thing as a disconnected system,

so from an architectural perspective, we have our hands full in terms of coming up with a solution.

Richard Hale

Having systems that we thought were disconnected but really were not goes back a long time. Early computer viruses were passed around on floppy disks; the computers were not yet connected, but there was a channel between them. Puzzling out what all those channels are, and trying to figure out how to control them, is part of our problem today.

Stuxnet is causing a number of us to rethink the fact that everything really is connected: the keyboard controllers in the keyboards, the systems themselves, the firmware that is in them.

One of my jobs, and that of my colleagues in the DOD who work on issues related to cybersecurity, is to make business processes dependable in the face of those who want to disrupt them. In other words, we want war-fighting to work even when someone is trying to interfere with the information or the information infrastructure. Sometimes this means being able to carry on in spite of a problem; other times, it is working very quickly to recover when a problem occurs. Whether fighting a war or doing relief work in Haiti, where we collaborate with nontraditional partners (Cuba and China, for instance), I want people on DOD missions to be able to depend on information and on the information infrastructure when someone is interfering with it. I think that cybersecurity problems with industrial control systems are closely related to this.

So I would suggest that dependability is an important aspect of security. We talked about trustworthiness earlier; now we are trying to figure out if we can depend on the systems that are exposed to this environ-

ment. At the DOD, we have a notion that materials and supplies the DOD buys for war-fighting need to work in a realistic operational environment: your tank has to be able to work properly even when people are shooting at it; it needs to be designed to handle whatever the threat. In general system design or application design, we do not yet have the notion that everything is hooked to everything else and that anyone can take a whack at us. Thus we have not gotten our heads around the concept that we need to build systems for a realistic operational environment. Every computer science department needs to teach realistic operational environment, all the time, or we are never going to have the dependability we hope to have.

The very basic issue here is our ability to design highly resilient systems that can defend themselves by recognizing what is acceptable and what is not.

Vinton Cerf

One way to characterize the problem is like this: the good thing about the Internet is that everything is connected; the bad thing about the Internet is that everything is connected. Much of the horsepower behind various forms of attack comes from laptops, desktops, and personal computers that have been penetrated. In the early stages of the Internet, when laptops and desktops were less prevalent, attacks were typically against large time-sharing machines, and they were fairly subtle attacks: a packet would be sent that led to a buffer overflow, causing code to be executed that should not have been, at a level of privilege that it did not deserve. Eventually, the operating system itself would be penetrated.

What is happening now in the evolution of the Net is that we have several billion devices online. Many of them are laptops, desktops, pads, and, increasingly, mobile phones. They use the World Wide Web as their principal means of interaction and of gathering data.

The Web works by allowing browser software to go to a particular machine on the Net, download a file, and then interpret and render it in some way. In the past, rendering involved only text and imagery, but today it might include Java script, Java code, Python, or some other high-level language. The sufficiently naive browser will simply interpret the code and do whatever it says – which may be something like "take this little piece of information, store it down here in the operating system, and change this file name to something else, and then do a few other little things." In the process, it compromises the machine.

Naive browsers and operating systems that allow browsers to operate at too high a level of privilege lead to a collection of infected machines that become part of the BotNet armies. We have work to do to make these machines a lot less vulnerable to this kind of attack. Once you have a BotNet army available, then you can do a lot of fairly bad things with it, including distributed denial-of-service attacks, which, independent of any subtlety, simply overwhelm the target and render it useless. The very basic issue here is our ability to design highly resilient systems that can defend themselves by recognizing what is acceptable and what is not.

Tom Leighton

One topic we have not covered yet is cybercrime. It is a very big business today and growing rapidly; it is estimated that industries are losing billions of dollars a year because of it. For all the problems we have with privacy, many of the protocols on the Internet protect the anonymity of cybercriminals. Is it possible to make the Internet safe, or are we stuck with cybercrime as a large and growing problem? To make it safe, do we face further loss of privacy on the Internet?

Richard Hale

We have to begin by making the Internet not as vulnerable as it is. In the ancient days of the Internet, everyone was a friend, and as a result, the basic underpinning of the

Internet did not consider that bad guys might exist in any deep way. This means there is now a lot of opportunity for mischief amidst the billions of people on the Internet, facilitated by anonymity and a lack of accountability. I think we need to increase accountability.

We have to begin by making the Internet not as vulnerable as it is.

We also need to improve the notion of identity. We can reduce cybercrime by making it easier for me as an individual to figure out whether a person is someone with whom I want to interact or trade credit card numbers. Right now, we get precious few reliable cues in that regard, and we need to fix that. We may not be able to trace back to the individual, but our efforts may dampen the ease with which bad guys can make money from cybercrime. We will not eliminate cybercrime by developing the appropriate social and technical mechanisms to deal with it, but we will reduce it to some manageable level. We will drive some of the opportunity out of the system.

Raymond Ozzie

Many of the attacks going on right now are, at their roots, social engineering attacks. For example, people might be confused about who has sent them an email message, but they click through anyway, get to a website, think that it is an authorized place to buy something (after all, it looks like a valid website), and supply their credit card information. The more successful the Internet is in terms of how far it is embraced in society for online commerce, the broader the attack area for criminals.

There is a lot of technology that we can bring to bear that we have not even begun to do yet. One of the beauties of now having a critical mass social network on the Internet is that we can give you hints while you are browsing as to whether the community believes this is a real website: infor-

mation on how many people have transacted on this website, and how many of your friends or friends of friends have done something on the website. We have figured out how to give people these sorts of cues in real life, such as getting a recommendation from a friend. I do not think that we have even scratched the surface yet in terms of the good things we can do with simple cues in our normal browsing activities on the Internet.

Vinton Cerf

I still think it is important that we be able to take actions and do things anonymously. On the other hand, I think it is extremely valuable to be able to demand strong authenticity of a party, if you feel the need for it. Take, for instance, a scenario in which I encounter Ray on some website. We do not know each other, but we begin to exchange instant messages. Somewhere along the line, Ray says he would like to borrow $250,000. Pretending that I have $250,000 to loan Ray, my first reaction might be, I think I need to know a little bit more about you; who are you besides this bank account to which you want me to wire money?

I think it is extremely valuable to be able to demand strong authenticity of a party, if you feel the need for it.

I can imagine asking Ray to supply me with a number of bona fides. He might send me a digitally signed object stating that he has certain assets and that he is prepared to repay me. At that point, I do not know for sure whether the things that Ray digitally signed are true, so I might turn to Richard, who, let's say, runs a service that keeps track of people's credentials. He can confirm for me that Ray has the assets that he claims to have.

My suggestion is that, as tools become available to enforce strong authentication, they do not necessarily need to be applied across the board under all circumstances; but they need to be available so that you can decide

whether you want to continue a transaction if you do not have a stronger sense of what is going on. I think of that as the analogue of the software that tries to be more resistant in the face of a highly corrosive environment. I do not see any other paths available to us in such a rich ecosystem that incorporates the general public, which is always going to have some element in it that is interested in doing things that are in some ways harmful to other citizens.

Question

As a professional who is involved in children's health care issues and as a father, one of the things that concerns me is the issue of what I call social cybercrime, involving bullying in the teenage years that children cannot get away from and that has resulted in numerous suicides. In spite of the privacy that is necessary, I wonder if there is a better way, at least for the under 18 age group, to track individuals who are involved in such social cybercrime: for example, by requiring some traceable log-in method.

Vinton Cerf

This sounds like a virtual cuff of some sort, akin to the ones we use for people on house arrest that feature a GPS receiver or a radio device to confirm their whereabouts. Let me respond by retargeting the question just a bit. One of the things your question suggests to me is the notion of auditing. This is different from painting a big mark on someone's forehead to indicate that he has been involved in cybercrime. But auditing could be very helpful, and a combination of auditing and strong authentication can help us, at least, detect that something has happened that is not acceptable. I would argue that we might find some benefit in that particular tactic.

For example, you are in a strange city and you have a health problem that is acute. When you get to the emergency center, you are probably less worried at that moment about privacy than you are about making

sure that everyone who is responsible for helping you recover from your health incident has access to all the information he or she needs. But it is also fair to say that after that crisis is over, you probably do not want all those people to continue to have access to all that information. It would be disappointing if it were the case that there were no way to provide ephemeral rights to access information.

The more successful the Internet is in terms of how far it is embraced in society for online commerce, the broader the attack area for criminals.

Thinking about mechanical devices or mechanical access control, what you want is the ability to authorize access to some information, but not necessarily forever. In the health care space, that would be another way to close down the potential for abuse. Credit cards have a similar character: they expire. One of the good things about the expiration of a credit card is that if it is being abused, it cannot be abused after it has expired.

Raymond Ozzie

I do not have a solution to the problem that you have stated, but the most effective tactic that I have seen to address those issues, as opposed to logging and auditing after the fact, is to have proactive members of the community identify and monitor the forums that are likely to be dangerous zones for kids. It depends on the direct involvement of a community participant, and it has been very effective in many of the online forums.

Vendors are in a very difficult position because, often, they create general-purpose tools that are subsequently repurposed. Furthermore, they cannot monitor every communication forum. In many cases, the community needs to become much more involved. Vendors can and should make warning buttons that signal inappropriate

content or that report offensive actions. But I would suggest that the solution is 80 percent social and community/20 percent technology, as opposed to vice versa.

There will continue to be all sorts of new types of communication and sharing tools, and there is not one mechanism to hit them all. For example, Chat Roulette, which was a fad a short time ago, was built by one person and took off like wildfire. The inappropriate things that happened in that environment could not have been controlled in the same way an online forum might have been. We have to stay on top of situations like this one and treat them as the community problem that they are.

Technologies do exist for strong authentication if we were to decide on that as the norm for dealing with a situation like online bullying.

Richard Hale

I would add only that technologies do exist for strong authentication if we were to decide on that as the norm for dealing with a situation like online bullying. Among other factors, our decision to pursue that norm might be influenced by the fact that we know bullying sometimes happens less when bullies know people are watching them and know who they are.

Question

It might be useful to think about the places where controls occur for cybercrime because, in fact, there is a real variety of problems out there. There is the person on eBay or Craigslist trying to sell you a Coach bag that turns out to be a piece of junk. In that case, it is just a breach of contract in a sense. Then there is everything from the theft of credit card information, to people raiding your bank account, to widespread Internet fraud, to child pornography.

It strikes me that some things may need to be done at the level of the ISP in order to facilitate government's ability to obtain a search warrant or to gain some sort of legitimate access. Could focusing on the ISP help with the challenge that cybercrime arises from a variety of places: sometimes at the website or the vendor level; sometimes through third parties? How do you decide on the optimal place for controls?

Vinton Cerf

I have a very visceral reaction to the idea of trying to control behavior and content issues at the low level of the ISP. Down there, where the packets are flipping back and forth, the packets do not know what they are carrying or how they are carried; the router has not a clue. If you care about content, you should be operating at a place in the architecture where content is visible.

Consider one approach that Google has tried. When Google crawls through the World Wide Web to build our index, we use a program that downloads each Web page and then scans it, trying to find all the hyperlinks and words on the page in order to build the index. Simultaneously, the program tries to detect whether there might be malware on the page. It is a program that is doing this, and so it is only as smart as a program can be – which is often not terribly smart. But whenever we find the possibility of malware on a page, we make a note of that.

When someone is using our search engine, if he attempts to go to one such site, we put up an interstitial Web page. It is bright red and warns the user that he may not want to go to the page because we think it contains malware. The user, though, is free to cut and paste the target into the browser address bar and go there anyway; we cannot stop that.

We have worked to set up an organization called StopBadware.org, which is a nonprofit spun out of the Berkman Center for Internet and Society at Harvard University. If someone complains that his website has been marked inappropriately, the StopBadware folks will carry out an evaluation. And

almost all of the time, there is something wrong, even though the party did not purposefully put anything on the page; it got there because security controls were not adequate.

A combination of auditing and strong authentication can help us detect that something has happened that is not acceptable.

I think you have to be very thoughtful about where you apply some of these controls. In some cases, the volume of things that go on is so high that it is impossible to predetermine a solution. YouTube is a good example: twenty-four hours of video are uploaded to YouTube per minute, and there is no way to keep track of all that. Therefore, the idea of warning buttons or notices, as well as takedown, is extremely helpful, because if the general population is capable of telling you there is a problem, then you can respond.

Raymond Ozzie

Google and Microsoft, as two vendors, clearly have scale issues that some service providers do not. The best suggestions that I have seen so far are, again, a combination of social, technical, and community mechanisms. There are certain things that are black and white: you get a takedown request because something is legally inappropriate, and we can take clear action in that case. But the volume of requests that we get that we really do not know what to do with is increasing. There are photographs or materials that, in one jurisdiction, in one country, in one nation or culture, are perfectly appropriate, but that in others are not. We are projecting our services out to the world, so dealing with takedown requests by various groups is a fairly challenging task. ■

Around the Country

Stanford

January 5, 2011 – Stanford University
Stated Meeting – The Future of Our Research Universities: Challenges and Opportunities
Speaker: John Hennessy

John Hennessy (Stanford University) and Paul Brest (William and Flora Hewlett Foundation)

George Shultz (Stanford University) and Persis Drell (Stanford Linear Accelerator Center)

San Francisco

January 6, 2011 – University of California, San Francisco
Susan Desmond-Hellmann, Chancellor of the University of California, San Francisco, hosted a reception for Fellows.

Susan Desmond-Hellmann (University of California, San Francisco) and Arthur Rock (Arthur Rock & Company)

Randy Schekman (University of California, Berkeley) and Richard Scheller (Genentech, Inc.)

Los Angeles

January 11, 2011 – UCLA Chancellor's Residence
Chancellor Gene Block and Mrs. Carol Block hosted a reception for Fellows from Southern California at their residence.

Fred Kavli (Kavli Foundation), Gene Block (University of California, Los Angeles), Geoffrey Cowan (University of Southern California), and Louis W. Cabot (Cabot-Wellington, LLC)

Gene Block and Carol Block

Los Angeles

January 12, 2011 – Residence of Aileen Adams and Geoffrey Cowan
Aileen Adams and Geoffrey Cowan welcomed Chairman Louis Cabot and a group of Fellows to their home.

Louis W. Cabot (Cabot-Wellington, LLC) and Geoffrey Cowan (University of Southern California)

Gordon Davidson (Mabery Road Productions), Kent Kresa (Northrop Grumman Corporation), and Geoffrey Cowan

Chicago

November 13, 2010 – Northwestern University School of Law
Stated Meetings – Reproductive Rights and CENSORED! – The First Amendment, Sex, and Obscenity
in collaboration with the Chicago Humanities Festival
Speakers: Geoffrey Stone, Reva Siegel, Gerald Rosenberg, Christine Stansell, Martin Redish, and Amy Adler

Geoffrey Stone (University of Chicago Law School) and Reva Siegel (Yale Law School)

Martin Redish (Northwestern University School of Law) and Amy Adler (New York University School of Law)

Midwest Regional Committee: Gerald Early (Washington University in St. Louis), Geoffrey Stone (University of Chicago Law School), Diane P. Wood (U.S. Court of Appeals for the Seventh Circuit), John Mark Hansen (University of Chicago), Leslie Berlowitz (American Academy), John Katzenellenbogen (University of Illinois at Urbana-Champaign), Emiko Ohnuki-Tierney (University of Wisconsin-Madison), Robert Wald (University of Chicago), François Abboud (University of Iowa Carver College of Medicine), and Robert Rosner (University of Chicago)

Around the Country

New York

December 8, 2010 – New York University School of Law
Stated Meeting – The University and the City
Speakers: John Sexton, Robert M. Berdahl, Jared L. Cohon, and Ruth J. Simmons
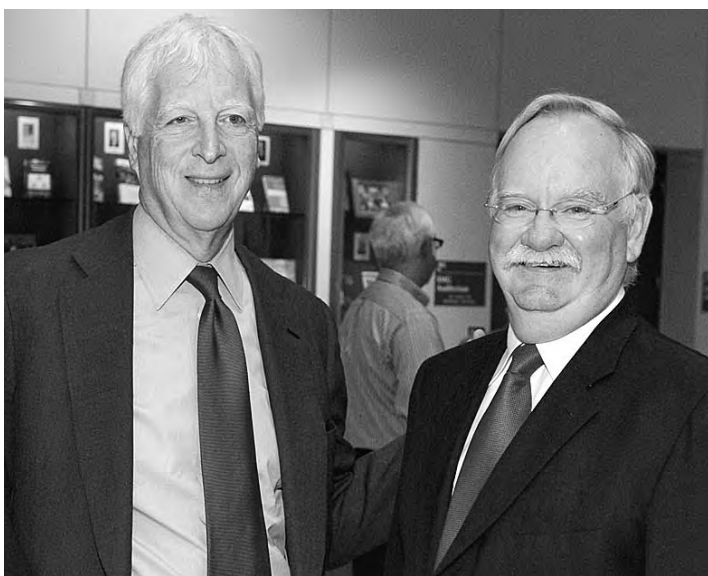

Robert M. Berdahl (Association of American Universities), Leslie Berlowitz (American Academy), John Sexton (New York University), Ruth J. Simmons (Brown University), Matthew Santirocco (New York University), Richard Revesz (New York University School of Law), and Jared L. Cohon (Carnegie Mellon University)

Boston

September 16, 2010 – Boston University
Stated Meeting – The Great American University
Speaker: Jonathan Cole

Jonathan Cole (Columbia University) and Robert Brown (Boston University)

Henry Rosovsky (Harvard University) and Jonathan Cole

Cambridge

September 27, 2010 – House of the Academy
Stated Meeting – Because It Is Wrong: Torture, Privacy, and Presidential Power in the Age of Terror
Speakers: Charles Fried and Gregory Fried

Gregory Fried (Suffolk University) and Charles Fried (Harvard Law School)

December 15, 2010 – House of the Academy
Stated Meeting – Holiday Concert: Celebrating the Music of American Academy Composers
Performers: Yehudi Wyner and Richard Stoltzman

Yehudi Wyner (Brandeis University) and Richard Stoltzman (New England Conservatory of Music)

Cambridge

November 10, 2010 – House of the Academy
Stated Meeting – The Financial Crisis & Economic Policy
Speakers: Robert M. Solow and Benjamin M. Friedman

John Y. Campbell (Harvard University), Benjamin M. Friedman (Harvard University), Robert M. Solow (MIT), and Peter Temin (MIT)

Science and the Educated American

Are colleges and universities adequately preparing students to be engaged citizens in an increasingly technological world? While fewer than one-third of American undergraduates major in the natural sciences, mathematics, or engineering, nearly all students take at least one science-related course in college. These courses vary widely and often do not give students – science and non-science majors alike – the level of scientific literacy they will need to make informed decisions about scientific or technical problems.

The essays in *Science and the Educated American: A Core Component of Liberal Education* describe specific courses and concrete strategies for curricular reform. They also offer spirited defenses of the value of science to the liberal arts curriculum.
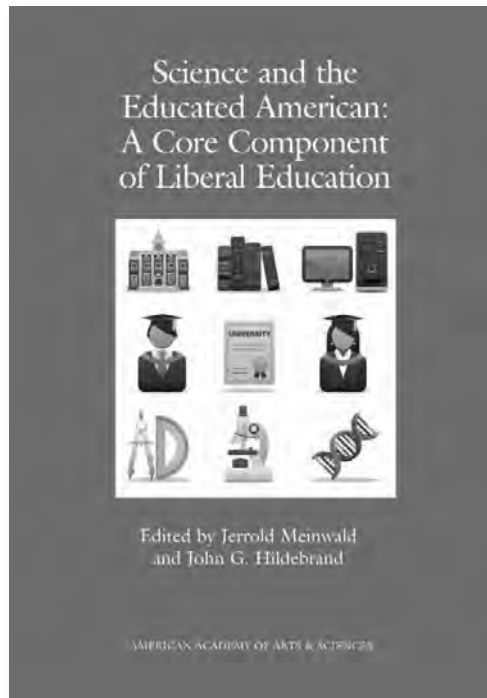
The articles in this volume identify several common themes:

- Twenty-first-century citizens must have a sense that scientific literacy is fundamental to full participation in and enjoyment of contemporary life.

- If members of the public do not have a basic level of scientific literacy, even the best science journalism and communication will not equip them with the ability to make informed decisions about science issues.

- Science courses belong in the liberal arts curriculum for the benefit of both science and non-science majors.

- The teaching of science to science and non-science majors should convey the limits of science and the dangers of misapplying it.

- Science and the humanities have much more in common than is generally appreciated.

Science and the Educated American describes ways to help institutions of higher learning instill a curiosity in students about science and an appreciation for its profound impact on everyday life. The volume examines the challenges of and opportunities for teaching science in a general education context and considers how to encourage non-science majors to gain a better grasp of science.

This volume is edited by **Jerrold Meinwald** (Goldwin Smith Professor of Chemistry Emeritus at Cornell University) and **John G. Hildebrand** (Regents Professor of Neurobiology at the University of Arizona, Tucson).

As Meinwald and Hildebrand note in their introduction, "If properly planned and taught, a curriculum enriched by a set of science courses that have been designed for all liberal arts students, independent of their major interests, would go a long way toward producing the scientifically literate, well-educated population that is essential for America to retain the leadership position it has enjoyed in the past."

Contributors to *Science and the Educated American* include: **Jon Clardy** (Harvard Medical School), **Diane Ebert-May** (Michigan State University), **Martha P. Haynes** (Cornell University), **Robert M. Hazen** (Carnegie Institution for Science and George Mason University), **John G. Hildebrand** (University of Arizona, Tucson), **Sally G. Hoskins** (City College of the City University of New York), **Chris Impey** (University of Arizona), **Darcy B. Kelley** (Columbia University), **Eugene H. Levy** (Rice University), **David R. Liu** (Harvard University), **Jerrold Meinwald** (Cornell University), **Jon D. Miller** (University of Michigan), **Jennifer L. Momsen** (North Dakota State University), **Richard A. Muller** (University of California, Berkeley), **Don M. Randel** (Andrew W. Mellon Foundation), **Frank H.T. Rhodes** (Cornell University), **Elena Bray Speth** (Saint Louis University), **James Trefil** (George Mason University), and **Brian N. Tse** (U.S. Department of Health and Human Services).

Science and the Educated American is available on the Academy's website at http://www.amacad.org/publications/scienceSLAC.aspx.

Academy Projects

Initiative for Science, Engineering, and Technology

Neal Lane

Neal Lane is Malcolm Gillis University Professor, Professor of Physics and Astronomy, and Senior Fellow of the James A. Baker III Institute for Public Policy at Rice University. He was elected a Fellow of the American Academy in 1995 and serves as Cochair of the Academy's Council. He also serves as Cochair of the Academy's Initiative for Science, Engineering, and Technology.

Charles Vest, of the National Academy of Engineering, and I are the cochairs of the Academy's Initiative for Science, Engineering, and Technology, which is an umbrella for Academy projects in the area of science and technology policy. One such project is an examination of how science is taught to non-science majors at U.S. colleges and universities, addressing such questions as, what are the goals of the science curriculum at liberal arts colleges? Are those goals appropriate? Are they being met? The study committee, chaired by Jerrold Meinwald of Cornell University and John G. Hildebrand of the University of Arizona, has worked in collaboration with provosts, deans, and faculty from institutions around the country. Later this year the Academy will publish a volume, *Science and the Educated American : A Core Component of Liberal Education*, that will include examples of the best practices and recommendations for higher education leaders.

Another project flips on its head the much-studied topic of the public's understanding of science. The Academy study considers the reverse : scientists' understanding of the public. The point, of course, is that the capacity of scientists to secure funding for their research and to provide scientific advice that policy-makers will pay attention to depends on an understanding of the social implications and the likely public responses to their work and to the policies that might result, in areas such as health and medicine, for example. Through a se-

By drawing on experts from virtually all academic disciplines as well as leaders in the professions – public affairs, journalism, the arts, and business – the Academy examines issues from a multidisciplinary, cross-institutional perspective.

ries of case studies, this project brings together scientists, journalists, policy-makers, and others to explore these issues. This summer, the Academy published *Do Scientists Understand the Public?*, a paper by author Chris Mooney that describes some of the project findings. It generated a great deal of press coverage and conversation in the science blogosphere and elsewhere.

A related, recently completed Academy project explored the role the media play in informing the public about the scientific and technical components of pressing challenges facing society : climate change, energy, national security, health and medicine, to name a few. This study was led by Donald Kennedy, president emeritus of Stanford University and former editor-in-chief of *Science*, and Geneva Overholser, director

of the journalism program at the University of Southern California. By convening a group of scientists, science journalists, and public information officers, the Academy examined the sometimes conflicting cultures of journalists, who value timeliness, speed, simplicity, and clarity, and scientists, who grapple with and embrace nuance and evolving states of knowledge. The project resulted in an edited volume, *Science and the Media*, which was published earlier this year ; this volume and all other occasional papers published by the Academy are available on the Academy's website (www.amacad.org/ publications/occasional.aspx).

Another project under the Initiative focuses on the future of the Internet, and David Clark will talk more about it a bit later in our program today.

The Academy is well suited to take on the work of these projects (and many others) because of its independence, which gives it the latitude to explore issues that the Fellows believe are important to pursue and that some other organizations might not be interested in or willing to take on. The second distinctive feature of Academy studies is their interdisciplinary nature. By drawing on experts from virtually all academic disciplines as well as leaders in the professions – public affairs, journalism, the arts, business – the Academy examines issues from a multidisciplinary, cross-institutional perspective.

In 2008, the Academy organized just such a cross-disciplinary group to assess Alternative Models for the Federal Funding of Science. It was chaired by Nobel Laureate and chemist Thomas Cech, who headed up the Howard Hughes Medical Institute before returning to research and teaching at the University of Colorado. There are regular calls from many quarters for more federal funding of research. The Academy committee began its work with a different question : regardless of the size of the pie, what strate-

gies can we adopt to maximize the impact of the government's extensive investment in research? After twelve months of work, the Academy produced a report, *Advancing Research In Science and Engineering,* which has come to be known as the ARISE report.

In answering the question of how to make federal support for science more effective, the committee chose to focus on just two primary issues: support for early-career investigators and support for high-risk, high-reward (sometimes called transformative) research. There isn't time this morning to give a detailed summary of our findings and recommendations, but I encourage you to have a look at the report on the Academy's website. (There are hard copies available, too.) The significant thing about this report was the enormous impact it had in Washington. And not all such reports – many of you know this from personal experience – can boast having had such impact.

For example, targeted funding for earlier-career investigators and transformational research was contained in the stimulus legislation that Congress passed and it was in the 2009 budget. The same was true for President Obama's first two budget requests. In each of the past two years, the directors of the Office of Management and Budget and the Office of Science and Technology Policy, where I once had a desk, sent a memorandum to all executive branch departments and agencies underscoring the White House commitment to these priorities. And during the past two years, several agencies – the National Science Foundation, National Institutes of Health, Department of Energy, DARPA, and other key science and technology agencies – have strengthened existing programs to focus on these areas. (I might note that it was fortuitous that Steven Chu was a member of our committee. It was not a recommendation of our report, but the President appointed him Secretary of Energy.) The Academy was not the first organization to raise the issues explored in ARISE, and at least two federal agencies,

the NSF and NIH, have been struggling with them for a very long time. But it is clear that the ARISE report helped get the attention of top-level policy-makers.

In carrying out the study that led to the ARISE report, we recognized that there were important matters we were not able to address. Thus, the Academy has organized a second phase of the ARISE project, which Venkatesh Narayanamurti will describe. ■

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The Impacts of Federal and Industry Funding of Science, Engineering, and Medicine on American Universities – ARISE II: Overview

Venkatesh Narayanamurti

Venkatesh Narayanamurti is Director of the Science, Technology, and Public Policy Program at the Belfer Center for Science and International Affairs at the Harvard Kennedy School. He is also the Benjamin Peirce Professor of Technology and Public Policy and a Professor of Physics at Harvard University. He was elected a Fellow of the American Academy in 2007 and serves as a member of the Academy's Council.

As you just heard from Neal, two years ago the Academy began a study to explore the current models for the federal funding of science, under the leadership of Tom Cech. Neal was one of the committee members who shaped that study and has been a tireless advocate for its recommendations. I think he deserves a lot of credit for its success.

About a year ago, Neal and I, along with Leslie Berlowitz, President of the Academy, Randy Schekman, from the University of California, Berkeley, who was also a member of the study committee, and Keith Yamamoto, of the University of California, San Francisco, began to think about the next phases of the ARISE study to address some of the initial report recommendations. In particular, we focused on the committee's conclusions that research universities must

accept a greater responsibility for faculty salaries and that they should shoulder a larger share of the cost for new facilities. (Some of you may have read "Overbuilding Research Capacity," an editorial in *Science* by Bruce Alberts. This issue is a very serious one at medical schools but also at some engineering schools.)

As the relationship between engineering, biology, medicine, and the physical sciences becomes increasingly important, we also recognized the need to bring the medical and engineering communities together to identify lessons learned on both sides. Specifically, there is a need to share best prac-

Our study group is investigating the sustainability and systemic effects of current funding policies, beginning with an examination of the relationship between the government and the university and between the university and industry.

tices in order to create a new paradigm to replace the current funding model. This model is unsustainable, carrying as it does both salaries and capital costs on the backs of agency budgets. Therefore, we need to examine the long-term impact of both reimbursement policies and funding mechanisms and propose ways to improve them. This effort must necessarily be a collaboration between universities and government, with some new compact perhaps being developed.

Keith Yamamoto and I are leading this new ARISE follow-on study, and we have a large number of excellent colleagues supporting us in this work, including many members of the Academy. Our study group is investigating the sustainability and systemic effects of current funding policies, beginning with an examination of the relationships between

the university and two integral stakeholders: federal funding agencies and industry. It is clear that this new compact between government and universities needs to be developed; but as we thought about this relationship, we realized that there is another critical counterpart, namely, the relationship with private industry. As a result, we have organized the committee into two separate subcommittees: one focusing on the government/university relationship, and the other on the university/industry interaction. Each subcommittee will be led by either Keith or me along with one or two cochairs.

We also have an intermediate group looking at issues related to conflicts of interest. We know there are conflicts of interest, especially in the medical arena, but we also know that collaborations with industry can be important in academia. Thus, this group is working to develop effective and actionable recommendations and to arrive at an agreed upon set of policies for managing conflicts of interest.

Over the next year, the committee will meet with key stakeholders before developing its recommendations for the funding system and the future scientific enterprise. Our hope is that these meetings will focus and enrich our final report, increasing the likelihood that it will have a positive impact on funding policies and mechanisms and, in turn, ensuring that American universities remain robust intellectual centers. ■

ARISE II Workshop: The University-Industry Partnership

"Many really interesting and important problems are not going to be solved by a solid-state physicist or a biochemist; they require input from many fields. Universities are in the very privileged position of having people who are experts in every field you can think of."

– Robert Birgeneau

"I think the most important thing that the Semiconductor Research Corporation does is to bring industry into the university and to work with students."

– Larry Sumney

American industries rely heavily on collaboration with the academic science and engineering communities and have an important stake in the vitality of research universities and their role in creating a well-trained workforce. The ARISE II study group is exploring the impact of current science funding policies, beginning with an examination of the relationships between the university and two critical stakeholders: federal funding agencies and industry.

On January 6 – 7, 2011, the ARISE II committee held a meeting at the University of California, San Francisco. The workshop focused on the university-industry partnership and included presentations from several industry representatives who have created or strengthened industry partnerships with academia. The panelists included Steven Freilich, Director of Materials Science and Engineering, Central Research and Development, at DuPont; Richard Scheller, Executive Vice President of Research and Early Development at Genentech; Larry Sumney, President and Chief Executive Officer at the Semiconductor Research Corporation; and Ellen Williams, Chief Scientist at BP.

The panelists discussed how industry can foster research collaborations with the university. Although each speaker represented a different industry sector – chemical, biomedical, engineering, and energy – their overall message was essentially the same: industry-university collaboration is vital for innovation. If the partnership between universities and industry is well managed, it can lead to successful research outcomes and create a pipeline of the next generation of researchers.

During the workshop, Robert Birgeneau, Chancellor of the University of California, Berkeley, spoke about technology innovation centers at universities, specifically the Energy Biosciences Institute – a unique collaboration between the University of California, Berkeley; the Lawrence Berkeley

National Laboratory; University of Illinois at Urbana-Champaign; and BP. Birgeneau stressed the importance of the university, with its breadth of researchers, in providing the basic research that forms the foundation of future technology. He emphasized that by working together, universities and industry have the potential to address a series of challenges facing our society.

The meeting also included a presentation by Aled Edwards, Director and Chief Executive Officer of Structural Genomics Consortium and Banbury Professor of Medical Research at the University of Toronto. Edwards offered a different perspective on the university-industry partnership. The Structural Genomics Consortium (SGC) is a public-private partnership dedicated to promoting the development of new medicines by carrying out basic science research relevant to drug discovery. The SGC currently has 241 collaborations with companies and universities from around the world, and all of the work produced by the SGC is published in the public domain; there are no intellectual property or confidentiality agreements. Edwards argues that this novel public-private relationship allows researchers to address interesting questions that are not normally considered high priorities for most sources of research support.

The ARISE II committee will next meet in late March to review the content, structure, and preliminary recommendations of the study. ■

The Alternative Energy Future – Legal, Social, and Economic Considerations: Overview

Robert W. Fri

Robert W. Fri is a Visiting Scholar and Senior Fellow Emeritus at Resources for the Future. He was elected a Fellow of the American Academy in 2010.

Those of you who follow the debate about alternative energy know that many studies of energy and climate change, including two recent ones by the National Academies – *America's Energy Future* and *America's Climate Choices* – have gone over that area in much detail. While they disagree on a few items, in general these studies conclude that limiting future greenhouse gas emissions and adapting to the inescapable change in the climate to which we are already committed will require a transformational change in our energy system. Thanks to billions of dollars spent by public and private sources over the last thirty years, policy-makers have a very good idea of what that technological and economic transition is going to look like, and it's a huge task.

But transformational change in the deeply embedded technological and economic infrastructure that is the current energy system will require a societal transformation that is equally profound, both to overcome the inevitable barriers to changing the energy system and to adapt to a new energy system as it emerges. Here, policy-makers are less well served by the research community, in particular, the social-science research community. The gap between the energy-policy community and the social-science research community, with a few notable exceptions, is both wide and deep. The purpose of our project is to begin to span that chasm.

Six broad issues constitute the intellectual framework of the project; they are designed to be bridging issues, issues that, on the one hand, are important for energy policy but, on the other, depend substantially on social-science content for their solution. The kinds of issues we expect to address include questions such as:

Our objectives in this project are twofold: to help policy-makers in the area of energy understand how social science can help solve their problems; and to build a social-science research agenda that is directed toward helping solve energy problems.

- What are the barriers to achieving a workable social consensus on climate and energy policies, and how can these barriers be overcome? Any of you who followed the climate argument for the last few years knows that is something of a challenge.

- How will climate policy and transformation in the energy system affect the behavior of individuals and communities? We know there is public resistance to green technologies such as windmills. We know that people do not behave in the way that neoclassical economics says they ought to. A whole series of issues related to behavior needs to be addressed.

- How do the rules we live by have to change? Do we need new rules for new technologies, and do some of the old rules we live by become out of date as new technologies are introduced?

- What governmental framework will best sustain climate and energy policy over the long run? What happens to the standard federal structure of the United States when state and local governments have more to do with the answer, as they do with regard to climate, than they have in the past? And how do you build a durable yet adaptable framework that can last for decades but can still take account of new information as it is developed?

- How will America's response to climate change affect our relationship to other countries? The collapse of negotiations at the Copenhagen Summit in December 2009 makes clear that we need a new international strategy.

- What will be the effect of changing the energy system on other physical systems, including ecosystems, land use, and water supply? In other words, how can this change be achieved in the context of sustainable development?

While these are fairly broad issues and we are not going to try to solve them, our objectives in this project are twofold: one, to help policy-makers in the area of energy understand how social science can help solve their problems; and two, to build a social-science research agenda that is directed toward helping solve energy problems. We expect three main products: a conference next spring that will be a low-hanging-fruit sort of affair, to take the opportunities for both energy policy and a social-science research agenda and get them on the table as quickly as possible; a conference report a year later, in 2012, to go into more depth on the same issues; and, finally, two issues of *Dædalus* in 2012 to report on many of these same questions. It is a reasonably ambitious agenda, I think, but there is room for optimism. We have discovered that the government is interested in these issues, including the energy-policy community. The social sciences that we have reached out to seem to be interested as well and are pleased to hear about the study.

The Academy is a great platform for this kind of study. Of course, the reputation and convening power of the Academy is terrific, but two things have really impressed me. One is the breadth of membership, which has allowed us to reach out to all kinds of disciplines and bring them into a room together – a hard task in most settings. But most important is the intellectual freedom that we have been offered to pursue this strange agenda and to see just where it takes us. ■

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Initiative for Humanities and Culture: Data Project

Francis C. Oakley

Francis C. Oakley is President Emeritus and Edward Dorr Griffin Professor of the History of Ideas at Williams College. He was elected a Fellow of the American Academy in 1998.

The history of the Academy has been a noble one in its support of the humanities. Those of us who have been involved with the National Humanities Center, for example, remember the central role the Academy played in creating that organization, as it did for many other agencies that support the humanities in America. It is my mission this morning to assure you that this great effort on behalf of humanistic studies continues in full force.

In 1998, responding to the quintessentially humanistic imperative to know thyself, the Academy launched its far-reaching, three-pronged Initiative for Humanities and Culture. First, it established the Visiting Scholars Program that Pat Spacks will speak about. Second, it committed itself to publishing a series of pertinent volumes and occasional papers. But it is my task to dwell at somewhat greater, if not unconscionable, length on the third prong of this humanities initiative. It involves an attempt to provide for the humanities a structure of statistical data: a set of indicators paralleling the thirty-year-old *Science and Engineering Indicators* published biannually by the National Science Foundation that has served our colleagues in the

natural and social sciences so very well, informing decision-making by academics, educators at large, and national policy-makers alike.

Launched in January 2009, after a multi-year planning process, the online *Humanities Indicators* (www.humanitiesindicators.org) gives scholars, policy-makers, and the general public the first comprehensive statistical picture of the state of the humanities nationwide. It includes seventy-four indicators, two hundred tables and charts, and interpretative essays covering five data areas: primary and secondary education; undergraduate and graduate education; funding and research; the humanities workforce; and the role of the humanities in American

The third prong of the Academy's humanities initiative involves an attempt to provide for the humanities a structure of statistical data: the online Humanities Indicators gives scholars, policy-makers, and the general public the first comprehensive statistical picture of the state of the humanities nationwide.

life. The site is constantly updated with new data, and since March 2010, the Academy has added new data stemming from the Humanities Departmental Survey, which provides a unique snapshot of American university and college humanities departments at the end of the first decade of the twenty-first century. Since its unveiling in 2009, the *Humanities Indicators* website has recorded more than 1.2 million hits originating from one hundred countries.

That fact notwithstanding, I have a sinking feeling, as I describe this great and challeng-

ing enterprise, that it may come across as dull old stuff, the enervating rattle of some very dry old bones. That may well be so. I would wager, however, that no one who has had the experience of trying to assess and write about the state of humanistic studies nationwide – no one who, in this experience, has felt caught in a crossfire of sweepingly negative attacks and bereft of any easy access to the sort of factual data needed if one is to make what is sometimes disparaged nowadays as a reality-based assessment – is unlikely to feel anything but gratitude for the assistance that the *Humanities Indicators* has finally made so readily available. Glancing back in this connection to the late lamented culture wars of the 1980s and 1990s, one should not too easily forget that the discussion was enveloped in a fog of confusion and misinformation that seemed to shroud humanistic endeavors, whether in relation to what was purported to be going on in higher education, in our primary and secondary schools, or in American society at large. Data deprivation was the order of the day.

Data concerning issues as fundamental as the number of students enrolled nationwide in courses devoted to the humanities were either entirely lacking, or were inconsistently assembled, hard to access, poorly disseminated, unwittingly ignored, and routinely underutilized. As a result, generalizations confidently advanced about the humanities – those supportive in nature no less than the negative ones – were all too often characterized by a woolly species of disheveled anecdotalism punctuated unhelpfully from time to time by moments of truly cranky but attention-grabbing dyspepsia. That, of course, was counterproductive then, and it would be counterproductive today. It simply won't do, especially now that we have at our disposal in the *Humanities Indicators* a user-friendly mode of access to many of the most pertinent facts. For what these data reveal (thinking nationally now) is a complex and highly nuanced picture that, while it certainly points out the danger of any business-as-usual attitude,

should equally inhibit any tendency toward the all-too-common Apocalypse Now genre of educational commentary.

Time permits me to put just one shred of flesh on these somewhat ungrateful bones. Somehow we may not be surprised to find out that a higher percentage of Americans demonstrate poorer literary skills than do citizens of any other Western industrialized nation, or that America's book-reading rates fall below those of Britain and Sweden. But it may surprise us to find out that, at the same time, the United States has one of the highest percentages of highly literate adults, or that the nation's book-reading rates are well above those of many other European nations, not excluding Italy, France, and Germany.

The generalizations we choose to make about the state of the humanities nationwide, then, really should be nuanced enough to reflect properly this sort of complexity in the picture that the data all too often reveal. So, all praise to the Academy for taking the ambitious initiative that now enables us to respond to that astringent imperative. ◼

Visiting Scholars Program

Patricia Meyer Spacks

Patricia Meyer Spacks is the Edgar F. Shannon Professor of English Emerita at the University of Virginia. She was elected a Fellow of the American Academy in 1994 and served as the Academy's President from 2001 to 2006. She is Chair of the Academy's Visiting Scholars Program.

Unlike the other Academy activities that you have been hearing about, the Visiting Scholars Program focuses specifically and purposefully on groups of non-Fellows, groups that may well supply Fellows of the future. Conceived in 2000, the program got under way in 2002, thanks to the efforts of Leslie Berlowitz, who developed support from a consortium of colleges and universities now known as the University Affiliates. The first year produced 110 applications; for this year's class, there were 300.

The Visiting Scholars Program is unusual, possibly unique, in supporting only early-career scholars and in providing systematic help for the tasks they have undertaken.

Each class has been very small: six to eight post-docs and assistant professors who show promise of becoming leaders in their fields, invited to spend a year at the Academy to work on book projects. They are supplied with offices and computers and with oppor-

tunities to interact with Academy Fellows. The scholars come from a range of disciplines in the social sciences and humanities: history (including the history of science and of education), art history, literature, anthropology, sociology, and law, among others. After their year at the Academy, they tend to do very well. Out of fifty-nine scholars before this year, fifty-six have secured full-time positions at universities and research institutions, which is a remarkable record in these times. New jobs secured by last year's Visiting Scholars included appointments at Johns Hopkins, Barnard, and Rutgers. Of the fifty-nine former scholars, nine are now associate professors, and two have received tenure. Members of the group have published more than seventy books.

But such data do not tell the whole story. They suggest that the program has been successful, but they do not indicate how. I want to use my few minutes to talk about what actually goes on while the scholars work at the Academy. Like all successful residential fellowship programs, the one here fosters close connections among its participants. The Visiting Scholars Program, however, differs from many others by being so small. The scholars typically bond early, forming an interdisciplinary community dedicated to helping one another fulfill their immediate aspirations. (This year they have also formed a winning trivia team.) They read one another's work, provide counsel on job letters and job talks, and discuss their own and each other's projects – all of this arising organically and spontaneously between the scholars. The official arrangements for the year, however, further the same ends. During the fall, every other week brings an informal speaker: an editor from a university press, a literary agent, experts on digital work in the humanities and social sciences, and local scholars willing to talk about their own work and about the processes of producing it. Lively discussion inevitably follows the presentations.

The scholars themselves plan the alternate weeks in conjunction with me as chair of the program. For the last two years, they have agreed to focus mainly on problems that arise in the effort to write what are usually first books. We discuss the content of what they are doing but also the difficulties that arise in doing it. One possibility that we have thought of for this year is a session on footnotes. How does one cut down on them while still remaining true to the imperative of situating individual work in the context of ongoing discussions? What sort of information belongs in notes? How does one avoid alienating an audience by including too many notes? Last year, we read together a book about how to turn a dissertation into something publishable and spent a session talking about it. One suggestion for this year is that we join in reading some theoretical works about various fields in the humanities and the connections among them. Whatever the specific activities, they turn out to focus on how to write a book.

The Visiting Scholars Program is unusual, possibly unique, in supporting only early-career scholars and in providing systematic help for the tasks they have undertaken. That systematic help, in conjunction with the spontaneous support that members of the group offer one another, enables them to work better and to have a richer sense of what their work entails. It is always fascinating to see how their elevator speeches – the one-minute summaries of what they are doing – change in the course of the year they spend here. Those summaries typically become much richer, much more nuanced, and usually much more complicated. Good books have issued from the program already, and I expect more to follow.

This imaginative expansion of the Academy's traditional concerns draws on Fellows both to select the scholars and to participate in discussions with them. I hope you will let us know if you are interested in filling either of these roles. ■

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The Global Nuclear Future

Scott D. Sagan

Scott D. Sagan is the Caroline S.G. Munro Professor of Political Science and Codirector of the Center for International Security and Cooperation at Stanford University. He was elected a Fellow of the American Academy in 2008.

The Academy's Initiative on The Global Nuclear Future has brought Academy members from many academic disciplines and professions together with significant Washington and international policy-makers to address a single but very complicated question: will the expected spread of nuclear power around the world also create the future spread of nuclear weapons? The project has entailed both research and policy-impact activities. The research has resulted in two special issues of *Dædalus* (Fall 2009 and Winter 2010) and a set of occasional papers, *Shared Responsibilities for Nuclear Disarmament: A Global Debate* and *Multinational Approaches to the Nuclear Fuel Cycle*. The policy-impact activities have involved workshops, meetings, and briefings, including with National Security Council staff, with House and Senate staff on Capitol Hill, with officials from the national laboratories, and with international scholars, government officials, and nuclear industry representatives in the Middle East and Southeast Asia.

Figure 1 shows which states have nuclear power today (listed in black) and which are aspiring nuclear power states. At one of the project meetings, we discussed the obvious

geographic spread of countries that have asked the International Atomic Energy Agency (IAEA) for assistance; we noted that it would be interesting to look at their economic standing as well, to get a sense of how likely it is that they will achieve their objectives. Further, one participant pointed out that we should also study the political conditions within each state, focusing on the characteristics that will influence how safely and securely they will be able to operate nuclear facilities. Looking at the countries listed in Figure 1 in terms of their ability to control corruption, we see that existing nuclear power states have higher abilities to

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control corruption than do aspiring nuclear states (see Figure 2). According to the World Bank, political stability is defined by the likelihood of insurrections or other serious violent uprisings within the state. We also have measures of government effectiveness, regulatory quality, and the state's scores regarding its status as a democracy or autocracy. On all these issues, aspiring states look quite different from existing nuclear power states, giving us a sense of the challenge we face in decreasing the likelihood that the spread of nuclear power will have security problems attached to it.

Expansion vs. Spread
States with nuclear power and states (in gray) now considering embarking on nuclear power programs

Americas	Western Europe	Eastern Europe	Central and South Asia	East Asia/ Oceania	Middle East	Africa
Argentina	Belgium	Armenia	India	China	Iran	South Africa
Brazil	Finland	Bulgaria	Pakistan	Japan	Egypt	Algeria
Canada	France	Czech	Bangladesh	Korea	Israel	Ghana
United States	Germany	Republic	Georgia	Taiwan	Jordan	Kenya
Mexico	Netherlands	Hungary	Kazakhstan	Indonesia	Turkey	Libya
Bolivia	Spain	Romania	Sri Lanka	Malaysia	UAE	Morocco
Chile	Sweden	Russia	Mongolia	Thailand	Bahrain	Namibia
Dominican	Switzerland	Slovakia		Vietnam	Kuwait	Nigeria
Republic	United	Slovenia		North	Oman	Senegal
El	Kingdom	Ukraine		Korea	Qatar	Sudan
Salvador	Italy	Belarus		Myanmar	Saudi	Tanzania
Haiti		Poland		Philippines	Arabia	Tunisia
Jamaica		Lithuania		Singapore	Syria	
Peru		Croatia			Yemen	
Uruguay		Estonia				
Venezuela		Greece				
		Latvia				

Sources: IAEA Power Reactor Information System, www.iaea.org/programmes/a2; www.fissilematerials.org; World Nuclear Association, http://www.world-nuclear.org/info/reactors.html

Figure 1

Figure 2

Regime Type, NPT Ratification, and Nuclear Exploration and Pursuit

For further discussion, see Scott Sagan, "The Causes of Nuclear Weapons Proliferation," *The Annual Review of Political Science* 14 (2011): 224–244.
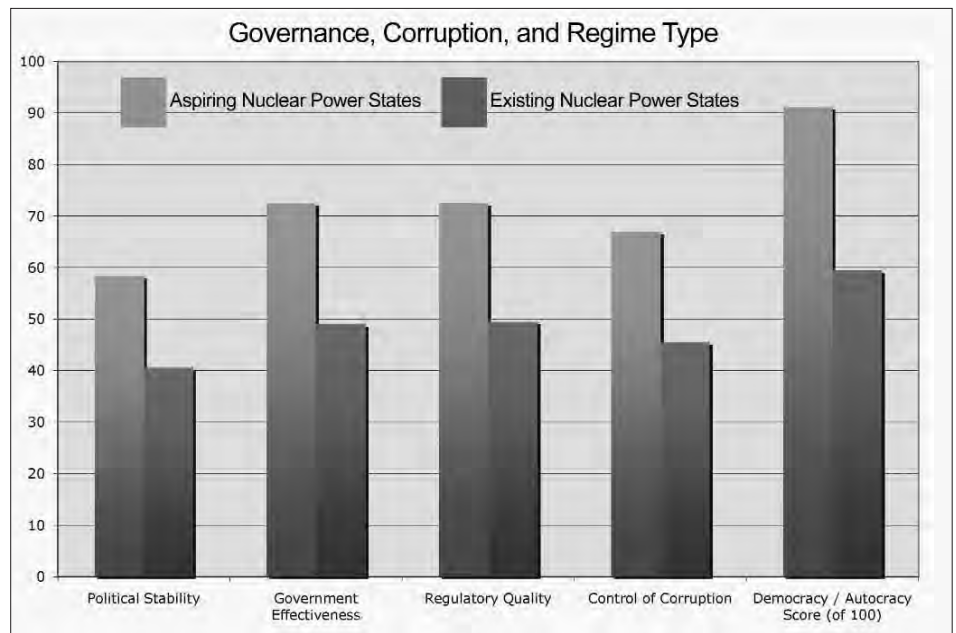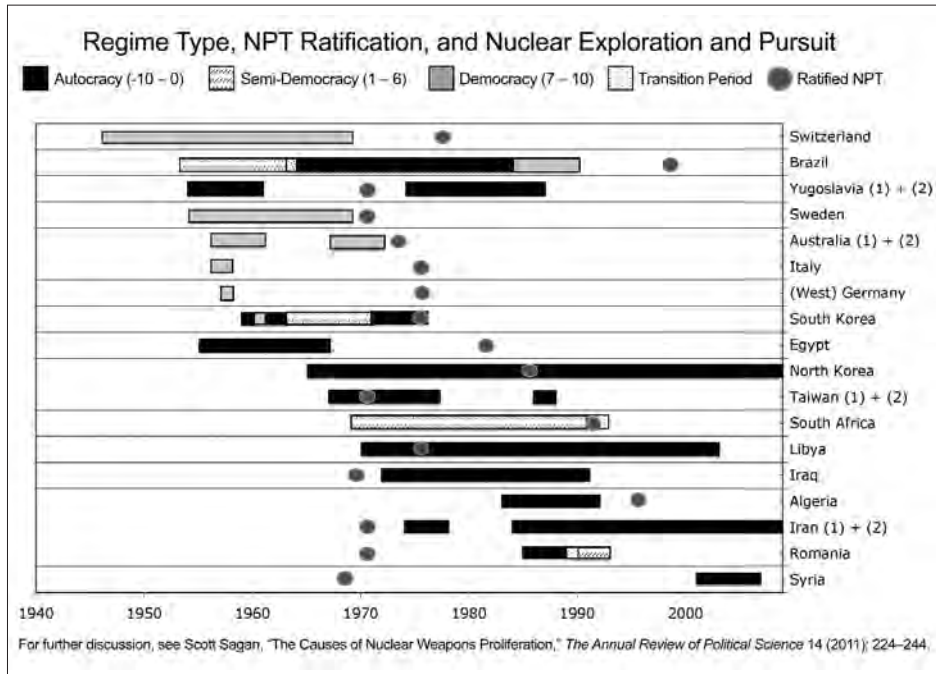
Figure 3

The democracy versus autocracy score is interesting in another way, as Figure 3 illustrates. Many countries have tried to get nuclear weapons or have started nuclear weapons programs and then ended them for a variety of reasons. Scholars in the past looking at this fact noted that both democracies and non-democracies have nuclear weapons. Likewise, both democracies and non-democracies have started nuclear weapons programs and ended them. According to those scholars, regime type – that is, whether a country is democratic or not – is not all that important. The data shown in Figure 3 suggest that this dismissal of the idea that democracies behave differently than non-democracies regarding nuclear weapons is wrong. In Figure 3, each gray dot indicates when a country joined the Nuclear Non-Proliferation Treaty (NPT), thereby committing itself not to seek or acquire nuclear weapons. All democracies, marked in gray, that had nuclear weapons programs but ended them and then joined the NPT have not cheated on their commitment not to seek or acquire weapons or to restart their programs. The countries that signed the NPT but subsequently cheated by having a

secret nuclear weapons program were all non-democratic. Although we do not have a full understanding of the influences of democratic polity on keeping international agreements, this finding is a valuable one that we want to explore in more detail moving forward.

Will the spread of nuclear power lead to the spread of nuclear weapons? We have a clear, simple answer to that complex question: it depends. It depends in part on which states with what types of governments develop nuclear power. It also depends on the global political institutions that provide export rules, inspections of new facilities, and safety and security guidelines. Will new institutions for the management of nuclear power be created and sustained, broken or strengthened over time? We need social scientists and physical thinking about these issues. We need meetings such as the one the Academy sponsored on the occasion of the NPT Review Conference in May 2010, gathering three past presidents of the NPT Review Conference, the current president of the Conference, and our project leaders to talk about how to improve the NPT and

what kinds of mechanisms could, in a political sense, improve the institution and the overall nonproliferation regime.

But the security of our global nuclear future also depends on what technology is developed. What will the next generation of nuclear power plants look like? What will improved safeguards and safety mechanisms look like from a technological perspective, and how will we ensure that the best technologies are exported and some of the ones that are more dangerous are not exported? What is the appropriate mix of new national laws and changing international regulations that will be required? We need strong networks of collaboration between social scientists, physical scientists, engineers, and lawyers to address these critical issues. ∎

The Global Nuclear Future

Steven E. Miller

Steven E. Miller is Director of the International Security Program at the Belfer Center for Science and International Affairs at the Harvard Kennedy School. He was elected a Fellow of the American Academy in 2006.

We live in a world that has a certain set of nuclear attributes, and that world is changing. We are heading into a different world, leading us to ask the broad question, how will we be able to live safely and fruitfully in that new world – or, if you are more cynical, *will* we be able to live safely in that world?

Today, there are 438 nuclear power reactors distributed across roughly 30 countries. About half that nuclear capability is in three countries: the United States, France, and Japan. The 30 of the existing nuclear power states tend to fall within the list of NATO countries, plus Russia, Japan, and China. In the last several years, 60 additional countries have approached the International Atomic Energy Agency (IAEA) and expressed an interest in pursuing nuclear power. If all those dreams came true, we would triple the number of nuclear power states. This possible outcome, however, is a very long timeline phenomenon, looking forward three or four decades from now. But that will be a very different world.

If the most extravagant visions presently forecast were to come true, in about 30 years we would be living in a world with 500 or 600 additional nuclear reactors spread across dozens of additional countries, many of which currently have no nuclear technology and very little capacity for handling nuclear technology. We are seeing a changing pattern in the demand for nuclear power for a variety of reasons having to do with climate change, energy security, and changing economics of energy, among others.

> *This Academy project asks, particularly on the nonproliferation front, what do we need to do now in order to ensure that the world we end up living in harvests the benefits of nuclear power while minimizing the potential adverse consequences?*

We try to distinguish between spread – the increase in the number of countries with nuclear technology – and expansion – the rapid growth of nuclear power in countries that already have it. Expansion can raise some problems of its own, in particular, when the result is a very small number of very large programs. For example, of the 60 or so reactors under construction today, half are accounted for by two countries, China and South Korea. Spread leads to a much larger number of small programs, greatly increasing the geographic scope of the nuclear issue.

Moreover, in the past the nuclear technology suppliers consisted of a tiny number of advanced industrial states – the United States, France, Japan – and those suppliers were selling mostly to countries such as Finland or Belgium. The most recent deal, consummated in December 2009, involved the Korean Electronic Power Company, KEPCO, in a twenty-year $40 billion deal with the United Arab Emirates. The next controversial deal coming down the pike involves China's selling two reactors to Pakistan. What these deals represent are the significant changes on both the demand side of nuclear power and the supply side that may tax our ability to manage this process.

The Academy project asks, particularly on the nonproliferation front, what do we need to do now in order to ensure that the world we end up living in harvests the benefits of nuclear power while minimizing the potential adverse consequences? Will existing rules and institutions be sufficient? Those of you who follow these questions know that the IAEA is widely criticized as being inadequate to its purposes today. How adequate is it going to be in 30 years, in a world where nuclear technology is much more widely distributed? Are the legal frameworks that currently exist durable and effective enough to cope with the additional pressures of a much wider distribution of nuclear technology? Overall, there is this broad question: will the NPT system – a collection of treaties, laws, norms, a variety of ancillary institutions, all clustered together in what we call the global nuclear order – be adequate to the task of protecting us from the dangers of the world into which we seem to be heading?
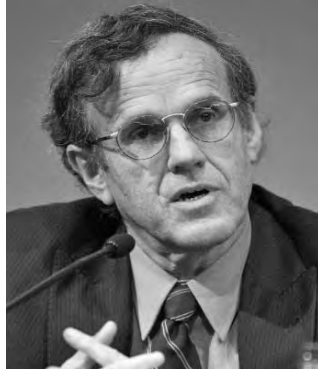
The Academy project recognizes that any effort to strengthen or improve the NPT regime will require the assent, buy-in, and full participation of nuclear newcomers. Currently, there is among the newcomers a substantial coalition of the disaffected; many of them do not share the same worries as the Western nonproliferation community and do not buy into our remedies. Thus, one prominent strand of our project is to reach out to the nuclear communities in places like the Middle East and Southeast Asia, where the appetite for nuclear power is nearly ubiquitous. We hope, first, to build ties with them, understand their points of view, and respect and give proper acknowledgment to their interests; and, second, to develop a frame of convergent interests demonstrating a shared global interest in creating a safe and secure nuclear

order, one that is better able to manage the surge in nuclear technology that we foresee.

To this end, the Academy held a meeting in Abu Dhabi in December 2009 that brought together those Middle Eastern players interested in nuclear power (which is just about all of them). We have a meeting in November 2010 in Singapore, as Southeast Asia is the other region where the nuclear appetite is nearly universal. Our meetings and project activities build from what now exists – a Western nonproliferation community – to what we think needs to exist: a global nonproliferation community. ▪

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The Global Nuclear Future

Robert Rosner

Robert Rosner is the William E. Wrather Distinguished Service Professor in Physics and Astronomy & Astrophysics at the University of Chicago. He was elected a Fellow of the American Academy in 2001.

The rational basis for any revival of nuclear energy is to meet concerns about operational safety, security, and, in the case of programs that have an international flavor (as the nuclear issue obviously does), nuclear proliferation. Are we doing all that we can in these areas given the ongoing nuclear renaissance that has become evident internationally, even if less so here in the United States?

In the United States, operational safety at nuclear plants has been excellent. But what about the nations that do not have the human or technical infrastructure to support domestic nuclear power but are buying nuclear power plants nonetheless? What are the rules by which we can be sure that these plants will be operated safely? We know that serious operational problems in one country – think of the Ukraine – can affect public relations elsewhere and lead to restrictions on nuclear power, even in locations where safe operations have traditionally not been an issue.

We have discussed this challenge with utility operators in the United States as well as France and Japan, and it turns out to be ex-

tremely difficult to arrange for a meaningful conduct of operations – that is, one that has consequences of some significance for violations. The International Atomic Energy Agency (IAEA) does have some (arguably, relatively ineffective) enforcement powers in the realm of nuclear security, but it really has none in the realm of nuclear safety. Take, for instance, the so-called 123 Agreements. The Atomic Energy Act of 1954 provided a framework for cooperation in the nuclear energy realm between the United States and any other country, laid out in Section 123 of

The rational basis for any revival of nuclear energy is to meet concerns about operational safety, security, and, in the case of programs that have an international flavor, nuclear proliferation. Are we doing all that we can in these areas?

the act and called "Cooperation with Other Nations." For this reason, such cooperative agreements are commonly referred to as 123 Agreements. This framework represents a trade: cooperation in providing nuclear expertise in return for agreement, for example, not to enrich uranium fuel, not to reprocess spent nuclear fuel, and, finally, to return spent fuel to the provider – that is, not to accumulate spent fuel in the host country.

On principle, these agreements offer the possibility of enforcing standards in nuclear security and nuclear safety; in practice, it has not been simple to conclude such agreements. The United States did conclude such an agreement with Abu Dhabi, for example, but is struggling in its negotiations on an agreement with Jordan. A key element to either success or failure in these negotiations seems to be the ambitions a particular nation has for engaging in the nuclear fuel cycle. For example, nations that have exploitable

uranium resources tend to be loath to sign away the right to make large profits on fuel enrichment and possible fuel fabrication – which, by the way, they are allowed by the Nuclear Non-Proliferation Treaty (NPT).

Where does this leave us? In the 1950s and 1960s, the United States was in a unique position as the acknowledged technical leader in things nuclear. Many nations still regarded America as a relatively benevolent superpower. Both of these facts, unfortunately, have dramatically changed, and especially in the latter area. There is substantial resentment about being lectured by America, a concern raised repeatedly at the Academy meeting in Abu Dhabi. There is distrust based on substantive departures by the United States from its very own standards as expressed in the NPT; think of the treaty America signed with India. And we seem to be losing our technological edge in nuclear power. Note that, for example, the major vendors of nuclear power plants today are from France, Japan, and South Korea, with Russia not far behind. In the wings are China and India, both of which have very serious ambitions in this area.

What about the United States? Westinghouse is now owned by the Japanese. GE is no longer able to build plants on its own and is also partnering with the Japanese. We have some start-ups in the United States that are exploring drastically new designs, but these will probably not see commercial use for at least a decade or more, probably more like twenty years. Our large construction firms, such as Bechtel, do have strong involvement in building nuclear plants abroad, but it tends to be on the civil construction end of things.

The nuclear renaissance one sees abroad is certainly not happening in the United States, so as a result, we are in danger of resting much of our nuclear design expertise on the work done at the weapons labs and within the naval reactor program, that is, within programs that are largely classified and not open to public scrutiny. This is not a promising development as we look forward to the future and think about America's role in dealing with the spread of nuclear materials and nuclear weapons worldwide in a transparent fashion. Whether or not you are in favor of nuclear power as a component of a new carbon energy future, you do need to think carefully about the unintended consequences for the United States to step out of nuclear power in a world where nuclear power does not seem to be disappearing. ■

International Agreements to Limit Cyberattacks

John D. Steinbruner

John D. Steinbruner is Professor of Public Policy at the School of Public Policy and Director of the Center for International and Security Studies at the University of Maryland. He was elected a Fellow of the American Academy in 1992.

The Academy's project on International Agreements to Limit Cyberattacks is in very early stages of conception. I will be presumptuous enough to imagine what the project might ultimately conclude, but I am imagining. The actual results are yet to come.

There are very good reasons to worry about a massively destructive use of cybertechnology. The practical question is: can we count on natural restraint or will we need organized protection?

Let me begin with a memorandum that was written in 1944 by Vannevar Bush and James Conant to Henry Stimson, who was then Secretary of War. They explicitly recognized the massive threat potentially posed by biotechnology. They described the science on which that was based. They doubted it would be a feature of the then-ongoing war, but they warned that in the aftermath

it would be a major international problem. They recommended organized transparency under the United Nations as the best available means of fending off the possibility of belligerent development of this technology. In that same memorandum, they implicitly alluded to a similar emerging problem with regard to nuclear weapons.

Their recommendation was not enacted for either of these technologies at that time. Nuclear weapons have been massively deployed in deterrent confrontation and still are. Biological weapons have been massively explored but not actively deployed. (It is a significant difference.) Neither has been used in warfare since World War II, leading to the evident question, does Murphy's law apply here? Is the deterrent effect indefinitely reliable in both of these technologies or is it susceptible to catastrophic breakdown? Conant and Bush, in 1944, were very worried about catastrophic breakdown. We have not yet experienced it, but that does not guarantee that we are indefinitely protected.

What does this have to do with cybersecurity? We are in a comparable situation to Conant's in 1944. We can see, perhaps with slightly less clarity than he had, very good reasons to worry about a massively destructive use of cybertechnology. The practical question here is whether we can count on natural restraint, which so far has protected us in these other areas, or whether we need organized protection? Will the spontaneous evolution of defensive technology in this area come to dominate offense? Can the inherent deterrent effect of potential destruction compensate for defensive advantage, or is there a set of rules that will establish a defensive advantage?

Over the past year, I have chaired a panel for the National Academy of Sciences on deterring cyberattacks. From listening to many people explore these questions, I would say that few argue that defensive advantage can be established by technical means. The common statement is that there is no technical solution to this problem. Moreover,

few are willing to argue that deterrent techniques can be reliably effective, and there is an evident danger of perverse dynamics driven by reciprocal fear. It is considered prudent under such circumstances to explore formal agreements establishing protective rules. It is widely assumed that any agreement would have to be global in scope, yet also widely accepted that it could not be comprehensive. The process of cyberexploitation on the Internet is too well ingrained to imagine its eradication anytime soon.

The presumption is that any effective protection would have to focus on acts of destruction. One can imagine an agreement that would formally prohibit destructive attacks on critical infrastructure targets: power grids, navigation services, financial clearing market mechanisms, emergency response systems, and health care delivery – all of which, I might add, are extremely vulnerable to deliberate destruction. The notion is that, along with formal prohibition, there would be active international monitoring of attempted violation and collaborative development of protective protocols. To ensure protection at a higher standard than we currently have, these functions would have to be separated from the normal Internet, admittedly a large and difficult enterprise. The point would be to engage major states in discussion of this possibility.

At the moment, although there is some loose discussion going on, the idea of pursuing actual formal prohibition has not been seriously explored. The primary initiative now is vested in U.S. Cyber Command, which is not inclined to engage in international discussions. The envisaged project will attempt to sensitize society to the scope of the cybersecurity problem and encourage more constructive organization of protection. ■

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Protecting the Internet as a Public Commons

David D. Clark

David D. Clark is a Senior Research Scientist at the MIT Computer Science and Artificial Intelligence Laboratory. He was elected a Fellow of the American Academy in 2002.

For a number of years, the Academy has been interested in the security of cyberspace. This interest is a natural outgrowth of the Academy's broader interest in security, but the issues of cybersecurity, or, more specifically, the security of the Internet, are different from other sorts of security. Moreover, the area of cybersecurity is poorly understood, even though it is currently receiving a lot of attention in the press and in Washington.

There are a number of ways to view the issues of cybersecurity. Right now, Washington is caught up in the framing and rhetoric of national security, which leads to vocabulary such as cyberattack, cyberdefense, cyberwar (whatever that might be), the "standing up" of a "cybercommand," and philosophies of cyberdeterrence. The interest in deterrence arises by analogy to nuclear deterrence, of course, but the two domains have almost nothing in common.

A second view of cybersecurity is that of economic activity and globalization. This view captures issues such as international crime and industrial espionage. The latter is a pressing problem right now, as we are

seeing state-sponsored industrial espionage directed at the United States, which (by our norms) is against the rules of fair play. But in the global game, there are few rules and few referees.

Most of these issues, aside from international crime, are not of daily concern to us as individuals as we use the Internet. Several of us urged the Academy to take a different and person-centered view of cybersecurity, a positive view centered on the Internet as a global commons. This viewpoint invites questions about what motivates people to

The goal of this study is to focus the "security discourse" on those issues that relate to how the Internet can empower the individual and can provide a "safe enough" experience that the user is willing to partake of that experience.

use the Internet, how the right sort of discourse can be encouraged, what causes people to hold back from participation, and so on. Of course, some of the other views relate to this approach: for example, the fear of criminal activity, much of which is indeed international, is a very real concern when it can directly affect us.

One vehicle we are using to address these concerns is a *Dædalus* issue, slated for Fall 2011, which will include contributions that explore aspects of the global commons of the Internet. Let me mention a few of the topics that the papers will consider.

For those of us who think the Internet is a wonderful invention, a nagging question is why everyone doesn't agree with us. Almost 25 percent of the U.S. population does not use the Internet. What defines these unbelievers? Some answers are obvious: those in the bottom socioeconomic tiers raise questions of cost, for example. The older

age cohorts are less fluent in Internet-speak and are involved less. But there is a cross-cutting theme that all age and economic groups express: the Internet is of no value to them. Our concern here is not just the desire to have everyone join in our point of view, but that these people will be more and more disenfranchised as the world moves online. There are many jobs today for which you can apply only online. Paper tax forms are almost a thing of the past. As more and more services and societal functions move online, pushed, among other factors, by lower cost, how should we think about those who hold out?

For the individual, the issues of security do not center on concepts such as cyberwar. They center instead on the fear of fraud and identity theft, the loss of personal information, and other sorts of personal fears. An obvious question is whether the Internet can be made secure against these personally threatening concerns. The honest answer is no. The Internet is a reflection of the real world, and we can no more lock out con men and other sorts of tricksters from cyberspace than we can from the real world. Every behavior, good and bad, will be reflected from the real world into the cyberworld.

The correct question is more like this: can we make the Internet safe enough that we should be willing to go there? It is the same question we ask when we decide whether to take our children to the park. A park is not totally safe, and if we tried to make it totally safe, it would be so constrained and repressive we would not want to go there because it would be no fun. When we think about whether the park is safe, we ask ourselves two related questions: is it safe enough, and do I know enough to make that judgment accurately? The issue with the Internet is as much the second question as the first; how can we tell when we accidentally go to a "bad neighborhood": a dangerous website, a misleading bit of email spam, and so on? In the real world, we help each other sort out these issues; we share social cues and experiences. We have

socially centered means to develop models of trust. But in the Internet of today, each of us is more on our own, and this needs to change. A framing of security that relates to the individual rather than the war-fighter must be that of shared experience and building a communal sense of trust. "Trust" is a critical concept here.

Another way to think about security, which a paper in the upcoming *Dædalus* issue will explore, is by analogy to public health regulation. Since bad software on one computer (the kind of code we call "malware") can lead to infestation of other computers if they interact – we don't call those programs "viruses" for nothing – a model and set of regulations that balance individual freedom with collective obligations to prevent the spread of malware seem to make sense. This is a very different way of thinking about security than you would get from the military or intelligence community, but it will be a useful point of view in the larger Internet context.

A number of other topics will be discussed in the *Dædalus* issue. For example, what is the shape of political participation on the Internet? What are the institutions and organizations that can foster our view of the Internet as a commons? (We can discuss national security at the United Nations, but where should we advocate for the emergence of a global civil society?)

I will leave you with a high-level thought about this study and the papers that will result from it: the goal is to take back the "security discourse" that today is centered around the language and posturing of war, defense, and deterrence, to focus it on those issues that relate to how the Internet can empower the individual and can provide a "safe enough" experience that the user is willing to partake of that experience. I think this is a suitable and worthy goal for this Academy and its fellowship. ■

Because It Is Wrong : Torture, Privacy, and Presidential Power in the Age of Terror

Charles Fried and Gregory Fried
Introduction by Michael Boudin

The 1957th Stated Meeting, held at the House of the Academy on September 27, 2010
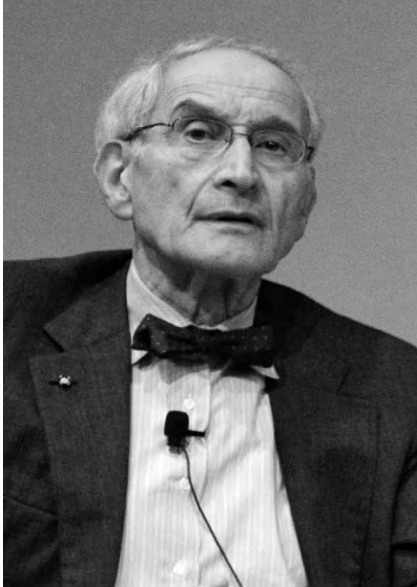
Introduction by Michael Boudin

Judge for the United States Court of Appeals for the First Circuit and Fellow of the American Academy since 1999

It is a particular pleasure to introduce two very good friends, Charles Fried and Gregory Fried. Father and son have coauthored the book *Because It Is Wrong : Torture, Privacy, and Presidential Power in the Age of Terror*. Charles is a graduate of Princeton University, Oxford University, and Columbia Law School. His career is centered around Harvard Law School, where he has held two named chairs in succession, taught a range of subjects, including constitutional law, and written a succession of books and articles, some of which have a decidedly philosophical slant. From 1985 to 1989, he served as Solicitor General of the United States. From 1995 to 1999, he was a Justice of the Supreme Judicial Court of Massachusetts. He is also a distinguished appellate lawyer and was elected a Fellow of the American Academy in 1997.

Gregory graduated from Harvard College, obtained his M.A. and Ph.D. from the University of Chicago, and is currently Chair of the Department of Philosophy at Suffolk University. He has acquired a number of distinguished fellowships and has published many scholarly writings, including a book on the philosopher Martin Heidegger. He has not yet held a high government office, but at his age, neither had Charles.

The events of 9/11 and the ensuing war on terror have focused attention on how far governments and individuals can go to protect domestic and national security. These questions recur in every age, but the perspective from which they are answered is often different. The fashionable modern view is a utilitarian perspective, which asks whether the benefits outweigh the costs in any decision. With respect to torture, Charles and Gregory reject that perspective. They have mostly joint views, although there is a discrepancy or two. To begin our discussion, I have a question for the authors.

Because It Is Wrong examines immoral behavior by high government officials, focusing on the use of torture, the invasion of privacy, and instances in which presidents act illegally. All three issues are connected to the Bush administration, though it is not alone. Some might think that the gravest devastation of the last eight years was wrought not by illegal or unethical behavior, but by the Iraq War. The planning and execution of the invasion of Iraq are viewed as serious mistakes in judgment. Is bad statesmanship in security matters arguably much worse than illegality and immorality ?

Charles Fried

Charles Fried is the Beneficial Professor of Law at Harvard Law School. He has been a Fellow of the American Academy since 1997.

The two problems are very different. Bad statesmanship is hard to avoid and frequently encountered. Grossly immoral behavior is something we can avoid. We know what should be avoided on moral grounds. We can be told what to avoid. On the other hand, to wag a finger at a president and say, "Be prudent, be wise," is an injunction without a lot of content, however much we would wish that injunction be followed.

Gregory Fried

Gregory Fried is Professor and Chair of the Department of Philosophy at Suffolk University.

Bad statesmanship can do enormous damage to a nation, but we focus in our book on matters of principle, not specific imprudent acts. Undermining matters of principle, in my view, has a longer-lasting deleterious effect on the character of a nation than a single miscalculation in diplomatic or military affairs.

Michael Boudin

Could you summarize for the audience the main point of the book?

Charles Fried

We start by looking at the difference between behaviors that are illegal because they are wrong and those that are wrong because they are illegal. Torture, on one hand, is illegal because it is wrong. Unwarranted wiretaps and the surveillance of cyberspace, among other violations of laws such as the Foreign Intelligence Surveillance Act (FISA) that the Bush administration engaged in after 9/11, were wrong because they were illegal.

Many people are reluctant to admit that torture is an absolute prohibition. Absolute prohibitions make people nervous, even if the choices they make in their own lives adhere to such prohibitions. This tendency is shown by the fact that people who have this decent and correct instinct cast about for empirical arguments for why torture never works: it provides wrong answers more often than it provides right answers; the results are unreliable; or the same information can be obtained in other ways. Those arguments make me nervous because as empirical facts, they may be correct much of the time, but they are not correct all the time. When this is the case, the temptation to allow torture creeps in.

We look at the difference between behaviors that are illegal because they are wrong and those that are wrong because they are illegal.

Torture is a very old prohibition. In the Lieber Code of 1863 – the first code of conduct for war developed by any nation – President Lincoln affirmed that it is proper to kill combatants and admissible, if regrettable, that noncombatants be killed as a result of so-called collateral damage. What he stated with great clarity, however, is that torture and cruelty are absolutely forbidden. In recent years, the Catholic Church – that great torturer – has admitted a similar absolute pronouncement: in the encyclical *Veritatis Splendor* of 1993 from Pope John Paul II.

How do we make a case that something is absolutely wrong? In our book, we first make the argument graphically. We show a painting by Leon Golub, a stark, striking painting of someone being tortured. Then we discuss what happens in torture. But in the end, we understand that this is not an unanswerable argument. As my dear friend, the late political philosopher Bob Nozick said, "A good argument is not like a machine

Torture is illegal because it is wrong. Unwarranted wiretaps and the surveillance of cyberspace that the Bush administration engaged in after 9/11 were wrong because they were illegal.

gun. It does not physically disable you from objecting." We do not try to machine-gun our audience into agreement.

What we do show is that the absolute prohibition is reasonable. It is in line with many of the beliefs that guide us; we do not think that everything has a price. Prohibition on torture is not a goal. In other words, we do not try to have as little torture as possible. Such a scenario is the premise of Lenin's argument: "Let's have a little torture today, so that we have much less torture in the future." Rather, the prohibition is a constraint. In the pursuit of goals, there are trade-offs, as the utilitarians like to say. The constraints are the borders – the limits – within which those goals are pursued. To quote my hero once again, Lincoln said, "As I would not be a slave, so I would not be a master." As I would not be tortured, so I would not be a torturer. Survival is not simply a matter of physical survival; what we survive *to be* matters. Respecting the absolute prohibition against torture describes the kind of human being that it is worth trying to be.

Caravaggio (Michelangelo Merisi da), *Flagellation of Christ*. S. Domenico Maggiore, Naples, Italy. Photo credit: Scala/Art Resource.

Gregory Fried

Although we state that, unlike torture, violations of privacy such as surveillance and eavesdropping are wrong because they are illegal, we are not making a purely relativistic argument about the latter. We believe there is a core value of privacy. Any decent society that respects fundamental principles will give its people some refuge of privacy to which they may retreat; that is a necessity of the human condition. However, the contours of that region of privacy must depend

somewhat on the traditions of the society in question as well as the level of technological progress in that society. A society without telephones, recording machines, or the Internet is very different than one that uses such technology. For a state to employ its investigative and prosecutorial powers, its duly appointed officers must have some capacity to invade the established zone of privacy. We believe, therefore, that while privacy is an important value, it is not an absolute one. In that sense, it differs from the prohibition on torture.

The third main subject of our book is executive authority. Our work on the first two topics led us to the realization that the world after 9/11, which has pushed us into these divisive questions on surveillance and torture, has also ushered in a crisis in how the American people relate to the concept of executive power. That crisis is embodied by some of the arguments the Bush administration made, particularly in its defense of torture. To what extent is any duly appointed officer of the law responsible for upholding the rule of law? In other words, is the rule of

law absolute in the same way that the prohibition on torture is absolute? Surprisingly, we argue in our book that the answer is no: officers of the law are sometimes required to break certain laws – not all laws, but some laws.

One example we use in the book is a story reported in *The Boston Globe* in early Winter 2008. A pregnant woman named Jennifer Davis had the misfortune of going into labor during rush hour, and there was a traffic jam along the route to the hospital. Her husband drove in the breakdown lane, which is against the law in the state of Massachusetts. They ran into one state trooper, who saw that Davis was in labor and waved them through. They ran into another state trooper, paused, and he waved them through. They ran into a third state trooper, who stopped them, saw that Davis was in labor, and then wrote them a ticket. The State Police of Massachusetts said the officer had made a principled decision based on his understanding of the rule of law. They were breaking the law; he had to write them a ticket.

Many people are reluctant to admit that torture is an absolute prohibition.

Aristotle said there is a principle of equity or reasonableness in the law, and that is because there is no such thing as a law that can anticipate all the possible conditions in which it could be applied. In the context of Jennifer Davis getting to the hospital, any reasonable agent of the law would have said that Jennifer should be waved through, and the law on driving in the breakdown lane ignored. Because it is impossible to write all conceivable exceptions into the law, people who have a responsibility to the law need to be able to judge when it should be ignored. But this principle can be dangerous, too, in a liberal democracy dedicated to the rule of law.

How do we get out of this bind? Presidents Jefferson and Lincoln provide good examples. In 1807, after the Chesapeake Affair in which a British warship fired on an American warship, Jefferson faced the real possibility that the United States would go to war with Great Britain in a very unprepared state. Therefore, he took it upon himself to requisition the funds to reequip our fortresses and navies. In doing so, he violated the Constitution, which states that only Congress has the authority to requisition such funds. He went to Congress, acknowledged his clear violation of the law, and asked Congress to ratify what he had done.

Abraham Lincoln acted similarly when he suspended habeas corpus, which only Congress can do, at the outset of the Civil War. He recognized this violation, and Congress ratified the suspension. In the same way, a police officer who not only waves a pregnant woman through but escorts her to the hospital, should tell his or her boss, "Chief, here are my badge and gun. If you think what I have done is wrong, accept my resignation." Presumably, the chief would say, "Forget about it. Take your badge, take your gun, and get back to work."

To repair the breach in the rule of law, those responsible must recognize their violations and seek reconciliation through the avenues available to them.

Charles Fried

We are left with a couple of dilemmas. What of the situation in which the president asks Congress to ratify his violations and heal the rule of law *nunc pro tunc*, as we lawyers say, and Congress does nothing? Congress ratified Bush's violation of FISA, but it certainly did not approve torture. Indeed, at the insistence of Senator McCain, Congress reconfirmed its prohibition. What happens in this case?

Greg had a wonderful idea for handling this situation that I think is genuinely patentable. The president should say, "Look, we've got

We believe that while privacy is an important value, it is not an absolute one. In that sense, it differs from the prohibition on torture.

to fix this somehow, and you won't do anything. I have drawn up my own articles of impeachment to present to the House Judiciary Committee." If Congress then fails to act, he ought to relax. Bush presented the FISA case before Congress, albeit kicking and screaming. With respect to approving the use of torture, however, Bush sought no congressional authorization. How is this breach to be healed? Gregory has one view.

Gregory Fried

It is important to underline that these are extremely difficult questions. Not only is the act of torture a serious crime, but also, the theory of presidential power employed by the Bush administration is utterly contrary to fundamental American principles. Namely, the administration advanced the doctrine that in his role as commander in chief, the president is unable to break a law because no law can stand before a president seeking to secure national security.

The engagement in torture and the serious refutation of this country's balance of powers deserve repudiation. In our system, crimes and faulty legal philosophies are repudiated through prosecution.

Charles Fried

I am convinced that there will be no prosecutions; indeed, there should not be. I have lived through Watergate, Billygate, Iran-Contra, the farce of Whitewater, and the Monica Lewinsky scandal, and history makes quite clear that in a functioning democracy, there is a very good reason why those who have ousted the persons before them should not try to put their predecessors in jail. If we started down that path,

then those in power might be tempted never to give it up because of the risks that would befall them. Or, they would await their chance to prosecute the next group. The process would create a terrible Orestian cycle.

We must remember that Vice President Cheney, Attorney General Gonzalez, and Secretary of Defense Rumsfeld, though they authorized terrible practices on an inadmissible theory, were not Hitler; they were not Pol Pot. They were trying to protect us against enemies who did not hesitate to torture and kill as many innocent people as possible. They made bad judgments, which must be repudiated. But if we pursued criminal prosecutions, they would not even begin until well into the second Palin administration! Furthermore, prosecutions might result in acquittals. Then where would we be? We have to find some other way. I think President Obama, who seems to share my distaste for criminal

To what extent is any duly appointed officer of the law responsible for upholding the rule of law?

prosecutions in this case, ought to issue a pardon to Rumsfeld, Cheney, and Gonzalez, stating that they have committed crimes but are being pardoned. There is a precedent for this idea; it is what Gerald Ford did for Richard Nixon, and it was an act of great wisdom and great courage. Ford's proclamation was the best case that could have been made against prosecution.

Michael Boudin

The central message of your book is that torture is absolutely wrong. Making the absolutist argument, you begin with the dramatic reproduction of a painting that shows fascist officers torturing a victim who is hung upside down, naked, in a cell; then you say the basis for your contention is not

aesthetic or emotional. You invoke the image of God and quote from the Scriptures; then you say the argument is not premised on a religious foundation. You reject, rather flatly, the suggestion that it is necessary to establish pragmatically that torture is always wrong. You believe it is wrong even if it is useful. What do you say to someone who maintains that your view is a personal intuition that he or she does not happen to share? How do you persuade that person?

Charles Fried

The chapter that discusses torture is directed at changing the reader's intuition, and it does that, first, evocatively, as in the examples you mentioned, but then rationally. The rational argument is that accepting moral constraints on one's choices in behavior is not unreasonable or unusual. Torture can easily be put on the list of things that most people would not do.

Gregory Fried

To return to my father's citing of Bob Nozick's wonderful line that an argument is not a machine gun, there is a point at which one cannot force people to share one's intuition. That said, the United States has had a long tradition of eschewing torture, from the Bill of Rights and its prohibition on cruel and unusual punishment to George Washington's proclamation after the Battle of Princeton that the Hessians, who had treated American soldiers with great cruelty, should not be treated with similar cruelty.

Of course, there have been departures from that tradition in American history. To the skeptic, I would pose the questions: What are the habits of thought and conduct that are necessary to a democratic republic? What instincts and intuitions are necessary to the people of a democratic republic? Repugnance against torture, I would argue, must be one of those instincts.

This is a quasi-Burkean argument in favor of the prohibition against torture. Torture is the practice of tyrannies. If we engage in

one of the most singular habits of tyranny, we should not imagine that the utilitarian calculus of rationalists will preserve us from it infecting all other branches of our civic life. Torture is a powerful venom; once it enters the system, it eats away at the fundamental habits and traits of a democratic people.

Is the rule of law absolute in the same way that the prohibition on torture is absolute?

Michael Boudin

Imagine a scenario in which a president is faced with a ticking nuclear bomb and a villain who says, "I've planted the bomb. It's going to go off in some large city. I know where it is, and you can't make me tell you." Couldn't a president who failed to waterboard the villain, or let loose the people with pliers to tear out his thumbnails, watch the city explode and think that he or she had acted immorally?

Gregory Fried

The problem with ethics is that sometimes it puts us in a position where we do not want to be; it forces us to ask ourselves, what would I do in a situation like that? This scenario reminds me of some of the castaway lifeboat cases of the nineteenth century, in which people ate one or more of the other people there. No one would say the castaways had done the right thing, but they might be excused. When people who are under enormous pressure and strain act wrongfully, they might still be pardoned on account of the circumstances. But this answer presents a problem for our argument because it seems to offer a get-out-of-jail-free card.

In this world, things pass away; but that does not mean we should not stand fast by our core principles. There are some fundamentals that define us as a nation, and I believe

that the prohibition on torture is one of them. We can give ourselves up in more ways than physical destruction. That's a hard thing to hold to in the moment of disaster, but I believe that's where we need to take our stance.

Question

We think of torture in terms of examples we can articulate and get our arms around, but there are circumstances in which our finite thinking needs to be replaced with infinite thinking – a magnitude of scale vastly beyond what we normally deal with. Suppose someone has invented an Earth-ending weapon. There is a prisoner in our midst, and we do not know for certain whether we will get the answer required to stop the bomb if we torture him. Under those circumstances, should the president insist on torturing the prisoner for the purpose of saving civilization? My answer is that he should.

Accepting moral constraints on one's choices in behavior is not unreasonable or unusual. Torture can easily be put on the list of things that most people would not do.

Charles Fried

The hypothetical is that there would simply be no world left afterwards? I want to say I am unmoved. I don't want to give the reasons that come crowding to my mind: What if just one continent was at risk? What if there were four hundred people who might have information? There are infinite possible circumstances. I'm inclined simply not to go there at all, and live with my answer. After all, the world will end, though almost certainly not in your scenario. Maybe it is best that the world not end with torture.

Question

Do you understand torture to mean deliberately inflicting tremendous pain on someone for a purpose, to get them to do something or expose information over a prolonged period of time?

Charles Fried

The chapter called "Bordering on Torture" confronts the difficult question of defining what constitutes torture. I will offer two answers. First, there are bound to be borderline questions. Take, for example, the question, "Are you bald?" Some people are clearly bald; some people are clearly not at all bald; and then there are the difficult in-between cases. Your question demands that we try to move beyond the ostensive definition. Second, I see a difference between torture and saying to a person who has been captured, "Look, if you don't help us, you will never see your wife and children and home again; you will be in prison for the rest of your life." I see a difference between addressing the will of the person and seeking simply to destroy it, so that he is no longer a person capable of thought or choice.

Question

Your argument seems to focus on torture that takes place once someone is captured. Now suppose you had to kill a person to stop him from shooting and killing another person. Then imagine that instead of killing the would-be shooter, you could incapacitate him by imposing physical pain for a certain period of time, perhaps for many hours. If you have the choice between killing the person to stop him from shooting someone or torturing him in that way, do you think it would be correct to kill him rather than torture him?

Charles Fried

Yes.

What are the habits of thought and conduct that are necessary to a democratic republic? Repugnance against torture, we would argue, must be one of those instincts.

Comment

I think it is torture to stop a person from killing someone else by inflicting terrible pain on him. Charles Fried says that this behavior also would be impermissible, but it doesn't strike me as impermissible.

Charles Fried

I think we do, in fact, acknowledge that distinction. In war, we have outlawed certain kinds of bullets because they cause terrible wounds that cannot be healed. We have forbidden poison gas on the same principle. In the early 1960s, philosopher Jack Rawls said his most awful experience in World War II was using flamethrowers to flush Japanese soldiers out of their cave. He said, "I'd rather encounter them in battle than do that."

Comment

The two paintings that you use as central illustrations in your book depict the kinds of torture that are not among the techniques we are worried about today, the ones that generated your book and this conversation. The United States did not use the rack and the screw. They used waterboarding, sleep deprivation, sensory deprivation, and solitary confinement for extended periods of time. The Bush administration never publicly took the classic position of "yes, it's torture, but it's permissible because we're trying to save the world." Rather, the consistent argument was that it wasn't torture. Waterboarding is very bad, but the UN Convention itself offers wiggle room, suggesting there is a category of cruel and inhumane methods of interrogation that are not torture.

Pictures of a doctor watching somebody being waterboarded would ask people to think about what actually occurred and who was responsible, particularly in terms of professional responsibility. Ultimately, we are talking about the CIA's use of so-called professional interrogators and whether that constitutes torture. If it does, then the fact that nobody has been prosecuted is horrific. But I also think it's horrific to say that torture is depicted by the images in your book, and so long as we are not doing that, it's merely cruel and inhumane and therefore subject to different modes of legal analysis.

Gregory Fried

Some of the chapters in Jane Mayer's book *The Dark Side* help explain the genesis of the actual procedures that the United States used. Methodologies like sensory deprivation, sleep deprivation, and forcing prisoners to stand for long periods of time were used by the Nazis, Stalin, and North Korea to induce insanity in their prisoners – to leave them gibbering mounds of flesh. These

Torture is a powerful venom; once it enters the system, it eats away at the fundamental habits and traits of a democratic people.

practices were all adopted by the people in the Bush administration as ways of softening up people to get them ready for interrogation. They have long been recognized as torture. After World War II we executed Nazis for using these "no blood, no foul" techniques.

The Jay Bybee memos of August 1, 2002, authorized not only waterboarding, which receives the most attention, but also stress positions and sleep deprivation, which were used by the Inquisition, the Gestapo, and Franco; exposure to extreme cold and heat; sensory deprivation, which was used on American citizen Jose Padilla, who went insane as a result; putting insects into cells

with prisoners; isolation in windowless cells for up to months at a time; forced nakedness, diapering, and slapping; the use of dogs to terrorize prisoners; and chaining prisoners to the floor and forcing them to defecate on themselves. According to a Senate Armed Services Committee report, those practices were all directly approved at the highest level. All that we see in the photos from Abu Ghraib are extensions of the techniques that those soldiers saw being used by duly appointed torturers. The techniques are incredibly insidious, and they constitute torture by the tradition of American law. Indeed, waterboarding was considered torture until the United States began to use it.

Charles Fried

The supposed benign quality of waterboarding is much belied by the fact that at least one person was waterboarded 187 times. The powers that were involved decided that they should use saline because the use of water risked causing the subject's death. The notion that waterboarding is not torture is unacceptable.

Gregory Fried

It has been documented that these other techniques, including exposure to extreme heat and cold and stress positions, have resulted in the deaths of people in our capture. Those are serious war crimes.

Charles Fried

I would like to come back to our rough definition of torture. Torture is that which does not seek to persuade the will, even in terms of what the mafia would refer to as "an offer you can't refuse." It is the employment of techniques meant to destroy the will, to drive the person mad.

Question

I have criticized the premature use of technologies for brain reading. But is the mind a privileged island of privacy, or is it permissible to develop these technologies for obtaining knowledge from guilty parties as an alternative to torture?

Torture is that which does not seek to persuade the will. It is the employment of techniques meant to destroy the will, to drive the person mad.

Charles Fried

The Fourth Amendment, which embodies our commitment to privacy, prohibits only unreasonable searches and seizures and search or seizure without a warrant. This stricture assumes that even your private diaries can be searched and seized with judicial authorization. To me, that is different from the torture that destroys you.

Gregory Fried

I think there may be a point at which we will need a warrant to do brain scans. The caveat is that these methods are potentially so invasive, and so unaccountable – both in the sense of who has them and also in the sense of where they are being used and how we know they are being used – that the public could reasonably sense that our island of privacy is being shrunk to zero, even if it isn't really. The development of those techniques is extremely dangerous and would need careful monitoring.

If it could save us from the situation in which either the world disappears into a black hole or we get world-saving information from a prisoner, I think I would prefer to have the prisoner's brain scanned. Those yet undeveloped techniques, wedded to other techniques that have been proven by many sources, may be our best bet for avoiding such nightmare scenarios. ◼

Noteworthy

As of press time, several Fellows of the Academy, listed below, had been nominated or appointed to key posts in the Obama administration:

Henry J. Aaron (Brookings Institution): Chair, Social Security Advisory Board

John T. Casteen III (University of Virginia): Member of the Board of Trustees of the Woodrow Wilson International Center for Scholars

Kenneth I. Chenault (American Express Company): Member, President's Council on Jobs and Competitiveness

Rita Colwell (University of Maryland; Canon U.S. Life Sciences, Inc.): U.S. Science Envoy

John Doerr (Kleiner Perkins Caufield & Byers): Member, President's Council on Jobs and Competitiveness

Roger W. Ferguson, Jr. (TIAA-CREF): Member, President's Council on Jobs and Competitiveness

Joseph S. Francisco (American Chemical Society; Purdue University): Member, President's Committee on the National Medal of Science

Alice Gast (Lehigh University): U.S. Science Envoy

Agnes Gund (Museum of Modern Art): Member, National Council on the Arts

William R. Hambrecht (WR Hambrecht + Co): Member, Board of Directors of the Presidio Trust

Jeffrey R. Immelt (General Electric): Chair, President's Council on Jobs and Competitiveness

Eric S. Lander (Broad Institute of MIT and Harvard): Member, President's Council on Jobs and Competitiveness

W. James McNerney, Jr. (The Boeing Company): Member, President's Council on Jobs and Competitiveness

Daniel Meltzer (Harvard Law School): Member, President's Intelligence Advisory Board

Margaret Murnane (JILA; University of Colorado): Member, President's Committee on the National Medal of Science

Richard D. Parsons (Citigroup, Inc.): Member, President's Council on Jobs and Competitiveness

Paul Sagan (Akamai Technologies): Member, President's National Security Telecommunications Advisory Committee

Robert Sampson (Harvard University): Member, Office of Justice Programs Science Advisory Board

Laura D'Andrea Tyson (University of California, Berkeley): Member, President's Council on Jobs and Competitiveness

Luis Ubiñas (Ford Foundation): Member, Advisory Committee for Trade Policy and Negotiations

Elizabeth Warren (Harvard Law School): Special Adviser, Bureau of Consumer Financial Protection

Carl Wieman (University of British Columbia): Associate Director for Science, White House Office of Science and Technology Policy

Select Prizes and Awards

Nobel Prizes, 2010

Economics

Peter A. Diamond (Massachusetts Institute of Technology)

Dale T. Mortensen (Northwestern University)

Presidential Medal of Freedom

Warren Buffett (Berkshire Hathaway)

Jasper Johns (Sharon, CT)

Yo-Yo Ma (Cambridge, MA)

National Medal of Science

Stephen J. Benkovic (Pennsylvania State University)

Esther M. Conwell (University of Rochester)

Marye Anne Fox (University of California, San Diego)

Susan L. Lindquist (Whitehead Institute for Biomedical Research; Massachusetts Institute of Technology)

Mortimer Mishkin (National Institutes of Health)

Stanley B. Prusiner (University of California, San Francisco)

Warren M. Washington (National Center for Atmospheric Research)

Amnon Yariv (California Institute of Technology)

Other Awards

Linda Abriola (Tufts University) has been recognized in the encyclopedia *American Women of Science since 1900*.

Chinua Achebe (Bard College) was awarded the 2010 Dorothy and Lillian Gish Prize.

Bruce Alberts (University of California, San Francisco; *Science*) is among the recipients of the 2010 George Brown Award for International Scientific Cooperation given by CRDF Global.

Alan Alda (New York, NY) is among the recipients of the 2010 AAAS Kavli Science Journalism Awards.

Nancy Andrews (Duke University School of Medicine) was awarded the 2010 Vanderbilt Prize in Biomedical Science.

David Awschalom (University of California, Santa Barbara) received the Turnbull Lecturer Award from the Materials Research Society.

Peter Beak (University of Illinois at Urbana-Champaign) was elected a Fellow of the American Chemical Society.

Stephen J. Benkovic (Pennsylvania State University) is the recipient of the 2011 National Academy of Sciences Award in Chemical Sciences.

Archie Brown (University of Oxford) has been awarded the 2010 W. J. M. Mackenzie Prize of the Political Studies Association of the United Kingdom (PSA) for his book *The Rise and Fall of Communism*. He also received the Diamond Jubilee Award for Lifetime Achievement in Political Studies from the PSA.

Theodore Lawrence Brown (University of Illinois at Urbana-Champaign) was elected a Fellow of the American Chemical Society.

Federico Capasso (Harvard University) won the 2010 Julius Springer Prize for Applied Physics.

Hal Caswell (Woods Hole Oceanographic Institution) is the recipient of a 2010 Humboldt Research Award by the Alexander von Humboldt Foundation.

Alexandre Chorin (University of California, Berkeley) was awarded the 2011 ICIAM Lagrange Prize.

Francis Ford Coppola (American Zoetrope/Francis Ford Coppola Presents, LLC) is the recipient of the Irving G. Thalberg Memorial Award given by the Board of Governors of the Academy of Motion Picture Arts and Sciences.

Gretchen Daily (Stanford University) is among the recipients of the 16th Heinz Awards.

Antonio Damasio (University of Southern California) was awarded the Honda Prize by the Honda Foundation of Japan.

Ingrid Daubechies (Princeton University) was awarded the 2011 Benjamin Franklin Medal in Electrical Engineering by the Franklin Institute.

Titia de Lange (Rockefeller University) is the recipient of the 2011 Vilcek Prize in Biomedical Science.

Noteworthy

Joseph M. DeSimone (North Carolina State University; University of North Carolina at Chapel Hill) received the 2010 Mentor Award from the American Association for the Advancement of Science.

Richard Eisenberg (University of Rochester) was awarded the 2011 Nobel Laureate Signature Award for Graduate Education in Chemistry by the American Chemical Society.

Sandra Faber (University of California, Santa Cruz) was awarded the 2011 Henry Norris Russell Lectureship by the American Astronomical Society.

Loren Ghiglione (Northwestern University) was named the winner of the 2010 Distinguished Service to Journalism History Award given by the American Journalism Historians Association.

Carlo Ginzburg (University of California, Los Angeles) was awarded the 2010 Balzan Prize for European History.

Vartan Gregorian (Carnegie Corporation of New York) received the Aspen Institute's Henry Crown Leadership Award.

James Haber (Brandeis University) was awarded the Thomas Hunt Morgan Medal for Lifetime Achievement in Genetics by the Genetics Society of America.

Thomas Hampson (Hampson Foundation) is the recipient of the Living Legend Award given by the Library of Congress.

Ulf Hannerz (Stockholm University) was awarded the 2010 Anders Retzius Medal by the Swedish Society for Anthropology and Geography.

John Hennessy (Stanford University) is the recipient of the 2010 Dr. Morris Chang Exemplary Leadership Award given by the Global Semiconductor Alliance.

Susan Band Horwitz (Albert Einstein College of Medicine of Yeshiva University) received the Lifetime Achievement Award in Cancer Research from the American Association for Cancer Research.

Toyo Ito (Toyo Ito & Associates, Architects) was named a 2010 Praemium Imperiale Laureate for Architecture by the Japan Art Association.

Anita Jones (University of Virginia) is the recipient of the National Academy of Engineering Arthur M. Bueche Award.

Bill T. Jones (Bill T. Jones/Arnie Zane Dance Company) is among the recipients of the 2010 Kennedy Center Honors.

Mary-Claire King (University of Washington) was awarded the 2010 Pearl Meister Greengard Prize by the Rockefeller University. She shares the prize with **Janet Davison Rowley** (University of Chicago).

Robert P. Kirshner (Harvard University) was awarded the Dannie Heineman Prize in Astrophysics, given by the American Astronomical Society and the American Institute of Physics.

Stuart A. Kornfeld (Washington University School of Medicine) is the recipient of the E. B. Wilson Medal awarded by the American Society for Cell Biology.

Robert Langer (Massachusetts Institute of Technology) is the recipient of the National Academy of Engineering Founders Award.

Leonard Lauder (Estée Lauder Companies) received the Aspen Institute's Corporate Leadership Award.

Joseph LeDoux (New York University) is the recipient of a Distinguished Scientific Award given by the American Psychological Association.

James C. Lehrer (NewsHour with Jim Lehrer) received the Aspen Institute's Public Service Award.

Susan L. Lindquist (Whitehead Institute for Biomedical Research; Massachusetts Institute of Technology) is the 2010 recipient of the Max Delbrück Medal.

Yves Meyer (École Normale Supérieure de Cachan, France) was awarded the 2010 Carl Friedrich Gauss Prize for Applied Mathematics.

Harold Mooney (Stanford University) is the recipient of the 2010 Volvo Environment Prize.

Jeffrey Moore (University of Illinois at Urbana-Champaign) was elected a Fellow of the American Chemical Society.

K. C. Nicolaou (Scripps Research Institute; University of California, San Diego) was awarded the 2011 Benjamin Franklin Medal in Chemistry by the Franklin Institute.

Louis Nirenberg (New York University) is the recipient of the 2010 Chern Medal, given by the International Mathematical Union and the Chern Medal Foundation.

Emiko Ohnuki-Tierney (University of Wisconsin-Madison) was elected a Fellow of the Institut d'Etudes Avancées-Paris for her project on aesthetic and militarism in comparative perspective. Her research focuses on its development in France.

Bert O'Malley (Baylor College of Medicine) is the 2011 recipient of the Ernst Schering Prize, awarded by the Ernst Schering Foundation.

Elinor Ostrom (Indiana University) received the Diamond Jubilee Award for Lifetime Achievement in Political Studies from the Political Studies Association of the United Kingdom.

Saul Perlmutter (University of California, Berkeley) was awarded the 2011 Einstein Medal by the Albert Einstein Society of Bern, Switzerland. He shares the prize with **Adam Riess** (Johns Hopkins University).

Francine Prose (New York, NY) was awarded the Washington University International Humanities Medal.

Marcus E. Raichle (Washington University in St. Louis School of Medicine) is among the recipients of the MetLife Foundation Awards for Medical Research in Alzheimer's Disease.

Calyampudi Radakrishna Rao (C.R. Rao Advanced Institute of Mathematics, Statistics and Computer Science, India) is the recipient of the India Science Award.

Adam Riess (Johns Hopkins University) was awarded the 2011 Einstein Medal by the Albert Einstein Society of Bern, Switzerland. He shares the prize with **Saul Perlmutter** (University of California, Berkeley).

Ronald L. Rivest (Massachusetts Institute of Technology) is the recipient of the James R. Killian, Jr., Faculty Achievement Award given by MIT.

Janet Davison Rowley (University of Chicago) was awarded the 2010 Pearl Meister Greengard Prize by the Rockefeller University. She shares the prize with **Mary-Claire King** (University of Washington).

Emmanuel Saez (University of California, Berkeley) was awarded a MacArthur Fellowship.

Robert Sampson (Harvard University) was awarded the 2011 Stockholm Prize in Criminology. He shares the prize with John Laub (National Institute of Justice).

William H. Schlesinger (Cary Institute of Ecosystem Studies) is the 2010 recipient of the Sustained Achievement Award given by the Renewable Natural Resources Foundation.

Kay Kaufman Shelemay (Harvard University) was awarded the 2010 Jaap Kunst Prize.

Ernest Sosa (Rutgers University) was awarded the Nicholas Rescher Prize for Contributions to Systematic Philosophy by the University of Pittsburgh.

Steven Squyres (Cornell University) is the recipient of the 2010 Eugene Shoemaker Memorial Award, presented by Arizona State University.

James Stimson (University of North Carolina at Chapel Hill) was awarded the 2010 Warren E. Miller Prize from the American Political Science Association.

John Meurig Thomas (University of Cambridge, UK) was awarded the 2010 Bragg Prize Lectureship of the British Crystallographic Association, the 2010 Sven Berggren Prize Lectureship of the Royal Physiographic Academy of Lund, and the 2010 Ertl Prize Lectureship of the Max Planck Gesellschaft.

David J. Weatherall (University of Oxford, UK) is the recipient of the 2010 Lasker~Koshland Award for Special Achievement in Medical Science.

E. O. Wilson (Harvard University) was awarded the Henry David Thoreau Prize for Literary Excellence in Nature Writing by PEN New England.

Peter Wolczanski (Cornell University) is the recipient of the 2011 National Award in Organometallic Chemistry from the American Chemical Society.

Adam Zagajewski (University of Chicago) is the recipient of the European Poetry Prize, awarded by the Cassamarca Foundation.

New Appointments

Fellows appointed to the Scientific Advisory Board of Immune Design

David Baltimore (California Institute of Technology)

Richard Klausner (Column Group)

Inder Verma (Salk Institute)

Other New Appointments

David Bloom (Harvard School of Public Health) was appointed to the Board of Directors of Population Services International (PSI).

Lee C. Bollinger (Columbia University) was named Chairman of the Board of Directors of the Federal Reserve Bank of New York.

Gary Borisy (Marine Biological Laboratory) was appointed as a Head of Faculty for Cell Biology within Faculty of 1000 (F1000).

Alan Brinkley (Columbia University) was named Chairman of the Board of Trustees of the National Humanities Center.

Emily Carter (Princeton University) has been appointed the Founding Director of the Andlinger Center for Energy and the Environment at Princeton University.

Geoffrey Cowan (University of Southern California) has been named President of the Annenberg Foundation Trust at Sunnylands.

Alan M. Dachs (Fremont Group) has been elected Chairman of the Board of Trustees of The Conference Board.

William F. DeGrado (University of Pennsylvania) was named to the Scientific Advisory Board of PolyMedix, Inc.

Susan Desmond-Hellmann (University of California, San Francisco) was named to the Board of Directors of Procter & Gamble.

J. Larry Jameson (Northwestern University) has been named Executive Vice President of the University of Pennsylvania for the Health System and Dean of the University of Pennsylvania School of Medicine.

Stephen M. Kosslyn (Harvard University) was appointed Director of the Center for Advanced Study in the Behavioral Sciences at Stanford University.

Kent Kresa (Northrop Grumman Corporation) was named Chairman of the Board of Directors of the Music Center.

Michael A. Marletta (University of California, Berkeley) has been named President of the Scripps Research Institute.

Michael L. Norman (University of California, San Diego) has been named Director of the San Diego Supercomputer Center at the University of California, San Diego.

Larry Page (Google Inc.) has been named Chief Executive Officer of Google.

David Rockefeller, Jr. (Rockefeller Financial Services, Inc.) was named Board Chair of the Rockefeller Foundation.

Gerald Rosenfeld (Rothschild North America; New York University) is Strategic Advisor and Vice Chairman of United States Investment Banking at Lazard Ltd.

Steven Rosenstone (University of Minnesota) was named Chancellor of the Minnesota State Colleges and Universities.

Eric Schmidt (Google Inc.) has been named Executive Chairman of the Board of Google.

Larry J. Shapiro (Washington University in St. Louis School of Medicine) was elected Chair of the Board of Directors of the Association of Academic Health Centers.

Margaret C. Simms (Urban Institute) was named to the Board of Trustees of Carleton College.

Luis Ubiñas (Ford Foundation) has been appointed to the Board of Directors of Electronic Arts Inc.

Susan R. Wessler (University of California, Riverside) has been elected Home Secretary of the National Academy of Sciences.

Select Publications

Poetry

Charles Simic (University of New Hampshire). *Master of Disguises.* Houghton Mifflin Harcourt, October 2010

Richard Wilbur (Smith College). *Anterooms: New Poems and Translations.* Houghton Mifflin Harcourt, November 2010

C.D. Wright (Brown University). *One with Others.* Copper Canyon Press, October 2010

Fiction

Seamus Heaney (Dublin, Ireland). *Human Chain.* Farrar, Straus and Giroux, September 2010

Ward Just (Vineyard Haven, MA). *Rodin's Debutante.* Houghton Mifflin Harcourt, March 2011

Steve Martin (Beverly Hills, CA). *An Object of Beauty: A Novel.* Grand Central Press, November 2010

Philip Roth (New York, NY). *Nemesis.* Houghton Mifflin Harcourt, October 2010

Garry B. Trudeau (New York, NY). *40: A Doonesbury Retrospective.* Andrews McMeel Publishing, October 2010

Nonfiction

Kwame Anthony Appiah (Princeton University). *The Honor Code: How Moral Revolutions Happen.* W.W. Norton, September 2010

Francisco J. Ayala (University of California, Irvine). *Am I a Monkey? Six Big Questions About Evolution.* Johns Hopkins University Press, October 2010

Leo Braudy (University of Southern California). *The Hollywood Sign: Fantasy and Reality of an American Icon.* Yale University Press, February 2011

Noam Chomsky (Massachusetts Institute of Technology) and Ilan Pappé (University of Exeter, UK). *Gaza in Crisis: Reflections on Israel's War Against the Palestinians.* Haymarket Books, November 2010

Donald D. Clayton (Clemson University). *Catch a Falling Star.* iUniverse, November 2009

Antonio Damasio (University of Southern California). *Self Comes to Mind: Constructing the Conscious Brain.* Pantheon, November 2010

Jacques d'Amboise (National Dance Institute). *I Was a Dancer: A Memoir.* Knopf, February 2011

Freeman Dyson (Institute for Advanced Study), editor. *The Best American Science and Nature Writing 2010.* Houghton Mifflin Harcourt, October 2010

Elizabeth L. Eisenstein (University of Michigan). *Divine Art, Infernal Machine: The Reception of Printing in the West from First Impressions to the Sense of an Ending.* University of Pennsylvania Press, December 2010

Daniel A. Farber (University of California, Berkeley) and Anne Joseph O'Connell (University of California, Berkeley), editors. *Research Handbook on Public Choice and Public Law.* Edward Elgar Publishing, September 2010

Eric Foner (Columbia University). *The Fiery Trial: Abraham Lincoln and American Slavery.* W.W. Norton, October 2010

Noteworthy

William A. Galston (Brookings Institution) and Peter H. Hoffenberg (University of Hawaii at Manoa), editors. *Poverty and Morality: Religious and Secular Perspectives.* Cambridge University Press, November 2010

Anthony Grafton (Princeton University) and Joanna Weinberg (University of Oxford, UK). *"I Have Always Loved the Holy Tongue": Isaac Casaubon, the Jews, and a Forgotten Chapter in Renaissance Scholarship.* Belknap Press of Harvard University Press, January 2011

Stephen Greenblatt (Harvard University). *Shakespeare's Freedom.* University of Chicago Press, November 2010

Charlotte Greenspan (Ithaca, NY; Academy Scholar in Residence, 2010). *Pick Yourself Up: Dorothy Fields and the American Musical.* Oxford University Press, July 2010

Edith Grossman (New York, NY). *Why Translation Matters.* Yale University Press, December 2010

Ulf Hannerz (Stockholm University). *Anthropology's World: Life in a Twenty-First Century Discipline.* Pluto Press, August 2010

Stephen Hawking (University of Cambridge, UK) and Leonard Mlodinow (California Institute of Technology). *The Grand Design.* Bantam, September 2010

Thomas C. Holt (University of Chicago). *Children of Fire: A History of African Americans.* Farrar, Straus and Giroux, October 2010

Maxine Hong Kingston (University of California, Berkeley). *I Love a Broad Margin to My Life.* Harvill Press, March 2011

Wendy Lesser (*The Threepenny Review*). *Music for Silenced Voices: Shostakovich and His Fifteen Quartets.* Yale University Press, February 2011

Pauline Maier (Massachusetts Institute of Technology). *Ratification: The People Debate the Constitution, 1787–1788.* Simon & Schuster, October 2010

Nelson Mandela (Nelson Mandela Foundation). *Conversations with Myself.* Farrar, Straus and Giroux, October 2010

Steven E. Miller (Harvard University), Michael E. Brown (George Washington University), Owen R. Coté Jr. (Massachusetts Institute of Technology), and Sean M. Lynn-Jones (Harvard University), editors. *Contending with Terrorism: Roots, Strategies, and Responses.* MIT Press, July 2010

Martha Minow (Harvard Law School). *In Brown's Wake: Legacies of America's Educational Landmark.* Oxford University Press, August 2010

Gary Saul Morson (Northwestern University). *The Words of Others: From Quotations to Culture.* Yale University Press, April 2011

Guy Nordenson (Guy Nordenson and Associates). *Patterns and Structure: Selected Writings 1972–2008.* Lars Müller Publishers, September 2010

Guy Nordenson (Guy Nordenson and Associates), Catherine Seavitt (Catherine Seavitt Studio), and Adam Yarinsky (Architecture Research Office). *On the Water | Palisade Bay.* Hatje Cantz Verlag/MoMA Publications, January 2010

Robert B. Pippin (University of Chicago). *Hegel on Self-Consciousness: Desire and Death in the "Phenomenology of Spirit."* Princeton University Press, February 2011

Eric A. Posner (University of Chicago Law School). *Economics of Public International Law.* Edward Elgar Publishing, November 2010

Robert D. Putnam (Harvard University) and David E. Campbell (University of Notre Dame). *American Grace: How Religion Divides and Unites Us.* Simon & Schuster, October 2010

Harriet Ritvo (Massachusetts Institute of Technology). *Noble Cows and Hybrid Zebras: Essays on Animals and History.* University of Virginia Press, December 2010

Neena B. Schwartz (Northwestern University). *A Lab of My Own.* Rodopi, January 2010

David Sehat (Georgia State University; Academy Visiting Scholar, 2007–2008). *The Myth of American Religious Freedom.* Oxford University Press, January 2011

Jane Smiley (New York, NY). *The Man Who Invented the Computer: The Biography of John Atanasoff, Digital Pioneer.* Doubleday, October 2010

Robert M. Solow (Massachusetts Institute of Technology) and Jean-Philippe Touffut (Cournot Centre for Economic Studies, France), editors. *The Shape of the Division of Labour: Nations, Industries, and Households.* Edward Elgar Publishing, January 2011

Patricia Meyer Spacks (University of Virginia). *Pride and Prejudice: An Annotated Edition.* Belknap Press of Harvard University Press, October 2010

Jeffrey Stout (Princeton University). *Blessed are the Organized: Grassroots Democracy in America.* Princeton University Press, December 2010

John A. Swets (BBN Technologies). *Tulips to Thresholds: Counterpart Careers of the Author and Signal Detection Theory.* Peninsula Publishing, June 2010

Helen Vendler (Harvard University). *Dickinson: Selected Poems and Commentaries.* Belknap Press of Harvard University Press, September 2010

Garry Wills (Northwestern University). *Outside Looking In: Adventures of an Observer.* Viking, October 2010

Theodore Ziolkowski (Princeton University). *Die Welt im Gedicht: Rilkes Sonette an Orpheus II.4.* Koenigshausen & Neumann, July 2010

Theodore Ziolkowski (Princeton University). *Dresdner Romantik: Politik und Harmonie.* Universitätsverlag Winter, October 2010

Commissions

Guy Nordenson (Guy Nordenson and Associates) was the lead designer and structural engineer with Pelli Clarke Pelli Architects of the Hillhouse Pedestrian Bridges for Yale University in New Haven, CT.

Billie Tsien and **Tod Williams** (Tod Williams Billie Tsien Architects) have been chosen to design Princeton University's new Andlinger Center for Energy and the Environment.

We invite all Fellows and Foreign Honorary Members to send notices about their recent and forthcoming publications, scientific findings, exhibitions and performances, and honors and prizes to bulletin@amacad.org. ∎

Remembrance
It is with sadness that the Academy notes the passing of the following members. *

Thomas Julian Ahrens – November 24, 2010; elected to the Academy in 1995

John David Alexander – July 25, 2010; elected to the Academy in 2006

Neal Russell Amundson – February 16, 2011; elected to the Academy in 1992

Milton Byron Babbitt – January 29, 2011; elected to the Academy in 1974

Kurt Baier – October 24, 2010; elected to the Academy in 1975

Ralph Belknap Baldwin – October 23, 2010; elected to the Academy in 1980

Paul Frank Barbara – October 31, 2010; elected to the Academy in 1999

Daniel Bell – January 25, 2011; elected to the Academy in 1964

Jacob Bigeleisen – August 7, 2010; elected to the Academy in 1968

Adriaan Blaauw – December 1, 2010; elected to the Academy in 1973

Reinhold Brinkmann – October 10, 2010; elected to the Academy in 2002

Nicola Cabibbo – August 16, 2010; elected to the Academy in 1981

Britton Chance – November 16, 2010; elected to the Academy in 1955

William K. Coblentz – September 13, 2010; elected to the Academy in 2002

Robyn M. Dawes – December 14, 2010; elected to the Academy in 2002

Jacqueline de Romilly – December 18, 2010; elected to the Academy in 1988

William von Eggers Doering – January 3, 2011; elected to the Academy in 1954

Shmuel Noah Eisenstadt – September 2, 2010; elected to the Academy in 1968

Charles J. Epstein – February 15, 2011; elected to the Academy in 2004

John Bennett Fenn – December 10, 2010; elected to the Academy in 2000

Alfred Paul Fishman – October 6, 2010; elected to the Academy in 1996

Joseph Harold Flom – February 23, 2011; elected to the Academy in 2006

Philippa Ruth Foot – October 3, 2010; elected to the Academy in 1983

Philip P. Frickey – July 11, 2010; elected to the Academy in 2002

Albert Ghiorso – December 26, 2010; elected to the Academy in 1972

William H. Goetzmann – September 7, 2010; elected to the Academy in 2000

Eugene Goldwasser – December 17, 2010; elected to the Academy in 1991

Morris Goodman – November 4, 2010; elected to the Academy in 1996

Oleg Grabar – January 8, 2011; elected to the Academy in 1973

Louis Henkin – October 14, 2010; elected to the Academy in 1974

Walter Rollo Hibbard, Jr. – February 24, 2010; elected to the Academy in 1963

Richard C. Holbrooke – December 13, 2010; elected to the Academy in 2004

Bernard Leonard Horecker – October 10, 2010; elected to the Academy in 1962

John Peter Huchra – October 8, 2010; elected to the Academy in 1991

David Lee Hull – August 11, 2010; elected to the Academy in 1992

Robert Stephen Ingersoll – August 22, 2010; elected to the Academy in 1988

Alex Inkeles – July 9, 2010; elected to the Academy in 1962

Walter Isard – November 6, 2010; elected to the Academy in 1975

Chalmers Ashby Johnson – November 20, 2010; elected to the Academy in 1976

Tony Robert Judt – August 6, 2010; elected to the Academy in 1996

Alfred Edward Kahn – December 27, 2010; elected to the Academy in 1978

Benjamin Kaplan – August 18, 2010; elected to the Academy in 1958

Friedrich Katz – October 16, 2010; elected to the Academy in 2003

James Collyer Keck – August 9, 2010; elected to the Academy in 1973

John Frank Kermode – August 17, 2010; elected to the Academy in 1976

Richard Darwin Keynes – June 12, 2010; elected to the Academy in 1978

John Werner Kluge – September 7, 2010; elected to the Academy in 2002

Leon Knopoff – January 20, 2011; elected to the Academy in 1965

Bernard MacGregor Walker Knox – July 22, 2010; elected to the Academy in 1977

Mabel Louise Lang – July 21, 2010; elected to the Academy in 1981

Henry Lardy – August 4, 2010; elected to the Academy in 1965

Jack Levine – November 8, 2010; elected to the Academy in 1949

Romulus Linney – January 15, 2011; elected to the Academy in 1998

Guido Majno – May 27, 2010; elected to the Academy in 1977

Benoit B. Mandelbrot – October 14, 2010; elected to the Academy in 1982

Jerrold E. Marsden – September 21, 2010; elected to the Academy in 1997

John Emery Murdoch – September 16, 2010; elected to the Academy in 1973

Nathan J. Oliveira – November 13, 2010; elected to the Academy in 1994

Kenneth Harry Olsen – February 6, 2011; elected to the Academy in 1976

Martin Ostwald – April 10, 2010; elected to the Academy in 1991

Oscar Sala – January 2, 2010; elected to the Academy in 1988

Daniel Schorr – July 23, 2010; elected to the Academy in 2002

Eli Shapiro – December 4, 2010; elected to the Academy in 1955

Alfred William Brian Simpson – January 10, 2011; elected to the Academy in 1993

Melvin Ernest Stern – February 2, 2010; elected to the Academy in 1975

Robert Edward Lee Strider – November 28, 2010; elected to the Academy in 1962

James Mourilyan Tanner – August 11, 2010; elected to the Academy in 1993

Michael Tinkham – November 4, 2010; elected to the Academy in 1967

Robert Charles Tucker – July 29, 2010; elected to the Academy in 1975

Frederick Theodore Wall – March 31, 2010; elected to the Academy in 1966

David J. Weber – August 20, 2010; elected to the Academy in 2007

Sidney J. Weinberg, Jr. – October 4, 2010; elected to the Academy in 2005

George Christopher Williams – September 8, 2010; elected to the Academy in 1990

Bernhard Witkop – November 22, 2010; elected to the Academy in 1978

Arnold Zellner – August 11, 2010; elected to the Academy in 1979

Notice received from July 23, 2010, to February 24, 2011

Condoleezza Rice Visits the Academy

Former Secretary of State Reflects on the Importance of Public Service

On December 1, 2010, President Leslie C. Berlowitz welcomed and formally inducted into the Academy former Secretary of State Condoleezza Rice. Patricia Meyer Spacks, President of the Academy from 2001 – 2006, also officiated at the induction ceremony.

Dr. Rice, who was elected to the Academy in 1997 while serving as Provost of Stanford University, spoke about her perspectives on the importance of public service to a group of Fellows and members of MIT, Harvard, Boston University, and the W.E.B. Du Bois Institute for African and African American Research.

"It is not always the easiest transition, to go from the academy into the world of government, but it is one of the really great honors that one can have," said Rice. She noted that although cynicism toward public service may make it an unattractive option for some, she is encouraged by the passion and idealism exhibited by many young people on college campuses. "A great democracy cannot function without those who are devoted to trying to make it a better democracy."

During a wide-ranging conversation, Rice reflected on her career as a Soviet and East European affairs specialist, an academic administrator, White House National Security Advisor, and the nation's sixty-sixth Secretary of State. She also spoke about more recent events in North Korea and China, the role of science and technology in diplomacy, and arms control and the New START Treaty with Russia.

Asked about the tenor of contemporary politics, Rice remarked that "our politics has just gotten too fast and the volume is too loud. . . the questioning of the motives of our politicians, of our public servants, has reached a fever pitch." She stressed the need for a less partisan, more constructive public discourse about such critical issues as immigration reform and national economic policy. ■

Condoleezza Rice

Leslie Cohen Berlowitz named President of the Academy

Leslie Berlowitz has been named the 45th President of the American Academy of Arts and Sciences. She has led the Academy as Chief Executive Officer since 1996 and was elected a Fellow of the American Academy in 2004.

Louis W. Cabot, Chair of the Board, noted that Berlowitz has presided over an unprecedented period of accomplishment.

"Leslie has raised the visibility and impact of the organization. She has expanded the scope and size of the research programs; enhanced our publications; increased the engagement of members around the country; created innovative new fellowship programs for early-career scholars; established an archives to improve access to the Academy's records; and overseen the most successful fundraising effort in our history," Cabot said. "This new title reflects the value that the Board places in Leslie's leadership and our confidence in her ability to bring the Academy to new levels of distinction."

Berlowitz has helped to advance major Academy initiatives on energy policy, federal funding of science, the independence of the judiciary, and new norms for business practices. A national leader on humanities policy, she led the creation of the Academy's Humanities Initiative and its widely cited *Humanities Indicators*.

Berlowitz is currently directing the Academy's response to a congressional call to assess the state of the humanities and social sciences and their impact on the country's education system, economic competitiveness, and cultural diplomacy.

"It is a great privilege to serve the members of the Academy," Berlowitz said. "This is an historic organization with a vital contemporary mission. I am grateful to the officers and members for the faith they have placed in me and look forward to collaborating with the Board and the fellowship in the coming years as we work to serve the public good." ■