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Academy Report Explores the State of the Humanities in Higher Education



The Invention of Courts

*Jamal Greene, Carol S. Steiker, Susan S. Silbey,
Linda Greenhouse, Jonathan Lippman, and Judith Resnik*



The Unstable Biomedical Research Ecosystem: How Can It Be Made More Robust?

*Mark C. Fishman, Nancy C. Andrews, Sally Kornbluth,
Susan R. Wentz, Richard H. Brodhead, Harold Varmus,
and Tania Baker*

ALSO: Replenishing the Innovation Pipeline: The Role of University Research
Mr g – The Story of Creation as Told by God
Policy Perspective on the Police Use of Lethal Force
On the Professions
In Memoriam: David Frohnmayer

Upcoming Events

JUNE

15th

Washington, DC
The Ritz-Carlton Georgetown
*Reception for Washington, DC,
Area Fellows and Guests
Welcome Newly Elected Fellows*

OCTOBER

9th – 11th

Cambridge, MA

Induction Weekend

9th *A Celebration of the Arts
and Humanities*

10th *Induction Ceremony*

11th *Academic Symposium*

NOVEMBER

17th

Cambridge, MA
House of the Academy

**Chamber Series
in collaboration with the
Cantata Singers**

*Made in America: Songs by Barber,
Copland, and Fine*

For updates and additions to the calendar, visit www.amacad.org.

Special Thanks

We recently completed another successful fund-raising year with more than \$6.7 million raised. The Annual Fund surpassed \$1.7 million, a record-breaking total. Gifts from all other sources – including grants for projects – totaled more than \$5 million.

We are grateful for the generosity of an increasing number of contributors – including members, staff, and friends; foundations, corporations, and associations; and University Affiliates – who made these results possible. A complete list of contributors will be sent to all members in the fall and will also be available on the Academy's website.

From the President

In 1993, Academy President Leo Beranek wrote in the *Records of the Academy*, “The Academy was founded on the idea that this nation could be best served by an institution that avoided every narrow form of partisanship – one that sought to involve individuals whose interests were diverse, who espoused no single philosophy and belonged to no one profession. Today, as an institution free of public and private constraints, the Academy is uniquely situated to bring the intellectual resources of its membership to bear on the social and intellectual dilemmas facing the country and the world.”

This theme of member engagement, of encouraging the Academy’s diverse membership to work together on “the social and intellectual dilemmas facing the country and the world,” has been central to the Academy’s activity since 1780. And it has been a special point of emphasis over the past academic year. There are more than ten studies now underway at the Academy, together drawing on the intellectual resources of hundreds of members. From the Lincoln Project on public research universities, to the Alternative Energy Future project, to an emerging study on New Dilemmas in Ethics, Technology, and War, these studies engage members from diverse professions and disciplines and bring them together to collaborate and serve the nation in areas of great need. Updates on several of these projects are provided in this issue of the *Bulletin*.

I would like to welcome the newly elected Fellows and Foreign Honorary Members of the Academy, some of whom are already contributing to the Academy’s work as authors in *Dædalus* or as advisors on projects and studies. The names of the 197 new members elected in April may be found on pages 53–55 of this issue. I hope you will reach out to your new colleagues and encourage them to become engaged and active in the Academy.

This academic year we have also made a special effort to bring the Academy to its members, traveling to twelve cities around the country and hosting over twenty-five events, many of them following up on our science report *Restoring the Foundation*. In addition to New York, Chicago, San Francisco, and Los Angeles, we have held meetings in cities and at institutions where the Academy has not traditionally met, such as in Princeton, New Haven, Philadelphia, Durham, Atlanta, and Houston. In all, over 850 members have attended an Academy event in person during this academic year. And we have heard the clear demand for more programs: The Academy is increasing its programming at the House of the Academy in Cambridge, adding, for example, more musical performances and presentations. Our Stated Meetings, meanwhile, have been live-streamed to New York and Chicago, with more cities to be added next year. This issue of the *Bulletin* includes transcripts of some of the diverse programs that have recently been presented; we welcome your suggestions of discussion topics and event locations for next year.

The Academy is also establishing committees at universities and in local communities around the nation to host and facilitate meetings of Academy members on topics of mutual interest. Local committees have been established in the Princeton and Philadelphia

areas, and plans are underway to form committees in North Carolina and Southern California. In the coming year we will also work to establish committees in New Haven, New York, Chicago, Houston, and San Francisco.

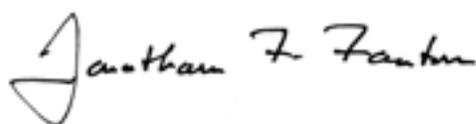
In addition to our traditional portfolio of projects and events, the Academy has established a new Exploratory Fund to enable members to convene colleagues from a range of disciplines and institutions and explore questions of shared interest. The first proposals to receive Exploratory Fund support include a symposium on the state of legal services for the poor, a series of meetings on the future of jazz, and a conference exploring new ideas for communication among people with autism. I encourage you to bring your ideas forward in a letter or phone call to me.

Looking ahead, communications from the Academy will also provide more space for members to share their work and ideas. We have introduced a new section in this issue of the *Bulletin*, entitled “On the Professions,” as a way for members to stimulate conversations about their work and new developments in their fields. I hope you will consider contributing to this feature.

Clearly, there are many new opportunities for members to be engaged in the work and life of the Academy. To strengthen the Academy’s capacity to serve its members, the Academy has created a position of Director of Member Engagement. I am pleased to report that Laurie McDonough will join the Academy in this capacity on June 1. For the past ten years Laurie has worked at the Stanford University School of Humanities and Sciences, where she planned and implemented outreach, stewardship, and engagement events. Laurie earned an A.B. in Chemistry from Bowdoin College and a Ph.D. in Physical Chemistry from the University of Colorado.

I hope you will find in this issue, and in the Academy more generally, many reasons to participate in the Academy’s work and opportunities to address “the social and intellectual dilemmas facing the country and the world.”

I wish you a restful and productive summer and, as always, welcome your questions about the Academy and suggestions for its future. Please feel free to write me at jfanton@amacad.org.



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New Academy Report Explores the State of the Humanities in Higher Education

Recent discussions about the state of the humanities in higher education have portrayed the field as beleaguered and declining. As a corrective, the Academy released a new report in early April, *The State of the Humanities: Higher Education 2015* (available online at http://www.humanitiesindicators.org/binaries/pdf/HI_HigherEd2015.pdf), which is intended to provide a more balanced and evidence-based depiction of the health of the humanities on college and university campuses.

While it examines the trend that has fed the story of decline in the field – a shrinking share of degrees at the baccalaureate level – the report also notes signs of stability or improvement for the humanities fields, including evidence of rising interest in the humanities at the pre-baccalaureate level (indicated in rising numbers of AP tests taken and community college degrees earned), increases in funding (from low levels, in comparison to other fields), and a steady stream of new academic books in the field.

The State of the Humanities: Higher Education 2015 draws on the latest research and analysis from the Academy’s Humanities Indicators (<http://www.humanitiesindicators.org>), an ongoing research initiative that combines government data and high-quality data from private sources (including the Academy’s humanities departmental surveys) to illuminate key trends in the humanities.

The report does not sugar-coat the trend in four-year humanities degrees that has caused alarm in recent years. As a share of four-year undergraduate degrees conferred, the humanities have been losing ground to other disciplines since 2007 (falling from 12.1 percent of new degree recipients to 10.4 percent in 2013). And the mix of institutions conferring degrees is also changing. Over the last twenty years, private not-for-profit colleges and universities – a traditional bastion of the humanities – have awarded a steadily declining share of their undergraduate degrees to students in the field (the share in 2013 was the smallest since at least 1987).

But these trends do not tell the whole story about the health of the humanities at four-year colleges and universities. For instance, the humanities are well-represented among second majors, with 25 percent of second majors earned in 2013 going to the humanities, more than twice the share of first majors completed in the field (10 percent). And even as the share of undergraduate degrees has been shrinking, the report notes evidence that undergraduate students are earning a much larger percentage of course credits in the humanities than the field’s share of undergraduate degrees (a median of 22 percent of all credits earned by bachelor’s degree recipients in 2008, as compared to 12 percent of the degrees received that year).

Despite the decline in the number of first degrees, a recent Academy survey found no evidence of a decline in the number of degree-granting departments in the humanities (from 2007 to 2013)



or a substantial increase in the percentage of humanities faculty employed in part-time and adjunct faculty positions. The report also points to information from the Bureau of Labor Statistics that shows continued growth in the number of humanities faculty employed at two- and four-year colleges.

The State of the Humanities: Higher Education 2015 notes a number of other upward trends that could be interpreted as signs of the field’s health. For instance, from 1987 to 2013, the share of associate’s degrees that had substantial humanities content (including “liberal arts” and “liberal studies” degrees that generally require a disproportionate number of credits in humanities subjects) rose from 25.8 percent to 38.9 percent of all two-year degrees. Along similar lines, the number of AP exams taken in the humanities more than quadrupled from 1996 to 2013, and was considerably larger than the number of courses taken in other fields throughout that time period.

To provide context for the report, the Academy published a discussion of its findings in its online Data Forum (<https://www.amacad.org/dataforum>), with commentary from Academy Fellow Danielle Allen (Institute for Advanced Study and Harvard University) and Michael Roth (Wesleyan University). Both Allen and Roth note the rise in associate’s degrees and AP exams, but draw different conclusions about the implications of these striking trends. For Danielle Allen, the declines at the baccalaureate level and corresponding increases in AP exams and associate’s degrees suggest “the humanities are in decline as a form of specialization and respected expertise.” She warns that “the growth in the general education sector of higher education works against the preservation of research expertise in the humanities.”

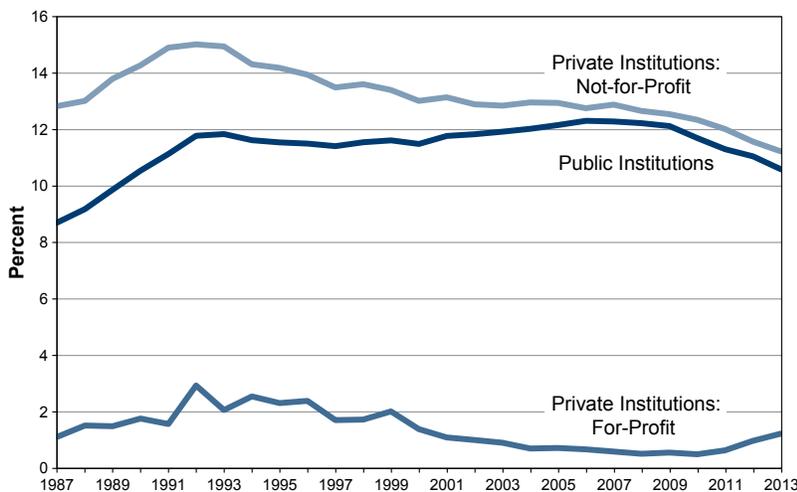
Looking at the same set of data, Michael Roth offers a more optimistic assessment, observing that “whatever the motivations for taking humanities classes, it’s clear that the ways of thinking and fields of

study on which they focus are recognized as relevant across so many domains in the STEM and social science fields.” He concludes that “students together with their families and future employers recognize that the benefits of a pragmatic liberal education – whatever the major – extend far beyond the university. And many still recognize that the humanities are a catalytic resource of life-long learning – for inquiry, for absorption, and for making meaning and direction in one’s life as one makes one’s way in the world.”

Danielle Allen concludes by challenging humanities faculty “to help diversify the professional pathways to which that expertise can lead” and “work on a stronger strategy of collaboration between those who work in the domains of humanities research expertise and those responsible for the general education curriculum.”

As these two perspectives suggest, *The State of the Humanities: Higher Education 2015* is facilitating a wide-ranging discussion about the current and future health of the humanities. ■

Humanities Bachelor’s Degree Completions as a Percentage of All Bachelor’s Degree Completions, by Control of Institution, 1987–2013



New Indicator shows the shrinking share of students earning degrees in the humanities at private colleges and universities.

Other recent updates in the Humanities Indicators:

- Performance on SAT Verbal/ Critical Reading and Writing Exams (March 2015)
- Charitable Giving for Humanities Activities (March 2015)
- Academic Publishing (November 2014)
- Earnings of Humanities Majors (October 2014)

The Lincoln Project Wraps Up Regional Forums and Prepares to Release First Publication

In its continued effort to identify common concerns and build consensus for innovative solutions in American public higher education, the Lincoln Project recently convened a series of regional meetings in Austin, Texas; Atlanta, Georgia; New York City; and Chapel Hill, North Carolina.

University leaders, representatives from the private sector, members of philanthropic and nonprofit organizations, and local and national policy-makers discussed topics ranging from challenges related to state appropriations; to balancing tuition, fees, and affordability; to the role of philanthropy and corporate giving in supporting public research universities. Drawing upon these conversations, the Lincoln Project is now gearing up to release a series of publications that will precede its final report and recommendations in early 2016.

President of the University of Texas at Austin William Powers hosted the project for a regional forum held in Austin on March 26, 2015. This meeting brought together leadership from several institutions, including UT Austin, UT Dallas, UT El Paso, UT Arlington, the University of New Mexico, and the University of Louisiana at Lafayette, as well as representatives from the public-private partnership Educate Texas and the Texas Higher Education Coordinating Board. Lincoln Project cochairs Robert Birgeneau and Mary Sue Coleman as well as members of the project committee heard about the challenges and successes of these institutions: online learning – and examples of effective and ineffective approaches – was a particular area of interest, in addition to the universities' increasing involvement in the economic development of their communities.

On April 2 the project cochairs, Academy President Jonathan F. Fanton, representatives from public and private universities in Georgia, Tennessee, and Florida, and representatives from the Southern Education Foundation and the Center for Civil and Human Rights attended the project's third regional forum hosted by Emory University President James Wagner. The discussion focused on the importance of public/private partnerships and Georgia's unique higher-education landscape. For example, Georgia's HOPE scholarship, a merit-based financial assistance program funded by revenue from the Georgia Lottery, has provided many students with full-tuition scholarships to any public institution in the state. The group also discussed successful programs like the University of Memphis's tracking system for degree completion, which helps the university to identify and redirect students who are not on track with their majors.

The next regional forum was held on April 6 in New York City. Members of the project advisory group heard from university leadership at Stony Brook University, the New Jersey Institute of Technology, Rutgers, and the University at Buffalo. Among other topics, the group discussed the added value of research experiences for

undergraduate students at public research universities, as well as the necessity of improving education at every level so that students can be successful in their postsecondary education. Representatives from the Association of Public and Land-grant Universities (APLU) and the National Research Council's Board on Higher Education and the Workforce also participated as part of the project's continuing efforts to partner with organizations concerned about the future of higher education.

On May 7, the Lincoln Project held a regional forum at the University of North Carolina at Chapel Hill, hosted by Chancellor Carol Folt. Lincoln Project members, UNC leadership, and representatives from local government and businesses discussed successful partnerships between public research universities and business.

The Lincoln Project is now preparing to release *Public Research Universities: Why They Matter*, the first in a series of publications that will precede its final report and recommendations. Available in late May, *Why They Matter* explores some of the major attributes of public research universities, including their commitment to providing a wide range of students with a high-quality education; their contribution to the economic vitality of their states, regions, and the nation; and their commitment to improving their states, region, and the nation through research and teaching excellence.

Following this publication are a white paper that will provide an overview of the state appropriations process and where higher education falls within it (to be released in summer 2015), a white paper on the current financial model of public research universities (to be published in fall 2015), a brief demonstrating the public good of public research universities (available in late fall 2015), and the final report, which will offer concrete recommendations and strategies to sustain these institutions for the foreseeable future (to be released in winter 2016). ■

The Lincoln Project: Excellence and Access in Public Higher Education is considering the implications of declining state investment in public higher education; assessing the role of the federal government in funding our great public research universities; and developing recommendations for ensuring that public universities continue to serve the nation as engines of economic development and opportunity for Americans from all backgrounds. Ultimately, the project will encourage the development of new federal, corporate, and philanthropic sources of support to sustain public higher education in every state. For more information about the Lincoln Project, please see the Academy's website at <https://www.amacad.org/LincolnProject>.



Dædalus Examines the “Successful Aging of Societies”

Given the decades-long advance warning, why has the United States failed to prepare for the oncoming age wave of the twenty-first century? While costly government obligations, most notably Medicare and Social Security, dominate U.S. political debate around the topic of aging, the rapid aging of baby boomers has faced U.S. society with a variety of under-recognized and no less critical challenges, including the adaptation of core societal institutions – from education and employment to familial roles and housing – to a progressively older and more dependent population.

Without policies in place to help the United States successfully adapt to an aging society, the nation will further suffer from inter-generational tensions, socioeconomic disparity, and an inability to provide the needed goods and services to some of its most vulnerable members. But while the oncoming and likely permanent demographic shift will present challenges, it also presents opportunity: the substantial positive contributions and potential productivity of its aging population.

The Spring 2015 issue of *Dædalus* on “Successful Aging of Societies” explores the opportunities and challenges facing the United States as it undergoes an unprecedented demographic transformation. The issue is guest edited by Academy Fellow John W. Rowe, Julius B. Richmond Professor of Health Policy and Aging at the Columbia University Mailman School of Public Health and Chair of the MacArthur Foundation Research Network on an Aging Society. The MacArthur Network – whose members author many of the essays in this issue of *Dædalus* – is an interdisciplinary group of scholars that studies the social, economic, and institutional implications of an aging society.

As Rowe explains in his introduction, the goal of the MacArthur Network is to “develop and help implement policies that assure our transition to a cohesive, productive, secure, and equitable aging society.” Though the costs of inaction are great, Rowe explains, we

still “have time to put in place policies that will help strengthen the future workforce, increase productive engagement of older individuals, and enhance the capacity of families to support elders.”

Among the essays in the volume, S. Jay Olshansky’s (University of Illinois at Chicago) “The Demographic Transformation of America” looks at the changing face of aging and life expectancy in America. Lisa F. Berkman (Harvard Center for Population and Development Studies), Axel Boersch-Supan (Max Planck Institute for Social Law and Social Policy), and Mauricio Avendano (London School of Economics and Political Science) explore how adaptation

of our expectations of the elderly can lead to a more productive and resilient society. In “Resetting Social Security,” S. Jay Olshansky (University of Illinois at Chicago), Dana P. Goldman (University of Southern California), and John W. Rowe (Columbia University) consider the critical financial safety net of Social Security and what impact might result from further

changes to its age of eligibility requirements. And David E. Bloom, David Canning, and Alyssa Lubet (all at the Harvard T.H. Chan School of Public Health) outline some of the major challenges associated with widespread population aging and describe current and possible future responses to them.

Print and Kindle copies of the new issue can be ordered at: <https://www.amacad.org/publications/daedalus>. ■

This issue of *Dædalus* explores the opportunities and challenges facing the United States as it undergoes an unprecedented demographic transformation.

Spring 2015 *Dædalus*
 “Successful Aging of Societies”

Successful Aging of Societies by **John W. Rowe** (Columbia University and the MacArthur Foundation Research Network on an Aging Society)

The Demographic Transformation of America by **S. Jay Olshansky** (University of Illinois at Chicago)

Hispanic Older Adult Health & Longevity in the United States: Current Patterns & Concerns for the Future by **Robert A. Hummer** and **Mark D. Hayward** (both, University of Texas at Austin)

The Future of Intergenerational Relations in Aging Societies by **Frank F. Furstenberg** (University of Pennsylvania), **Caroline Sten Hartnett** (University of South Carolina), **Martin Kohli** (European University Institute), and **Julie M. Zissimopoulos** (University of Southern California)

Labor-Force Participation, Policies & Practices in an Aging America: Adaptation Essential for a Healthy and Resilient Population by **Lisa F. Berkman** (Harvard Center for Population and Development Studies), **Axel Boersch-Supan** (Max Planck Institute for Social Law and Social Policy), and **Mauricio Avendano** (London School of Economics and Political Science)

Productivity & Engagement in an Aging America: The Role of Volunteerism by **Dawn C. Carr** (Stanford University), **Linda P. Fried** (Columbia University), and **John W. Rowe** (Columbia University and the MacArthur Foundation Research Network on an Aging Society)

Resetting Social Security by **S. Jay Olshansky** (University of Illinois at Chicago), **Dana P. Goldman** (University of Southern California), and **John W. Rowe** (Columbia University and the MacArthur Foundation Research Network on an Aging Society)

Global Population Aging: Facts, Challenges, Solutions & Perspectives by **David E. Bloom**, **David Canning**, and **Alyssa Lubet** (all, Harvard T.H. Chan School of Public Health)

Individual & Social Strategies to Mitigate the Risks & Expand Opportunities of an Aging America by **Julie M. Zissimopoulos** (University of Southern California), **Dana P. Goldman** (University of Southern California), **S. Jay Olshansky** (University of Illinois at Chicago), **John Rother** (National Coalition on Health Care), and **John W. Rowe** (Columbia University and the MacArthur Foundation Research Network on an Aging Society)

The Unstable Biomedical Research Ecosystem: How Can It Be Made More Robust?

On February 24, 2015, the Academy held its 2018th Stated Meeting at Duke University as part of a conference on ensuring the stability of the biomedical research enterprise in the United States. **Richard H. Brodhead** (President of Duke University) introduced the panel discussion, which was moderated by **Nancy C. Andrews** (Dean and Vice Chancellor for Academic Affairs, Duke University School of Medicine) and **Sally Kornbluth** (Provost and James B. Duke Professor in the Department of Pharmacology and Cancer Biology at Duke University). The panelists included **Harold Varmus** (then Director of the National Cancer Institute; currently, the Lewis Thomas University Professor of Medicine at Weill Cornell Medical College), **Susan R. Wentz** (Provost and Vice Chancellor for Academic Affairs at Vanderbilt University), **Tania Baker** (E.C. Whitehead Professor of Biology at Massachusetts Institute of Technology), and **Mark C. Fishman** (President of the Novartis Institutes for BioMedical Research). The program also included a welcome from **Jonathan F. Fanton** (President of the American Academy). The following is an edited transcript of the discussion.



Richard H. Brodhead

Richard H. Brodhead is President of Duke University and the William Preston Few Professor of English. He was elected a Fellow of the American Academy in 2004 and served as Cochair of the Academy's Commission on the Humanities and Social Sciences, which released its report, "The Heart of the Matter," in 2013.

The American Academy is an organization that recognizes those who represent high accomplishment in the intellectual domain. But in the last fifteen years or so, the Academy has increasingly assumed a

Even though the size of the investment has been diminishing in real dollars for over ten years, people have not yet realized that the world of endlessly increasing and enriching resources for research is not guaranteed.

second function, which is to bring all that intelligence to bear on questions at the interface between policy, politics, social life, and academia in this country. That is not an easy relationship to facilitate. The American Academy's *ARISE* (Advancing Research in Science and Engineering) report, released in 2008, is a product of those recent efforts. It comprehensively details the increasingly challenged ecosystem in which biomedical research (and other scientific research) takes place, and I believe it is one of the most important policy-research documents produced in recent years. *ARISE*, by the way, is a good title – "Arise! Wake up, your house is on fire!" In 2013, *ARISE II* was released, signaling that, unfortunately, the house is still on fire.

What people consider to be the standard environment for biomedical research is actually a fairly modern invention; it did not exist before World War II. I bring to you these astonishing numbers: The whole amount invested by the federal govern-

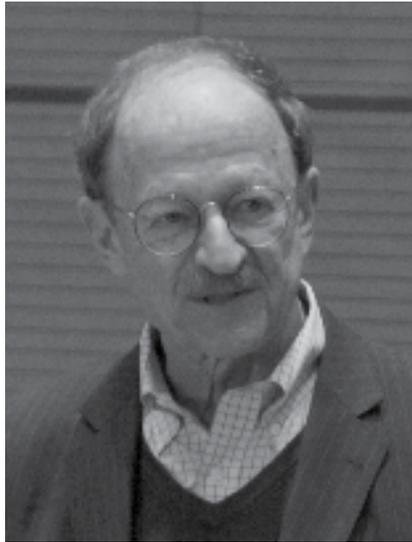
ment in research and development in the year 1940 was \$5 million. In the year 1960 it increased dramatically to \$405 million. The number jumped to \$4 billion in 1980, to \$17 billion in 2000, and to \$31 billion in 2010. So we think of this funding system as if it were permanent, but it was actually created recently and over a fairly limited period of time, and it could decline just as quickly. Even though the size of the investment has been diminishing in real dollars for over ten years, people have not yet realized that the world of endlessly increasing and enriching resources for research is not guaranteed.

One of the things university presidents do is berate members of Congress for their failure to invest in things like research. But it doesn't turn out to be a persuasive strategy to go up to people and say, "You are so shortsighted." One of the troubles is that when you go to Washington and say that more money needs to be invested in research,

everyone agrees with you. It's just that nothing really follows from that agreement.

You are all aware of the American invention called sequestration. This system was once considered too nonsensical to remain in place; now it is the new reality in which budgets are created in this country, and the fear of deficits means that both military and discretionary expenditure is kept under artificial restraints. Until that problem is solved, there will be no possibility of any increase in research funding. The American Association of Universities has been a big proponent of this. Our best argument in Washington has been to say, "Your solution to the fiscal deficit is creating another deficit." This has been cunningly named the "innovation deficit." By saving money through budget restrictions, we are failing to make investments that actually produce economic growth, individual prosperity, and other qualities we desire for our society.

The trouble is that mentioning the innovation deficit is just another more elaborate and interesting way of accusing policy-makers of shortsightedness and stupidity. And truth be told, the innovation-deficit argument, though I think it is a fine one in theory, has not actually ended up producing the effects we have hoped it would. So it seems to me that when a group like this one gathers, it is not just to lament the fact that the pie is not as big as we wish it were; it is because we need to think either of better arguments or of different, more ingenious and imaginative ways of approaching this whole subject altogether. If the history of American biomedical research becomes a history of continuous decline from the year 2003 on, the outcome will not be good for anybody. So we need not only to diagnose but to cure, which our panelists will help us do today. My thanks to you all for coming and sharing your wisdom.



Harold Varmus

Harold Varmus is the Lewis Thomas University Professor of Medicine at Weill Cornell Medical College at Cornell University and the former Director of the National Cancer Institute. He was the co-recipient of the Nobel Prize for studies of the genetic basis of cancer. He was elected a Fellow of the American Academy in 1988.

Thanks for hosting this important discussion. Before we get embedded in a list of what is wrong with this enterprise and think about ways to fix it, let us reflect for a moment on just how important fixing it is – not just because the population, costs, and expanse of the enterprise have risen precipitously in the years since World War II, but because biomedical research in this country is without parallel in the world and essential for many aspects of our culture. In its construction, it reflects the imagination of Vannevar Bush in many ways: money is given by the government to investigators mainly at academic institutions who pursue basic research, the results of which are then translated into products and useful tools by industry. This pattern has been extremely effective. It forms the fiscal infrastructure

that supports research for some of the biggest enterprises in the United States – health care and research tools. The former alone accounts for about 20 percent of our economy. Equally important, biomedical research is also tightly linked to the educational enterprise and is now a prominent feature on nearly all of our major university campuses, including this one; since the United States leads the world in the strength of its research universities, biomedical research is essential for another national characteristic that has been essential to our stature and economy.

In short, basic research, especially biomedical research, is a centerpiece of American enterprise, innovation, and development; it plays a very important role in the United States' preeminence in science globally. Frequently, President Barack Obama speaks in glowing terms about his aspirations for American contributions to science, including his BRAIN initiative and a recently announced initiative on precision medicine. This is still a very strong system, so in trying to think about how to fix the current ills, we have to remember: "Do no harm."

About a year and a half ago, I began meeting regularly with three distinguished colleagues of mine – Bruce Alberts, the previous president of the National Academy of Sciences and a longtime colleague at UCSF; Marc Kirschner, professor of systems biology at Harvard Medical School; and Shirley Tilghman, a distinguished molecular biologist who was also the president of Princeton for over a decade – to discuss our sense that life in the world of biomedical science is not what it used to be. Our concerns were not simply about the fact that biomedical scientists of all ages and abilities were having trouble getting grants. We have been equally concerned about many researchers' ability to use the full range of their imaginations – especially young scientists just entering the system. These

limitations on imagination and risk-taking are an inevitable consequence of the hypercompetitive atmosphere of a growing number of people chasing a shrinking pot of funds to support research. We have built a system founded on the false premise that the world of biomedical research can expand forever. We have created a Malthusian dilemma in which we train a lot of people, use those trainees in our laboratories to produce exciting results, and then expect the world to accommodate the careers of these trainees in the way that it accommodated our own. That obviously cannot go on forever.

We have had, as President Brodhead mentioned, a reduction in our budget in both real and constant dollars over the last several years, due most recently to sequestration and, over the longer term, to the

treatment of disease. But their resources for doing so are dwindling.

This Malthusian dilemma has created a hypercompetitive environment that, in my view, has undermined the atmosphere in which we do science. There is not enough time to do science in an unbridled fashion, imaginations are constrained by concerns about what the government wants from its grantees, and scientists are not taking the risks they ought to be taking or enjoying laboratory life as much as they should. And there are a number of measurable sources of the malcontent: the rising age at which people receive their first grant from the NIH; the heavy load of regulatory and compliance issues that universities need to face and pay for; and our concern that grant applications are increasingly made for projects in the domain of practical applications,

attention and precipitated discussions not unlike this one on many campuses. Further, a number of senior scientists got together in August of last year at the Howard Hughes Medical Institute to discuss what might be done, a meeting that we also describe in the *Proceedings*.

Some of the issues that we feel need to be discussed today on this university campus include how we attract young people into science, how we train them, and what the expectations of training – especially graduate and post-doctoral training – should be. Is the current length of the training period right? Are we teaching people enough about the various alternative career opportunities to those in academia? Are we mentoring them in the right way? Are we structuring our labs correctly, with the right distribution of various kinds of trainees and staff scientists? Have we considered the possibility of worrying more about quality and balance than simply numbers of grants and of trainees when we evaluate each other? Have we thought about making greater use of staff scientists and trying to reduce the now awkwardly long time for postdoctoral training? Are we using the right metrics when we evaluate each other? Is it right to ask about the impact factors of journals in which one publishes as opposed to the quality of work? Is peer review up to the quality standard we would expect when carried out by journal editors and by NIH study sections? Are the funders of research issuing the best kinds of grants to promote the most imaginative and productive kinds of science? Or are they seeking short-term rewards through work that is unlikely to produce groundbreaking discoveries?

It is easy to list some of these questions and think about solutions, but it is harder to make the changes that might be required to restore our enterprise to better health. To propose the most effective solutions possible, we are interested in the idea of creating

We must give very serious thought to the question of how we can create a universe of biomedical research that is both sustainable and able to encourage the kind of productive work that has characterized American biomedical science for over fifty years – putting us in a position of world leadership that we are now in danger of losing.

failure of Congressional appropriators to keep up with inflation. Further, we have too many people pursuing too little money for research support at a time when the horizons of research in the biological sciences have expanded dramatically. Equipped with a detailed picture of the human genome, new techniques for analysis of proteins, and many other powerful tools, biomedical scientists have more opportunities than ever before to make unexpected discoveries and to apply those to the diagnosis and

as opposed to the basic research and curiosity-driven discovery that many of us here would endorse.

Bruce, Marc, Shirley, and I spent a lot of time talking about what we might be able to do to address some of these issues and we published our analysis and proposals in a widely read paper that appeared in April 2014 in the *Proceedings of the National Academy of Sciences*. Our first goal was to try to describe the system as we currently see it in dramatic terms; that has attracted a lot of

think tanks for biomedical scientists and others who are interested in the future of our field and the policies that will guide it. My colleagues and I are worried that too little effort has been put into building adequate datasets to analyze what happens to people who get trained in our field. We need to track what happens to them after they acquire their degrees, pursue additional training, and obtain their first, second, and third grants in order to analyze the results of the investment that NIH and other funders have made in the process. This may be essential to describing in compelling terms how we ought to fix the system.

My hope is that the ongoing recovery of our economy will allow Congress to provide more resources to the NIH and to other science funding agencies. However, we must also contend with the reality that the simple pattern of growth that has characterized our world cannot go on forever. We must give very serious thought to the question of how we can create a universe of biomedical research that is both sustainable and able to encourage the kind of productive work that has characterized American biomedical science for over fifty years – putting us in a position of world leadership that we are now in danger of losing.



Susan R. Wentz

Susan R. Wentz is Provost and Vice Chancellor for Academic Affairs at Vanderbilt University.

I want to comment specifically on the training, development, and experience of our graduate students and postdoctoral fellows. I have long had a heartfelt passion for training; it is one of our fundamental callings as university faculty. Not just to make discoveries, but to actually train people in the process of making discoveries, and in that way point toward the future of discovery by the next generation of physician-scientists, biomedical scientists, and leaders in the biomedical enterprise.

The data is clear: biomedical graduate programs and postdoc training and fellowship programs take a long time. The median time for a PhD is 4.88 to 5.73 years for all the fields within biomedical research. Data suggest that the mean length of postdoctoral fellowship periods is around 7.8 years, summing together potentially multiple postdoctoral experiences for many individuals.

What are the consequences of this protracted training period? First, the positive: scientists have an extended period of time in

which to explore their passion in depth, to develop very unique skillsets, to challenge themselves by working with different models and with different technologies. And the lengthy training time provides flexibility for those trainees in terms of future career decisions: they can reflect back on different things they learned during various training experiences. But the negative consequence is that scientists launch their independent careers very late. Currently, the average age at which new faculty with PhDs begin their independent careers is 37. The average age at which they have their first independent R01 (NIH research grant program) is 42. Those numbers are still higher for physician-scientists pursuing MD-PhDs. These long training periods hold our highly talented next generation in transient positions, at comparatively low pay, during what should be the most productive periods of their personal and professional lives.

Now, with this long training path, some might ask themselves, “Why do students go to graduate school? Why are our application numbers still increasing for our biomedical PhD programs? Why do people finish PhD training and go on to a postdoc?” Well, I think the reason is the passion that every scientist feels about the topic that he or she is studying, as well as the desire to make a contribution to discovering the unknown. I think it is also the inherent optimism and risk-taking nature of scientists; you have to be optimistic that the experiment will work or that your paper will get accepted or that your grant will get funded or that you may indeed get a job at the end of this long track. But I also think we have created an artificial economy in terms of how our training programs are constructed.

As we think about this, we need to ask some very difficult questions. Some of those fundamental questions are: What is a PhD needed for? What is the concrete purpose of that PhD training? In that light, are there

some career paths in which a master's degree would be equally valuable and a more appropriate investment of time and resources? A second question, then, is: What is a postdoctoral fellowship needed for?

Right now it is thought that about 90 percent of PhD graduates from R1 universities go on to do a postdoc fellowship; it almost

for that program being expanded to more of our leading institutions to allow more young people to explore possibilities during their PhD training.

There are also many conversations about the postdoctoral fellowship experience itself, the salary levels for postdoctoral fellows, the length of time one should spend in a postdoc

Long training periods hold our highly talented next generation of scientists in transient positions, at comparatively low pay, during what should be the most productive periods of their personal and professional lives.

seems to be a default next career step. I would challenge us to think carefully about why that is and about who does and does not need a postdoctoral fellowship. Can we shift toward an actual balance within our training of this next generation of scientists? In rethinking about these fundamental tenets of the system, we all have to realize that the culture of mixing the education, training, and working environments has been in place for decades. Graduate students and postdoc fellows are key parts of the mission of discovery in laboratories; at many universities, their role as teaching assistants makes them key parts of the education mission too. So in thinking about how we can or possibly should shift the culture, we also need to think deeply about the essential roles training programs play and how we might find a way to preserve them.

One change we should consider is how to give students opportunities to make career decisions earlier in their paths. One of those options is the NIH director's new program for BEST (Broadening Experiences in Scientific Training) awards, which supports the expansion of career development activities for biomedical trainees. I would advocate

fellowship position. Finally, so often the metrics for evaluating mentors are those same generic metrics applied to all scientists: their number of grants, their number of publications, their citation indexes. But it seems that what trainees do at the end of the training period – be it PhD education or postdoctoral fellowships – should also be looked at when we evaluate mentors. The culture surrounding the training periods is full of incredible discovery and learning, and we should think of ways to shift how we are educating and training without breaking this culture.



Tania Baker

Tania Baker is E.C. Whitehead Professor of Biology at Massachusetts Institute of Technology and an Investigator at Howard Hughes Medical Institute. She was elected a Fellow of the American Academy in 2004.

My goal here is to summarize some of the ideas we been discussing about the structure of academic labs. I want to begin by saying that academic labs are valuable places where education, mentoring, and curiosity-based science are done synergistically, bringing success to the students and the postdocs as well as making important new scientific discoveries.

However, we understand that there is some imbalance in the way our academic labs are normally organized. Some changes to that system are going to be very difficult to implement and will occur very slowly; others are experimental practices that universities can try and then gauge the impact of. As you have already heard, we have been discussing the fact that postdoctoral training is very long. One of several possible reasons is that the bar for getting a job at an academic university is extraordinarily high. The num-

ber of high-profile papers you have is important; candidates are also expected to have extremely detailed knowledge of their future plans. As a job candidate in an interview, you will be asked what your research is going to be about, whether you have preliminary data, what your first Ro1 will look like, what the first three graduate students in your lab are going to do, what your second Ro1 will look like, and so on. These sorts of requirements essentially exclude candidates who do not have the extremely extensive postdoctoral experience that Dr. Wenthe referred to. Trying to figure out how we can hire excellent people without their having to spend so much of the creative part of their life in the training and postdoctoral periods is something we are very interested in exploring.

Postdocs also, of course, go on to do jobs other than university professorships, many of which require at least some postdoctoral training. For example, journal editorships, many positions in pharmaceutical companies and biotech companies, and other jobs at teaching institutions all often require at least a short postdoc. So it is important that we look at the structure of the postdoctoral training period and see if it can be shortened and matched to an individual's particular career goals.

We also discussed how to make biological science undergraduate degrees and master's degrees more useful. Usually, an undergraduate degree in biology does not open many doors to exciting research – or exciting jobs. Often those who hold these degrees can find jobs as lab technicians; they can sometimes find other work in their field, but there may not be much upward mobility in the career path. A master's degree is unfortunately often viewed – at least by the high-research schools – as sort of a failed PhD. The assumption is often that the student either decided not to finish his PhD or was counseled that pursuing a PhD was probably not in his best interest. But many of us here today believe that the master's

Many of us here today believe that the biological science master's degree can be retooled to allow graduates to do some very interesting and useful things that we as a society need more of.

degree can be retooled to allow graduates to do some very interesting and useful things. One experiment we are trying at MIT is a joint undergraduate and master's degree in computer science and molecular biology; students in this program take many computer science courses and develop excellent quantitative skills while also taking the full biology curriculum. So graduates of this program should be great at biological modeling and at handling large datasets – skills that we as a society need more of. Rethinking the master's degree is an exciting idea to continue experimenting with.

We also feel a great deal of enthusiasm for more openings, more opportunities, and more respect for staff scientists who are not affiliated with research universities. These would be PhD-level scientists who have permanent positions and a track to follow to rise in their careers. They may run core facilities, for instance, or they may work in one or multiple labs carrying out research. But in any case, we want to promote the idea that these are real jobs: that these scientists should be well-funded, respected, and promoted.

Another goal we should investigate is creating positions and raising money to support scientists independently from federal grants, essentially creating endowed fellowships for individuals in different career states. For instance, Cold Spring Harbor Lab has endowed all their PhD students, giving them freedom to join whichever lab they want independent of how much money that lab has. At MIT we have about seven endowed positions for graduate students. Such programs allow more freedom for those people.

Physician-scientists have a big problem with fragile funding. If they do not maintain a very high level of funding for their own salaries as well as their research, they are often left with no choice but to work more in the clinic and let their research careers more or less fizzle out. More endowed money for that position, I think, would be very useful. It would attract more individuals to that track and allow them to focus more attention on their science.

Finally, departments can control the size of their endeavors. They can limit the space that students and faculty members are given, put guidelines or caps on how many people they can hire, and make it very expensive to keep a postdoc for extended periods of time (for instance, by requiring that their position be converted into senior scientist and their salary raised after five years' time). Those are some things that can be done at the departmental or university-wide level.

On a larger scale, we should be rethinking the tenure process. It is not clear that having tenured faculty in biology creates the best situation for the whole community, and some higher-education institutions are implementing a rolling five-year career review that gives the administration and the scientists themselves a semi-regular opportunity to evaluate whether the appointment is still working. That could potentially free up slots for hiring excellent and exciting new people. That was some food for thought about the range of possible changes in the structures of academic labs.



Mark C. Fishman

Mark C. Fishman is President of the Novartis Institutes for BioMedical Research. He was elected a Fellow of the American Academy in 2002.

I was asked to opine on how to increase the effectiveness of science in academia – probably because of the illusion that someone from industry would be better equipped to speak on the issue. I do have a different perspective, having progressed over the course of a couple of decades from very basic work to my current work, which is to discover new medicines. And I have a very simple message: for the health of the country, both medically and economically, the scientific mission in academia must be to conduct basic research. You would think that would be obvious, but because this is a time of limited resources, there tends to be a push at both the levels of funding agencies and institutions, both in Europe and the United States, to be more “practical.”

It is true that about 40 percent of the improvement in health care over the last century is due to new medicines. Research that helps to generate new medicines is important. Each new medicine is based

For many of the most important new medicines used today, the time from fundamental discovery to approval is thirty to forty years. The actual discovery and development of a new medicine takes a small fraction of this time. But the recognition of the target and its potential link to medicine is a long and winding road – and these, the basic discoveries that are the foundation of drug discovery, take place in academia.

upon decades of fundamental discovery work. For many of the most important new medicines used today, the time from fundamental discovery to approval is thirty to forty years. The “practical” part – the actual discovery and development of a new medicine – takes a small fraction of this time. It is the recognition of the target and its potential link to medicine that is such a long and winding road – and these, the basic discoveries that are the foundation of drug discovery, take place in academia.

Hence, it seems unwise to deflect much funding of academic research from basic to more “practical” activities because it would diminish the real key to making new medicines, which is basic discovery. One might therefore ask how many new medicines would even emanate from such a diversion. Each year, only about twenty to thirty new drugs are approved by the FDA, of which only a handful are directed to truly novel targets. These come from the more than three thousand self-described pharmaceutical companies and cost on average \$1–2 billion per new drug. So in the context of a \$30 billion NIH budget, for example, any diversion is unlikely to have more than a negligible effect on the pace of drug discovery, while constraining basic discovery to a far greater degree.

So I believe universities’ commitment to basic research should remain, and they

should be set up so as to remain devoted to long-term fundamental discovery. But academia could make some changes. For one, it could expand its current definition of interesting and worthwhile research. Many fields of pathophysiology have fallen by the wayside over the years, and it is time to return to those – including toxicology, pathology, and pharmacology. How about training in academia for potential careers in biotechnology? What do we look for in an investigator at Novartis? We use the same criteria that you would use to hire a faculty member. We look for someone who has had a very strong track record of discovery in basic science. In addition, we seek clinicians who can do translational medicine and people with specific expertise – in IT, for example. At least in the research and development arenas, prior training in management or business is irrelevant.

Even as we celebrate the beauty and power of the science that is done at Duke and other great American universities, we must also continue reminding policy-makers that basic research is what we need to make new medicines and to improve the health of the country more generally.



Nancy C. Andrews

Nancy C. Andrews is Dean of the Duke University School of Medicine and Vice Chancellor for Academic Affairs. She was elected a Fellow of the American Academy in 2007.

My question for the panel is, What is the low-hanging fruit? What can investigators, academic institutions, the NIH, and others do quickly and without much resistance to start moving in the right direction?

Harold Varmus

What we have tried to do at the National Cancer Institute is to start a few new grant programs to address some of these problems. One is to try to give a greater degree of stability and reassurance to our very best investigators by reinitiating an Outstanding Investigator Award that would give very substantial support for most of an investigator's research program for seven years. To start, we are making fifty awards a year every year for seven years, evaluating the program as we go along.

Second, we are trying to accelerate training by discussing and hopefully soon imple-

menting a program that would identify the best graduate students and move them more quickly through graduate training into post-doctoral positions. Third, we are trying to embody our enthusiasm for staff scientist positions by offering independent grants to people who would be either working as independent scientists in existing laboratories, working as directors of core facilities, or serving the research needs of entire communities of scientists. Fourth, we are trying to change some of the evaluation procedures. For example, throughout the NIH-supported world, grant applicants are no longer required to just simply list their citations, but instead to describe in half a page of prose their five most important contributions to science. Investigators are then evaluated more by their substantive achievements rather than by whether they were able to get their papers into the most prestigious journals. Regardless of such progress, I am concerned that we are just choosing to change the things that are easiest to change and not trying to instantiate deeper change. Deeper change is difficult, because the system is fragile and inherently conservative, and perturbations of it run big risks.

Susan R. Wentz

I commented on some of these short-term solutions before, but I would add that we need to charge our students to be proactive in seeking mentoring and making well-informed decisions about each step of their career path along the way, rather than waiting until the fourth year of graduate school.

Tania Baker

Making real scientific tracks for the research scientists or directorships for the core facilities are both goals we can focus on now, but unfortunately it is still hard to figure out how to fund those people. Many of us

are involved in trying to raise money for our institutions and our departments. When we are doing that, we can also advocate for increased freedom to pursue different types of activities. Endowed fellowships for particularly fragile parts of our academic system are extremely useful, such as for professors up for tenure. If their first grant is not funded, that could actually ruin their entire career, because they might not get tenure if their position is not funded.

We can also expose our students and fellows to multiple career options in many ways: having panels of alumni who are in exciting alternative careers; allowing our students to take classes in areas not directly related to their PhD work; encouraging them to take teaching classes (we have a little teaching certificate program at MIT that our students often take); and providing brief (six- or ten-week) internships in companies, policy-research organizations, or government. Some universities already have such opportunities, but many of the students do not know that they exist or take advantage of them; spreading awareness of those resources for career planning is also something we could work more on.

Mark Fishman

I am a bit reluctant to talk about incremental change because it often takes the focus off the need for substantive change. However, I think that one of the opportunities for industry to help is, as Tania was saying, to have more shared exposure. We have a postdoc program, for example, with one hundred scientists in it, co-mentored by someone in academia. We have sabbaticals where our scientists go into academia, and academics can come in and do sabbaticals at Novartis as well. It would be wonderful to encourage the faculty of large research universities to teach more.



Sally Kornbluth

Sally Kornbluth is Provost and James B. Duke Professor in the Department of Pharmacology and Cancer Biology at Duke University School of Medicine.

Should we be complacent about the stagnant NIH budget? Should we just assume that it will be flat for the foreseeable future, or can we somehow push for expansion? I would like to hear what everyone has to say, but Harold Varmus may have some insider information.

Harold Varmus

There seems very little prospect for a major increase in the NIH budget, but we should not abandon hope by any means. First, recall that the President asked this year for a \$1 billion increase. One billion dollars sounds to most of us like a lot of money – and it is a 3 percent increase over last year’s budget – but this amounts to just a bit more than inflation and more importantly would get us back to a little below the place we were before sequestration (in other words, to 2012 levels). We frequently talk about the inflation

rate (or the biomedical research price index, which is about two times the nation’s overall inflation rate) as the standard minimum for keeping the NIH budget at current levels of spending power. But we have to face the fact that science itself has also become a lot more expensive. In my area of research, what we spend on the research of a single postdoc has gone up threefold over the last ten to twenty

A rolling five-year projection of appropriations for biomedical research would give Congress a standard to live up to, rather than simply waiting to see whether the economy is properly primed, whether politics are right, and whether the President has made a certain kind of recommendation.

years. Much of that can likely be attributed to the rising costs of prepackaged kits and animal care, as well as to the increasing ease of access to complex and expensive services such as genomics. We cannot be sure whether the President’s request for that billion dollars will be met. There are specific (and worthwhile) projects that President Obama has identified that he wants to spend this money on. Moreover, even if the requested increase is awarded, it is not clear whether Congress is going to mandate that the NIH follow the President’s instructions for spending it. You may have noticed the President’s requests to Congress are not always greeted with enthusiasm, especially now that we have two Republican chambers.

But over the long run we should be thinking in much broader terms than just next year’s budget. After all, people who are being trained now will be doing research, we hope, for the next thirty, forty, or fifty years, and we need to think with a much broader perspective to ensure their future. I notice with pleasure that the American Academy’s

Restoring the Foundation report, as well as statements by several individuals active in this debate, have advocated that Congress put in place a five-year rolling budget projection, as well as annual appropriations. Multiyear appropriations seem unrealistic. But the five-year projection is something that we may be able to persuade Congress to do if we got all of the elements – industry, uni-

versities, patient advocates, and scientists working at universities – to say together, “Let’s have a template for what we think we would like to spend if the economy allows it and get people to work together to have a much longer-range view of how the budget ought to evolve.” Let’s persuade Congress to adopt a standard to live up to, rather than simply waiting to see whether the economy is properly primed, whether politics are right, and whether the President has made a certain kind of recommendation.

Susan R. Wentz

I am not as near to the crystal ball as Dr. Varmus is, but I think I can speak to a couple of points. First, I think we are very fortunate to have people lobbying to increase NIH funding, but we each need to take personal responsibility for conveying as clearly as possible to laypeople – to our parents, grandparents, neighbors – the value of basic research and the consequences of not funding it. That is a responsibility for all of us to

take on in addition to the leadership that we have advocating directly with those who fund the NIH.

Another aspect of this is that our research programs are not only supported by the NIH, but also by philanthropists and by institutions such as biomedical enterprises and academic medical centers. We need to think carefully about how to steward our resources in the most effective manner, how we can change the way we work to get more bang for our buck, as I like to say. That takes people coming together and being willing to share and think about new ways of doing things more efficiently.

Tania Baker

Yes, I absolutely think that we should continue to communicate with the NIH as clearly as we can and help others communicate to the NIH and to the government generally the incredible importance of basic research. We, as experimental scientists, can do so many things today because of completely unanticipated discoveries of basic research. It is a very compelling story that we should keep telling.

We have been talking a lot about medical centers. I am fortunate enough to work at one of the only universities that does not have a medical school. Actually, MIT has hard nine-month salaries for all faculty. I have noticed in the last couple of years that people leaving my lab – and people leaving the labs in general – are looking for positions like those at MIT, where they may have a higher teaching load than people at the medical centers, but where they have this guaranteed salary forever if they get tenure. Additionally, if professors are paid by the university, then grant money goes a lot farther.

Mark Fishman

I do not think we can be complacent about NIH funding levels, but the problem goes a lot deeper than that. One issue is that most people in this country do not believe in the importance or power of science. I think fundamental science education must be improved at all levels. ■

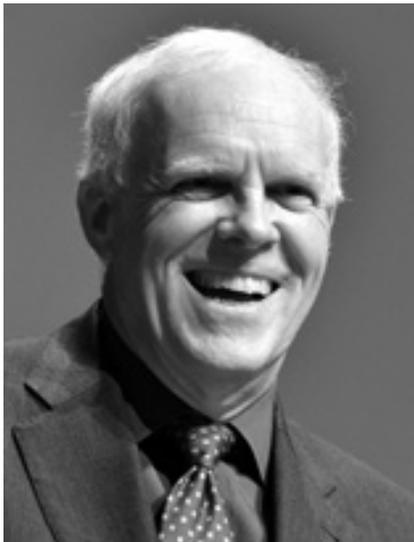
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To view or listen to the presentations, visit <https://www.amacad.org/biomedical>.

Replenishing the Innovation Pipeline: The Role of University Research

On February 3, 2015, **John L. Hennessy** (President of Stanford University and the Bing Presidential Professor), **Ann M. Arvin** (Vice Provost and Dean of Research, Lucile Salter Packard Professor of Pediatrics, and Professor of Microbiology and Immunology at Stanford University), **Carla J. Shatz** (Sapp Family Provostial Professor; David Starr Jordan Director, Stanford Bio-X; and Professor of Biology and of Neurobiology at Stanford University), and **Peter S. Kim** (Virginia and D. K. Ludwig Professor of Biochemistry at Stanford University and Member of Stanford ChEM-H) participated in a discussion at Stanford University about the role of university research in the innovation pipeline. The program, which served as the Academy's 2015th Stated Meeting, included a welcome from **Jonathan F. Fanton** (President of the American Academy). The following is an edited transcript of the presentation.



John L. Hennessy

John L. Hennessy is President of Stanford University, where he also holds the Bing Presidential Professorship. He was elected a Fellow of the American Academy in 1995.

The Academy has for many years played a major part in shaping the intellectual landscape of our country. The recent Academy report *Restoring the Foundation: The Vital Role of Research in Preserving the American Dream* is a call to action, presenting in clear terms the need for a sustainable and competitive investment in the research ecosystem in the twenty-first-century United States. The report begins with three impor-

tant findings: The first is that the nation's investment in science and technology was the dominant driver of economic growth, security, and vitality for the United States in the twentieth century. Second, the report showed that in just twenty years, from 1992 to 2012, the United States moved from second in the world among developed countries in R&D spending as a percentage of GDP to tenth. And the third major finding is that that declining investment has led the United States to lose its global leadership in science and technology research, creating an innovation deficit between the leadership position we aspire to and the weakened position we find ourselves in today. The question is: what can we do about it?

Restoring the Foundation answers with three prescriptions. The first prescription is to resecure America's global leadership in science and engineering research by providing sustainable federal funding as part of a clear long-term government investment goal. In particular, the federal government needs to fund basic research, which, as we know, has been the source of many unintended, profound, and widely beneficial advances in our nation's development. For the last two decades, adjusted for inflation, federal funding has remained stagnant. We need to return to the historical growth rates of between 3 and 4 percent of GDP invested in research and development. Second, the report prescribes that we ensure

that the American people receive the maximum benefit from federal investments in research. We need to enhance the ability of our governmental organizations to tap into university and research enterprise knowledge to make better policy. We must also elevate science and technology issues in the minds of the American public, thereby increasing awareness of the negative consequences of federal disinvestment. The third prescription is to regain America's standing as a leader in innovation by building a more robust research partnership between industry, government, and universities. We need to improve upon our intellectual property policies and remove the barriers that prevent industry from translating research breakthroughs into new technologies.

Today, we are going to talk about that research and innovation pipeline; how we can initiate the process of replenishing it; and the role of universities in the development and application of new technologies.



Ann M. Arvin

Ann M. Arvin is Vice Provost and Dean of Research, Lucile Salter Packard Professor of Pediatrics, and Professor of Microbiology and Immunology at Stanford University. She was elected a Fellow of the American Academy in 2012.

How can Stanford and other research universities be most effective in this effort to replenish the innovation pipeline? Research universities fill a unique role in the U.S. research and development enterprise. According to the National Science Foundation, university researchers perform 54 percent of the basic research, 19 percent of the applied research, and 2 percent of the development done in the United States. Clearly, the research university's greatest contribution to the innovation pipeline is in basic and applied research. There is no substitute for the university's commitment to individual faculty and their efforts to do discovery-based research. We need to trust the knowledge and creativity of our colleagues and create an environment that allows them both to take risks and compete for outside funding, which is what actually funds most university research. The corollary to that

There is no substitute for the university's commitment to individual faculty and their efforts to do discovery-based research. The corollary is that there really isn't any substitute for federal research funding.

is that there really isn't any substitute for federal research funding. There is no other source of money that can cover the needed investment.

What are some strategies for universities to contribute and support innovation? Investing in researchers at the earliest stages of their careers is a wonderful model for fostering innovation. As the report shows, young researchers face daunting challenges: the percentage of academic researchers under the age of forty who are funded by the NIH has steadily declined since 1980, while the percentage of funded researchers over sixty has steadily grown. Young researchers must have the independence and opportunities to take the risks that can lead to breakthrough research, afforded by obtaining their own research awards. This is one of the most important principles about research funding. Further, helping young researchers compete should encourage older researchers to maintain innovative programs: they cannot rest on their laurels and be assured continued funding. This competition and mixing of generations, achievable when the research investment is adequate, clearly drives the creativity that leads to research breakthroughs.

Additionally, we have seen at Stanford that encouraging research across disciplinary boundaries sparks innovation. (Carla will speak more to this strategy and our experiences implementing it at Stanford.) We also know that twenty-first-century science requires the university to invest in state-of-the-art shared facilities; the days of a single researcher at the bench, looking through his or her microscope

and producing revolutionary science, have essentially passed. We need shared facilities to foster collaboration and to pool intellectual and funding resources. We must also improve on our efforts to engage students at the earliest levels and across diverse student populations. By demonstrating that people from all backgrounds can thrive as researchers, students who otherwise may not have considered research may be encouraged to pursue it; and the entire enterprise will benefit in the future from the diversity of their perspectives and contributions.

I believe that to replenish the innovation pipeline we need, above all else, to reinvest in the approaches and structures that we already know to be highly successful in fostering creative thinking. But what then of our partnership with industry? Stanford historically has never been an ivory tower. Apparent in the early documents of the university, Stanford's mission has always been to transfer knowledge for the public good. And if the university is to do that, it is necessary to work with industry partners. Successful partnerships between Stanford and industry have included sponsored research contracts, funded collaborations, technology licensing, student internship programs, shared specialized facilities, industry affiliates programs, and faculty consultation with the private sector, which also transfers knowledge from industry back into the academy. So, in light of all of this, is there really much more that needs to be done?

Universities and private companies are fundamentally different. Universities are open environments that encourage free exchange of ideas via the publication pro-

The days of a single researcher at the bench, looking through his or her microscope and producing revolutionary science, have essentially passed. We need state-of-the-art shared facilities to foster collaboration and to pool intellectual and funding resources.

cess. Companies are closed; research in companies is proprietary. Universities are decentralized, whereas companies, by necessity, have a central control. In universities, faculty define the research agenda, and research is largely performed by trainees, who, in stark contrast to companies, are not employees. Research universities preserve their nonprofit status, while private-sector research is funded by the company and is therefore accountable to its shareholders. But these differences are strengths. University researchers ought not ask how they can make their industry counterparts more like them; just as industry researchers ought not think that academics are disorganized dawdlers. Rather, each group should have an appreciation for the need the other serves, and each should envision how they can best join forces to expand scientific discovery and its application – the foundation of which is communication and interaction.

How can we promote interactions? Convening in a neutral environment that invites people from companies to talk about science and technology topics, especially those of immediate concern to the private sector, certainly encourages informal and productive interaction. Universities can designate funds, as Stanford has, to help faculty bring their research closer to a proof of concept that would more readily attract companies. University contracting processes, intellectual property licensing processes, and other kinds of more formal interactions certainly can improve. We would also like to engage with companies about how they

could better support basic research at universities. Our model for this is the Global Climate and Energy Project (GCEP), which is a consortium of companies that pools funds to be distributed to researchers based on peer review. The fund welcomes faculty-researcher applicants from beyond Stanford.

These are ways in which companies and universities might be able to think more broadly. Certainly the process will require us to go out on a few limbs, but to quote Will Rogers, “that’s where the fruit is.”



Carla J. Shatz

Carla J. Shatz is the Sapp Family Provostial Professor; the David Starr Jordan Director of Stanford Bio-X; and Professor of Biology and of Neurobiology at Stanford University. She was elected a Fellow of the American Academy in 1992.

In many ways, Stanford is quite lucky: it has established a framework that allows for remarkable innovation, often marrying fundamental research with both applied research/engineering and clinical research. These three areas are often isolated at universities; but when they intersect and become wedded to each other, incredible discoveries and public benefit can result.

That is the theoretical foundation of Stanford Bio-X, the interdisciplinary center I direct. As you may already know, the *X* in Bio-X is a variable: let *X* equal chemistry, physics, electrical engineering, computer science, medicine, psychology, or even law. It can encompass the life sciences, clinical sciences, and physical and engineering sciences. And Stanford is especially well-positioned to foster crossdisciplinary interactions: all these different academic

Bio-X operates on the belief that maximizing cross-disciplinary interactions will maximize innovation.

disciplines physically neighbor each other on the same campus. Bio-X operates on the belief that maximizing interactions will maximize innovation. And we aren't alone in that belief. Last year the National Academy of Sciences held a meeting on what they called *convergence*, which is, perhaps, the East Coast way of labeling the intersections of disciplines that Bio-X operates in. It's an idea that is generating a lot of excitement.

Bio-X has a number of funding mechanisms to encourage innovation and interaction across disciplines, which brings us back to the idea of competition for resources. We have an open-competition fellowship program that awards funding to between ten and twenty PhD or M.D./PhD students every year. Fellows must work with at least two mentors across disciplines/departments, creating a network of mentorship and an expansion of training. We also have seed grants to fund about twenty teams of faculty researchers every other year. In an open and vigorous competition, about one hundred fifty teams usually apply for these seed grants, representing more than fifty departments across six schools within the university. And the applications are extremely diverse. Over the last fourteen years, we've held seven rounds of competition, awarding about one hundred forty of these seed grants. And over this period, the Bio-X collaborative seed grants have driven the number of interactions between faculty of different disciplines, between the schools, and between faculty and students to expand exponentially. The seed grants have constructed a horizontal web of interactions between faculty who would ordinarily be enclosed in their departmental silos. Of course, this model can only be as effective as the excellence of the faculty

allows. But one builds on the other: great faculty enable fruitful crossdisciplinary interactions, and those interactions build stronger faculty.

So in what fields, specifically, can these methods help replenish the innovation pipeline? Let me give you an example. Wouldn't it be amazing if, just by shining light on a cell or a few cells in your body, you could make those cells take action? For example, if you had diabetes, what if you could compel the pancreatic cells to release insulin just by shining light on them? Well, because of an amazing discovery made by Stanford faculty member Karl Deisseroth, we're beginning to open up this incredible world. Karl figured out how to genetically engineer

What could the future hold if the U.S. government were to apply this model, which Stanford has shown can succeed on a small scale, to the national research enterprise?

parts of certain proteins to be light-sensitive, just like the rods and cones in your eye. But the proteins do not merely capture the light; they transfer the information to the cells to make them do their job. When Deisseroth first conceived of this idea, he wrote two NIH grants in close succession, and the NIH reviewers replied, "Wow, that would be extraordinary if it worked, but it likely won't work, so we're not interested in funding it." What could he, an early-stage assistant professor, do? Fortunately, Karl applied for one of the Bio-X seed grants; and we thought his application was amazing. Bio-X helped fund Karl during the riskiest stage of his research, and this work led to

crossdisciplinary collaboration, which led to more collaboration, leading to student fellowships and crossdisciplinary training in engineering, medicine, and neuroscience, before he received significant NIH funding. By now I think Karl has founded a company to build off of and apply his work, and who knows where it's going from there.

Karl's story illustrates how investing a small amount of money – in this case, \$150,000 over a two-year period, which might pay for a student or a postdoc and some lab supplies – can generate a legacy of amazing resources and launch the new field: *optogenetics*. The demand to learn how to do optogenetics is great, and Bio-X and Karl have launched an optogenetics innovation training lab where people not only at Stanford, but from all over the world, can come and learn the technology. Critically, the training lab is helping to spread

the technique long before you can buy it off the shelf. And yet, in the traditional model, no one would have funded Karl's work; they just didn't think it was possible. A core purpose of Bio-X is to fund high-risk, high-reward projects. Many will fail, but if funders do not take these risks, society won't benefit from the revolutionary few that succeed. Let me conclude with two questions: Who else will take that risk? And what could the future hold if the U.S. government were to apply this model, which Stanford has shown can succeed on a small scale, to the national research enterprise?



Peter S. Kim

Peter S. Kim is the Virginia and D. K. Ludwig Professor of Biochemistry at Stanford University and a Member of Stanford ChEM-H. He was elected a Fellow of the American Academy in 2008.

I started out as a faculty member at MIT before moving to Merck, where I oversaw drug discovery and development for twelve years, and am now back in academia. I thought that I would begin by reflecting on my experiences and the interaction between academia and industry, which is so crucial to the third prescription of the *Restoring the Foundation* report: to regain America's standing as a world innovation leader by establishing a more robust government-university-industry partnership. I will focus on drug discovery; but let me state upfront that there are, of course, many other types of interactions between industry and academia.

The first thing I'll say is that discovering and developing a drug is incredibly hard. And it wasn't until I actually went to Merck that I fully appreciated this essential point. Let's put it in perspective: if you have a new

If you have a new mechanism of action, and you've tested that mechanism completely in animals, and you have a drug candidate that now passes all tests for toxicity, and you can apply this mechanism to a human being, the probability that your molecule will become a drug is still much lower than 10 percent.

mechanism of action, and you've tested that mechanism completely in animals, and you have a drug candidate that now passes all tests for toxicity, and you can apply this mechanism to a human being, the probability that your molecule will become a drug is still much lower than 10 percent. Such a high probability of failure means risk is inherent to the business. Further, the process of developing, testing, and releasing a drug takes about twelve years, which obviously is an enormous amount of time to invest into a project with a very low probability of success. Which leads to my third point: developing drugs is very expensive. According to the Tufts Center for the Study of Drug Development, if you include the cost of failure, it costs an estimated \$2.5 billion to discover and successfully develop a single drug. In sum, the process is extremely risky, time-consuming, and expensive.

One major observation that I would make is that there's a significant disconnect between the perceived value of discovery in academia and the value of discovery to drug manufacturers. In academia, we of course want to be the discoverer, the pioneer of a new program; and we believe that when we accomplish this very difficult task, we have contributed something of high value. But from the industry's point of view, the probability of successful application of what you've discovered, ingenious though it may be, is stunningly low. And given that it takes twelve years to bring to market a *successful* drug, the one- or two-year head start you bought for

yourself as discoverer is not that big of a deal. Further, the sort of chemistry that is addressed in most academic centers is really quite primitive compared to the medicinal chemistry undertaken by these huge departments in pharmaceutical companies that are expert at refining an initial small-molecule lead to make a drug molecule with desirable characteristics. So the initial leads are usually not considered to be of much value. Being first isn't important, being the best is. To put that into perspective, Lipitor was the fifth drug to join the statin class of drugs; this multibillion dollar success for Pfizer was not close to being the first molecule to come to market in that category, but it prevailed. Clearly, the premium of being the discoverer, which is so important in academia, is much less important in industry.

What are the potential solutions to this disconnect? Well, one that I have seen with increasing frequency and that is really quite admirable is for academic researchers to carry their project further, past the point of discovery. Either in academia or through a start-up company, researchers can further develop and increase the value of their initial discovery, while at the same time taking on the risk of the high probability of failure. But I thought I would bring up another possible solution, which I tried to push when I was at Merck: to recognize that the value of a strong partnership is not so much in the initial discovery, but rather in gaining – through academia – the opportunity to work with the world's experts in a particular field. Compa-

nies don't employ the leading researcher in each and every field that their research and development happens to touch on. Thus, the deep and highly specialized subject-matter expertise of university faculty is valuable to a company attempting to develop a new product. The value of industry to academia, then, is to connect researchers with experts in fields in which they may not be familiar, such as medicinal chemistry, drug metabolism, animal toxicity, formulation science – topics often considered boring by the academy, but which are absolutely critical to bringing the product to bear.

And for these relationships to blossom, they must be true partnerships when it comes to intellectual property. Inventorship – meaning the people who are listed as inventors on patents – is defined by law. Thus, with intellectual property, you either have an inventor who satisfies the requirements for being an inventor, or you do not. Ownership of intellectual property, by contrast, is completely negotiable. The best uni-

technologies; there are some inventions that we would all agree should be licensed on a nonexclusive basis so that the whole world can benefit from their uses. But sometimes it's not so clear, as with specific enabling technologies; or in the case of drug discovery, with specific drugs or specific targets. Understandably, universities want to maximize the value they get from the invention, while also ensuring that the invention doesn't get buried or stuck because it has been exclusively licensed to a party that, for whatever reason, does not or cannot develop it. These considerations would appear to favor a nonexclusive licensing strategy. But I want to stress the importance of capitalizing on a highly motivated inventor. A highly motivated inventor can really push an invention forward with very positive consequences for the university, investors, and society. And oftentimes, the best way to capitalize on a highly motivated inventor is to grant an exclusive license. Which begs the question, how do you structure an exclusive relationship that is respon-

The best university-industry collaborations that I have had experience with specified that any new intellectual property would be co-owned, regardless of who came up with the invention.

versity-industry collaborations that I have had experience with specified that any new intellectual property would be co-owned, regardless of who came up with the invention. This eliminates any question of who will most profit from an invention. It also opens the doors of communication and reduces the incentive to be secretive with the other party

Finally, I would like to reflect on the issue of exclusivity versus nonexclusivity in the interactions between inventors and universities. I am not talking about broad-platform

sive to the perfectly legitimate concerns of all involved parties? It is a difficult question to answer; I note that university offices of technology licensing do try to carve out a specific area of exclusivity, allowing alternative licensing options to the university. Less common are diligence clauses with real teeth, specific enough to allow a university to take aggressive action if the licensor does not actually invest appropriately, or if the investor does not hit certain milestones.

Discussion

John L. Hennessy

Ann and Carla, you both touched on innovation and the willingness to take risks, and there is a broadly held feeling that NIH has become much more conservative over time, and that they are failing to invest adequately in young people. What can we do about that fundamental problem?

Ann M. Arvin

I think the core issue is that there is not enough money to support the whole research enterprise. If you create a situation in which peer review is no longer relevant, essentially because a study section is reviewing one hundred proposals, five of which it can fund, it becomes impossible not to become more conservative and selective. Funders are forced to look for the sure thing, or whatever comes closest. So I think the conservatism that we're seeing is a direct consequence of the pressure that is put on the peer-review process by limitations in funding.

Carla J. Shatz

Universities are trying to supplement the funding of young faculty who are just getting started; we see this in the escalation of start-up packages that allow young investigators to take off. When it comes to discovery-based fundamental research, which is often the beginning of the innovation pipeline, we rely on research entities like the Howard Hughes Medical Institute or, in Europe, the Burroughs Wellcome Fund and Max Planck Institute, which actually reward people for taking risks – it is part of their tradition. But they can only fund a few hundred investigators. And Ann has outlined the limitations of NIH. So there seems to be a need for another resource, a competitive resource that could

Without research career-development awards, young researchers struggle to even get started; yet we know early researchers often contribute some of the most important work in their fields.

fund the kind of discovery-based research that we believe is necessary for the beginning of the innovation pipeline.

Peter S. Kim

The NIH Director's Pioneer Award is a good example of funding high-risk, high-reward research; it's very limited, but it's a step in the right direction. In fact, NIH could shift toward a more Howard Hughes–like funding model, in which the investigator, not the project, is judged and funded or not.

John L. Hennessy

One of the most stunning graphs in *Restoring the Foundation* shows the doubling of the NIH budget, followed by a precipitous drop. Essentially, over the last fifteen years, the doubling made no difference in terms of federal basic research investment as a share of GDP. Given such reversion and long-term failure, do we need a new national policy for research investment? Wouldn't we be better off with a national policy that grows the country's investment in basic research in proportion to GDP growth, at sustainable and competitive growth rates? Do we actually benefit from dramatic funding surges if regression is inevitable?

Carla J. Shatz

I think we could all agree that a long-term plan would be good. The idea of trying to run a research enterprise without knowing what your budget will be next year, even if you have a five-year commitment from the

NIH (which at any year may be cut due to budgetary problems), is absurd. You can't run a high-quality, sustained research enterprise with such unpredictable and oscillating funding. You certainly would not run a business that way. And junior researchers especially suffer from this instability. Without career-development awards, young researchers struggle to even get started; yet we know early researchers often contribute some of the most important work in their fields.

John L. Hennessy

Peter, you spoke about the low probability of success on the long timetable of developing drugs; and there has been much discussion about the valley of death in drug development (the period between initial funding and first returns of revenue) and the fact that it is increasingly difficult to adapt an academic discovery to a commercial product. Given the data you have offered, investors are acting much as I would want them to act with my money: they are logically recognizing that the high risk and the long wait for any potential return calls for conservative investment. The market logic is clear, but from a wider viewpoint, the probability for breakthrough developments is lowered substantially. How can we combat this problem?

Peter S. Kim

That's a really hard question. Investors *are* acting rationally. These are people who actually run the numbers and invest accordingly. Again, given these numbers, I think that it would be helpful for academics to be more

realistic about the value of their initial discoveries. The value of their research is nil if it doesn't get picked up. But I also think that we all need to ask if there are creative mechanisms for the university to protect and increase the value of research discoveries.

Ann M. Arvin

I do believe that we can help academics, and as I mentioned, Stanford has put resources toward getting selected works closer to a proof of concept. But I do not think that we as academics are in any way capable of commercializing anything. Some of our colleagues feel otherwise, arguing that they are prepared not only to see the venture through but to do it right here at Stanford. To me, that is an inappropriate use of our resources, including our students and staff, colleagues, and facilities. Moreover, we academics just don't know how to do it. Instead, we should move things as quickly as possible, transferring the opportunity to the people who can evaluate whether a project deserves to be pushed forward and who know how to do it. And to return to diligence clauses, we do have them in our university contracts. But how would it appear if Stanford elected to sue a faculty-created company, which is struggling to hang on to its last dollars of venture capital investment, because it missed a month's progress report? It is a tricky field to navigate, but the university is talking about it and is actively looking for ways to improve. ■

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To view or listen to the presentations, visit <https://www.amacad.org/replenishing>.

Mr g – The Story of Creation as Told by God

The Academy's 2017th Stated Meeting on February 11, 2015, featured members of the Catalyst Collaborative@MIT performing a staged reading of *Mr g*, a novel by Alan Lightman (Professor of the Practice of Humanities at the Massachusetts Institute of Technology) adapted for the stage by Wesley Savick (playwright, director). *Mr g* is the story of creation as narrated by God (Mr g). In it, Mr g's uncle Deva and aunt Penelope give him advice as he sets about creating the universe; he also spars with a Satan-like character about various ethical and philosophical issues raised by his creation, especially when intelligent life emerges.

Debra Wise (Artistic Director of the Underground Railway Theater and Codirector of the Catalyst Collaborative@MIT) introduced the reading. The program also included a welcome from Jonathan F. Fanton (President of the American Academy) and a panel discussion featuring Lisa Sowle Cahill (J. Donald Monan Professor in the Department of Theology at Boston College), Edward J. Hall (Norman E. Vuilleumier Professor of Philosophy at Harvard University), and Alan Lightman. The following is an edited transcript of the discussion.



Lisa Sowle Cahill

Lisa Sowle Cahill is the J. Donald Monan Professor in the Department of Theology at Boston College. She was elected a Fellow of the American Academy of Arts and Sciences in 1996.

I am a Christian theologian, but I will stay away from anything specific to Christian theology and try to address *Mr g* on the basis of the Book of Genesis and some contemporary theological questions that it raises. When I first opened the book and

***Mr g* deals with three enduring questions – enduring because they are very difficult to answer. The first is: Why is there something rather than nothing? The second is: Is there one god or many? And the third: Why does evil exist?**

started to read it, I thought, “What do they need a theologian for? It’s fiction; who cares whether it conforms to any theological criteria?” But as I continued to read, I realized that the book is in some ways quite traditional, or at least many of the things that it suggests are also suggested in the Book of Genesis. The questions that *Mr g* opens are actually at the heart of some of the liveliest debates in theology today. Specifically, I see it dealing with three enduring questions – enduring because they are very difficult to answer. The first is: Why is there something rather than nothing? The second is: Is there one god or many? Or, at least, might there be multiple primordial beings who are working at cross-purposes? And the third: Why does evil exist? (To me that was the driving question of the book, or at least the one that I related to the most as a nonscientist.)

Let us start out with the first question: Why is there something rather than nothing? In the Book of Genesis (specifically Genesis 1, which reached its final form in about the sixth century BCE), it is God who creates something. Incidentally, God is creating out of the Void, but the Void is not nothingness, exactly. It is the earth with a sort of watery covering. So the idea of creation “out of nothing” was really a later Christian doctrine; Genesis remains much more ambiguous about exactly what is going on. One of the most historically and theologically striking things about the Genesis creation narratives is that they are less concerned with the nothingness that came before than with the creation of a habitat that is beneficial to human beings and an orderly environment in which human society can exist. In the other ancient near-Eastern myths there is usually a contest or conflict

between primordial beings who struggle until the world is created. The story that is most often compared to Genesis is the Babylonian myth of Enuma Elish, in which there is a masculine God named Marduk and a feminine goddess of the waters named Tiamat. They struggle and Marduk wins. So you have a picture in which a primordial conflict between two different beings creates the world and humanity.

In Genesis as well as in *Mr g*, there is just one creator who looks at his creation in the end and says, “This is good.” So the theological suggestion is that there is one universe; even if it is not completely orderly, its fundamental nature is at least not based on conflict. At the same time, though, Mr g does not seem entirely sure of what he is doing; he bumbles a little bit. This is actually also true of the creation of human beings in Genesis, which is chronicled in an older piece of the book that is more like folklore. In it, God makes the first human and then belatedly realizes that it does not have a partner. He runs through all the animals trying to find one before finally realizing he has to make another human.

The second issue in *Mr g* is of unity and plurality, or monotheism and polytheism. The problem of evil, which we will get to in a moment, is a lot easier to resolve if there are multiple forces in conflict; that is, if there is a polytheistic system. Judaism, Christianity, and Islam are monotheistic religions, so we struggle with how to explain evil if God is good. So I looked at the names of Mr g’s companions: Uncle Deva and Aunt Penelope. Deva is a Hindu word for a god; Penelope is the spouse of the hero Odysseus in Homer’s *Odyssey*. In Genesis 1:26 when God is about to make humankind, God actually says “let us make,” and there has always been a big scholarly debate about whom the plural pronoun is referencing. The biblical scholars’ solution to that is that “us” is the heavenly court. So that is a little bit like Aunt Penelope and Uncle

Deva. There is another rather odd reference in Genesis 6 to marriages between sons of God and daughters of men. There is a parallel between Uncle Deva, who’s a god, and Aunt Penelope, who might be a human being. That plurality is tacitly reflected in Genesis, despite the fact that the Abrahamic religions are monotheistic.

The third issue is how to explain suffering and evil. In *Mr g*, Belhor is a male character, imposing, very thin, and sinister, with two little sidekicks who are based on pagan deities. Belhor is a variation on a demon in the Bible called Belial – which means “worthless” – who is not quite evil, but rather destructive and lawless. There are two accounts in *Mr g* of why Belhor – and evil – exist, which in my opinion are never resolved. Belhor claims that Mr g created him, or at least that Belhor came into existence when and because Mr g created the world. Mr g, on the other hand, maintains at the end of the book that Belhor is immortal and is his – Mr g’s – antipodal companion rather than his creation. In the first case, God (Mr g) remains the sole primordial being and creator, as in Genesis. In the second, the scenario is more like the Babylonian Enuma Elish: Mr g and Belhor are independent forces.

Furthermore, Belhor and Mr g have different explanations of evil. Belhor claims that it is impossible to have good without evil and vice versa, and also that a consequence of having free and intelligent beings is that they must be free to do evil. This is actually the standard theological explanation of why evil exists in the world, so it is interesting to me that it comes from the mouth of Belhor, who in the book is certainly not to be trusted. He may not always be wrong, but he certainly was when he said all worlds would end in tragedy; at the end of the book, Mr g says the world was beautiful, that it was full of joy as well as sadness, and that it was a lovely thing.



Edward J. Hall

Edward J. Hall is the Norman E. Vuilleumier Professor of Philosophy at Harvard University.

When I read *Mr g* it was very natural for me to interpret it against the background of two very basic, almost primordial philosophical questions. For many of us these questions are inescapable, which explains a lot of the book's power to draw the reader in so quickly. The first question is a cosmological one, which I will state in an extremely simplistic and flat-footed manner because I think that is the way we actually confront it within ourselves: What is this thing that we find ourselves part of? By "this thing," I mean the whole shebang, all of it, everything that exists in the past, present and future – or out of time, for that matter. In short, all of reality. What is it? It is fascinating to me how much of a grip that question has on us. If you think about our location in evolutionary history, it is not obvious that it would be a good design principle to build intelligent beings that are particularly gripped by that question, but it is not hard to see that this is exactly what we are.

It is interesting that Mr g himself possesses all three of these human features: he is capable of self-conscious thought; he makes choices; and he takes himself to be subject to moral norms. In that sense his nature is fundamentally similar to the nature of part of his creation, and I wonder if that was done on purpose.

So imagine as a thought experiment that an oracle of some kind came to you and said, "I've got five minutes. You have two options. I can give you a sort of synopsis of the whole shebang, which is not going to be hugely informative because I only have five minutes and you're not that smart. But I can tell you as much as I can in five minutes about all of reality. Or, if you like, I can zoom in on one particular detail and spend the time talking about that." You can imagine people who would take the second option. You know, "I was at a dinner party the other night and I left the room for five minutes and when I came back people were sort of chuckling. I'm sure they were talking about me and I want to know what exactly was happening in that five minutes." But for a lot of us, at least, choosing the first option would be a no-brainer. Of course you'd want the synopsis – and you'd be hungry for more after it was over. That, I think, is fascinating. One of the things *Mr g* does is provide the reader with an imagined version of that synopsis, an educated guess, because Alan was consciously attempting to do justice to the physics of the cosmology of our universe as we currently understand it.

But one aspect of the cosmological story in *Mr g* goes beyond what a standard physics textbook would give you. That is, the universe is created by a rational being who ponders over what the organizational principles should be. He tries some out and dis-

covers that adding a fourth principle breaks things, so to have this universe behave in a rational manner he needs to stick to these three principles. This backstory rationalizes a central part of scientific discovery, particularly in the field of physics, in which we are always in the business of looking for mathematically elegant principles. It is child's play to write down physical principles that will issue correct predictions but in an ugly and ad-hoc manner. Most physicists learn very early on in their training not even to think of these principles as options; they're off the table. When I teach philosophy of science, I put them back on the table and then students get worried – why is it that we're so confident that the world *doesn't* work that way? Why assume that the world works according to simple, elegant, mathematized principles? Of course, if you think the world is the creation of some very intelligent – not all-knowing, not omniscient, but very intelligent – and rational being, then that makes sense.

This first inescapable cosmological question kind of gets an answer within the book. But it is not a complete answer, because there are unresolved questions. For example, if Mr g has an aunt and an uncle, does that mean he has a parent or parents? Where is that parent? What exactly is Belhor's relation to Mr g?

The second inescapable question for us humans, I think, is: What are we, who are

part of this thing? How do we fit in? To see the urgency and difficulty of that question it is helpful to notice, I think, three features of human existence. It is difficult to see at first how they fit in to the world as it is revealed to us, particularly in the modern scientific image and in the image given to us by physics.

One of those essential features is that we are capable of self-conscious thought, and by thought I mean thought in all its varieties: beliefs, fears, hopes, speculations, desires. We are capable of representing reality to ourselves in certain ways *and* of being fully aware that we are doing so. That is really quite remarkable; it is not clear that any other creatures on the planet can do that. Take my dog Milo, for example. I think he has thoughts—although there aren't many, he does occasionally have them. But I very much doubt he ever has self-conscious thoughts; that is, the sort of thought displayed with crystalline clarity in Descartes' second meditation: "I think, therefore I am." That is the essence of self-conscious awareness. How does that fit in? In the book, Alan has lots to say about the physics of the universe, albeit in a very gentle and user-friendly way. When it comes to how consciousness arises, however, there are beginnings of speculations, but it is left very vague and unclear. We are told simply that there are about 200 million cells, and when they start interacting in a very complicated way, this somehow becomes thought. What I like about this description is that it is honest with respect to the current state of scientific understanding. We do not really see how self-conscious thought fits into the grand scheme of the universe, nor how it can be explained in light of our present knowledge of neuroscience.

The second fact about human life is that we take ourselves—perhaps mistakenly—to be capable of guiding our action according to reason. We believe we possess the kind of

free will that endows us with genuine responsibility for what we do. That leads us to the third distinctive feature of humans: we take ourselves to be subject to moral norms. It is not just that we can do things that are harmful or hurtful; animals can do that too. But only we can have obligations to one another, we can have rights and responsibilities, we can be morally praiseworthy or blameworthy for our actions. It is quite remarkable that a collection of atoms could have that ability. In *Mr g*, how these three features arise is, again, left as something of a mystery. I think that is as it should be and I think it is helpful that Alan makes *Mr g* less than perfectly omniscient, so there is room for this kind of mystery even in his own creation.

I want to close with a question. It is interesting that *Mr g* himself possesses all three of these human features: he is capable of self-conscious thought; he makes choices; and he takes himself to be subject to moral norms, as the debates with Aunt Penelope and Uncle Deva show. In that sense (and in that sense alone) his nature is fundamentally similar to the nature of part of his creation, and I wonder if that was done on purpose.



Alan Lightman

Alan Lightman is Professor of the Practice of the Humanities at the Massachusetts Institute of Technology. He is the author of several novels, including Einstein's Dreams, The Diagnosis, and Mr g. He was elected a Fellow of the American Academy of Arts and Sciences in 1996.

I want to touch briefly on some philosophical, intellectual, and literary motivations for the book. First of all there is the portrayal of God – Mr g. Most religions have a fearsome and judgmental god who takes himself very seriously. I wanted to challenge the traditional understanding of God, because we really have no idea what God is. So I wanted to challenge the traditional notion of God by creating a much more humble and playful God. I've also been interested in the ongoing conversation between science and religion for a long time, and I think it is one of the great conversations of human civilization. The challenge that I gave myself in the book was to propose a kind of god that would be completely compatible with science. All the science in *Mr g*, as Ned said, is in keeping with the modern understandings of physics, chem-

Most religions have a fearsome and judgmental god who takes himself very seriously. I wanted to challenge the traditional understanding of God, because we really have no idea what God is.

istry, and biology. But I do have the Void in addition to the physical universe, and I have God creating the universe, because science can never know what created the universe. We can have theories of quantum gravity, but we can absolutely never know what created the universe. So for a believer, there is always room for God to have created the universe. However, if God then intervenes in His creation, as He does in most religions, that is definitely in conflict with science. In attempting to write a book in which God was completely compatible with science, I made sure that Mr g did not intervene in the universe (although he badly wanted to at times to relieve the suffering of some of his intelligent creations). That decision gave rise to the various debates between Belhor and Mr g about why he is not intervening.

Finally, there is the literary side of the book. Every writer has literary influences – we all read and try to learn and borrow from other writers. Some of my writing has been very influenced by the magic realist writer Italo Calvino, who died in 1985. His best-known work is probably *Invisible Cities*, but he also wrote a lesser-known book called *Cosmicomics*, in which he invents a group of celestial beings who have supernatural powers. They can stride through the galaxies with ease, but they also squabble among themselves and have humanlike qualities. They sometimes take an interest in the mundane affairs of human beings on Earth. Calvino's cosmic beings are really a modern version of the ancient Greco-Roman gods and goddesses, but with a perspective in keeping with modern science. So I got the idea for the heavenly family of Mr g, Aunt Penelope, and

Uncle Deva from Calvino's celestial beings. Finally, a bit about my character Belhor – he is a sparring partner with Mr g, sort of like a devil character, but he's neither all bad nor all good. He's not completely evil. He is a complex devil, as are, I think, the most interesting Satan-like characters, both in scripture and in literature. My literary inspiration for him was the devil in Mikhail Bulgakov's great novel *The Master and Margarita*. I will end my remarks there. I want to thank the wonderful panel for your thoughts. It is really a great compliment to an author to have scholars provoked by a book.

Question and Answer Session

Question

I am fascinated by the fact that you depict God as a teenage boy. Would you like to talk about that?

Wesley Savick

Alan Lightman didn't do that – that was my fault. One of the greatest challenges of adapting a work intended for one medium into another is finding visual metaphors that will make the work successful onstage. As I read the book, I came to terms with Mr g as a character who is a bit bored, who is omniscient in his own way, who is impulsive, very confident in his abilities, and

interesting for the stage. Like a teenager, the character is very certain of himself and yet prone to great doubts, is capable of both making big decisions and second-guessing them, and worries a great deal about the suffering that he's causing. In casting, a teenage boy just seemed to ring all the bells and opened up the play for me. That led further, then, to my decision to change Belhor from a male to a female character, making her a kind of girl next door. I wondered, "What if Belhor doesn't broadcast what she is really about from the get-go? What if there is a progressive effect for the audience where at first she seems nice and they think that perhaps she and Mr g might even make a nice couple – but then her true character is revealed over time?" That is one way I tried to make the story unfold in the real time of a play.

and a Void that would be compatible. In terms of the epistemological question and the nature of being – I think that that might be a little too abstract for what I wanted to do in the book.

Edward J. Hall

I would add that one of the attractive features of that compatibility is that it also makes sense of the successes of the creatures within Mr g's universe who engage in scientific inquiry. Presumably, if Mr g were a meddler, he might occasionally interrupt the elegant organizational principles that he laid down, which would have introduced a fair bit of noise into an otherwise orderly system. This is another way of saying that when I think about problems about the compatibility of science and religion I do not think so much about specific factual claims but about a certain epistemological mindset. Within physics, at least one aspect of that mindset is that we insist that statements about how the world works should be testable and should have a certain precision and elegance. Mr g's meddling could have made that kind of inquiry impossible for the intelligent beings. And that is, I think, interesting to notice. As for why I would put the cosmological question first, it is not because the epistemological questions are not important, but because I think in the order of inquiry they tend to come later. I think when we try to make ourselves as philosophically innocent and naive as possible, the cosmological question – "what is this thing and how did it get here?" – is one of the first to strike us. It is only later as we reflect on that question, and in particular on the very different ways of trying to answer it and the challenge of adjudicating those answers, that we start worrying about epistemology. Then we consider epistemological questions such as the extent to which we can know an answer to a question and, perhaps even more insidiously,

Mr g has what I would call a deist relationship to the world. That is, he is like a clockmaker whose creation is self-running. Mr g creates the world and then stands outside of it as it runs on internal principles.

hyper-focused on a particular concern. I was looking for an element in my adaptation that would open up the metaphor and best reflect those characteristics. In theater you have to think in very concrete terms and make very concrete decisions, and the way I come to those decisions is to think, "Which decisions will provide the most accurate and expansive echoes?" What's the metaphor that will make the play happen in the audience's heart and mind, rather than remaining a self-contained entity?

So all of a sudden I started thinking about a teenage boy. My wife Lourey and I heard a reading of an early draft and we wondered what it would do to the story if Mr g was a teenager. It actually made the story more

Question

Why does the panel start with the cosmological question and not with the epistemological question? I also want to pose a question to Mr. Lightman. Why must God be compatible with science? Maybe it should be that science is compatible with God in terms of the nature of being.

Alan Lightman

Thank you for the correction. I should have said the compatibility of science and God. It is not about one taking precedence over the other; it is about mutual compatibility. My challenge to myself was to create a cosmos

whether our own concepts and representational capacities are even up to the job of framing a correct answer, let alone an answer that we can know to be true. So although those questions are hugely important, they do not feel to me like urgent starting points. They feel like things that we find ourselves grappling with later on in moments of philosophical despair.

Lisa Sowle Cahill

In the book, the creatures on earth ask questions about why they are there, why they are suffering, and whether God is accountable for their situation. These epistemological questions are posed from the creatures' own standpoints and experiences. Some of the things they express do not particularly reflect Mr g's position. A related issue in the book is that Mr g cannot really explain why suffering exists, but still has a response on the basis of compassion. Two other things stand out about his relationship to the intelligent beings he creates: one is that he gives them a glimpse of immortality at the last moment, and the other is he gives them a religious sense – some ability to discern the larger frame of the universe or the existence of God. It is not stated quite in those words, but it is clear to Mr g's creations that there is a mystery beyond their comprehension. So I think the epistemological questions – what is an appropriate starting point from which to ask questions, how do we know our questions are the right questions, and how do we know whether we have an answer – were embedded in the book in a useful way, and the diversity of questions and viewpoints was thought-provoking.

Edward and I also both noted that Mr g has what I would call a deist relationship to the world. That is, he is like a clockmaker whose creation is self-running. Mr g creates the world and then stands outside of it as it runs on internal principles. That is

not really the God of the Bible. It is also not the God described by many contemporary theologians, who talk about deep creation or continuing creation: the idea that God is not the *same* as the world but is also not completely separate from it as a spectator. He is somehow inherent in and present to the world, a force behind the natural processes of creation and regeneration. Some theologians even talk about the imperfect creation, a creation that is still going on. This would reframe the epistemological and cosmological issues in a way that leaves a much greater margin for uncertainty, which I think was also an important part of the book. Mr g does not really seem like he has the Greek “omni-” attributes – omnipresence, omniscience, omnipotence – and truthfully, those are not really part of the biblical depiction in Genesis either. Those are some of the reasons that I really liked the book. It was very provocative in getting to those contemporary open-ended questions.

Question

If Mr g is in the Void and is capable of creating a universe that is separate from the Void, how come Aunt Penelope can feel time? How come time has to affect the Void?

Alan Lightman

Oh, that's a good question. Mr g is capable of creating a separate universe because he, Aunt Penelope, and Uncle Deva live in the Void. But then when he creates time they feel it in the Void and Aunt Penelope complains about it. Why is this? I think that time is more pervasive than matter and energy and space and that when time is created it exists in the Void as well as in the material universes that are floating around. But it is a wonderful, very perceptive question.

Edward J. Hall

I would like to add that when questions about space and time come up in the philosophy of science, the observation is often made that we can imagine space itself as somehow being a derivative or emerging property. It was not presented that way in the book, but there are versions of physics that see the fact that we live in a three-dimensional space as a relatively superficial, nonfundamental feature. For that matter, you can imagine space itself being an illusion. Think of George Berkeley's subjective idealism, which posited that the material world does not exist. It is much more difficult to imagine time being an illusion in the same sense. It is hard to even begin to make coherent sense of that. I think that is something that Alan captured in his book: time is the necessary prerequisite for the existence of any kind of causal relations, which you would need to draw on if you were to explain anything. ■

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Policy Perspectives on Police Use of Lethal Force

On February 4, 2015, **Andrea Roth** (Assistant Professor of Law at the University of California, Berkeley School of Law) and **Franklin Zimring** (William G. Simon Professor of Law at the University of California, Berkeley School of Law) participated in a conversation at the University of California, Berkeley, on police use of lethal force against civilians. The program, which served as the Academy's 2016th Stated Meeting, included a welcome from **Nicholas B. Dirks** (Chancellor of the University of California, Berkeley). During the event, **Jonathan F. Fanton** (President of the American Academy) recognized distinguished Academy Fellow **Jesse H. Choper** (Earl Warren Professor of Public Law and former Dean at the University of California, Berkeley School of Law) for his many years of service to the Academy. The following is an edited transcript of the discussion.



Andrea Roth

Andrea Roth is an Assistant Professor of Law at the University of California, Berkeley School of Law.

I am going to speak about what we do and do not know about police use of lethal force in the United States: how often it happens, how the practice has changed over time, and the circumstances under which it occurs. My colleague Franklin Zimring will follow by talking about what we can and should do about it.

Here is what we know: between four hundred and five hundred people in the United States are killed each year by police officers acting in the line of duty. That is about ten

Killings of police have dropped by 69 percent over the past thirty-five years. . . . At the same time, there has only been a 31 percent drop in killings by police.

times the number of people who are executed each year in the United States. We also know, however, that this figure has been stable over time. In public health parlance, we might call homicides by police a chronic problem, rather than an epidemic.

Nonetheless, the annual number of killings by police is a dark figure that has had a low-visibility career, owing largely to a system of fragmented political accountability for police killings. The United States has seventeen thousand police departments—mostly municipal and county agencies—which, amazingly, are not required by state and federal agencies to keep data on police use of lethal force. The FBI's Uniform Crime Reports and the supplemental homicide reports from the National Archive of Criminal Justice Data do list justifiable homicides by police officers that are reported by U.S. police departments each year. But these numbers are indisputably incomplete: they are unaudited, they are self-reported, and they include only justifiable homicides.

To give you a sense of the incompleteness, a *Wall Street Journal* investigation in December of 2014 looked at the internal records of the largest one hundred and five police departments in the country. The report

found five hundred and fifty homicides by police officers between 2007 and 2012 that were not accounted for in the Uniform Crime Reports.

Available data on police killings are not only numerically incomplete, but also do not distinguish the circumstances of the killings. Because the killings are justified (and, to be clear, nearly all killings by police officers are characterized by federal officials as justifiable), they do not merit the type of data collection by the FBI that crimes such as killings of police have always merited. Thus, the circumstances of justified killings are hard to discern. It used to be that an officer could shoot a fleeing felon and not be deemed to have used excessive force. But this doctrine was struck down by the Supreme Court's 1985 decision in *Tennessee v. Garner*, which stated that lethal force by police is only justified under the Fourth Amendment's prohibition against unreasonable searches and seizures if, based on an imminent and deadly threat, the officer had reasonable fear for his or others' safety. *Garner* represented a moral victory, but in practice, for obvious reasons, the criteria justifying lethal force in a shooting are difficult to scrutinize after-the-fact.

That said, we can use existing data, however questionable and incomplete it is, to analyze trends in the ratio of killings of police to killings by police over time and gain a sense of the relationship between killings by police and actual threats to officer safety. The results are striking. Killings of police have dropped by 69 percent over the past thirty-five years. Part of that decline is due to the period's overall decrease in homicide risk, and part is due to technological advances that have reduced police vulnerability, such as the Kevlar vest. But whatever the reasons, urban policing is a much less dangerous job in 2015 than it was in 1975. At the same time, there has only been a 31 percent drop in killings by police. If we express these numbers as a "kill ratio," if you will – meaning the ratio of killings by police to

It seems fair to say that a not-insubstantial proportion of police use of lethal force – at least in those cases not involving firearms – is unnecessary as a means of ensuring police safety.

killings of police – we see that the ratio has always been high, greater than three to one. But that ratio has more than doubled since 1977 (see Figure 1).

We also know which weapons do and do not mortally threaten police. We are clearly in an era of proliferation of guns in public spaces. And those guns pose serious risks to officers, especially in domestic violence interventions and traffic stops. But officers do not seem to be at a high risk of death in assaults that involve a weapon other than a

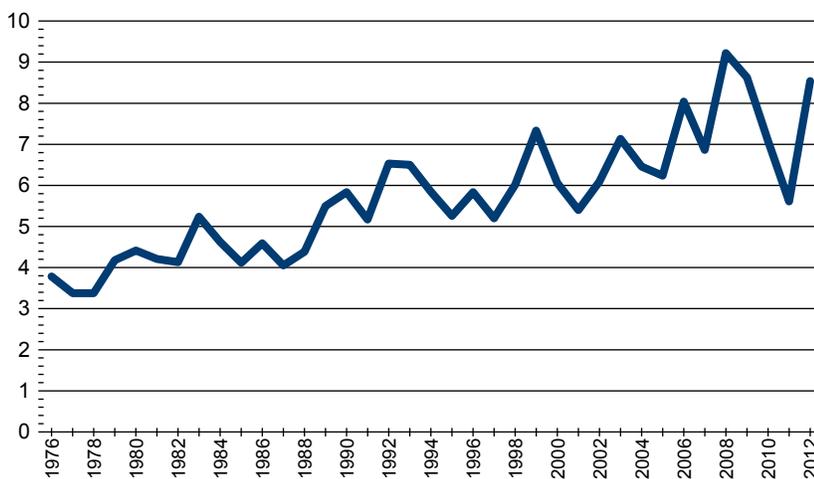
firearm. Among the 265 officers killed from 2008 to 2012, for example, only two were killed by a knife; 91 percent were killed by a firearm.

Now those numbers might simply mean that suspects just are not wielding knives against police officers. But if you look at the weapons used in criminal homicides overall, a full 13 percent involved a knife. Meanwhile, 20 percent of conventional aggravated assaults featured a knife. And although the FBI does not share data on weapons used by suspects in killings of police, another database does. The Wikipedia open-source database has collected press records relating to police killings since 2009. According to the records, of the 352 cases from 2012 that involved suspects whom the officers reported as wielding a knife, a gun, or what the officer reported as a possible gun or knife, nearly 20 percent involved knives exclusively.

So even with our incomplete and unaudited data, it seems fair to say that a not-insubstantial proportion of police use of lethal force – at least in those cases not involving firearms – is unnecessary as a means of ensuring police safety.

Finally, let me talk about race. It is clear that black men are killed by police in numbers disproportionate to their share of the population. Thirty-eight percent of suspects killed by on-duty police are African American, while African Americans make up only 13 percent of the U.S. population. It is difficult to make quantitative claims about how much of this disparity is due to implicit or explicit racial bias; we do not know what the baseline for comparison

Ratio of Killings by Police to Killings of Police



Source: Figure originally published in Franklin E. Zimring and Brittany Arsiniega, "Trends in Killings of and by Police: A Preliminary Analysis," *Ohio State Journal of Criminal Law* 13 (forthcoming 2015).

Figure 1

should be. We cannot simply look to crime statistics, since police killings of civilians do not only happen during crimes-in-progress or attempted arrests. And we do not have data on the racial breakdown of suspects involved in police-citizen encounters in which a suspect is killed after posing no reasonably apparent risk of wielding a firearm against the officer. Even if such data existed, it might be affected by implicit bias. But we do have studies that show, for example, that undergraduates acting as police in computer simulations are more likely to shoot African American suspects than white suspects under identical conditions, in terms of both suspect behavior and weapon status.

Obviously, the inspiration for this discussion today was the killings of Michael Brown in Ferguson and Eric Garner in Staten Island. But as I said at the outset, this is a chronic problem and an old problem. What Ferguson and Staten Island did, because of the unusual visibility of these events and their effect on a population that previously did not have the political capital to ask for this data, was to finally render visible a problem that had been in the dark, waiting to be better understood.



Franklin Zimring

Franklin Zimring is the William G. Simon Professor of Law at the University of California, Berkeley School of Law. He was elected a Fellow of the American Academy in 1990.

I would like to address one very easy question, and one very difficult question. Let's begin with the easy question: is five hundred killings a year by police officers – the vast majority of which are local police – too many? The answer is yes. By how many is it too many? Well, that depends on what kind of standard of comparison you want to use. Were you to compare the United States with other developed countries, the conclusion would be astonishing. The number of citizens of the United Kingdom killed by police in a year could be counted on the fingers of one hand. Now, their population is about one-fifth of the United States, yet their police killings rate is vastly lower than the United States'. Adjusted for population, the rate of civilian killings by police in the United States is fifty times the rate of fatal shootings by police in England and Wales. German police kill one citizen per ten million each year; our death rate is sixteen

times higher. Is it feasible to reduce the number of killings by American police to match the rates of our Western European counterparts? No, it is not.

But given the communities our police patrol and the pervasive culture of handgun ownership in the United States, what number of police killings of civilians would be “appropriate” in 2015? Concealed handguns threaten the lives of municipal police and that is what provokes lethal force from them. A good policy target would be to reduce police killings by one-half, from about five hundred to two hundred and fifty killings a year. Now, those two hundred and fifty instances of lethal force would still overwhelmingly target the poor and those with dark skin. And two hundred and fifty killings is a huge cost in lives and human dignity. But the policies that could produce a reduction to two hundred and fifty deaths a year are very much worth finding.

In what situations could a change in policing tactics lead to reductions in civilian casualties? As Andrea mentioned, about one hundred civilians are killed per year in the United States by police who believe that they are being assaulted with knives, blunt instruments, or personal force – all of which do not typically put the police officers' lives at risk. Thus, the situation calls for a less-than-lethal response from police. Further, when police officers do begin shooting, for justified or unjustified reasons, the majority will keep shooting for longer than is necessary to extinguish the threat. It isn't a question of firing one, two, or three rounds. Because most of these shootings are not the result of officers acting alone, but rather of officers working in pairs, police not infrequently shoot multiple rounds at a single target – to “make sure.” Of course, the desire to make sure that the suspect is dead or incapacitated elevates the death rate in shooting incidents substantially.

There are three circumstances in which we could work to decrease the death toll from police lethality: police responding to nonlethal threats with lethal force; police shooting more than is necessary to ensure death; and police engaging potential threats when not required.

Finally, police officers frequently press forward in situations where they simply do not have to take action. Imagine that police observe two people sitting in a car at two thirty in the morning, and – suspecting that a crime is in progress – the officers approach the vehicle with their guns drawn. No crime has been reported. The officers are advancing solely based on their observations and instincts. Approaching the suspected criminals in this manner easily leads to situations in which surprised and alarmed civilians might make gestures that police will interpret as an attempt to be “going for a gun.”

So, there are three circumstances in which we could work to decrease the death toll from police lethality: police responding to nonlethal threats with lethal force; police shooting more than is necessary to ensure death; and police engaging potential threats when not required. But now for the very difficult question: how are we going to do it? Let’s first look at one proposed mechanism, the use of criminal law to charge and convict police officers who commit unlawful homicide. In the United States we require proof beyond a reasonable doubt to justify a criminal conviction. And that is proof of the absence of a subjective element – for example, did the police officer, in fact, believe his life was at risk or that a gun was being drawn? And if you can’t prove the officer did not *perceive* a genuine risk, you cannot convict him. Further, prosecutors and juries tend to think like police officers; they want to believe police officers. So only shootings

in which the police obviously were not in peril or egregiously used excessive force are going to lead to criminal convictions of the offending officers. The cases of Oscar Grant – who was shot by a BART (Oakland public transportation) police officer while lying face-down on the ground – and Rodney King – who was beaten excessively by LAPD following a car chase – illustrate this rule. Pursuing criminal charges against officers is simply not effective enough to save significant numbers of civilian lives.

It is important to motivate police administrators to create both incentives for using nonlethal force and disincentives for using lethal force. If restraint is rewarded and excess is punished within police departments, the civilian death toll can really drop.

Then what will? To begin: federal lawsuits for damages. Being forced to pay damages is a powerful deterrent, and is at least ten times more likely to happen than the criminal conviction of an officer. Moreover, settlements paid by cities should be directly linked to repercussions for their police department; in current practice, city governments accept the burden of paying damages, leaving police budgets unscathed. So money talks, and money can save lives. But even more important is motivating police administrators to create both incentives for using nonlethal force and disincentives for

using lethal force. If restraint is rewarded and excess is punished within police departments, the civilian death toll can really drop. Further, reducing discretionary confrontations between police and civilians to begin with will also only make the streets safer.

But how do you gain the support of police administrators for this cause? What leverage do we have? Section 14141 of the Federal Crime Control Act of 1994 gives the Department of Justice the power to review local police departments who may be systemically violating citizens’ federally protected rights, and to intervene in civil actions with consent decrees. The Department of Justice’s recent findings on the pervasive racism in the Ferguson, Missouri, police department is one such review; and it has also intervened in Los Angeles, Oakland, and Albuquerque. So the path from five hundred police killings of civilians per year to two hundred and fifty is much more a path of administrative reform

and fiscal engineering than a dependence on or reform of criminal law.

Two hundred and fifty killings a year would still be cause for concern; but compared with the death toll of 2015, it would be significant progress in an area that has long been ignored. ■

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To view or listen to the presentations, visit <https://www.amacad.org/lethalforce>.

The Invention of Courts

On December 4, 2014, several panelists participated in a conversation on the function of courts in the United States. Included were **Judith Resnik** (Arthur Liman Professor of Law at Yale Law School), **Jonathan Lippman** (Chief Judge of the State of New York and Chief Judge of the Court of Appeals), **Carol S. Steiker** (Henry J. Friendly Professor of Law at Harvard Law School), **Susan S. Silbey** (Leon and Anne Goldberg Professor of Humanities, Anthropology, and Sociology and Professor of Behavioral and Policy Sciences at the Sloan School of Management at the Massachusetts Institute of Technology), **Jamal Greene** (Vice Dean and Professor of Law at Columbia Law School), and **Linda Greenhouse** (Knight Distinguished Journalist in Residence and Joseph Goldstein Lecturer in Law at Yale Law School). The program, which served as the 2013th Stated Meeting, included a welcome from **Jonathan F. Fanton** (President of the American Academy). The following is an edited transcript of the presentations.

“The reason to reflect on two hundred years of courts in the United States is because it is all too easy to think that what courts represent now—equal justice for ‘everyone’—was what they offered all along. But the transformation of courts occurred as the result of popular mobilization and sharp conflicts over norms—on battlefields, in elections, and in litigation.”

— *Judith Resnik*



Judith Resnik

*Judith Resnik is the Arthur Liman Professor of Law at Yale Law School. She was elected a Fellow of the American Academy in 2001, and is the guest editor with Linda Greenhouse of the Summer 2014 issue of *Dædalus* on “The Invention of Courts.”*

My charter is to introduce the themes that today’s speakers will address and that are explored in greater detail in the *Dædalus* volume, “The Invention of Courts,” that Linda Greenhouse and I coedited. Because state courts are central to adjudication in the United States, I begin with a photograph of a 1784 courthouse in New London, Connecticut (Figure 1).

The building is still in use; it is one of thousands of courthouses around the country – aiming to respond to a myriad of problems. The obligation to do so comes from constitutions, and Connecticut provides an example. The words from its 1818 Constitution sound familiar because they echo provisions of the Magna Carta: “All courts shall be open, and every person, for an injury done him in his person, property or reputation, shall have remedy by due

course of law, and right and justice administered without sale, denial or delay.” The 1819 Alabama Constitution uses almost the same language (“All courts shall be open, and every person, for an injury done him in his lands, goods, person, or reputation, shall have remedy by due course of law, and right and justice administered, without sale, denial, or delay”). Similar provisions can be found in many other state constitutions, from that era and today.

Pursuant to such texts, the public gains two kinds of access rights – individuals can file lawsuits in courts and they can watch the proceedings of courts. Thus, judges must welcome both complainants and third parties who are entitled to observe what transpires.

But a reminder is in order. The phrase “every person” did not, in the early part of the nineteenth century, carry the same meaning that we give it now. In that era,

white women and blacks of either gender could not, in Connecticut or in Alabama, vote or participate fully in society. Rather, the reference to “every person” having the potential to exercise juridical authority was limited to a subset of persons. Courts were not then the welcoming institutions that we imagine and that we hope them to be now.

Moreover, the relevant courts at the time were state courts, as illustrated by the photograph of a state courthouse, which was one of many such buildings dotting the country’s landscape. In the 1850s, the U.S. federal government owned about fifty buildings outside of Washington, D.C. around the United States; these were marine hospitals and customs houses. None had signs on their front doors reading “United States Court.” At that time, Congress had commissioned some forty federal lower court judges to preside around the United States. They did not have courthouses of their own, but



Figure 1: New London County Courthouse, New London, Connecticut, 1784 (relocated in 1839 to the current site). Architect: Isaac Fitch; 1909 addition: Dudley St. Clair Donnelly; 1982 addition: Hirsch and Persch. Photo courtesy of Connecticut Judicial Branch.

used space in federal buildings such as customs houses or in state and private facilities.

The Civil War marked the change; with the North's conquest of the South, Congress sought to instantiate a "federal presence" (to borrow the title of Lois Craig's book) through building new structures and by enforcing new norms across the country. Congress expanded federal courts' jurisdiction through new provisions on habeas corpus, on federal question jurisdiction, and on civil rights. The Department of Justice was founded in 1870 and, in the decades thereafter, Congress authorized the construction of many more federal buildings – frequently combining courthouses and post offices – across the country. In 1935, the now-iconic U.S. Supreme Court building – promoted by Chief Justice William Howard Taft and designed by architect Cass Gilbert – opened (Figure 2).

The Neoclassical building was, in many respects, what could be called a fake old building, as this was the era of Art Deco architecture – soon to be joined by Modernism and the International style. The old-fashioned design made it easy to forget that until 1935 the U.S. Supreme Court had been housed in the Capitol. Yet in many ways, having a home of its own for the first time in the 1930s was apt.

During the first part of the twentieth century, under the leadership of Chief Justice Taft, the Supreme Court gained new powers from Congress – to select which cases it would hear by granting discretionary grants of certiorari and to promulgate national rules of procedure. In addition, Congress licensed a body of judges to form a "Judicial Conference" to create policy for the federal courts.

The words that are inscribed on the back of the 1935 Supreme Court

building are "Justice, the Guardian of Liberty." The front façade bears the inscription – visible in the photograph – "Equal Justice Under Law." Those words were chosen because they fit the space but were not then used much in law; the phrase does not appear in the U.S. Constitution's text.

Once again, the import then was not what we take the words to mean now. Equality was not the focus of the 1930s' jurisprudence, as is illustrated by the speech of Chief Justice Charles Evans Hughes when the cornerstone was laid. When speaking about the ambitions that the new building

represented, the Chief Justice used the word "liberty" many times but did not reference "equality." His words reflected attitudes of that era – skeptical of federal government regulation (the New Deal faced many legal challenges) and tolerant of a host of formal inequalities.

This point can be seen by looking at a mural (Figure 3) that was installed behind a judge's bench in a courtroom in a 1938 federal district courthouse in Aiken, South Carolina. Both the art and the building were funded by the Works Project Administration – the WPA.

The artist, influenced by Mexican muralists, called this figure "Justice as Protector and Avenger." The female figure at the center references the Renaissance Virtue Justice. Yet the WPA artist explained that his "figure of 'Justice'" was "without any of the customary . . . symbolic representations (scale, sword, book . . .)." Rather, the only "allegory" he had permitted himself was "to use the red, white and blue [of the United States flag] for her garments."

What did others see? A local newspaper objected to the "barefooted mulatto woman wearing bright-hued clothing." The federal judge in whose courtroom the mural was displayed called it a "monstrosity" – a "profanation of the otherwise perfection" of the courthouse – and wanted it removed. The artist offered to repaint, as he had "intended nothing of the sort."

A proposed compromise – to "lighten" Justice's skin color – never took place. The press coverage about the exchanges prompted a national controversy. The National Association for the Advancement of Colored People and artists objected to the condemnation and to the alteration



Figure 2: Lois Long, *The Contemplation of Justice*. United States Supreme Court, Washington, D.C., 1935. Photo courtesy of the Collection of the Supreme Court of the United States.



Figure 3: Stefan Hirsch, *Justice as Protector and Avenger*, 1938 (commissioned through the U.S. Treasury's Section of Fine Arts, 1934–1943). United States Court House (renamed in 1986 the Charles E. Simons Jr. Federal Court House), Aiken, South Carolina. Image courtesy of the U.S. General Services Administration, Public Buildings Service, Fine Arts Collection.

of the art. The denouement was to cover the mural with a tan velvet curtain, seen at the edges of the photograph. In 1938, a figure perceived as “mulatto” could not be permitted to stand as the representation of Justice. The draped wall echoed the limited responses of law; people labeled “mulattos” did not have much protection in courts.

Indeed, in 1938, when the “mulatto” Justice was draped because she was seen as unsightly, another series of WPA murals was placed on the walls of the Ada County Courthouse in Idaho. In the early part of the twenty-first century, a reporter described the scene as showing an “Indian in buckskin . . . on his knees with his hands bound behind his back . . . flanked by a man holding a rifle and another armed man holding the end of a noose dangling from a tree.”

No objections to the display were recorded at the time, but toward the end of the twenti-

eth century, a judge in Idaho concluded that the imagery was offensive and ordered that it be covered – with flags of the state and of the United States. In 2006, questions were raised about whether to continue to hide the murals or paint over them. The state legislature, in consultation with Indian tribes, decided instead that the murals should remain on view – framed by official, educational interpretive signs to explain that the picture reflected “the values” of that time.

But much has changed since then. In the 1950s, *Brown v. Board of Education* overturned school segregation laws; in the 1970s, *Reed v. Reed* was a watershed for women’s equality, as the Court applied the Fourteenth Amendment’s Equal Protection guarantees to women. More recently, *United States v. Windsor* has become a shorthand for LGBT equality, reflecting new understandings in law and in culture about sex, gen-

der, marriage, and families. (And as Jamal Greene will discuss, other cases – such as *Dred Scott* – have become part of an “anti-canon,” posited as exceptions rather than as exemplary of their times.)

With these many changes, the words above the U.S. Supreme Court’s front steps – “Equal Justice Under Law” – gained a new resonance. Although not used in law before 1935, this phrase has since appeared hundreds of times in judges’ decisions and now graces the cover of some of the Court’s publications as its tagline.

In short, the reason to reflect on two hundred years of courts in the United States is because it is all too easy to think that what courts represent now – equal justice for “everyone” – was what they offered all along. But the transformation of courts occurred as the result of popular mobilization and sharp conflicts over norms – on battlefields, in elections, and in litigation.

Another way to capture the changes is to look at the number of cases brought to courts. At the beginning of the twentieth century, fewer than thirty thousand cases were filed, and more were criminal than civil. By the end of the twentieth century, more than three hundred thousand cases had been filed, and civil filings far outnumbered criminal cases.

The number of judgeships provides another metric. At the beginning of the twentieth century, Congress had authorized about one hundred judgeships; by that century’s end, more than 850 slots were provided for life-tenured judges. Returning to buildings, today’s largest federal courthouse (Figure 4) is the twenty-nine-story Thomas F. Eagleton United States Courthouse in St. Louis, Missouri.

The hundreds of new, purpose-built courthouses reflect aspirations that courts be accessible to all of humanity. As you will hear from Chief Judge Lippman, the filings in the federal courts are but a tiny fraction

of the cases brought to state court – where more than 100 million claims (civil, criminal, family, juvenile, and traffic) are filed annually. The volume of cases marks the success of courts as institutions understood to be places to which many in distress can turn. (The contradictory accounts in popular discourses about courts is the topic of Susan Silbey’s discussion.)

The buildings are one way to make material the political obligation that governments permit the public to observe their work as adjudicators. The theory behind that obligation reflects Jeremy Bentham’s commitment to “publicity” – that observation is a key method of disciplining the authority of government, judges included. Publicity is also a tool of education, enabling

a reciprocal relationship between audience and disputants.

The judicial system could thus be viewed as a thriving part of democratic interactions in the United States, where “everyone” – consumers and manufacturers, employees and employers, prisoners and prison officials – is entitled to egalitarian and dignified treatment under the law. Courts are venues in which the public can understand the challenges of applying law to fact, and lawsuits provide insights into the debates about and needs for new norms.

Of course, these are aspirational goals. In practice, many court systems fall far short of what is hoped from them – as revelations about the municipal courts in Ferguson, Missouri, and elsewhere make plain. Courts can be mills in which to prosecute individuals and trap them into a cycle of civil debt payments. And courts can fail to protect criminal defendants’ rights, as Carol Steiker will discuss. But with publicity comes the possibility of learning about such practices of unfairness and the potential for oversight and for interventions – aiming to try to make good on promises of “equal justice under law.”

Thus, one narrative of the legal history of the twentieth century is the *invention of courts*. What we think of as intrinsic in courts today – equality, fairness, openness, independent jurists – are artifacts of relatively recent vintage, produced by political and social movements contesting democracy’s obligations. The challenges of achieving those aims remain, and Chief Judge Lippman will detail some of the many efforts underway to enable courts to do that work.

Yet another competing narrative is coming to the fore – reshaping the landscape and practices of dispute resolution and moving many decisions offscreen to private exchanges in courts or to other venues altogether. A first example comes from a visit to the website for the U.S. federal courts; in 2014, if one clicked on a link to learn



Figure 4: Thomas F. Eagleton Federal Courthouse, St. Louis, Missouri. Architects: Hellmuth, Obata + Kassabaum, Inc., 2000. Photographer: Magistrate Judge David D. Noce, Eastern District of Missouri, 2006. Photo courtesy of the photographer.

about “how to use” the courts, one would find a text box message, encouraging users try alternative methods of resolving their disputes, explained as preferable so as “to avoid the expense and delay of having a trial.” Those concerns about costs are readily understandable, as are many other criticisms of courts.

Yet the question is how to take account of such costs and criticisms while remaining committed to efforts to ensure equality, fairness, openness, and judicial independence. How do law and policy keep the public engaged with and supportive of the public services that courts provide? The problem with the privatization that reformats court-based procedures and turns judges into settlers and managers is that it obscures the services that courts can provide and limits the capacity to learn when failures occur. In the federal system, about one of every hundred civil cases filed in the federal system begins a trial. Because most of the settlement and management exchanges happen in chambers, the public’s access to observe exchanges among litigants and judges diminishes.

Another method of privatization is to insist that members of the public use arbitration in lieu of courts, while not insisting that such arbitral proceedings be open to the public. As is likely familiar, many providers of various goods and services require that, when we purchase a product or apply for a job, we waive our rights to use courts for disputes related to those products or jobs and instead must use a dispute resolution system designated by the provider.

For example, almost all the wireless phone services require such waivers. Even if some permit use of small-claims court, all ban collective redress – whether as a class action in court or in arbitration. In 2011, in *AT&T Mobility v. Concepcion*, the United States Supreme Court concluded (five to four) that such bans were enforceable under an expan-

sive interpretation of a 1925 federal statute, designed at the time to enable merchants to enforce clauses in their custom-made contracts providing for arbitration.

To conceive of the documents that today come with credit cards and cell phones or on job application forms as “contracts” is a mistake, just as to characterize arbitration as the output of “private ordering” is misguided. Contracts are bargained-for agreements. Although I tried, my wireless service provider did not permit me to alter its terms. Yet, on its website, the wireless service states that it can unilaterally “change any terms, conditions, rates, fees, expenses or charges regarding . . . Services at any time.”

Millions of consumers and employees are subject to such provisions. Thus, thousands of claims that might have been pursued collectively can only be brought single-file in closed arbitration hearings (or sometimes in small claims court). The theory is that arbitration is “speedy” and “efficient” – and thus a better way to vindicate rights than courts.

But the mass production of arbitration clauses has not resulted in a mass of arbitrations. We have some data because California and a few other states require reporting by organizations offering arbitration within their borders. I reviewed data from 2009 to 2014 provided by the American Arbitration Association on claims filed by individual consumers in proceedings against AT&T. I chose that provider because it was the purveyor of the class action ban enforced by the Supreme Court in 2011. I found 134 individual consumer claims – or about 27 per year during those five years. And during that time, between 85 and 120 million customers used that wireless service.

The U.S. Supreme Court’s law takes those kinds of cases out of state, as well as federal, courts. But as you will hear from Chief Judge Lippman, demand remains intense state-side. As I noted, when counting all the kinds

of cases (civil and criminal, as well as traffic, juvenile, and family included), some one hundred million cases begin in state courts each year around the country. That volume is both a remarkable tribute to courts, perceived to be a government service available to so many, as well as an enormous challenge for courts. These numbers are also a source of concern, as many people are brought too frequently to the courts – drawn in as defendants in criminal and civil cases.

In short, democracy has not only changed courts – radically – by reinventing courts as belonging to “everyone”; democracy also challenges adjudication deeply. Providing adequate services to the millions seeking help is an enormous burden. In 2011, New York reported 2.3 million people in civil litigation without lawyers; in 2009, California counted 4.3 million civil litigants without lawyers.

The photograph in Figure 5, taken by William Clift, marks the problem of resources. Shown is the historic Warren County Courthouse in Missouri. The building was forty-five by fifty-five feet and built in 1870. A century later, the courthouse gained a designation in the National Register of Historic Places. But by then, the crack in the wall pointed to the building’s deteriorating condition. After a lawyer brought a class action lawsuit alleging that the courthouse was physically inaccessible for those with handicaps and therefore not compliant with the Americans with Disabilities Act, the courthouse was replaced.

Built in its stead was a new three-story, 54,000-square-foot “justice center,” which not only had more courtrooms and accessibility but also a jail with about a hundred beds. Tracking the evolution of courthouse construction over the centuries is thus one way to gain insights into the changing demands placed on courts. The lawsuit that prompted the demolition reflects important new anti-discrimination laws, as well as the development of new procedures such as the class



Figure 5: William Clift, *Crack, Jury Chairs*, Warren County Courthouse, Warrenton, Missouri, 1974–1976. Photo courtesy of the photographer.

action, just as the expanded jail space marks the precipitous growth in prison populations.

A final introductory image was also taken by William Clift. This 1976 photograph (Figure 6) shows at its center the domed Old St. Louis Courthouse, where Dred and Harriet Scott sought to secure their freedom. Although a Missouri jury had ordered the Scotts free in 1850, the Missouri Supreme Court reversed the decision. Likewise, in 1857 the United States Supreme Court held that, as slaves, the Scotts could not be heard in court to challenge that ruling.

The Old St. Louis Courthouse was also the site of a lawsuit by Virginia Minor, seeking to protect her right to vote. In 1872, she argued that the Privileges and Immunities Clause of the recently enacted Fourteenth Amendment required the state to give women access to the voting booth. But in its 1875 ruling in *Minor v. Happersett*, the U.S.

Supreme Court concluded that, although a citizen, Minor had no federal right to vote.

The Old Courthouse is a testament to the injustices promulgated in the name of the law. Its picture makes plain that our discussion is not predicated on a view that courts are intrinsically just. Rather, courts are contingent institutions, embedded in and reflective of the political orders that empower them. Tonight’s exchange, and the *Dædalus* volume on which it is based, aims to explore what public courts can offer, the challenges they face, and the failures that have occurred.

Litigation provides opportunities to contest law’s rules and – if coupled with social movements – to bring about changes in the governing norms. Once again, buildings track the changes. In the 1930s, the Old St. Louis Courthouse was abandoned in favor of a new Civil Courts Building. In 1940, it was rescued for restoration and named a national monument. Today it is a museum. While appropriate to mark its history, turning this courthouse into a museum may portend the trajectory facing current courthouses – unless the shift toward privatizing dispute resolution is reversed.

The large commercial structure reflecting the Old Courthouse in Figure 6 is a multi-use commercial space that was known in the 1970s as the Equitable Life Building. Behind the Old Courthouse is the former regional headquarters of the American Arbitration Association. The flat glass of the International-style skyscraper lends the appearance of a court subsumed by the corporate structures that surround it.



Figure 6: William Clift, *Reflection, Old St. Louis County Courthouse*, St. Louis, Missouri. Image photographed in 1976 in conjunction with the Seagram Court House Project. Photo courtesy of the photographer.



Jonathan Lippman

Jonathan Lippman is the Chief Judge of the State of New York and Chief Judge of the Court of Appeals.

It is the importance of the state courts that I would like to discuss today; our federal courts are quite wonderful, but they represent a miniscule part of what goes on in courthouses around the country. Let me start off by explaining what purpose I believe courts serve today in our society and then segue into an issue that I think is the greatest threat to the legitimacy of our courts and our system of justice. Today's courts are the emergency room for society's ailments and illnesses, whether they be eviction, foreclosure, drug crime, family dysfunction, consumer credit cases, domestic violence, or human trafficking. This is particularly true in the state courts where, as Judith indicated so clearly, 98 percent of court cases in our country are filed. The disproportionate media attention afforded to federal courts suggests that they are where most people come into contact with the justice system, but this is just not the case: the average person develops a relationship with the concept

The heart of the problem is that civil legal services for the poor are distinguished from criminal legal services. You may be fighting for the necessities of life – the roof over your head, your personal safety, the well-being of your family, your livelihood – but you are not entitled to a civil lawyer in the United States of America.

of justice in our state courts. The courtroom is the one place that anyone – rich, poor, or in between – ought to be able to get *equal justice*, wherein each party is treated the same by a neutral arbiter of the dispute.

The concept of equal justice is embedded in our standing laws and in our founding principles. Yet in our country today, there is a huge justice gap between the finite legal resources available and the desperate need for legal services by the poor, the vulnerable, and people of modest means. This gap limits public access to the courts and to justice: the wealthy can afford the best legal representation imaginable; the poor and people of limited means cannot afford a lawyer at all. How has this been allowed to happen? First of all, the recent global economic crisis has caused many people to fall off the financial cliff, destroying their savings and often tearing apart their families. Exacerbating this problem is the fact that funding for lawyers that can help poor people and people of modest means has been reduced in Washington. The funding of the Legal Services Corporation, which is the primary federal funder of legal services for the poor, was cut dramatically, and it now operates at a limited capacity. IOLTA (Interest on Lawyers' Trust Accounts) funds – which come from the gained interest on the escrow accounts that lawyers hold for their clients – also help fund legal services for the poor, but they, too, have

been drastically reduced because of the poor economy.

And the real heart of the problem is that civil legal services for the poor are distinguished from criminal legal services. In the United States, when someone's liberty is at stake in a criminal case, he or she has a constitutional right to representation. We all know about "Gideon's trumpet" – the famous case of *Gideon v. Wainwright*, in which the United States Supreme Court determined that those in danger of having their liberty taken away from them are entitled to a lawyer. That is not the case in civil matters. You may be fighting for the necessities of life – the roof over your head, your personal safety, the well-being of your family, your livelihood – but you are not entitled to a civil lawyer in the United States of America. And while we know *Gideon* is a seminal case of the Supreme Court, it has not resulted in a perfect system, as our subsequent speakers will detail. Even the availability of lawyers for criminal cases is very uneven. But on the civil side, the situation is much worse. In New York during this terrible economic crisis, eight out of nine people that came to the Legal Aid Society, the oldest legal services entity in the United States, for help with civil legal problems were turned away because there were not enough resources for their representation. Last year, an estimated 2.3 million people came into the New York state courts without legal representation.

What could undermine the justice system more than this lack of a level playing field? If we cannot ensure equal justice – even in this vast state court system, which is the one place where we hold out the hope that all of us, no matter our station in life, can pursue it – then we might as well close the courthouse doors. Our entire system of justice, our system of government, would be fundamentally broken. So what do we do about it? We are trying to reprioritize what is truly essential in society, and those of us that believe that courts, judges, and lawyers are a bastion of equal justice also believe that legal representation for those who cannot afford it is as important to a society as housing, hospitals, and schools. We do not respond to a faltering economy by closing our children’s schools, by turning away the sick from our hospitals. To do so would be to admit our failure as a society. And we believe that to deprive people of legal representation in matters involving the essentials of life is just as shortsighted and unconscionable. In order to reprioritize representation for all, we must educate and advocate for legal services for the poor.

In New York, we have set public hearings around the state in order to show the public what legal services do for people in need. We do not simply insist that the poor need lawyers and that helping the poor is the right thing to do. Unfortunately, that does not work. Instead, we have taken the counterintuitive approach of inviting landlords, the heads of large businesses and hospitals, and those in the real estate industry – people who you might not expect to advocate for legal services for the poor – to proclaim that this is, in fact, the best investment that society can make. They spread the message that for every dollar invested in legal services for the poor, five to six dollars are returned to the state in reduced incarceration costs, reduced social-services costs, and federal funding available for other uses. And judi-

cial leadership is critical in trying to get this message across. It is the constitutional mission of the judiciary to foster equal justice. If we do not, who will? That is why, last year, the New York judiciary put \$70 million in its budget for grants for legal-services organizations. To give you some sense of context, the Legal Services Corporation gets \$360 million per year to distribute between all fifty states. We in New York prioritize this funding because it is not tangential to our identity; it is fundamental to the judiciary’s role. We must show that we stand for something. In making accessibility of legal services central to the judiciary’s mission, we are stating that providing equal justice is the one meaningful contribution of the courts.

However, with all of that said, there is just not enough money to meet the need of people seeking civil legal services. So we require also the voluntary pro bono efforts of the members of the bar to give their time for free to help people fight for the essentials of life. Lawyer jokes notwithstanding, this is a noble profession. From time immemorial, lawyers have helped people. It is unacceptable to have a monopoly on legal services and use that monopoly only to feather our own nests and serve our own economic interests. Lawyers are supposed to give back and help people in need. The judiciary, as the legal regulator of the profession and the gatekeeper for bar admission, should be leading the way and pushing the envelope in inspiring lawyers to aspire to the highest principles of their profession, not only to their own economic gain. So our job also serves to promote public trust and confidence in the judiciary’s commitment to the public good.

To this end we have been reaching out to constituencies of lawyers that have not historically done much pro bono work. Baby boomers who are starting to slow down their practices should now be doing voluntary pro bono work for the poor. We now

require aspiring law students in New York to give fifty hours of pro bono legal services to the poor before they can be admitted to the bar. The theory behind this is that if you want to be a lawyer in our state, you must embrace the core values of our profession, which first and foremost include service to others. We also have a pro bono scholars program that lets law students take the bar early if they give their last term over to pro bono work. We require lawyers to report their pro bono work to the courts to let us know how they are doing.

There are many efforts underway serving the mission of promoting equal access to justice. These include increasing public funding, encouraging pro bono work, and new ideas like having nonlawyers help promote equal justice. Where does all this lead? I think we are already changing the public dialogue and creating new norms. Years ago, before *Gideon*, if we asked whether someone whose liberty is at stake requires a lawyer, many would have responded with uncertainty. Today, most everyone would say *definitely*. We want to get to the point where if we were to ask whether people whose essentials of life are at stake in a civil trial need a lawyer, anyone and everyone would respond *absolutely*. We want to make the ideal of equal justice a reality. We think that the judiciary, the profession, and academia all have a major role in this effort, so we want to encourage an evolving partnership between these three players. Together, we can change the dialogue and get to the day when, just as we provide for representation in criminal cases, we provide for representation for everyone seeking to protect life fundamentals such as housing, education, and safety.



Carol S. Steiker

Carol S. Steiker is the Henry J. Friendly Professor of Law at Harvard Law School.

In some ways my talk is going to be a version of “be careful what you wish for.” Chief Judge Lippman says he only wishes there were a civil *Gideon*. Clarence Earl Gideon is the thief whose conviction was overturned after his landmark case in 1963 – *Gideon v. Wainwright* – in which the Supreme Court acknowledged that attorneys are “necessities, not luxuries” (in the Supreme Court’s words), at least in criminal cases. And for a two-bit thief, Clarence Gideon has a pretty high-falutin’ epitaph on his gravestone: “Each era finds an improvement in law for the benefit of mankind.” Certainly *Gideon* was an improvement, as there was no constitutional right to have a lawyer in criminal cases until 1963. Henry Fonda played Clarence Earl Gideon in the iconic film adapted from the book by Tony Lewis, *Gideon’s Trumpet*. Clarence Earl Gideon died in 1972. Tony Lewis, the author of *Gideon’s Trumpet*, died just last year on *Gideon*’s fiftieth anniversary. Sadly, the triumphant story of *Gideon* died long before that.

We are not *supposed* to think that justice is something that money can buy, but clearly it is, and the underfunding of indigent criminal defense is absolutely endemic in the United States.

On every significant anniversary of *Gideon v. Wainwright* in my thirty-year career in law, there’s been hand-wringing about how far from *Gideon*’s promise we are. I could spend my entire allotment of time telling you horror stories about incompetent and unprepared attorneys, ridiculous caseloads, inadequate resources, and defendants railroaded and even erroneously convicted and sentenced to death. But instead of sharing those stories, I will just say that an unlikely group of champions has recently arisen to acknowledge just how terrible the situation is. The nation’s chief prosecutor, Attorney General Eric Holder, has declared that the United States’ indigent defense system is in crisis. He recently joined a New York class-action lawsuit that is suing Governor Andrew Cuomo and the state of New York to get the state to take over the provision of indigent defense services in criminal cases, because the counties are doing such a terrible job. Moreover, many of you may not know this, but the Koch brothers have recently given a multimillion dollar gift to the National Association of Criminal Defense Lawyers (NACDL) to promote indigent defense services for the poor, arguing that it is a terrible black eye to American liberty that poor people in criminal cases are treated so shabbily. The Koch brothers are quite a departure from the usual champions of indigent defense services, which tells you something about how rotten the situation has become.

Why is it so terrible? Why has it proven so difficult in more than fifty years to make good on the promise of *Gideon*, the constitutional promise so stirringly celebrated in

book and film? The triumphal story is simple, but the story of failure is more complex. We have fifty states and the federal system and, as you know, criminal justice is meted out through local systems, not just a state-wide or federal system; so many counties and localities are in charge of the provision of indigent defense services. *Gideon* has therefore been enforced in an inconsistent and piecemeal fashion. I will briefly survey what I think are the four main reasons for this failure.

The most significant problem is, of course, money – inadequate funding. In one of my favorite cartoons, a lawyer says, “You have a pretty good case, Mr. Pitkin. How much justice can you afford?” We are not *supposed* to think that justice is something that money can buy, but clearly it is, and the underfunding of indigent criminal defense is absolutely endemic in the United States. The reason for that is simple. The right acknowledged by the Supreme Court in *Gideon* is unlike most of the other rights in the Constitution, which are negative rights – rights preventing the government from doing something to you – rather than a positive right that demands the government give something to you. For *Gideon* to be realized, it has to be funded, making it a positive right. But, as Alexander Bickel famously said, the courts are the least dangerous branch of government because they control neither Army nor purse – meaning the courts do not have the power to order a state to spend a certain amount of money on indigent defense services.

Thus, the primary responsibility for paying for lawyers for the poor falls to state

legislatures and—in states like New York where there is no statewide system for the provision of indigent defense services in criminal cases—to individual counties. States and counties have a wide variety of ways of meeting this obligation, including statewide public defenders who are funded by the state, county attorneys who are paid (often very low) hourly rates, and, in some counties, an auction system in which the bidder willing to be compensated the least gets to represent indigent defendants in court. However states choose to handle the load, chronic underfunding, which everyone acknowledges, leads to a host of problems. The first of these is astronomically high caseloads. When I say astronomically high, I think of Dade County, which covers Miami, Florida: in this county alone, it is typical for a felony public defender to have five hundred cases per year and for a misdemeanor public defender to handle more than two thousand cases per year. That is simply a ridiculous number of cases for lawyers to try to cover; and, indeed, they cannot. In fact, here in New York, in some of the hearings about New York's indigent defense provision, public defenders were actually not ashamed to say that they triage: they pick the cases that they think might go to trial or the ones in which they believe they could do some good, and they devote their time exclusively to them. Public defenders simply cannot give the kind of representation that they are supposed to give in all of the cases that they are assigned.

High caseloads make it impossible for competent lawyers to perform adequately even when they want to, but it is also very hard to attract good lawyers or to retain experienced lawyers when salaries are very low. This is partially because indigent defense services are a kind of welfare system. It is very unpopular to provide welfare for the poor, but it is even more unpopular to provide welfare for poor people charged

with crimes. It is one of the least popular things for legislatures to do even in Democratic Massachusetts, where I am from and where I serve on the board of the statewide public defender. It was recently proposed just last year by our Democratic legislature that we put indigent defense services in Massachusetts out for low bid. Luckily the proposal for this system, which has shown itself to work terribly in places like Alabama and Mississippi, did not even make it to the floor; but that it was proposed at all in the Massachusetts legislature tells you something about the state of funding.

But money isn't everything. The second issue is independence: even with adequate funding, public defenders have to be independent and unfortunately, in many parts of the country, public defenders run for office and make promises to their constituencies. One public defender running for office in Nebraska stated in a campaign interview that he manages the office as though the taxpayers are shareholders, and that he promises to above all not spend too much money. What platform do you think public defenders who run for office run on? "I will spend less of your money representing poor criminals" is a good approximation of their campaigns. Even when public defenders are not themselves elected, they often must report to elected judges who want to keep costs low and cases moving along, so they lack the independence that they really need. In sum, providers of indigent defense services face serious institutional impediments such as lack of independence from voters or judges, or from the need to bid as low as possible to keep contracts.

The Supreme Court has said that the right to a lawyer includes the right to a minimally adequate lawyer; this is called effective assistance of counsel. So you might think that this would ensure the adequacy of indigent defense services. Unfortunately, the Supreme Court held in *Strickland v.*

Washington that the standard for ineffective assistance of counsel is a daunting one for defendants to meet. They have to show a high level of deficiency, and they have to show the existence of "prejudice"—that is, they have to prove that their case would likely have come out the other way had their counsel been adequate. So often, in finding that the defendant is most likely guilty anyway, judges give a pass to some truly egregious behavior on the part of their lawyers. I hate to say this, but there have been multiple cases where lawyers sleep through trials. They are common enough that they have a name: "sleeping lawyer cases." There was one death penalty case in which the defendant's lawyer fell asleep while the prosecutor was cross-examining his client. The defendant, reasonably enough, said on appeal, "You've got to overturn my conviction and death sentence, because my lawyer slept through the cross-examination." A federal appeals court upheld the conviction and sentence because, as they said, it wasn't a very *long* cross-examination and the lawyer woke up by the end. So, no problem—no ineffective assistance of counsel there. This example makes perfectly clear that the availability of legal remedies for ineffective assistance of counsel is slight.

And finally, the fourth problem preventing the realization of *Gideon's* promise is the incredible upsurge in plea bargaining. At the same time as federal cases are falling off and state cases are increasing in number, both federal and state cases increasingly end in guilty pleas before ever going to trial. In fact, fewer than 5 percent of criminal cases are disposed of by trial. More than ninety-five out of every hundred plead guilty. There is never a trial; the government's case is never put to the test. In essence, the plea bargain is like Harry Potter's invisibility cloak. The public cannot see what went on before the plea is entered. You do not see whether the lawyer did any investigation. It

does not matter what legal arguments the lawyer made. You do not know whether the lawyer was prepared to defend the client. All of that gets washed out by the plea, and the defendant waives the right to appeal anything except misinformation about the plea or an illegal sentence. So we have very little information about what is going on in these cases, and if the case ends in a plea, defendants do not have any ability to challenge the adequacy of the representation they were given.

This is an extraordinarily large problem and it will take an extraordinarily concerted effort from the judiciary, from lawyers, and from concerned citizens to make a dent in it. As a former public defender and now as a board member of a statewide public defender system, I can say that public defenders and indigent defense lawyers truly stand on the front lines of justice, monitoring the most coercive powers that our state uses. Until the justice system enables them to do this critical job adequately, this issue should concern us all.



Susan S. Silbey

Susan S. Silbey is the Leon and Anne Goldberg Professor of Humanities, Anthropology, and Sociology and Professor of Behavioral and Policy Sciences at the Sloan School of Management at the Massachusetts Institute of Technology.

You have heard from Judith Resnik about the invention of courts as egalitarian institutions and their recent metamorphosis; from Chief Judge Lippman about the challenges of providing access to justice in the civil courts; and from Carol Steiker about how the promise of *Gideon v. Wainwright* remains an aspiration rather than a reality. My task is to talk about what the American people make of this: what they think is happening in the courts and the law and how they talk about it. More specifically, I will report from a sociological perspective on interpretations – which turn out to be quite contradictory, I might add – of the role of courts from two different kinds of data. First I will talk about polling data and then I will talk about data we collected through conversations with citizens. Finally, I will try to explain how these paradoxical accounts sustain, rather than undermine, the power

of courts in American culture by combining both aspirations for disinterested, objective, rule-bound decision making with quite realistic understandings of the practical day-to-day constraints, compromises, and shortfalls that lead to the failure of these aspirations.

First I need to explain what I mean by the word *culture*. This is a very difficult word whose growing colloquial usage has only contributed to the confusion. In the media and in the popular vernacular, we have “safety culture,” “youth culture,” “drug culture,” “legal culture.” Often, people talk about culture as if it were simply people’s personal attitudes and opinions, or what people feel, or some individual expression we enact in public. Sociologists and anthropologists, who take culture as their subject, have something much more complicated in mind when they use the word. According to the academic understanding, we live in a system of signs and symbolic representations that have associated practices, and culture refers to the interactions and connections between these symbols. It is through culture that we make sense of what we say and do in the context of society. A symbol, a word, a phrase can be understood and can communicate only because it is part of the structured network of signs (and associated meanings) that we exchange in our daily interactions.

My task for this volume of *Daedalus* was to show which representations of courts and law circulate in American popular culture. In general, the public’s view of the courts is actually quite favorable. What we heard from Chief Judge Lippman and from Carol Steiker is what legal professionals know, but it is not what the public tends to think. Public opinion polls on the judiciary regularly report strong confidence in the courts, alongside weaker expressions of what we might call direct approval – confidence and approval being different things. Public opinion surveys regularly describe a deep reservoir of

goodwill and diffuse support for the courts, especially the United States Supreme Court. Time and again, polls have shown that Americans have more confidence in the court than they do in either the President or Congress. Most Americans think that the court is exercising just about the right amount of political power and, more often than not, they think the court is doing a good job.

The law is embedded in American society. It is everywhere: it is depicted in television and films; it regulates the packaging of our food. The law creates access for people. The law organizes our lives. *This* is how people experience the law – it’s not just courthouses.

Recently, however, the polls have begun to tell a very different story, which has spurred some of the widespread concern within the judiciary and among others in the legal community that the authority and legitimacy of the courts may be threatened. A July 2013 Gallup poll suggested that approval for the U.S. judiciary had dipped to an all-time low: just 43 percent of the respondents said that they approved of the way the court was handling its job. Approval ratings are currently at just half of their historic levels. Every year before 2007, somewhere between 73 and 100 percent of the American people approved of the courts; starting in 2007, the number began to drop. Yet, even with this decline, we should note that the courts’ rating is still much healthier than that of Congress or the President.

Some observers have interpreted these recent polls as an indication of the fragility of public support for the legal system. I, on the other hand, think that the polling results show the need for more and different data.

In a moment, I will show you what different data look like. But first, it does bear asking: why did the numbers change so radically in the last few years? The polls suggest that people are not happy with either the current Supreme Court or with local courts. However, there is also a technical social science issue at play here. It turns out that the polls started wording the questions differently,

meaning that this is a matter of people’s cultural interpretation of language. That is, from 1973 to 2011, the public was asked, “How much confidence do you have in the courts?” In the polls after 2011 they were asked, “Do you approve of what the court is doing?” These questions are not equivalent, and we need to understand the difference between them. Without further conversation with poll respondents, we cannot know how they understood the terms in the questions. Perhaps they understood confidence to be a reflection of deeper long-term commitments and approval to be something more specific, time-bound, and responsive to particular cases or issues. Without locating the poll responses within a framework of concepts, we cannot know what any particular answer means.

So how do we find out about what people really think and how they interpret the role of the courts in their lives? Well, some years ago my colleagues and I specifically set out to learn what Americans thought about the law and the courts: when the law was rele-

vant to their lives and when it was not, what their expectations were for legal encounters and what actually happened. We did this by interviewing a random sample of 430 people in one state. It was a good sample in that it reproduced that state’s distribution of income, education, and race. We offered them compensation for speaking with us about their lives for one to two hours. We did not ask them about the law and courts. We simply asked them about their lives: where they lived, how long they had lived there, what they did and did not like about it, how they were similar or dissimilar to their neighbors. We had a long conversation in which people could really show us who they were. Then we asked them to tell us about problems that they might have encountered in their communities and what they did about the problems they named.

The things we asked about included neighborhood problems, family problems, and issues with property taxes, schools, and crime. The respondents told us about just under six thousand events; in about 14 percent of these, the respondents turned to the law for recourse. In telling these stories, people appraised the value of the court system and what it achieves. They talked about what enhanced and what limited the courts’ capacity to act. So we analyzed these stories and found that they often returned to a few similar themes, which we grouped into three distinct stories about the law. In one narrative, the law is described as a bureaucracy; in another, it is described as a game; in the third, it is a force overwhelming life – something to avoid or just find a way to get around or resist.

In the narrative of law-as-bureaucracy, people most often described themselves as standing “before the law,” waiting for justice to be done. The legal system is described as something different from everyday life, as rule-bound, objective decision-making, executed by disinterested

and distant actors. Those who described the legal system this way told us that they often felt that their expectations of the system were met, but they tended to turn to the law only with a general problem that might affect their community as a whole – not something personal.

In the second story model – that of the legal system as a game – people described themselves as acting “with the law,” using it to their advantage. In this account, people went to the law to pursue self-interest in ways that are not always permissible in ordinary civil life, and they used it to solve all sorts of problems. This process was an extension of everyday life, not separate from it. They did not feel a bureaucratic remove or believe that the power of the law was inaccessibly located in court-houses and leather-bound books. Rather, these respondents astutely and sometimes playfully looked for opportunities to use the legal system to their benefit. Theirs is a system that ends problems, in which the outcome is never guaranteed, but rather must be won. The legal system is objective in that its results are contingent upon the skill of the player. Those who espoused this version of the legal system said that the most important resource for making the law work is lawyers who play the game with skill and experience.

Those who shared with us the third and final story did not think the law was objective, nor did they have the resources to play it like a game: for them, it was just about power. Such a big, powerful institution promises all sorts of rights that it cannot really practically protect. It is unpredictable, like a giant who could run amok at any time. These respondents found that the law colonizes everyday life, so they may resist the law, finding clever ways around it.

So what is the point? These stories locate citizens variously as supplicants, as engaged players, or as inventive resisters. It is import-

ant to note that these three stories were not told by distinct types of people. One person can tell all three stories. How can this be? Well, the law is embedded in American society. It is everywhere: it is depicted in television and films; it regulates the packaging of our food. The law creates access for people. The law organizes our lives. *This* is how people experience the law – it’s not just court-houses. So in the end the stories describe the law in the United States as both a *god* and a *gimmick* – these two conceptions form the warp and weft of the fabric of legality itself. This contradiction protects the system because any criticism has already been heard – it is part of the system’s totality, rather than a flaw or imperfection. But, to conclude, change is still important, and the difference between the ideal and the reality is exactly the place where things change and get better – the space in which the kinds of proposals we’ve just heard from Carol and from Chief Judge Lippman can be made.



Jamal Greene

Jamal Greene is Vice Dean and Professor of Law at Columbia Law School.

My essay in the “Invention of Courts” *Dædalus* issue is about the role that courts, and in particular the Supreme Court of the United States, can play in constructing certain narratives of historical continuity. I want to suggest that these narratives are important to overcoming a certain kind of cognitive dissonance about our history. I will begin with an anecdote that captures something of the way in which we go about constructing our history.

The seat of Southeastern Ohio’s Harrison County is a town called Cadiz. It was the home of George Custer, who, of course, is famous for many reasons, including for his help securing the surrender of Robert E. Lee at Appomattox. It was also home to the law office of Edwin Stanton, who was Abraham Lincoln’s Secretary of War. In front of the Harrison County Courthouse in Cadiz you will find a statue of another significant resident: John Bingham, who wrote the most significant words in the Constitution; namely, the privileges and immunities

clause, the equal protection clause, and the due process clause of the Fourteenth Amendment. He was also a legendary orator in the U.S. Senate and the prosecutor of Lincoln’s assassins. But the town of Cadiz is far and away better known as the birthplace of Rhet Butler, and many passers-through and tourists think the statue of John Bingham is actually an image of Clark Gable. Now, if we consider Bingham and *Gone with the Wind* side by side, it is clear which holds a more prominent place within our culture. As David Blight has described in his masterful book, *Race and Reunion*, efforts to refigure the Civil War and its aftermath as a battle among moral equals – and Reconstruction in particular as a kind of ill-conceived power grab by carpetbaggers from the North and their scalawag allies in the South – was quite a deliberate effort on the part of members of the Lost Cause movement, for whom *Gone with the Wind*, with its glorification of Klan violence in response to Reconstruction, is a central and defining work of art.

Now, my essay in the issue argues that the message of moral continuity with the past, which the Lost Cause movement sought to promote, also lies beneath a prominent feature of American constitutional argument and especially American constitutional argument in the courts. We tend to structure constitutional arguments around a reference point: a set of what I and others have called *anticanonical cases*. The most prominent examples of anticanonical cases, one of which has been mentioned, are *Dred Scott v. Sandford*, *Plessy v. Ferguson*, and *Lochner v. New York*. These cases share a consensus within the mainstream community of present-day lawyers and judges: that they were wrong the day they were decided. *Dred Scott v. Sandford* declared African slaves and their descendants to be incapable of American citizenship and also held that slavery could not be prohibited in federal territories, *Plessy v. Ferguson* upheld a law segregating rail cars

by race, and *Lochner v. New York* invalidated a New York maximum-hours law for bakers.

Now, there are many cases in U.S. constitutional law that people believe were wrongly decided. What makes these three cases unique is that they tend to be used across the ideological spectrum to argue that some particular proposition in modern constitutional argument is wrong. So, for example, originalism (the idea that the Constitution’s meaning is unchangeable since its inception), which tends to be promoted on the ideological right, and substantive due process, which tends to be promoted on the ideological left, are both tied to *Dred Scott v. Sandford*. Judicial activism, a favorite charge of the right, and insensitive neoliberalism, a favorite charge of the left, are both associated with *Lochner v. New York*. Legal formalism, criticized fairly often by the left, and race-conscious governmental action, which over the last thirty years has been most prominently criticized by the right, are both associated with *Plessy v. Ferguson*.

The ideological promiscuity of these cases – the fact that they are able to travel across the political spectrum – tends to give them staying power. And the tendency to frame them as anticanonical aberrations – as the worst of the worst – situates them as products of bad judges rather than as genuine reflections of their times. By holding them out as prime examples of how to err in constitutional decision-making, we position their authors – the judges – as rogues rather than as representatives of significant currents of proslavery, prosegregation, and antilabor ideology. So in a sense, by underscoring the errors that we find in these cases, we end up alienating those courts from the culture that produced them. The upshot of that artificial separation is that we end up alienating *ourselves* from the culture that these cases represented as well. We, all of us, are the sanctified people to whom the Constitution’s preamble refers. *We are*

the people who keep faith with the ideals of the Constitution's framers. On the other hand, we want to believe that *they*, meaning the judges who decided these anticanonical cases, sought to tarnish those ideals. This kind of cognitive distancing resonates with the revisionism of the Lost Cause movement; it revises history in order to remove our collective discomfort with it.

The result is that we lose sight of the many ways in which our current moral progress has been shaped not by the original commitments of the Constitution's framers (many of whom owned slaves and signed a constitution that protected slavery as an institution), but instead by heroic citizens, by social movements, by politicians who struggled mightily, even fatally at times, against established immoral traditions. John Bingham is, of course, an example of such a person. So the notion that the Constitution's meaning is open to contestation by modern citizens based on evolving conceptions of value suffers when the courts, rather than contemporaneous cultural and legal understandings, end up forming our points of departure.

So, for example, if *Dred Scott v. Sandford* was egregiously and constitutionally wrong even on the day it was decided, then this means that Reconstruction and the Reconstruction Amendments to the Constitution did little more than restore its original meaning, in which case the Civil War really should never have been fought and Bingham really isn't that much of a hero after all. If *Plessy v. Ferguson* was wrong the day it was decided then it diffuses responsibility for Jim Crow and racial segregation, which in reality rests both with defiant Southern racists as well as with many wary Northerners. *Plessy's* status as anticanonical focuses our attention instead (I think rather distractingly) on the ugly rhetoric of Justice Brown's majority opinion in that case. *Lochner* is a more complicated and perhaps a more interesting example. The

By underscoring the legal errors that we find in cases such as *Plessy v. Ferguson* and *Dred Scott*, we lose sight of the many ways in which our current moral progress has been shaped not by the original commitments of the Constitution's framers, but instead by heroic citizens, by social movements, by politicians who struggled mightily, even fatally at times, against established immoral traditions.

Lochner court invalidated a New York law prohibiting bakers from working more than sixty hours a week on the ground that the law violates the baker's right to contract. What is interesting here is that the anticanonicity of *Lochner* is in part responsible for the Supreme Court's highly deferential review of economic and social rights. So in 1970, when a Maryland family claimed before the Supreme Court that the state's welfare laws artificially restricted their welfare benefits, preventing them from achieving a kind of minimum subsistence, the Supreme Court ruled that the Constitution does not recognize social- and economic-rights claims, citing *Lochner* in the decision.

One result of *Lochner's* treatment as a kind of shibboleth is that the U.S. court lags far behind other nations in its recognition of affirmative government welfare obligations. My essay asks us to imagine a world in which Reconstruction is considered just as central to American constitutional law and constitutional ethos as the founding, to imagine a world in which the repudiation of Jim Crow counts as a triumph of a grassroots social movement over an ideology deeply embedded in both the North and the South, to imagine a world in which the end of the laissez-faire era constitutes a triumph for social and economic justice. We are denied that world by the legal treatment of antica-

nonical cases. It is not, incidentally, a world in which many of the Supreme Courts' recent civil rights cases would resonate. I am thinking here of *Shelby County v. Holder* (2013), which overturned section four of the Voting Rights Act; *Fisher v. University of Texas* (2013), which called into question the affirmative action policies of a university that has a storied history of racial discrimination; and the ObamaCare decision, which chastises the government for seeking to secure social and economic rights for its citizens. Part of the argument of my essay is that the way in which we distance ourselves from anticanonical cases makes those more recent decisions find a more comfortable place within our constitutional law. So in short, holding up anticanonical decisions feels at first blush like a repudiation of courts, but it is really a glorification of the role that courts play in our collective life. I argue that it is time to recognize that our courts are really part of who we are, warts and all.



Linda Greenhouse

*Linda Greenhouse is the Knight Distinguished Journalist in Residence and Joseph Goldstein Lecturer in Law at Yale Law School. She was elected a Fellow of the American Academy in 1994, and is the guest editor with Judith Resnik of the Summer 2014 issue of *Daedalus* on “The Invention of Courts.”*

Professor Greene’s presentation is a wonderful coda to our whole discussion – warts and all. What we have heard, from the start to the finish of our panelists’ discussions is that there is nothing about courts that we can take for granted. There is nothing inherently good or bad about courts: they are what we make of them. As Judith Resnik started out by saying, our first courts did not offer us much of anything. She offers us an example of an architect hired to build a fake historic building to create a false sense of historical continuity, as though equal justice for all were an essential principle all along. Thankfully, this hollow promise was fulfilled because of what our society was willing to put into an empty vessel.

Professor Greene ends by asking us to look at judicial decisions and the behavior

of courts as anchored very much in our time, our place, and our politics. We are currently living through a fascinating example of this concept: same-sex marriage. We now have thirty-six states in which same-sex couples may marry, some by legislative enactment, some by judicial decisions; and perhaps ultimately, perhaps soon, by the Supreme Court’s declaration of the meaning of equal protection and due process. Even without the Courts’ action, however, this social revolution is underway. Within the last two or three years, there was a great debate in the legal community about the utility of turning to the courts to accomplish this outcome. Many in the gay rights legal community said that it was too soon to go to the courts, that without more grassroots activism and work in politics, the courts would be dangerous to the cause. So far, this has proven not to be true – in fact, we have seen the opposite.

So it repays all of us who are interested in not only our legal system but our social and political system to take a look at what is happening in the courts today, hold it up against the mirror of some of the comments tonight, and watch what happens in the future. Because when historians look back on this particular period of the twenty-first century, they will draw some very interesting lessons – just as we have drawn lessons from the inflection points of the twentieth century that some of our panelists have spoken about tonight. ■

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Taekjip Ha (I :2 & II :1)
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Kay R. Jamison (II :5 & III :1)
Johns Hopkins University

Robert M. Nosofsky (II :3 & III :1)
Indiana University

Roger Ratcliff (II :3 & III :1)
Ohio State University

Tom Wolfe (IV :4 & V :1)
New York, New York ■

Editors' Note: We are inaugurating a new feature in this issue of the Bulletin: notes and short essays written by Academy Members on their current work or on new developments or topics of interest in their fields and professions. We invite all Members interested in contributing to "On the Professions" to contact the editors of the Bulletin at bulletin@amacad.org. We hope that this new feature will be a medium through which Members address one another and share in the excitement of each other's work.

Writing as Discovery

Scott Russell Sanders

When I told my parents I wanted to switch my major, midway through college, from physics to English, my father replied, "But you already know English." So I explained that I wanted to study British and American literature, pursue a Ph.D., and become a professor. To my parents, neither of whom had graduated from college, that goal seemed rather grand, but like many of their generation, who came of age during the Great Depression and World War II, they believed that a brighter future awaited their children. My father had earned his living in factories, first as a line worker and eventually as a manager, and he was surprised to learn that a person could actually get paid for reading and talking about books. My mother was a homemaker with sundry skills, none of which were dignified by a paycheck, but she was an artist at heart as well as an avid reader, and she understood that my real ambition was to become a writer. If studying English would help me pursue that dream, then she would support me wholeheartedly, and she persuaded my father to do the same.

Half a century after my parents gave me their blessing, I can look back on a career that has proven to be more fulfilling than anything I could have imagined as an undergraduate. After completing my Ph.D. in English at the University of Cambridge in 1971, I joined the faculty at Indiana University, where I taught for the next four decades. During all those years I never ceased feeling grateful to be able to earn my living in the way my father found so implausible: by reading and writing, and by discussing works of literature with bright, inquisitive young people. In what other profession could one share on a daily basis the pleasures of language well used and art well made, while exploring the variety and meaning of human experience?

It is not fashionable in today's academy to speak of literary study as a source of aesthetic pleasure, much less as a way of exploring what it means to be human. But those were the rewards that drew me to the reading of stories and novels and poems in childhood, and that keep me reading now. Literature helps me think about how we shape our individual lives, how we treat one another, how we organize ourselves into communities, how we relate to the rest of nature, and how we might do all of those things more wisely, kindly, and richly. Biology influences our behavior profoundly, of course, as it does that of all animals; but humans are distinctive in the degree

to which we must choose how to act, individually and collectively. Shall we go to war or make peace? Shall we enslave one another or not? Shall we cheat and lie and steal or shall we deal honestly with each other? Shall we care for the poor or discard them? Shall we regard Earth as a warehouse of raw materials or as our beautiful and irreplaceable home? Shall we think of ourselves as machines made of meat or as beings with souls?

The questions that guide my reading have also guided my writing over the past half-century. My first published work, which appeared when I was a junior in college, was an essay on the morality – or, as I concluded, the immorality – of nuclear weapons. I turned next to short stories, heavily (and clumsily) influenced by Faulkner and Fitzgerald and Hemingway, models that allowed me to brood over racism, class divisions, and war. Those issues, like the ethics of nuclear armaments, were impressed on me not only by the public history of the 1950s and 1960s – the civil rights movement, the persistence of poverty in the world's richest nation, the Vietnam War – but also by my private history. Born in Tennessee, with a father from Mississippi, I felt implicated in the bitter legacy of slavery. I grew up among working class people, many of them chronically unemployed, in an economically and environmentally ravaged part of Ohio. I spent my school years living on and near an Army munitions base, surrounded by the expensive machinery of war. It puzzled me that we could spend vast amounts of money preparing to slaughter our enemies, while kids boarded my school bus from rusting trailers and tarpaper shacks, their cheeks hollow with hunger.

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Like all children, I absorbed notions about gender roles without questioning them. Only after I became a father, first of a daughter and then of a son, did I begin to write about the impact of sexism on women and the impact of violent and oafish models of masculinity on men. Becoming a father, and then, thirty years later, a grandfather, made me pay closer attention to the deteriorating condition of the planet, a legacy of abuse as grievous as slavery, and one for which our descendants will have good reason to condemn us. While my colleagues were studying literary theory, I was reading reports by scientists about pollution, ozone depletion, ocean acidification, species extinction, climate disruption, and other symptoms of humankind's erosive impact on nature, and I was weaving these disturbing trends into the plots of stories and novels or into the arguments of essays.

These concerns – about race, class, war, gender, environment – have preoccupied me on and off the page throughout my writing life. Whether in fiction or nonfiction, I have sought to understand these matters more deeply, hoping that in doing so I would make them more comprehensible, and more compelling, to readers. Literature has the power to enlighten as well as entertain us, to wake us up to life's subtleties and beauties and possibilities. I have experienced this as a reader, and I have witnessed it as a teacher. Whether my writing carries that power, I cannot say, but I do know it has served me as a means of discovery, about language as well as nature, about our inner and outer worlds, mind and cosmos, and about the ever challenging task of being human.

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An Intellectual Journey and Personal Odyssey

Arthur Kleinman

In 1973, at the very outset of my career in psychiatry and anthropology, I published four papers that would become the foundation of my journey as a scholar, teacher, and practitioner. One paper drew upon the research I had already initiated on patients, their families, and healers in Taiwan – where I had served as an NIH fellow in the U.S. Public Health Service seconded to the U.S. Naval Medical Research Unit No. 2 – to formulate a model of health care systems. A second paper sketched a way of studying the history of public health in China through the Cultural Revolution, which Chinese society was then undergoing. Another put forth a practical clinical method for eliciting patients' culturally shaped expectations of care to improve diagnosis and treatment. The last work was at once the most ambitious and least developed: it proposed studying medicine as a cultural system that could provide a way for biomedical science and clinical practice to become an object of cultural enquiry – an anthropology of science.

Over the years to come, I would work on each of these subjects with shifting intensities, and in so doing I crossed back and forth between medical anthropology, cultural and clinical psychiatry, social medicine, global health, the medical humanities, and China studies. While the driving force behind this broad interdisciplinary mobility doubtless was in part my personal peculiarities and predilections, I owed the rest to those whom I engaged as intellectual interlocutors and academic collaborators along the way.

I have always been passionate about transdisciplinary collaboration. Working with historians, sociologists, and humanists, on the one side, and with biomedical practitioners and scientists, on the other, taught me respect for the different forms of knowledge creation and education. Biosocial processes linking disease pathology, illness experience, caregiving, or health systems required that the social world be understood as *embodied* in populations and individuals and that psychophysiological processes in such conditions as depression, AIDS, or diabetes be reinterpreted (*resocialized*) in terms of the political economy of poverty, the moral economy of relationships, and the culture of institutions. To do so meant reading broadly across disciplines, engaging in academic conversations with those working in archives as well as laboratories, and forging ties in field research and teaching with different kinds of scholars. With them I have published and taught courses on topics from social suffering to SARS, subjective wisdom to global health policy, psychotherapy to neoliberalism, religion to pharmaceuticals, narratives to local biology.

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And these border crossings have affected my academic career as much as my personal life. I have chaired the Department of Social Medicine at Harvard Medical School and the Department of Anthropology in Harvard's Faculty of Arts and Sciences, and I have directed the Harvard Asia Center and the Division of Consultation-Liaison Psychiatry at the University of Washington. I have practiced psychiatry in general hospitals and spent years in ethnographic field research. I have taught undergraduates and medical students, and I have mentored Ph.D. students and postdoctoral fellows. And I have felt equally at home in Brooklyn, where I grew up, at Stanford, where I studied, in Boston, where I now live, in Washington, D.C., where I consulted at the NIH and Institute of Medicine, and in Taipei, Changsha, and Shanghai, where I conducted field research across five decades.

Those different worlds and ways of knowing have made me better able to understand the shared existential condition of what really matters for ordinary men and women facing the dangers and uncertainties of living. They have sharpened my awareness of the incompleteness and multiplicity of human conditions. They have better prepared me to appreciate not just the joys but the failures of aesthetic, moral, and religious quests. Shaking up my perspectives and expectations has curiously centered my understanding of the world. By forcing me to rethink and reimagine, these different worlds have served to free me from overly narrow, culturally constrained, and professionally circumscribed ways of knowing. Together with numerous former students I have worked toward uniting theory, research, practice, and policy so as to create a different kind of academic field. As a clinician and scholar who crosses disciplinary boundaries, I have learned to ask different questions, go against the grain, put findings into practices of care, and build a career and sustain a life.

The multiple worlds, cultural contestations, and near constant personal disorientation of a globalized career – with its intellectual dissonances and tense post-colonial professional experiences –

used to seem particular; but now that it is increasingly the world we all inhabit, I feel the benefits of advanced preparation for a new age. It is a transitional age in which no single academic or intellectual perspective is adequate to capture the complexity of society and the rapidity of perceptual, affective, and value transformation. It is at once a dismaying and appealing time: challenges to the very idea of what is human, the differing notions of a good or at least adequate life, and the clash of an idealistic pursuit of social justice and humanitarian practices with the cynical reality of systemic corruption and extremist violence make it clear we really do not yet possess the concepts or language to adequately make sense of what we are facing. We are right now building a world whose environmental, health, technological, developmental, and ethical conditions have set us in a whole new reality. But what that reality is and what it will require of us to endure by fashioning an appropriate *ars vivendi*, no one knows. It is honest awareness of our ignorance and often the hypocrisy of our claims – as well as our urgent need to cross intellectual and practical domains of life in order to begin to get a handle on the radically new configurations of things – that tell me I haven't been wrong in centering my work on the meaning of lived experience. And yet, I am humbled by having rarely succeeded in taking full advantage of what was once a precocious intellectual quest and is now a widely shared enterprise of interdisciplinary, collaborative, and useful (if incomplete) knowledge about global life in our times.

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Freedom of Expression on Campus

Geoffrey R. Stone

In light of recent events that tested the commitment of colleges and universities nationwide to free and open discourse, University of Chicago President Robert J. Zimmer appointed a faculty committee last summer to draft a statement articulating the University of Chicago's "overarching commitment to free, robust, and uninhibited debate and deliberation." In the words of the committee, which was chaired by Geoffrey R. Stone, this statement, which was completed at the end of 2014, "reflects the long-standing and distinctive values of the University of Chicago and affirms the importance of maintaining and, indeed, celebrating those values for the future." We present it here as an invitation to further debate and deliberation by other academic institutions throughout the nation.

From its very founding, the University of Chicago has dedicated itself to the preservation and celebration of the freedom of expression as an essential element of the University's culture. In 1902, in his address marking the University's decennial, President William Rainey Harper declared that "the principle of complete freedom of speech on all subjects has from the beginning been regarded as fundamental in the University of Chicago" and that "this principle can neither now nor at any future time be called in question."

Thirty years later, a student organization invited William Z. Foster, the Communist Party's candidate for President, to lecture on campus. This triggered a storm of protest from critics both on and off campus. To those who condemned the University for allowing the event, President Robert M. Hutchins responded that "our students . . . should have freedom to discuss any problem that presents itself." He insisted that the "cure" for ideas we oppose "lies through open discussion rather than through inhibition." On a later occasion, Hutchins added that "free inquiry is indispensable to the good life, that universities exist for the sake of such inquiry, [and] that without it they cease to be universities."

In 1968, at another time of great turmoil in universities, President Edward H. Levi in his inaugural address celebrated "those virtues which from the beginning and until now have characterized our institution." Central to the values of the University of Chicago, Levi explained, is a profound commitment to "freedom of inquiry." This freedom, he proclaimed, "is our inheritance."

More recently, President Hanna Holborn Gray observed that "education should not be intended to make people comfortable, it is meant to make them think. Universities should be expected to provide the conditions within which hard thought, and therefore strong disagreement, independent judgment, and the questioning of stubborn assumptions, can flourish in an environment of the greatest freedom."

The words of Harper, Hutchins, Levi, and Gray capture both the spirit and the promise of the University of Chicago. Because the

University is committed to free and open inquiry in all matters, it guarantees all members of the University community the broadest possible latitude to speak, write, listen, challenge, and learn. Except insofar as limitations on that freedom are necessary to the functioning of the University, the University of Chicago fully respects and supports the freedom of all members of the University community "to discuss any problem that presents itself."

Of course, the ideas of different members of the University community will often and quite naturally conflict. But it is not the proper role of the University to attempt to shield individuals from ideas and opinions they find unwelcome, disagreeable, or even deeply offensive. Although the University greatly values civility, and although all members of the University community share in the responsibility for maintaining a climate of mutual respect, concerns about civility and mutual respect can never be used as a justification for closing off discussion of ideas, however offensive or disagreeable those ideas may be to some members of our community.

The freedom to debate and discuss the merits of competing ideas does not, of course, mean that individuals may say whatever they wish, wherever they wish. The University may restrict expression that violates the law, that falsely defames a specific individual, that constitutes a genuine threat or harassment, that unjustifiably invades substantial privacy or confidentiality interests, or that is otherwise directly incompatible with the functioning of the University. In addition, the University may reasonably regulate the time, place, and manner of expression to ensure that it does not disrupt the ordinary activities of the University. But these are narrow exceptions to the general principle of freedom of expression, and it is vitally important that these exceptions never be used in a manner that is inconsistent with the University's commitment to a completely free and open discussion of ideas.

In a word, the University's fundamental commitment is to the principle that debate or deliberation may not be suppressed because the ideas put forth are thought by some or even by most members of the University community to be offensive, unwise, immoral, or wrong-headed. It is for the individual members of the University community, not for the University as an institution, to make those

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judgments for themselves, and to act on those judgments not by seeking to suppress speech, but by openly and vigorously contesting the ideas that they oppose. Indeed, fostering the ability of members of the University community to engage in such debate and deliberation in an effective and responsible manner is an essential part of the University's educational mission.

As a corollary to the University's commitment to protect and promote free expression, members of the University community must also act in conformity with the principle of free expression. Although members of the University community are free to criticize and contest the views expressed on campus, and to criticize and contest speakers who are invited to express their views on campus, they may not obstruct or otherwise interfere with the freedom of others to express views they reject or even loathe. To this end, the University has a solemn responsibility not only to promote a lively and fearless freedom of debate and deliberation, but also to protect that freedom when others attempt to restrict it.

As Robert M. Hutchins observed, without a vibrant commitment to free and open inquiry, a university ceases to be a university. The University of Chicago's long-standing commitment to this principle lies at the very core of our University's greatness. That is our inheritance, and it is our promise to the future.

Geoffrey R. Stone, Edward H. Levi Distinguished Service Professor of Law, *Chair*

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Mark Siegler, Lindy Bergman Distinguished Service Professor of Medicine and Surgery

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Ferguson and the Meaning of Race in America

Douglas S. Massey

As we all know, on August 9, 2014, an eighteen-year-old black male named Michael Brown was shot and killed by white police officer Darren Wilson in Ferguson, Missouri, a suburb just outside of St. Louis. The killing led to much civil unrest locally and widespread demonstrations nationally, and set off a national debate on the state of American race relations. Whereas media pundits and news reporters focused on what Michael Brown and Officer Wilson may or may not have done that fateful afternoon, as a sociologist I looked to the structural context in which the encounter occurred to make sense of the events.

The structural context for race relations in St. Louis, as in other metropolitan areas with large black communities, is one of longstanding and intense residential segregation. With the mass migration of blacks out of the rural South and into cities during the first half of the twentieth century, ever-higher levels of residential segregation were imposed on African Americans such that by 1950, the black ghetto was a characteristic feature of urban society.¹

No other ethnic or racial group in the history of the United States has ever experienced the degree of residential segregation and spatial isolation that was routinely imposed on African Americans by the mid-twentieth century. Based on a standard index that varies from 0 (when blacks and whites are evenly distributed across neighborhoods) to 100 (when blacks and whites share no neighborhood in common) black-white segregation averaged 88.4 in the North and 90.1 in the South in 1950. In St. Louis, the index stood at 92.9.² The only other place where racial segregation this durable and intense has been documented is the Union of South Africa under Apartheid.³

Although the black ghetto was well established as a structural feature of American cities by mid-century, black neighborhoods throughout the nation underwent a dramatic geographic expansion between 1950 and 1970. Aided by federal outlays for highways, income tax deductions, and government insured loans from the Federal Housing Administration (FHA) and Veterans Administration (VA), whites moved en masse out of cities to occupy the burgeoning suburbs being constructed on the urban fringe, while African Americans from the South moved into the neighborhoods the whites left behind. Black suburbanization was precluded by the fact that both the FHA and VA prohibited lending to black borrowers and to black neighborhoods, practices that set the standard for the entire lending industry. Even if a black borrower could somehow scrape together the money to purchase a home, racial discrimination was institutionalized throughout the real estate industry.⁴

Despite massive redistribution of urban populations during the postwar period, levels of black-white segregation hardly changed. As of 1970, the average level of black-white segregation across 287 metropolitan areas stood at 77.6, and in St. Louis the index was 85.0. Moreover, in a subset of U.S. metropolitan areas, African Americans were highly segregated across multiple geographic dimensions simultaneously, a pattern Nancy Denton and I labeled *hypersegregation*.⁵ In these areas, not only were African Americans unevenly distributed in space, they were also largely confined to all-black neighborhoods that themselves clustered together in a densely packed contiguous zone near the urban core. St. Louis, of course, was a hypersegregated metropolitan area.

Because black individuals and neighborhoods were cut off from capital and credit, once a residential area became black it inevitably began to deteriorate physically. Those areas that had gone black the earliest experienced the longest period of disinvestment, meaning that the process of deterioration began in the core of the ghetto and over time spread outward toward the periphery, creating areas of widespread abandonment and profound deprivation within an otherwise expanding economy. Under these circumstances, it is not surprising that American cities were swept by successive waves of racial violence during the 1960s. In response to the rioting, Congress finally acted to combat housing segregation by passing the 1968 Fair Housing Act, though it was prompted to do so only in the aftermath of Martin Luther King's assassination. It was followed in 1974 by the Equal Credit Opportunity Act, which banned discrimination in mortgage lending, and the 1977 Community Reinvestment Act, which prohibited discrimination against black neighborhoods.

In order to secure congressional passage of these pieces of legislation, however, their authors were forced to strip away the enforcement powers originally intended for federal authorities. Thus, in each case, the only remedy for victims of discrimination was to file a civil lawsuit to prove discrimination in federal court, obtain a cease and desist order, secure punitive fines, and collect damages. But over the years, relatively few lawsuits have been filed, fewer have gone to trial, and even fewer have resulted in a conviction. Moreover, the racially biased landlords unlucky enough to be convicted generally received small fines and very modest damage awards. It

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is hardly surprising, therefore, that audit studies have consistently shown that high levels of clandestine discrimination continue to pervade the U.S. housing and lending markets.

Over the course of the civil rights era, white racial attitudes nonetheless did change and principled support for segregation waned. Whereas in the early 1960s, 68 percent of white Americans believed that blacks should go to separate schools, 60 percent felt that whites had a right to keep blacks out of their neighborhoods, and 54 percent endorsed racial segregation in transportation, by the 1980s these percentages had fallen to 4 percent, 13 percent, and 12 percent.⁶ Although whites gradually came to accept the idea of a race-blind society in principle, they remained uncomfortable with its implications in practice. Integration was tolerated only insofar as it did not bring whites into frequent contact with many black people. In opinion polls, as the relative number of blacks in a social setting increased, ever-larger shares of whites replied they would seek to leave or refuse to enter.⁷

In the years since the civil rights movement, therefore, metropolitan areas with small black populations have moved steadily toward integration while those with large black communities have not.⁸ Shifts toward integration were especially pronounced in smaller, newer metropolitan areas containing colleges and universities (higher education is associated with racial tolerance) and military bases (racial tolerance in the military is mandated by command). In contrast, segregation levels in large metropolitan areas containing large black populations have stubbornly remained high, especially in areas with older urban centers surrounded by suburbs with density zoning regimes that prohibit the construction of multiunit housing. Metropolitan areas that fit this profile also tended to remain hypersegregated, and one-third of all black metropolitan residents continued to live under conditions of hypersegregation in 2010.⁹

As of that date, the St. Louis metropolitan area still satisfied the criteria for hypersegregation, with an average index value of 77.4 across the five geographic dimensions of segregation, making it the third most racially segregated city in the United States, behind only Milwaukee and Detroit. Given that segregation works to concentrate economic deprivation spatially for groups with high poverty rates, the average black resident of metropolitan St. Louis in 2010 lived in a neighborhood in which 42 percent of all residents earned less than thirty thousand dollars – an exceedingly high spatial concentration of poverty.

Over the past six decades, St. Louis has followed the classic trajectory of a large, older metropolitan area with a significant black community surrounded by independent white suburbs. Whereas in 1950 the bulk of the area's residents lived in the city – which was

82 percent white and, of course, hypersegregated – over the next six decades, the city population fell from 857,000 to 319,000 while the white percentage dropped to 44 percent, even though the greater metropolitan area itself grew from 1.5 million to 2.8 million and remained 77 percent white: which brings us to Ferguson.

Although the white city population fell continuously from 1950 onward, the black population continued to grow through the 1990s. But over the last two decades, even the black population has begun to decline in response to the years of color-coded disinvestment that have steadily eroded the physical integrity of the black ghetto from the inside out. Although the pace of white population loss exceeded that of blacks until 2000, the rate of black decline since then has surpassed it. From 2000 to 2010, a net of 21,000 African Americans left the city, compared with just 12,000 whites.

The exodus was led by middle-class African Americans who sought improved residential circumstances in close-in suburbs such as Ferguson. Ferguson is an older suburb in which the median age of housing is fifty-five years. It was part of the first wave of post-war suburban construction and its population peaked at 29,000 in 1970, when it was just 1 percent black. Over the ensuing decades, the city population gradually dropped, reaching roughly 21,000 in 2010. Replicating the experience of St. Louis, this population decline was accompanied by an increase in the black share of the population, which stood at 67 percent in 2010, well on the way to incorporation into the St. Louis ghetto.

Such rapid demographic change has naturally led to a stark mismatch between a still overwhelmingly white municipal bureaucracy and a predominantly black resident population. In addition, the racial tensions inherent in such a mismatch were exacerbated by the emergence of a new form of credit discrimination that emerged in the 1990s. Whereas black neighborhoods had historically been systematically “redlined” by banks and thus excluded from mortgage lending, they have more recently become favored targets for a lending process that has become known as “reverse redlining” or “predatory lending.” In predatory lending, black borrowers who qualified for conventional loans were instead channeled into high-cost, high-risk subprime mortgages that were extremely vulnerable to the vagaries of the housing market, leading to the disproportionate concentration of foreclosures in black residential areas. Indeed, the single most important factor predicting the number and rate of foreclosures across metropolitan areas is the level of black-white segregation.¹⁰

The innovation that transformed the home lending industry was the invention of mortgage-backed securities. Whereas in the past banks made loans directly to borrowers who repaid them over time in monthly installments, mortgages today more often originate

with brokers who quickly sell them to large financial institutions such as Goldman Sachs, who, in turn, bundle them together into bonds that are sold to investors. As a result, the number of mortgages a bank generates is no longer limited by total bank deposits, but by whatever the market for mortgage-backed securities will bear. In addition, the risks of lending are borne by investors, not by brokers or financial institutions. These actors simply serve as middlemen who make profits by originating, bundling, and selling mortgages, rather than collecting interest on the loans themselves. Moreover, even if a financial institution chooses to buy mortgage-backed securities, it can insure against loss through a credit default swap in which a third party, such as AIG Insurance, agrees (for a fee) to pay off the bonds in the event of default.

Together, mortgage-backed securities and credit default swaps created what economists call a “moral hazard” in which brokers, banks, and financial institutions have strong incentives to generate as many loans as possible irrespective of a borrower’s ability to repay and to steer as many customers as possible into subprime lending products, which carry higher interest rates, larger fees, and inflated repayment structures. Under these circumstances, formerly excluded black communities such as Ferguson became prime targets for predatory lending, housing a striving middle-class black population with incomes and homes that can be capitalized through refinance loans. The middle-class status of Ferguson’s black community is indicated by the fact that the number of college graduates rose from 19 percent to 30 percent from 2000 to 2010 as the population shifted from half to two-thirds black.

Compared with whites, African Americans in places like Ferguson were far more likely to receive home equity loans and, regardless of their financial circumstances, were far more likely to be steered into riskier, costlier, and generally more unfavorable lending terms. As a result, the inevitable housing bust put African Americans at greater risk of insolvency. In the course of the recession, massive amounts of home wealth were transferred away from black households and communities and into the pockets of financiers in faraway financial centers like New York.¹¹ Home values in Ferguson fell by around 10 percent, foreclosures proliferated, and home ownership dropped from 67 percent to 59 percent. At present, half of all home owners are “underwater,” owing more on their mortgages than their homes are worth. The economic fragility of the community is evident: median household income in Ferguson dropped by 14 percent in real terms between 2000 and 2010 – despite the rising share of college graduates – and the poverty rate more than doubled from 12 percent to 25 percent.

The economic devastation of communities like Ferguson led to two ancillary developments relevant to understanding the mean-

ing of the events there. First, encouraged by foreclosures and a proliferation of underwater properties, outside investors swept in to buy distressed homes on the cheap and convert them into rentals, often leasing to families that before the crisis had themselves been homeowners. Second, the decline in home values and incomes put downward pressure on municipal revenues from property and sales taxes, prompting officials to allocate more resources to traffic enforcement as a revenue-generating strategy. Traffic enforcement generates money not only from fines, but also from penalties and interest on late payments, as well as court costs and garnished wages when arrests are made and forfeiture when contraband is found during a traffic stop. In the three fiscal years prior to 2014, municipal court revenues in Ferguson rose by 80 percent and came to constitute 13 percent of the total municipal budget. Under such circumstances, it is little wonder that in a recent poll, 70 percent of blacks nationally said that police do a poor job of treating the races equally and only 31 percent of blacks believe police do a good job of protecting people from crime.¹²

Thus, the encounter between Michael Brown and Officer Wilson occurred against a backdrop of intense racial segregation and predatory lending that devastated the black community economically. Aspiring middle-class black homeowners saw their hard-earned wealth flow into the pockets of distant, wealthy white financiers, while they themselves were displaced into rented homes they formerly owned, while also being purposefully harassed by white police officers seeking revenue to pay the salaries of a mistrusted white municipal bureaucracy. In this tense, racially charged context, any encounter between a white police officer and a young black male has the potential to escalate out of control, thereby setting fire to the tinderbox of racial inequalities and longstanding grievances that pervade the St. Louis region. Owing to the continuing reality of racial segregation in the nation’s large urban black communities, America’s racial divisions are by no means a thing of the past. Communities such as Ferguson are simply conflagrations waiting for the right sparks to ignite them.

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ENDNOTES

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Mathematical Population Biologist

Joel E. Cohen

When asked my profession, I usually respond with a telescoping sequence: scientist – biologist – mathematical biologist – mathematical population biologist. Most people look away with regret after the first word, and I stop there. I proceed, step by step, only on provocation.

What does this mathematical population biologist profess? I try to understand biological populations – humans, bacteria, trees, fish, viruses, trypanosomes that cause Chagas disease, bugs that transmit infection, and food webs, but normally not populations of light bulbs or buildings – by using mathematics in the broadest sense, which includes mathematics, statistics, and computation. As a tool-maker, I try to create new mathematics to understand questions in population biology.

For example? Shrimp are generally more numerous than whales per square kilometer of ocean surface where both occur. In a single species of oak, seedlings are more numerous per square kilometer of land than mature giants. Bigger organisms are rarer than smaller organisms. Almost always, the population density of organisms declines as their average body mass increases. Here's the surprise: the relationship of population density to average body mass can be described well by a simple mathematical formula, a power law.

What is a power law? In elementary geometry, the area of a square increases as the second power (the square) of the length of an edge: $\text{area} = (\text{edge length})^2$. This is a power law with exponent two. The volume of a cube increases as the third power (the cube) of the length of an edge: $\text{volume} = (\text{edge length})^3$. This is a power law with exponent three. Since a cube has six square faces, the surface area of a cube is six times the area of one face of the cube: $\text{surface area of cube} = 6 \times (\text{edge length})^2$; another power law with exponent two. It follows that the surface area per unit volume of a cube is $6 \times (\text{edge length})^2 / (\text{edge length})^3 = 6 / (\text{edge length})$. This power law (with exponent negative one, for those at ease with such details) explains why, when you take a baby out of doors in cold weather, you should wrap the baby more warmly than you wrap yourself. You have a much bigger edge length (height or girth, for example) than the baby does. Therefore, to the extent that you and the baby are more or less the same shape (even if neither of you is a cube), you have a smaller ratio of surface area to volume than the baby, so you lose relatively less heat through your surface, per unit of your volume, than the baby loses through its surface, per unit of his or her volume.

Ecologists have verified so many times that population density is inversely proportional to some (disputed) power of average body

mass that they've given this power law a name: density-mass allometry. Although density-mass allometry has the same power-law formula as the geometric power laws, there is a major conceptual difference. The geometric power laws relate two attributes of individual squares, cubes, or other geometrical objects of different sizes. By contrast, in density-mass allometry, population density (defined as the number of organisms per unit of area or of volume) is not an attribute of any individual, but is an attribute of a population (ensemble of organisms). Average body mass – the other quantity in density-mass allometry – is a hybrid of individual and population attributes: body mass is an attribute of an individual, but the average body mass is a statistical attribute of a population.

Mathematical biology is interested in patterns and mechanisms applicable to individuals and populations. Mathematical population biology focuses on patterns and mechanisms applicable to the attributes of populations that are not attributes of individuals. In that difference lies scientific opportunity. Population thinking in biology is less than two hundred years old. The mathematical tools for population thinking are also young, and in many cases, much younger. Far more mathematical tools for population thinking remain to be invented and discovered than we now possess.

In 2007, I had the good fortune to spend the summer in the laboratory of evolutionary biologist Michael Hochberg at the University of Montpellier. That his laboratory was located in a beautiful old city in southern France near the Mediterranean coast was not irrelevant, but was not my primary motivation for going there. Montpellier has perhaps the world's largest concentration of population biologists in basic and applied fields. I had known and admired Hochberg's work over decades.

He and two graduate students were designing experiments with bacterial populations to test theoretical predictions published in 2003 about Taylor's law. By 2007, Taylor's law had been the subject of an estimated one thousand papers. Hochberg invited me to join the design and analysis of the experiments. For starters, he asked, what did I think about Taylor's law?

Truth be told, I knew nothing about it, but on first exposure, I was fascinated. Initially, Taylor's law seemed magical; simple but widely applicable. Though his examples were not the first, ecologist L. Roy Taylor published in *Nature* in 1961 twenty-four examples of the power law that would later unjustly be named after him. Chester I. Bliss published examples in 1941, S. B. Fracker and H. A.

Joel E. Cohen is the Abby Rockefeller Mauzé Professor of Populations and head of the Laboratory of Populations at Rockefeller and Columbia Universities. He was elected a Fellow of the American Academy in 1989.

Brischle in 1944, B. I. Hayman and A. D. Lowe in 1961. These examples ranged from aphids to zooplankton.

In the experiments of Hochberg and his students, clones of a bacterial species were grown in laboratory dishes that had eight different amounts of bacterial food (nutrient concentrations), with eight replicate dishes for each level of nutrient concentration. All dishes started with the same number of bacteria. After twenty-four to thirty-six hours, the students estimated the number of bacteria in each dish. For each level of nutrients, they estimated the mean and the variance of the population density of bacteria in the eight replicates. The mean is simply the average of the bacterial counts (the sum of the counts in all eight dishes, divided by eight). The variance is a standard statistical measure of scatter, that is, of how much the counts varied around the mean: it is the average of the squared difference of each count from the mean count. The bigger the variance, the greater the scatter. Taylor's law connects the mean and the variance: it asserts that the variance of the counts should be a power of the mean of the counts, with an exponent near two. Both variables in Taylor's law – the variance and the mean of counts – are intrinsically population attributes, not attributes of individuals. Sure enough, when the experimental dust settled, the eight points (one for each nutrient concentration) lined up as predicted by Taylor's law with an exponent not statistically distinguishable from two. How did the bacteria know?

My own work, some of it not yet published, with collaborators in many countries, has confirmed Taylor's law in oak forests in New York; mountain beech forests in New Zealand; parasites and hosts in New Zealand lakes; gray-sided voles in Hokkaido, Japan; and humans in Norway and the United States.

Beyond the empirical testing of Taylor's law, theoretical questions beckon. Why is Taylor's law so successful with so many diverse populations, and far beyond population biology? To explain why a simple formula describes so well such a widespread empirical pattern, I have shown mathematically that several well-known models of population dynamics lead to Taylor's law. One of these models was published prominently (by others) in 1969. But it was not until 2013 that my coauthors and I established a connection between that 1969 model and Taylor's law. We showed that the mechanisms assumed in the model described the details of observed tree counts over seventy-five years of censuses from Black Rock Forest, New York, and correctly predicted the form and parameters of Taylor's law for the trees.

In addition to trying to explain Taylor's law, I have been exploring its consequences. Independently, the Chilean ecologist Pablo Marquet and his colleagues and my colleagues and I realized that a combination of Taylor's law and density-mass allometry predicted a new power law, which I called variance-mass allometry: the vari-

ance of population density should be a power of average body mass. My colleagues and I confirmed variance-mass allometry empirically for plants and animals.

Completely unexpectedly, in purely theoretical work, I discovered that the exponent of Taylor's law could pass through a singularity: as one parameter in a highly simplified climate model changed smoothly, the exponent of Taylor's law started at two, grew faster and faster, exploded to positive infinity, jumped to negative infinity, and returned to two. Subsequently, I showed that classical population models like branching processes and linear birth-and-death processes also led to Taylor's law and displayed abrupt changes of the exponent of Taylor's law in response to smooth changes in their parameters. In these examples, abrupt biotic change crawled unbidden out of the theoretical woodwork of smooth environmental change, hissing with teeth bared. A greater investment in understanding the conditions, warning signals, and consequences of abrupt biotic change seems in order.

Many questions remain unanswered. For example, how much of the widespread empirical success of Taylor's law reflects the biology of populations, and how much reflects statistical processes independent of biology? Taylor's law is used in controlling insect pests of economically important crops like cotton and soybeans and in assessing extinction risks in conservation. What are other practical or scientific applications, in mathematical population biology and beyond?

When I was fourteen, living in Battle Creek, Michigan, I knew I wanted to become a composer of music, or a writer of journalism or poetry, or a mathematical biologist. I knew then that biology had irresistible problems and that new mathematics would be required to make sense of them. I've been lucky. Nearly six decades later, I am still in love with music, poetry and prose, and the adventure of mathematical population biology. ■

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Most of Joel E. Cohen's academic publications are freely available for download at <http://lab.rockefeller.edu/cohenje/cohenall>. For more background reading on these topics, see Nicolas Bacaër, *A Short History of Mathematical Population Dynamics* (London; Dordrecht, The Netherlands; Heidelberg, Germany; New York: Springer-Verlag, 2011); Joel E. Cohen, "Mathematics is Biology's Next Microscope, Only Better; Biology is Mathematics' Next Physics, Only Better," *Public Library of Science Biology* 12 (12) (2004): 2017–2023; and Zoltán Eisler, Imre Bartos, and János Kertész, "Fluctuation Scaling in Complex Systems: Taylor's Law and Beyond," *Advances in Physics* 57 (1) (2008): 89–142.

In Memoriam: David Frohnmayer (1940–2015)

Elected to the Academy in 2002



With the passing of Dave Frohnmayer on March 9, 2015, we have lost a remarkable statesman and friend. Although the sadness that comes with his absence will be felt for a long time, we can find comfort in reflecting on this amazing man's life. He leaves behind a powerful legacy as a charismatic leader in the national and statewide political arena, in public higher education, in the health sector, and in a multitude of other public service roles.

Dave Frohnmayer was a dedicated and visionary leader who would give as much to the nation as to his beloved state of Oregon. After growing up in the small town of Medford, Oregon, Dave attended Harvard University for his undergraduate education and the University of California, Berkeley for his law degree. He was also a Rhodes Scholar at Oxford University in England. In 1969, he began his national service as special assistant to Elliot Richardson, then the U.S. Secretary of Health, Education, and Welfare. While in Washington, D.C., he met his future wife Lynn, an Oregon native, Stanford graduate, and former Peace Corps volunteer who had just finished teaching English on the Ivory Coast.

Oregon was the great beneficiary of their talents: they moved back to their home state in 1971, when Dave joined the faculty of the University of Oregon School of Law. He next served from 1974 to 1980 in the Oregon House of Representatives. Earl Blumenauer, a U.S. Representative from Oregon (D) who served with Dave in the state legislature during this period, remembers him as a “voice in the finest tradition of progressive Republicanism in Oregon. Dave was thoughtful, reform-oriented, and was a great partner to work [with] on legislation and public policy.” Dave subsequently served as the Oregon attorney general, winning three consecutive terms in office (in 1980, 1984, and 1988). A fierce defender of public values, his legacy endures through the transparency in government that he assured via clarifying and creating landmark Oregon public records laws. A gifted attorney, he was also victorious in six of the seven cases he argued before the U.S. Supreme Court.

With his appointment in 1994 as president of the University of Oregon, he became the state's most prominent advocate for higher education: someone who knew how both the state capitol and a

state university were supposed to work. For fifteen years he served as president, including some of the most difficult financial years faced by public higher education in the state. I had a front-row seat to observe his leadership during this period, serving as a governor appointee to the State Board of Higher Education, the governing board for public higher education institutions in Oregon. In meetings in which institutional parochialism often tainted discussions, President Frohnmayer would rise above the fray with eloquent oratory that would impress even his opponents with his ability to clarify issues and assist in developing a unifying path forward. He was a master in his ability to bring people together and build successful partnerships. He was also a master in knowing when to push and when to be patient. During his tenure as president of the University of Oregon, he helped the university add nineteen new degree programs, double the number of federal research grants, increase student enrollment, build or renovate fourteen campus buildings, and raise \$1.1 billion.

The American Academy of Arts & Sciences has also been the beneficiary of his wisdom and expertise following his election as a Fellow in 2002. He served as a member of the Board of Directors of the Academy, and as a member of the Compensation Committee, Audit Committee, and the Committee on Development and Public Relations. His willingness to be an active member of the Advisory Committee of The Lincoln Project: Excellence and Access in Public Higher Education further demonstrated his passion for the health and vitality of public higher education in this country. His exemplary service to the Academy was characteristic of the many other leadership roles that he took, including serving on the Ford Foundation Board of Directors, the Executive Committee of the Associ-

ation of American Universities, and as the founding director of the National Marrow Donor Program.

While Dave savored his efforts in public service, he was equally dedicated to his family and the pursuit of a cure for Fanconi anemia, the rare genetic medical condition that had taken the lives of two of his daughters and threatens his third daughter. In 1989, he and his wife Lynn founded the Fanconi Anemia Research Fund to find effective treatments and a cure for Fanconi anemia and to provide education and support services to affected families worldwide. Their efforts have resulted in significant breakthroughs in the understanding of Fanconi anemia. With their help, researchers have now identified the genes that cause the disease, as well as genes linked to breast and ovarian cancer. Fanconi anemia patients are now living longer because of the efforts of the Frohnmayers.

With his passing has come an outpouring of stories of the wisdom, leadership, sense of humor, generosity, and humility that defined his life. The stories illustrate in very human terms how he inspired others to achieve their best and to never stop giving. Even in his final days, when only his closest friends and family knew of the seriousness of his cancer, he was teaching his leadership course to students at the university and driving from Eugene to Portland to attend a charity event. The effects of that endless giving that he practiced while living will continue well beyond his passing. To his devoted wife Lynn, sons Mark and Jonathan, and daughter Amy, we extend our heartfelt condolences. We will miss Dave more than words can express and we hope that, in his memory, we can give to others as he did for so many of us. ■

Geraldine Richmond
Presidential Chair in Science and Professor of Chemistry,
University of Oregon

Select Prizes and Awards to Members

A. Paul Alivisatos (Lawrence Berkeley National Laboratory) has been elected to the American Philosophical Society.

Danielle S. Allen (Institute for Advanced Study; Harvard University) has been elected to the American Philosophical Society.

Frederick Alt (Harvard Medical School; Boston Children's Hospital) has been awarded the 2015 Szent-Györgyi Prize for Progress in Cancer Research by the National Foundation for Cancer Research.

David Baltimore (California Institute of Technology) has been awarded the AACR-Irving Weinstein Foundation Distinguished Lectureship.

Larry M. Bartels (Vanderbilt University) was named a 2015 Andrew Carnegie Fellow.

Sangeeta Bhatia (Massachusetts Institute of Technology) received the Heinz Award for Technology, the Economy & Employment.

James Bjorken (Stanford University) was awarded the 2015 Wolf Prize in Physics. He shares the prize with **Robert P. Kirshner** (Harvard University).

David E. Bloom (Harvard T.H. Chan School of Public Health) was named a 2015 Andrew Carnegie Fellow.

Michael Bloomberg (Bloomberg L.P.) has been elected to the American Philosophical Society.

Robert Brandom (University of Pittsburgh) received an Anneliese Maier Research Award from the Alexander von Humboldt-Stiftung Foundation.

Emery N. Brown (Massachusetts Institute of Technology; Harvard Medical School; Massachusetts General Hospital) was elected to the National Academy of Engineering. He was also named a 2015 Guggenheim Fellow.

Peter R. Brown (Princeton University) was awarded a 2015 Dan David Prize, given by the Dan David Foundation.

Linda Buck (Fred Hutchinson Cancer Research Center) has been elected to the Royal Society.

Robert Campbell (Cambridge, Massachusetts) received the Lifetime Achievement Award at AD20/21: Art & Design of the 20th & 21st Centuries during Boston Design Week 2015.

Lewis C. Cantley (Weill Cornell Medical College) was awarded the 2015 AACR Princess Takamatsu Memorial Lectureship.

Mario R. Capecchi (University of Utah) is the recipient of the AACR Award for Lifetime Achievement in Cancer Research.

Roz Chast (*The New Yorker*) received a 2015 Heinz Award for the Arts and Humanities. She also received a National Book Critics Circle Award for *Can't We Talk About Something More Pleasant?*

Joanne Chory (The Salk Institute) has been elected to the American Philosophical Society.

David Brion Davis (Yale University) won a National Book Critics Circle Award for *The Problem of Slavery in the Age of Emancipation*.

Stephen Elledge (Harvard Medical School) received the Wiley Prize in Biomedical Sciences from the Wiley Foundation. He shares the prize with **Evelyn Witkin** (Rutgers, The State University of New Jersey).

Jonathan F. Fanton (American Academy of Arts and Sciences) has been elected to the American Philosophical Society.

John V. Fleming (Princeton University) has been elected to the American Philosophical Society.

Elaine Fuchs (The Rockefeller University) has received the E.B. Wilson Medal from the American Society for Cell Biology.

Thomas W. Gaehtgens (Getty Research Institute) has been awarded the 2015 Prix Mondial Cino Del Duca.

Michael S. Gazzaniga (University of California, Santa Barbara) is the recipient of a 2015 William James Fellow Award from the Association for Psychological Science.

Charles D. Gilbert (The Rockefeller University) was awarded the 2015 Edward M. Scolnick Prize in Neuroscience from the McGovern Institute for Brain Research at MIT.

Claudia Goldin (Harvard University) has been elected to the American Philosophical Society.

Susan Goldin-Meadow (University of Chicago) is the recipient of a 2015 William James Fellow Award from the Association for Psychological Science.

Jeffrey I. Gordon (Washington University in St. Louis) has been awarded the King Faisal International Prize in Medicine by the King Faisal Foundation.

Linda Gordon (New York University) has been elected to the American Philosophical Society.

Greg Grandin (New York University) was awarded the Bancroft Prize for *The Empire of Necessity: Slavery, Freedom, and Deception in the New World*.

Harry Gray (California Institute of Technology) has been awarded the Theodore William Richards Medal from the American Chemical Society.

Donald P. Green (Columbia University) was named a 2015 Andrew Carnegie Fellow.

Amy Gutmann (University of Pennsylvania) received the 2015 Reginald Wilson Diversity Leadership Award from the American Council on Education.

Naomi Halas (Rice University) was awarded the 2015 R.W. Wood Prize by the Optical Society. She shares the prize with Peter Nordlander (Rice University).

Jeffrey Hamburger (Harvard University) is the recipient of an Anneliese Maier Research Award from the Alexander von Humboldt-Stiftung Foundation.

Fiona A. Harrison (California Institute of Technology) has been awarded the 2015 Rossi Prize from the American Astronomical Society.

David Haussler (University of California, Santa Cruz) was awarded a 2015 Dan David Prize, given by the Dan David Foundation.

John P. Holdren (Office of Science and Technology Policy, Executive Office of the President) has been elected to the American Philosophical Society.

A. J. Hudspeth (Rockefeller University) has been elected to the American Philosophical Society.

Gwen Ifill (WETA) is the 43rd recipient of the Fourth Estate Award, given by the National Press Club. She has also been named the 2015 Hunter B. Andrews Distinguished Fellow in American Politics at the College of William and Mary.

Carl June (University of Pennsylvania) was awarded the 2015 Paul Ehrlich and Ludwig Darmstaedter Prize. He shares the prize with James P. Allison (University of Texas MD Anderson Cancer Center). Dr. June also received the AACR-CRI Lloyd J. Old Award in Cancer Immunology.

Marc Kamionkowski (Johns Hopkins University) was awarded the 2015 Dannie Heineman Prize for Astrophysics. He shares the prize with **David Spergel** (Princeton University).

David I. Kertzer (Brown University) won a Pulitzer Prize for Biography for *The Pope and Mussolini: The Secret History of Pius XI and the Rise of Fascism in Europe*.

Robert P. Kirshner (Harvard University) was awarded the 2015 Wolf Prize in Physics. He shares the prize with **James Bjorken** (Stanford University).

Peter T. Kirstein (University College London) was awarded the 2015 Marconi Prize.

William E. Kirwan (University System of Maryland) received the 2015 Circle of Discovery Award from the University of Maryland's College of Computer, Mathematical, and Natural Sciences.

Sergiu Klainerman (Princeton University) was named a 2015 Simons Fellow in Mathematics.

Nancy Kopell (Boston University) has been awarded the Mathematical Neuroscience Prize from Israel Brain Technologies.

Laurence Kotlikoff (Boston University) has been named one of the most influential economists by *The Economist* magazine.

Nicolai Krylov (University of Minnesota) was named a 2015 Simons Fellow in Mathematics.

Thomas W. Laqueur (University of California, Berkeley) has been elected to the American Philosophical Society.

Joseph LeDoux (New York University) is the recipient of a 2015 William James Fellow Award from the Association for Psychological Science.

Patrick Lee (Massachusetts Institute of Technology) was named a 2015 Simons Fellow in Theoretical Physics.

Arthur Levine (Woodrow Wilson National Fellowship Foundation) received New Jersey SEEDS' Leading Change Award.

Stephen J. Lippard (Massachusetts Institute of Technology) is the recipient of the 2015 Benjamin Franklin Medal in Chemistry.

David Luban (Georgetown University) received the 2015 PROSE Award from the American Publishers Association.

Arthur Lupia (University of Michigan) was named a 2015 Andrew Carnegie Fellow.

Lynne E. Maquat (University of Rochester Medical Center) received the 2015 Gairdner International Award.

Philippa Marrack (National Jewish Health) received the 2015 Wolf Prize in Medicine. She shares the prize with **Jeffrey V. Ravetch** (The Rockefeller University) and **John Kappler** (National Jewish Health).

N. David Mermin (Cornell University) has been elected to the American Philosophical Society.

Malcolm Morley (Bellport, New York) received a 2015 Francis J. Greenburger Award.

Toni Morrison (Princeton University) received a lifetime achievement award from the National Book Critics Circle.

Glenn Most (Scuola Normale Superiore di Pisa) has been elected to the American Philosophical Society.

Margaret Murnane (University of Colorado) has been elected to the American Philosophical Society.

William Nordhaus (Yale University) received the Thomas C. Schelling Award from the Harvard Kennedy School.

J. Tinsley Oden (University of Texas at Austin) has been named to the Louisiana State University Alumni Association Hall of Distinction.

Bjorn Poonen (Massachusetts Institute of Technology) was named a 2015 Simons Fellow in Mathematics.

Marcus E. Raichle (Washington University in St. Louis School of Medicine) has been named an honorary member of the American Society of Neuroradiology.

Jeffrey V. Ravetch (The Rockefeller University) received the 2015 Wolf Prize in Medicine. He shares the prize with **Philippa Marrack** (National Jewish Health) and **John Kappler** (National Jewish Health).

Anne Walters Robertson (University of Chicago) has been elected to the American Philosophical Society.

David Robertson (Saint Louis Symphony Orchestra) won a Grammy Award for Best Orchestral Performance with the Saint Louis Symphony Orchestra of John Adams' composition *City Noir*.

Marilynne Robinson (University of Iowa) received a National Book Critics Circle Award for *Lila*.

Alex Ross (*The New Yorker*) was awarded a 2015 John Simon Guggenheim Memorial Fellowship.

Stephen A. Ross (Massachusetts Institute of Technology) received the Deutsche Bank Prize in Financial Economics from the Center for Financial Studies.

Helmut Schwarz (Technische Universität Berlin; Alexander von Humboldt Foundation) was awarded the 2015 Schrödinger Medal by the World Association of Theoretical and Computational Chemists. He is also the 2015 recipient of the Karl Ziegler Award of the German Chemical Society.

John Sexton (New York University) is the recipient of the 2015 TIAA-CREF Theodore M. Hesburgh Award for Leadership Excellence. He also received the Award for Individual Achievement from the Arab American Institute.

Phillip Sharp (Massachusetts Institute of Technology) received the 2015 Othmer Gold Medal from the Chemical Heritage Foundation.

Thomas Eugene Shenk (Princeton University) has been elected to the American Philosophical Society.

David Dean Shulman (Hebrew University) has been elected to the American Philosophical Society.

Asif Siddiqi (Fordham University; Academy Visiting Scholar, 2004–2005) was awarded a 2015 John Simon Guggenheim Memorial Fellowship.

Barry Simon (California Institute of Technology) has been awarded the International János Bolyai Prize of Mathematics by the Hungarian Academy of Sciences.

Michael Sorkin (Michael Sorkin Studio; City College of New York) was awarded a 2015 John Simon Guggenheim Memorial Fellowship.

David Spergel (Princeton University) was awarded the 2015 Dannie Heineman Prize for Astrophysics. He shares the prize with **Marc Kamionkowski** (Johns Hopkins University).

Joan A. Steitz (Yale University) is the recipient of the 2015 Connecticut Medal of Science, given by the Connecticut Academy of Science and Engineering.

Nicholas Stern (London School of Economics and Political Science; The British Academy) has been elected to the American Philosophical Society.

Michael Stonebraker (Massachusetts Institute of Technology; Tamr) is the recipient of the 2014 A.M. Turing Award, given by the Association for Computing Machinery.

Steven Strogatz (Cornell University) was awarded the 2015 Lewis Thomas Prize for Writing about Science by The Rockefeller University. He shares the prize with **Ian Stewart** (The University of Warwick; Gresham College).

Thomas J. Sugrue (University of Pennsylvania) was named a 2015 Andrew Carnegie Fellow.

Philip E. Tetlock (University of Pennsylvania) was named a 2015 Andrew Carnegie Fellow.

Twyla Tharp (Twyla Tharp Dance Company) has been elected to the American Philosophical Society.

Moshe Vardi (Rice University) has been named a Fellow of the Society for Industrial and Applied Mathematics.

Jeremy James Waldron (New York University School of Law) has been elected to the American Philosophical Society.

Peter Walter (University of California, San Francisco) was awarded the 2015 Vilcek Prize in Biomedical Science.

Rosanna Warren (University of Chicago) has been elected to the American Philosophical Society.

Michael Waterman (University of Southern California) was awarded a 2015 Dan David Prize, given by the Dan David Foundation.

Timothy D. Wilson (University of Virginia) is the recipient of a 2015 William James Fellow Award from the Association for Psychological Science.

Evelyn Witkin (Rutgers, The State University of New Jersey) received the Wiley Prize in Biomedical Sciences from the Wiley Foundation. She shares the prize with **Stephen Elledge** (Harvard Medical School).

Owen N. Witte (University of California, Los Angeles) received the AACR G.H.A. Clowes Memorial Award.

W. Hugh Woodin (Harvard University) was named a 2015 Simons Fellow in Mathematics.

New Appointments

Marlene Belfort (University of Albany, State University of New York) has been named an Editor-in-Chief of *Mobile DNA*.

Ben S. Bernanke (Brookings Institution) is a senior advisor to Pimco.

Mary Schmidt Campbell (New York University) has been named President of Spelman College.

Ashton B. Carter (U.S. Department of Defense) was confirmed as the 25th U.S. Secretary of Defense.

Jennifer Doudna (University of California, Berkeley) has joined Intellia Therapeutics as a Founding Member and Scientific Advisor.

Persis Drell (Stanford University) has been named to the Board of Directors of NVIDIA.

Julio Frenk (Harvard T.H. Chan School of Public Health) has been named President of the University of Miami. He has also been elected to the Board of Trustees of the Robert Wood Johnson Foundation.

Andrew Hamilton (University of Oxford) has been named President of New York University.

Marc Kastner (Massachusetts Institute of Technology) has been named President of the Science Philanthropy Alliance.

Haig Kazazian (Johns Hopkins University School of Medicine) has been named an Editor-in-Chief of *Mobile DNA*.

Silvio Micali (Massachusetts Institute of Technology) has been named Associate Head of the Department of Electrical Engineering and Computer Science at MIT.

James Plummer (Stanford University) has been named to the Board of Trustees at Franklin W. Olin College of Engineering.

Richard H. Scheller (Genentech) has been appointed Chief Science Officer and Head of Therapeutics of 23andMe. He has also been appointed to the Board of Directors of Xenon Pharmaceuticals Inc.

Paul Schimmel (Scripps Research Institute) has been appointed to the Board of Directors of TocaGen Inc.

John Sexton (New York University) has been appointed to the Board of Directors of OvaScience.

Donna Shalala (University of Miami) has been named President and Chief Executive Officer of the Clinton Foundation.

Sanford I. Weill (SIWeill) was named President of Carnegie Hall.

Mark S. Wrighton (Washington University in St. Louis) has been elected to the Board of Directors of Akermin, Inc.

Yehudi Wyner (Brandeis University) has been elected President of the American Academy of Arts and Letters.

Select Publications

Fiction

Jonathan Galassi (Farrar, Straus & Giroux). *Muse: A Novel*. Knopf, June 2015

Milan Kundera (Paris, France). *The Festival of Insignificance*. Harper, June 2015

Nonfiction

Emery N. Brown (Massachusetts Institute of Technology; Harvard Medical School; Massachusetts General Hospital), Robert E. Kass (Carnegie Mellon University), and Uri Eden (Boston University). *Analysis of Neural Data*. Springer-Verlag, March 2014

Peter Brown (Princeton University). *The Ransom of the Soul: Afterlife and Wealth in Early Western Christianity*. Harvard University Press, April 2015

Harvey Cox (Harvard Divinity School). *How to Read the Bible*. HarperOne, April 2015

David M. Culver (Alcan Aluminum) and Alan Freeman (*Globe and Mail*). *Expect Miracles: Recollections of a Lucky Life*. McGill-Queen's University Press, April 2014

Freeman Dyson (Institute for Advanced Study). *Dreams of Earth and Sky*. New York Review Books, April 2015

Philip Glass (New York, New York). *Words Without Music*. Norton/Liveright, April 2015

James S. House (University of Michigan). *Beyond Obamacare: Life, Death, and Social Policy*. Russell Sage Foundation, May 2015

Oliver Sacks (Columbia University). *On the Move: A Life*. Knopf, May 2015

John R. Searle (University of California, Berkeley). *Seeing Things as They Are: A Theory of Perception*. Oxford University Press, February 2015

David Sehat (Georgia State University; Academy Visiting Scholar, 2007–2008). *The Jefferson Rule: How the Founding Fathers Became Infallible and Our Politics Inflexible*. Simon & Schuster, May 2015

Helen Vendler (Harvard University). *The Ocean, the Bird, and the Scholar: Essays on Poets and Poetry*. Harvard University Press, May 2015

James Wood (Harvard University; *The New Yorker*). *The Nearest Thing to Life*. The Mandel Lectures in the Humanities, Brandeis University, April 2015

Daniel Yankelovich (Viewpoint Learning). *Wicked Problems, Workable Solutions*. Rowman & Littlefield, December 2014

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. ■

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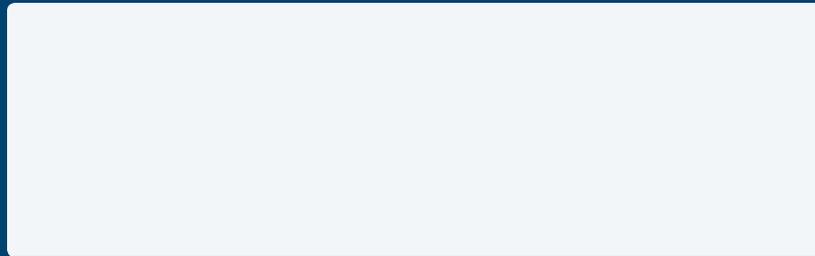
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