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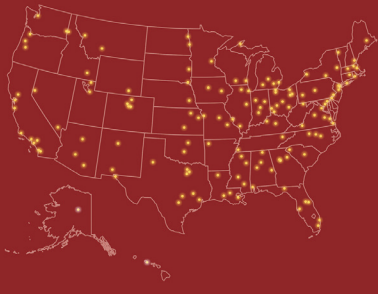
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Bulletin

SPRING 2016
VOL. LXVIX, NO. 3

Public Research Universities

Recommitting to Lincoln's Vision:
An Educational Compact for the 21st Century



Lincoln Project Offers Recommendations for Strengthening Public Research Universities



Water: California in a Global Context

*Holly Doremus, Isha Ray, Anna Michalak,
Joya Banerjee, Annie Maxwell, and
Christopher Field*



Consensus & Controversy in Science

*Jennifer Doudna, Randy W. Schekman, Pamela Ronald,
and Richard A. Muller*

ALSO: Governance of Dual-Use Technologies
The Crisis in Legal Education
Fear and Democracy: Reflections on Security and Freedom
From Local to Global: Public Research Universities in the 21st Century

Upcoming Events

JUNE

1st

House of the Academy
Cambridge, MA

Russia Beyond Putin

Featuring:

Timothy Colton (Harvard University) and
George Breslauer (University of California,
Berkeley)

3rd

House of the Academy
Cambridge, MA

Friday Forum

*Jean-Antoine Houdon and His Portraits
of Americans*

Featuring:

Anne Poulet (The Frick Collection)

24th

House of the Academy
Cambridge, MA

Lunch and Book Discussion

Featuring:

James Stone (Plymouth Rock Companies),
author of *Five Easy Theses: Commonsense Solu-
tions to America's Greatest Economic Challenges*

SEPTEMBER

14th

House of the Academy
Cambridge, MA

*Capturing Music: Writing and Singing Music in
the Middle Ages*

Featuring:

Thomas Forrest Kelly (Harvard University)
and The Vocal Ensemble **Blue Heron**

OCTOBER

7th – 9th

Cambridge, MA

Induction Weekend

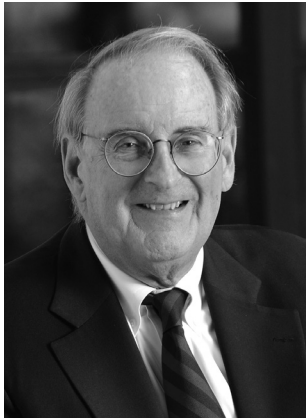
7th: *A Celebration of the Arts and Humanities*

8th: *Induction Ceremony*

9th: *Academic Symposium*

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

Advancing the Common Good



Jonathan F. Fanton

Since its founding in 1780, the American Academy has sought to advance useful knowledge in the arts and sciences. To quote the Academy's *Memoirs* from 1783, "It is the part of a patriot-philosopher to pursue every hint – to cultivate every enquiry, which may eventually tend to the security and welfare of his fellow citizens, the extension of their commerce, and the improvement of those arts, which adorn and embellish life."

Different from other academies, the American Academy draws its membership from colleges and universities, business, public service, and a range of professions including art, law, and medicine. One of the great values of the Academy is that it brings together members from different disciplines and fields of expertise to participate in its projects, studies, and publications.

Through the Academy's Board of Directors, Council, and Committee on Studies and Publications, the members decide what issues to address.

Sometimes the Academy appoints a commission to study an important issue, for example, the Commission on the Humanities and Social Sciences and another Commission on the Future of Undergraduate Education. Often members come together on a specific topic, for example, a group studying the future of alternative energy and another advising on how to develop nuclear power safely. An issue of *Daedalus* is often connected to the Academy's work in a particular area: a project exploring ethical dilemmas posed by new technologies employed in war is the topic of two forthcoming issues of *Daedalus*. A full description of current and recent Academy studies and publications may be found on the Academy's website.

It is understood that important ideas and policy recommendations often mature over time and that the Academy encourages intellectual inquiry that may never yield measurable results. But there are examples of how recent Academy work has posed fresh questions, shaped research agendas, framed issues in new ways, stimulated public discussions of important topics, and provided useful advice to policy-makers.

Here are a few recent examples:

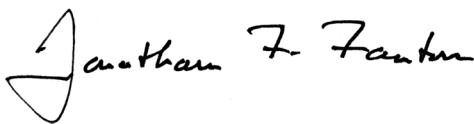
- **ARISE (Advancing Research In Science and Engineering), 2000–2008**, addressed two issues central to the vitality of America's research enterprise: 1) the support of early-career investigators; and 2) the encouragement of high-risk, high-reward research. The recommendations included in the ARISE report were incorporated into the American Recovery and Reinvestment Act of 2009 as well as the federal budgets for FY2010 and FY2011.
- **The Commission on the Humanities and Social Sciences, 2010–2016**, published *The Heart of the Matter* report, which has been downloaded more than two hundred thousand times and has more than ten thousand copies in print. The Report Brief contributed additionally to these totals: six thousand copies in print; 19,977 downloads in English; 2,753 downloads in Spanish; and 7,033 downloads in Korean. The film associated with *The Heart of the Matter* has been viewed online more than fifty thousand times. *The Heart of the Matter Around the Country*, the final publication of this initiative, offers a selection of the Commission's activities in action across the United States on university campuses and in local communities, and includes a collection of testimonies written by organizations that have been encouraged and aided by *The Heart of the Matter* report. Among these activities were nearly fifty events in twenty-three states as well as in England, Switzerland, and Sri Lanka.

FROM THE PRESIDENT

- **The Alternative Energy Future, 2010–present**, produced the *Beyond Technology* report that was cited in the Department of Energy’s (DOE) 2011 Quadrennial Technology Review (QTR) as evidence of the importance of applying social science expertise to the design of energy technologies and policies. The DOE used the report’s recommendations to establish a new SunShot program on Solar Energy Evolution and Diffusion Studies (SEEDS), which requires participating engineering teams to include social scientists as integral team members from the beginning of the project.
- **The Global Nuclear Future Initiative, 2008–present**, has produced more than thirteen publications. Many of them have helped to foster much needed public debate on key nuclear issues; some have been instrumental in guiding the development of government policies. For example, in 2014 the project published *A Worst Practice Guide to Insider Threats: Lessons from Past Mistakes*, which has been adopted by U.S. national laboratories as training material for staff to ensure the security of nuclear facilities and nuclear material. In addition, in November 2015, the Nuclear Fuel Cycle Royal Commission of South Australia contacted members of the GNF Initiative to discuss the feasibility of a proposal developed by the project for the creation of a regional interim storage facility in Asia. The official report of the Royal Commission refers explicitly to the work of the GNF project on this subject.
- **New Models for U.S. Science and Technology Policy, 2013–present**, published *Restoring the Foundation: The Vital Role of Research in Preserving the American Dream*, which suggests actions to secure America’s leadership in science and engineering research. Committee members were invited to present the report’s recommendations at Senate hearings in July 2014 and May 2016. The report also inspired a call to action issued by ten American business leaders. Titled “Innovation: An American Imperative,” the statement urges policy-makers to act on several of the *Restoring the Foundation* report’s recommendations for stronger federal policies and investment to drive domestic research and development. Over 400 organizations have endorsed this call to action.
- Earlier this spring, **The Lincoln Project: Excellence and Access in Public Higher Education, 2013–present**, released its recommendations for preserving the strength and diversity of the nation’s public research universities. Over the course of the project, more than 33,000 copies of the Lincoln Project publications have been distributed to universities and policy-makers around the country – with many public research universities requesting additional copies for distribution to members of their legislatures, other elected officials, chamber of commerce staff and directors, and local business leaders. To further disseminate and publicize the project’s recommendations, the Academy held events in Massachusetts, Michigan, Tennessee, Texas, and Washington, D.C., with representatives from the media, scholars in higher education, elected officials, and nonprofit and business leaders. Additional meetings are planned in the coming months, at venues across the country.

I hope these examples make clear that the Academy is committed to following up on commission and project reports produced by its members. One of the Academy’s governing bodies, the Trust, is charged with measuring the impact of Academy commissions and projects and reporting the results to the membership on a regular basis.

I want to thank the members who have given generously of their time and wisdom to advance the common good through the Academy’s projects and publications. As I write, over 175 members are involved in the Academy’s current commissions, projects, publications, and exploratory conversations. If you are interested in participating in the substantive work of the Academy – or have an idea you want to explore with other members – please let me know.



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Lincoln Project Releases Final Report with Recommendations for Strengthening Public Research Universities

Over the past decade, state funding of public research universities has declined an average of 34 percent nationwide, a more severe drop than in any other sector of higher education. On average, state appropriations now account for only 18 percent of the total educational revenue per full-time equivalent student at public research universities – a dramatic decrease from 32 percent in 2000. In response, public research universities have cut spending and raised tuition in order to maintain their educational and research missions, but this trend is not sustainable.

Since it began its work in January 2013, *The Lincoln Project: Excellence and Access in Public Higher Education* has studied the important role public research universities play in their communities and in the nation, and assessed the implications of rapidly declining state support for public higher education. On April 7, 2016, The Lincoln Project released its final report, *Public Research Universities: Recommitting to Lincoln’s Vision – An Educational Compact for the 21st Century*, with new recommendations for stabilizing and strengthening the nation’s public research universities that serve approximately 3.8 million students each year and perform much of the country’s groundbreaking research.

An Educational Compact for the 21st Century argues that public research universities cannot continue to cut academic programs without a negative impact on educational quality, and cannot further raise tuition without simultaneously increasing need-based financial aid. In this context, the report acknowledges that these institutions must pursue new revenue streams and cultivate partners from across the private and public sectors. Most importantly, the report formulates a new educational compact – a call for state and federal governments, universities, businesses, and philanthropic organizations to come together in support of America’s public research universities. Each sector has a role to play in preserving and strengthening these institutions, which are an essential component of the nation’s intellectual infrastructure and a key driver of American education, research, culture, and the national economy.

An Educational Compact for the 21st Century urges public research universities to lead the charge in forging this new compact. The report offers specific recommendations that these institutions might consider, including:



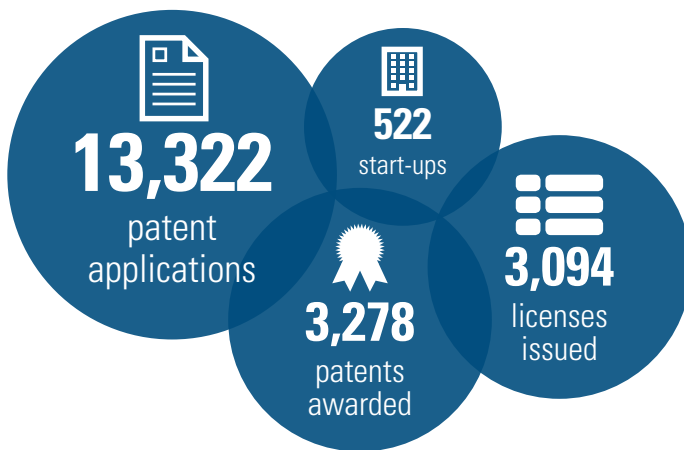
- Exploring and pursuing new revenue streams, consistent with the fundamental values of public research universities;
- Establishing annual cost and efficiency targets, and public progress reports for the university community and the broader public;
- Forming regional alliances with other colleges and universities to facilitate research partnerships, shared course offerings, collective purchasing contracts, common facility usage, and collaborations on innovative programs; and
- Signaling to the business community that public research universities are willing partners by accelerating and simplifying the transfer of knowledge to the private sector.

Some of the recommendations *An Educational Compact for the 21st Century* offers to state governments, the federal government, and the private sector include:

Recommendations for state governments:

- Finding alternative strategies to balance the budget besides cutting university funding;
- Reversing cuts made over the last decade, restoring funding to pre-recession levels, incrementally if not all at once; and
- Establishing long-term funding goals, including targets for the growth of state investment, to bring stability to higher education budgets and assist universities in planning.

Between 2012 and 2013, research at public universities resulted in more than:



Recommendations for the federal government:

- Recognizing that the intellectual infrastructure of the nation is as important to the future as the physical infrastructure;
- Encouraging partnerships among state governments, federal agencies, private philanthropists, and public research universities through the use of challenge-grant programs; and
- Reforming regulations that discourage students (especially low-income or first-generation college students) from applying for financial aid, including by simplifying the Free Application for Federal Student Aid (FAFSA).

Recommendations for the private sector:

- Acknowledging the importance of public research universities to the preparation of the American workforce by supporting public research university scholarships and internships;
- Engaging in public advocacy in each state on behalf of public research universities and in support of the nation's intellectual infrastructure; and
- Promoting research partnerships and simplified intellectual property agreements.

An Educational Compact for the 21st Century is the fifth and final publication from the Lincoln Project. Previous publications provide an overview of the current financial challenges as well as the significant achievements of public research universities. The first publication, *Public Research Universities: Why They Matter*, describes the benefits of public research universities as well as the changing demands on these institutions. The second, *Public Research Universities: Changes in State Funding*, examines state financing of higher education, describes the challenges that state governments face, and assesses the prospects for greater state support in the future. *Public Research Universities: Understanding the Financial Model*, the third publication in the series, details the most common financial models that sustain public research universities, describes institutional responses to the changing financial climate, and examines new ideas for diversifying and enhancing funding sources in the future. The fourth publication, *Public Research Universities: Serving the Public Good*, describes the impact of public research universities on economic growth, civic engagement, scientific and technological discovery, and the well-being of individual students.

The Academy has disseminated broadly all five Lincoln Project publications to its membership, as well as to federal and state-level policy-makers and policy and higher education organizations. Over the next six months, The Lincoln Project will be holding events across the country with key leaders and partners at the institutional, state, regional, and federal levels to discuss how to implement the project's final recommendations. Outreach meetings have been held already in Florida, Louisiana, Tennessee, Michigan, Texas, and Massachusetts.

Additional information about The Lincoln Project, including a short animated video and digital access to all of the project's publications, is available on the project's website, www.amacad.org/lincoln. ■

New Publication Examines Governance Structures for Reducing Risks Posed by Dual-Use Technologies

A new publication released by the Academy's Global Nuclear Future Initiative, *Governance of Dual-Use Technologies: Theory and Practice*, explores the legal frameworks for the regulation of nuclear, biological, and information technologies. Edited by Elisa D. Harris, Senior Research Scholar at the Center for International and Security Studies at Maryland, the publication examines the similarities and differences between the strategies used for the control of nuclear technologies and those proposed for biological and information technologies.

The term *dual-use* characterizes technologies that can have both military and civilian applications. Some of the questions addressed in *Governance of Dual-Use Technologies* include: What is the state of current efforts to control the spread of nuclear, biological, and cyber technologies that can simultaneously advance social and economic well-being and also be harnessed for hostile purposes? What have previous efforts to govern nuclear and biological weapons taught us about the potential for the control of these dual-use technologies? What are the implications for governance when the range of actors who could cause harm with these technologies include not just national governments but also non-state actors?

This publication highlights the challenges that are concomitant with dual-use governance. For example, general agreement exists internationally on the need to restrict access to technologies that enable the development of nuclear weapons. However, no similar consensus exists in the biological and information technology domains. The volume also explores the limitations of military measures like deterrence, defense, and reprisal in preventing globally available biological and information technologies from being misused.

Governance of Dual-Use Technologies: Theory and Practice is available on the Academy's website at <http://www.amacad.org/dualuse>. For more information about the Global Nuclear Future Initiative, please visit <https://www.amacad.org/gnf>. ■

Governance of Dual-Use Technologies: Theory and Practice

Preface by Robert Rosner (University of Chicago; Codirector of the Academy's Global Nuclear Future Initiative)

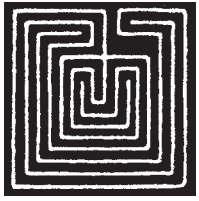
Introduction by Elisa D. Harris (Center for International and Security Studies at Maryland)

On the Regulation of Dual-Use Nuclear Technology by James M. Acton (Carnegie Endowment for International Peace)

Dual-Use Threats: The Case of Biological Technology by Elisa D. Harris (Center for International and Security Studies at Maryland)

Governance of Information Technology and Cyber Weapons by Herbert Lin (Stanford University)

Concluding Observations by Elisa D. Harris (Center for International and Security Studies at Maryland)



Dædalus Explores “What’s New about the Old”

The collection explores new developments in the classics that are reshaping our understanding of the ancient world – and its relevance to today

Fascination with Greco-Roman culture continues to drive academic curricula and popular interest, in spite of recent data signaling a decline in the study of the humanities. New developments in the study of the ancient world – integrating methodological, philosophical, and technological advances – have, in some cases, revolutionized our understanding of the past, opening up a new realm of classical studies for the twenty-first century.

This period of discovery is due in large part to a new generation of classicists who are reshaping our access to and understanding of Greco-Roman culture. Innovative, multidisciplinary approaches, often applying cutting-edge science and technology to the study of the ancient world, are yielding new questions and altering our engagement with the past. For example, not only have novel technologies enabled the discovery of new literary papyri, but methodological changes have altered which texts scholars might use to piece together ancient worldviews. This “new science of antiquity” – including multispectral imaging, 3D laser scanning, and bioarchaeology – is enabling researchers to reconstruct previously inaccessible data and documents, revealing, for example, mysteries about ancient ecosystems and deciphering papyri carbonized during the eruption of Vesuvius.

In the Spring 2016 issue of *Dædalus*, guest editor Matthew S. Santirocco (New York University) has curated a series of essays that explore the notion that “the past is still very much alive in the present.”

In the introduction “*Reassessing Greece & Rome*,” Matthew S. Santirocco notes how recent developments in the study of the ancient world have dramatically altered our understanding of the past. His overture to the issue introduces some of these methodological, philosophical, and technological advances, and argues that twenty-first-century classicists – being an increasingly multidisciplinary and interconnected group of scholars – are reshaping our interactions with Greco-Roman culture.

In “*Tragedy in the Crosshairs of the Present*,” Brooke Holmes (Princeton University) explores how at the same time that Greek literary studies have broken down boundaries of canon and genre, opening up for analysis previously ignored families of texts, the rise of reception studies has raised new questions about how our present cultural and historical position shapes our interpretations of ancient literature. She explores these developments through the case study of Greek tragedy.

In “*Roman Literature: Translation, Metaphor & Empire*,” Shadi Bartsch (University of Chicago) notes how having adopted as their



Jean-Joseph Taillasson (France, 1745–1809), *Virgil Reading the Aeneid to Augustus and Octavia* (1787)

own the literature of a conquered empire, the Roman elite self-consciously sought to translate the Greek canon into a thoroughly Roman form of expression, leaving behind the pleasurable, poetic, and sensual language of the Greeks. Could the Romans protect their militaristic and masculine integrity in this transference, or did the Greeks get their revenge, ultimately “conquering” Rome through literary influence?

Emily Greenwood (Yale University), in “*Reception Studies: The Cultural Mobility of Classics*,” considers how classicists have turned to reception studies to understand the unique encounters that various historical audiences have had with Greek and Roman literature. She explores the cultural mobility of the classics through a Malawian reception of Sophocles’s *Antigone*.

In “*On Translating Homer’s Iliad*,” **Caroline Alexander** (Author and Journalist), who published her celebrated English translation of the *Iliad* in 2015, reflects on the process (and challenges) of rendering a modern translation of Homer. She analyzes her work, and that of previous translators, using the principles outlined by the Victorian poet and critic Matthew Arnold.

Phillip Mitsis (New York University), in “*Philosophy & Its Classical Past*,” argues that although some recent philosophical schools have rejected their classical past, attempting to set their arguments on wholly new foundations, a renewed philosophical engagement between the old and the new has elsewhere initiated major new debates. Focusing on the philosophy of death, he shows how ancient philosophy both inspires new ideas and new modes of public discourse and criticism.

In “*The Matter of Classical Art History*,” **Verity Platt** (Cornell University) presents a new lens with which Greco-Roman art may be studied. Though Greco-Roman visual art is often isolated within the larger discipline of art history, which focuses increasingly on the modern and non-Western, Platt explores how recent scholarship has built on archaeological and literary studies to situate Greco-Roman visual art within the dynamic contexts that produced them. Using Pliny the Elder’s *Natural History*, she raises questions about the artist’s relationship with his materials, models of perception, and “the slippage between medium and representation.”

Roger S. Bagnall (New York University), in “*Materializing Ancient Documents*,” discusses how texts written on stone and metal (including coins), ostraca (potsherds), wooden tablets, and papyri have become critical documents for twenty-first-century historical researchers of the ancient world. Two “materializing revolutions” have signaled this shift in papyrology, moving from predominantly literary and philological approaches toward a broader cultural history of the ancient world built on collaboration with archaeological methodology.

In “*Memory, Commemoration & Identity in an Ancient City: The Case of Aphrodisias*,” **Angelos Chaniotis** (Institute for Advanced Study) uses the case study of the ancient city of Aphrodisias in modern-day Turkey to explore how civic, religious, and social identities competed and overlapped in ancient Greece. By analyzing the content, context, and changing uses of stone inscriptions in Aphrodisias, he constructs a centuries-long narrative of shifting identities, concluding in the mid-seventh century CE, when the “City of Aphrodite” was rechristened as Stauropolis, the “City of the Cross.”

In “*The Environmental Fall of the Roman Empire*,” **Kyle Harper** (University of Oklahoma) uses new scientific data and approaches to argue that a cascade of environmental disasters, more than any single event, pushed Rome’s resilient economy and agricultural sys-

tem to the breaking point. The effects of climate change – including food crises in Egypt resulting from the Nile’s failure to flood, as well as the devastating Antonine Plague and Plague of Cyprian – were, in a sense, “the revenge of [Rome’s] giant imperial ecology.”

In “*What is Ancient History?*” **Ian Morris** (Stanford University) and **Walter Scheidel** (Stanford University) offer two competing models of ancient history that have defined academic discourse for the last three centuries: the classical model, which regards ancient Greece and Rome as the beginning of human history that “matters,” and the evolutionary model, which is global in outlook and goes back to the origins of humanity. They propose that the new evidence and methods available to scholars today may allow these two schools of thought to engage with each other with renewed coherence, in turn offering comprehensive new models of ancient history.

Peter T. Struck (University of Pennsylvania), in “*Classics: Curriculum & Profession*,” probes what the classics offer prospective students who are increasingly pursuing vocational studies. While the field’s experimentation and diversity of thought (literary, historical, philosophical, archaeological) remain its strengths, by disseminating knowledge of the past through popular media and online courses, Struck argues, the classics can reach a broader public and make classical teaching a public good.

In “*Greco-Roman Studies in a Digital Age*,” **Gregory Crane** (Tufts University) reflects on the responsibility classicists have to share their research with the general public. He considers the role of classics in modern society, and looks to the future by way of the transformative power of technology, the “extent to which the shift from print to a digital space changes how the classics can contribute to society as a whole.”

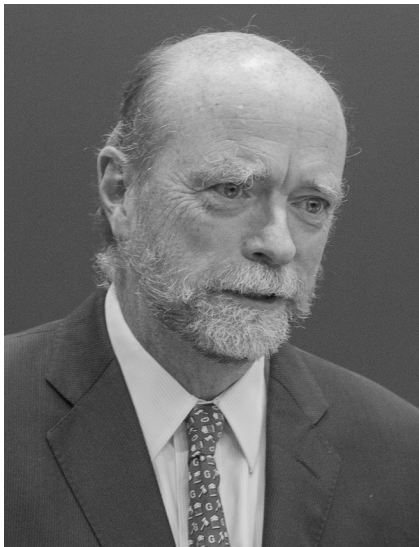
Additional contributions to this issue of *Dædalus* include:

- *The New “Brothers Poem” by Sappho* by **Rachel Hadas** (Rutgers, The State University of New Jersey – Newark)
- *Explicating Catullus* by **Michael C. J. Putnam** (Brown University)
- *The Scientific Study of Antiquity* by **Malcolm H. Wiener** (Institute for Aegean Prehistory)

Members may access an electronic copy of this *Dædalus* issue by logging into the Academy’s website. For more information about *Dædalus*, or to order additional print and Kindle copies of “What’s New About the Old,” please visit <http://www.amacad.org/daedalus>. ■

The Crisis in Legal Education

On December 4, 2015, at the Georgetown University Law Center, the Academy hosted a panel discussion on “The Crisis in Legal Education” with **Louis Michael Seidman** (Carmack Waterhouse Professor of Constitutional Law at the Georgetown University Law Center), **Robert A. Katzmann** (Chief Judge of the United States Court of Appeals for the Second Circuit), **Philip G. Schrag** (Delaney Family Professor of Public Interest Law and Director of the Center for Applied Legal Studies at the Georgetown University Law Center), **Robin L. West** (Frederick J. Haas Professor of Law and Philosophy at the Georgetown University Law Center), and **Patricia D. White** (Dean and Professor of Law at the University of Miami School of Law). The program, which served as the Academy’s 2028th Stated Meeting, included a welcome from **William Michael Treanor** (Executive Vice President, Dean, and Professor of Law at Georgetown University Law Center) and **Jonathan F. Fanton** (President of the American Academy of Arts and Sciences). The following is an edited transcript of the discussion.



William Michael Treanor

William Michael Treanor is Executive Vice President, Dean, and Professor of Law at the Georgetown University Law Center.

There are two crises in legal education today. One is the profound challenge to traditional legal education produced by the economic change that occurred as a result of the recession that began in 2008. When the market declined, big firms cut back on their hiring, rapidly and significantly. In 2009, large firms hired 5,200 new graduates; in

When there are fewer jobs that are remunerative, there is an increased focus on the affordability of law schools.

2011, their hiring levels dropped to 2,900 graduates. This represented a nearly 50 percent decline in the segment of the market for new graduates that provided them the highest salaries.

That decline led to a series of grave problems confronting law students, lawyers, and law schools. The drop in hiring made students more attentive to financial aid because they began to worry even more about debt. When there are fewer jobs that are remunerative, there is an increased focus on the affordability of law schools. Law schools thus significantly expanded what they spent on financial aid. Further, there was a significant decline in applications. Ten years ago, we had 96,000 applicants to law schools. Now we have 56,000. This is an extraordinary drop in a decade. The decline in applicants and the increased demand for financial aid put great economic pressure on law schools. Seeking to ensure that the quality of law students remained in the face of declining applications, law schools dramatically cut the number of seats. Ten years ago, there were 56,000 seats, and now there are 43,000 seats.

This decline in the number of students also put economic pressure on law schools. Finally, as schools struggled to place their graduates in a declining market, they often tried to make them more “practice ready,” and the cost of expanding clinics and improving legal writing programs put even more economic pressure on law schools.

This was the shape and substance of the post-2009 crisis. There were fewer lucrative jobs for new lawyers, graduates faced increased financial pressure, and law schools struggled economically as they tried to respond to a very different market. However, law schools currently face a much more profound level of crisis than simply the current economic challenges. The challenge of creating practice-ready graduates has long concerned us, but we need to ask, more broadly: are we preparing our graduates for their lives as professionals? Are we preparing them to make ethical choices, to reflect and to learn from their experiences? Are we educating them holistically?

Legal education professionals are concerned about the struggles that law school

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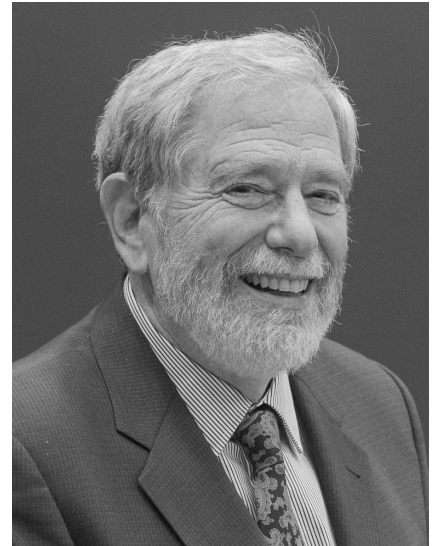
applicants face and endure. Many law school students, for example, suffer from depression – much more than the population as a whole – and this depression often continues into their lives as professionals. Other questions arise as well: are we teaching people to flourish in their careers? Are we helping them to be professionals who can succeed in every aspect of their lives?

These are the two crises we face – the post-2008 challenge and the ongoing profound challenge to our educational model caused by our failure to educate too many graduates in ways that equip them for lives of meaning and professional fulfillment.

These crises confront the core of legal education, which was effectively created in 1870 by Langdell at Harvard. Langdellian legal education brilliantly brought law into the modern research university. Under this model, law schools prepare people to think like lawyers; law firms train them. The Langdellian model is cheap beyond belief. Indeed, other than a MOOC, it is hard to think of a cheaper form of mass education.

Since the late nineteenth century, we have seen a series of modifications of the system: the rise of legal realism in the 1930s, which challenged the formalist approach of Langdell and opened us up to a more interdisciplinary approach; the beginning of experiential education and clinics in the 1960s; and then, in the 1980s, issues of race, gender, and sexual identity became central to legal education. But today, far more than in the past, we are grappling with the core of the legal education model.

This is a time of extraordinary creativity in legal thought. We are witnessing the expansion of experiential education and a focus on teaching students a broader range of competencies not traditionally taught in law schools, like leadership and strategic thinking. We are trying to prepare our students better for legal practice that is global. We are examining ways to make legal education cheaper, such as through a one-year limited license, and we are looking at expanding the period of training through post-graduate residency equivalents, such as the wonderful Immigration Justice Corps championed by Judge Katzmann. All of these changes to the model of legal education are taking place at a time when we need to remain true to the core values of the university. It is an important moment for us to think through how we will promote access to justice, how we prepare our students for fulfilling lives, how we equip our students with the ability to succeed in their professional careers, and how we make sure that law schools and universities remain places of creativity that foster experimentation and innovation. We will be grappling with these issues today, and I look forward to the discussion.



Louis Michael Seidman

Louis Michael Seidman is the Carmack Waterhouse Professor of Constitutional Law at Georgetown University Law Center. He was elected to the American Academy of Arts and Sciences in 2011.

Historically, law schools have occupied an ambiguous position within universities. On one hand, they are professional schools; they train students to participate in a highly specialized profession. On the other hand, they are part of universities, and stand outside the profession, offering a locus from which people can analyze and think critically both about the field and about law in general. I do not think this is just true of elite law schools; it should be true of all law schools. Law schools are not doing their jobs if they are not regularly criticized by the bar, by judges, and by politicians. Their role is to stand outside of those forces of power and offer cogent social criticism. That position, by its nature, is precarious, but many of us think that it is worth preserving.



Robert A. Katzmann

Robert A. Katzmann is the Chief Judge for the U.S. Court of Appeals for the Second Circuit. He was elected to the American Academy of Arts and Sciences in 2003.

This afternoon, I would like to talk about the skills that a law school graduate needs today. This might help provide a frame to think about the challenges facing legal education.

We operate in a very specific context: a shrinking job market; declining law school applications; law schools decreasing their size both in response to the market and to maintain the quality of their student body; and finally, the challenge of meeting the financial needs of law students with great debt. As we think about the skills required of today's law school graduates, we would do well to remember the diversity of legal experiences: post-graduate, private practice, government, public interest, judicial clerkships, business, and academia.

So what are the skills necessary to succeed across these settings? Two skills in particular that we need to emphasize are the capacity to think critically, and the capacity

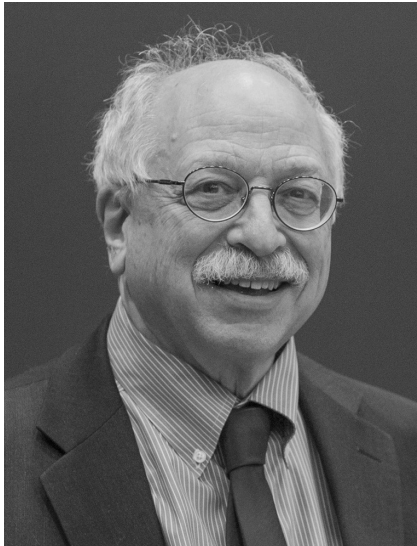
Legal education should foster a traditional mastery of the black letter courses, necessary for the practicing lawyer. At the same time, it is very important to have the academic, theoretical grounding that law school can give you.

to write clearly. My impression is that law school graduates are too often deficient in these areas. I also believe graduates need to be able to express themselves orally – and concisely at that – so as to advocate effectively. Further, they need to be able to conduct legal research, and to exercise wise and balanced judgment. They need a mindset in which they strive to think about their professional obligations to their clients and to society. These skills are all part of the make-up of what constitutes a “complete” lawyer.

How does a lawyer acquire this skill set? There is a lot of discussion at the moment about *black letter* courses and more theoretical academic courses, with some advocating that the emphasis in legal education should be on the former, and others advocating for an emphasis on the latter. I believe that balance and moderation are in order. Legal education should foster a traditional mastery of the black letter courses, necessary for the practicing lawyer. At the same time, it is very important to have the academic, theoretical grounding that law school can give you, to gain an understanding of such areas as law and the humanities, law and the social sciences, law and business, law and public policy, law in the global community, and law in science. Such courses can be valuable for the development of the critical mind that lawyers should have. I believe that courses, whether more academically oriented or black letter, should have writing components that train lawyers to think and write as lawyers should. And along with these courses, there should be opportunities for experiential learning: the clinics, the practicum

courses, the externships, and the simulations. If we take a look at what Georgetown has done in the last few years, we find a great example of how you can have experiential learning and preserve the academic culture of a law school at the same time.

I want to emphasize that law school education should challenge each lawyer to think about how best to deliver legal services in a society where the unmet needs of the lower- and middle-income and the poor are vast. As part of their skill set, law school students should be required to immerse themselves in the practical examination of how to meet those needs. They should be trained not only in terms of how to meet the challenges of individual representation across a whole area of law, but should also be asked to think more broadly about the system in which they operate. If they can think in terms of that system, they will be thinking about the systemic changes that might be necessary in the delivery of legal services. This, in turn, may affect (over time) the kind of legal education that we offer.



Philip G. Schrag

Philip G. Schrag is Director of the Center for Applied Legal Studies and Delaney Family Professor of Public Interest Law at Georgetown University Law Center.

Dean Treanor mentioned two crises in our profession: the crisis in legal education and the crisis in the delivery of legal services. To me, the more serious crisis is not in legal education but in the underserved population of this country: the lower and middle-income clients.

Declining applications to law schools since 2010 may not turn out to be a crisis after all. The decline may reflect a cyclical downturn in a business cycle that will change as the economy improves. In fact, though enrollments have been declining, they may not continue to decline. The number of people taking the LSAT in October 2015 was 7 percent higher than in 2014.

If the enrollment decline continues, some law school faculty may need to find employment elsewhere, and a somewhat smaller number of lawyers will enter the workforce. But these adjustments will make little difference with respect to the real crisis of

Most of the legal needs of people are not being met by lawyers. Those needs will be met only if we allow people who are not lawyers to perform some of the tasks that we currently regard as legal services.

the legal profession, which is not about law schools but about legal services to the public. Already, most of the legal needs of people are not being met by lawyers, and that won't change. Those needs will be met only if we allow people who are not lawyers to perform some of the tasks that we currently regard as legal services.

The downturn in law school enrollments provided all law schools with the opportunity to reflect on their missions and futures. In my view, the mission of the law school is threefold: first, to train people to provide legal services to the public; second, to produce educated citizens who will, in each generation, reform the laws, institutions, and procedures of society; and third, through the scholarship and public service of their faculties, to participate directly in reform.

Today, I want to focus on the first two missions: the teaching missions. In recent years, many people have called attention to the high cost of legal education, and to the fact that much of higher education, both at the undergraduate and graduate level, is financed by student loans. There is reason to believe that increases in the cost of legal and other graduate education over the last several decades, and corresponding increases in student debt levels, have been matched by improvement in the quality of education and services made available to students. In 1979, the faculty to student ratio in law schools was 30 to 1. Today, it is 14 to 1.

Nevertheless, some have called for radical changes in the educational models of most law schools. Five types of proposals have been made. The first, as Professor

Brian Tamanaha of the Washington University School of Law has argued, is that law schools should take on higher teaching loads and produce less scholarship, enabling the schools to offer more instruction with fewer teachers. The second proposal, supported by President Barack Obama, would reduce legal education from three years to two years, cutting tuition costs for students. Still others have urged, in a third proposal, that to a much greater extent than in the past students should be instructed by watching lectures on their laptops rather than coming to class. The law school-accreditation arm of the American Bar Association (ABA) has recently accepted this proposal; it has increased the number of credits a J.D. candidate can earn online from six to fifteen, and has allowed up to a third of all other students' courses to be taught online as well. In a fourth proposal, the ABA's law student division has advocated that students should be allowed to earn academic credit for paid, term-time work in law firms, work that helps them offset their tuition and fees, but also may dilute an educational experience that depends on reflection. Recently, *The New York Times* has leapt into the fray with a fifth proposal, calling for cutbacks in federal loans to law students, based on the theory, unsupported by any evidence, that reduced lending would force schools to cut tuition.

All of these proposals seek to make law school cheaper. Unfortunately, *cheaper* education does not necessarily mean *better* education. Clinical education – the most important innovation in legal education in the last fifty years – is also the most expen-

sive method of education, and it may well be the first to be jettisoned if law schools respond to economic challenges by slashing budgets, laying off faculty, replacing retiring teachers with adjuncts, or eliminating semesters. Further, writing seminars are almost as expensive as law school clinics, and for much the same reason: the low faculty to student ratio that is required. University administrators could lower the cost of education by replacing clinics and seminars with large lecture classes, televised lectures, and online lectures that students could watch on their iPhones while, say, running on a treadmill. They could still bless these students with J.D. degrees, but these changes will not produce critical thinkers who have the skills to solve complex legal problems, or to argue effectively against the laws and regulations proposed by entrenched corporations, government agencies, and politicians.

These changes will also undercut or fail to advance the other major mission of law schools: training their graduates to serve the public. Wealthy individuals and large corporations will always get the high-quality legal services that they can afford to buy, but most studies show that about 80 percent of the legal needs of the general public, consisting of middle-income and lower-income individuals, are not met. Most people simply cannot afford legal services to address their needs. The most standard of these services are resolving employment disputes, consumer disputes, housing problems, family law matters, and problems with government benefits. These are the real legal needs of the public. Unable to pay the high fees that lawyers ask, most people either do not try to assert their rights, or even find out what those rights are. If they do find out that they have a legal problem, they tend to go to a friend or a relative, rather than a lawyer. Or they simply give up.

But a modest reduction in law school tuition or debt does not translate to a mar-

ket flooded with lawyers eager and able to address these problems at low cost. Why? First, loan repayment is not the main obstacle to low-cost legal services. Law graduates can now repay their student loans, no matter how large, by paying only 7 percent of their annual gross income toward those loans, with forgiveness of any remaining balances at the end of twenty years. So, reducing the size of the loan usually will not affect the amount or rate of repayment. Second, loan repayment is only a small fraction of the cost of operating a law office, or supporting a family. If cheaper legal education did bring about a modest reduction in the size of the monthly repayment, it would not greatly affect the price of legal services. Most important, lawyers have high expecta-

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tions. They don't want to spend their lives performing routine consumer or divorce services. We give them a degree called *juris doctor*, and they expect that with that doctorate will come a lifetime of highly intellectual work. Some aspects of work for lower- and middle-income individuals, such as immigration work, can be highly challenging; however, an entire career of defending against foreclosures or evictions, helping people with uncontested divorces, or arguing for immigration benefits may not be what most law school graduates desire.

So what is the solution to these dual problems of preparing lawyers to question and

reform the social order, and helping to provide better legal services to ordinary people, particularly in an era with smaller law school enrollments?

The market is already answering part of this question. Many law schools are now being subsidized, temporarily, by their universities, which is a reverse of the previous decades-long arrangement in which law schools subsidized universities. However, this university-subsidization will not last forever; if enrollment does not rebound, some law schools will merge or close. But though there may be somewhat fewer schools or graduates, many law schools will remain, continuing to produce thousands of well-trained lawyers every year to meet the needs of those who can afford to pay them.

Along with faculties, they will serve as critics and reformers of the law. Those graduates will replace the approximately 40,000 baby boomer lawyers who will retire during the next decade. Some of these graduates will serve the needs of large corporations, as the 16 percent of lawyers who work in large firms do today. Others will go into government, prosecution, criminal defense, transactional work, and dispute resolutions for small businesses. Occasionally, some will do some pro bono work for those who cannot afford to pay. But for the most part, they will not fill the void in the need for routine services that has long existed.

In her article “The Cost of Law,” Professor Gillian Hadfield argues that these needs cannot be met primarily by the graduates of three-year law schools. Individuals can solve a number of routine legal problems on their own, using online instruction forms. Others require the help of professionals with specialized legal training, but one year or eighteen months of such specialized training will suffice. Washington State is

certificates or masters degrees to future legal technicians. These programs could include a course that exposes students to legal methods and reasoning, the nature of legal institutions, and a limited amount of technical writing, along with several practical courses in the subject matters of their chosen specialty, including discussions of the ethical issues that may arise in each particular area of work.

Clinical education – the most important innovation in legal education in the last fifty years – is also the most expensive method of education, and it may well be the first to be jettisoned if law schools respond to economic challenges by slashing budgets, laying off faculty, replacing retiring teachers with adjuncts, or eliminating semesters.

already experimenting with licensing legal technicians – the legal equivalent of physicians’ assistants – to perform specific tasks, such as advising clients in family law matters, the writing of wills, and resolving landlord-tenant disputes. After a period of apprenticeship, these technicians will no longer have to be supervised by lawyers. Other experiments in the delivery of legal services are bound to follow. Following Washington State’s lead, state supreme courts will need to change their rules so that lawyers no longer have a monopoly on providing services that they themselves are unwilling or unable to provide.

Law schools can serve a critical role in providing this training. In fact, several law professors at Washington State are currently offering low-tuition courses for the first wave of legal technicians who will offer family law services. In addition to J.D. degrees, many law schools could offer one-year programs, awarding either technical

This is not a one-size-fits-all proposal. No single formula is likely to be adopted by all law schools. Of the law schools that survive the reduction in enrollments, some will want to remain research institutions, whose graduates gravitate primarily to large law firms and government agencies. Other schools may survive by cutting costs and offering large amounts of academic credit for externships or distance learning.

But if enrollments do not bounce back, I would suggest that the better way for law schools to fulfill their traditional mission is to cut back on faculty and student numbers while preserving teaching methods that have produced excellent lawyers and citizens for the past fifty years, and also to offer a lower-cost, specialized, non-doctoral degree to those who are willing to do the hard work of providing routine legal services to those who need them.



Robin L. West

Robin L. West is the Frederick J. Haas Professor of Law and Philosophy at the Georgetown University Law Center. She was elected to the American Academy of Arts and Sciences in 2015.

Part of the contemporary skepticism about the value of a legal education, and, more broadly, the value of the legal academy, is focused on the perceived lack of value in legal scholarship. As presently configured, this scholarship is a part of the legal academy's mission, and is certainly – alongside law school graduates – its major product. Legal scholarship is under attack from critics both inside and outside the academy. The bill of particulars is both lengthy and internally contradictory. On one hand, legal scholarship is overly precious because it is excessively theoretical and interdisciplinary, and therefore not grounded in the real world. On the other hand, legal scholarship can be overly utilitarian, providing nothing more than blueprints for a better mousetrap; it therefore has no value to the larger academy. In further critiques, legal scholarship is overly academic, and therefore of no use to the legal profession. For others, legal scholar-

Part of the contemporary skepticism about the value of a legal education, and, more broadly, the value of the legal academy, is focused on the perceived lack of value in legal scholarship.

ship is nothing but elaborate memoranda for courts, legislators, and regulators; therefore, it is not scholarship, and serves no use for either the university, or for the larger community of knowledge seekers. For every critique leveled against legal scholarship, one can find the opposite reaction.

I cannot take on all of these critics. Instead, I would like to address a complaint often voiced by critics of legal scholarship both within the legal academy and from other parts of the university that legal scholarship is somehow “not true scholarship” because so much of it is overtly *normative*. By “normative,” critics mean that the goal of such scholarship is to argue for, or at least to articulate, the way the law ought to be, as well as what the law is. And so, this dominance of “ought” statements, and thinking premised on explicit or implicit claims about how the world and law should be, means it is also political, moral, sentimental, and emotional in nature – and so, not “true” scholarship.

Let me first note the utter, absolute *ordinariness* of normative legal scholarship over the past century. By this I mean traditional doctrinal scholarship, including policy-based scholarship, precedent-based scholarship, and scholarship that is often derided as “extended briefs.” I also include “big-idea pieces,” such as Benjamin Zipursky's pioneering work refashioning tort law as a law of wrongs, Hanoch Dagan's work unearthing the public regarding theories of justice and contract, and Larry Kramer's arguments about and against judicial review. All of these arguments fall under normative legal scholarship, which contends

with what the law ought to be, and not only with what the law is. While over the last couple of decades, it may have become more theoretical, interdisciplinary, or philosophical, this form of inquiry has been the bread and butter of legal scholarship for a century.

What is the case against normative legal scholarship? I want to focus on just one complaint, nicely captured in *Save the World on Your Own Time* by Stanley Fish. Fish's complaint, aimed at his colleagues in English departments, was that humanities scholars should not preach their politics in the classroom. Legal scholars who conduct normative scholarship are much more unequivocally guilty of the same sin: they are often overtly and unapologetically trying to save the world in their – our – scholarship. But overtly normative legal scholarship is not scholarship; it is sloganeering, campaigning. It is not grounded in reason, but rather in passion, sentiment, or, worse yet, in partisan politics. Arguments about what form the law should take fall on the value side of the fact/value divide.

Two practices have arisen within normative legal scholarship; they are, in some ways, responsive to this complaint, if not a direct defense against it. One practice I will call the *quasi-Dworkinian* response, and the second the *quasi-Posnerian* response, named, unimaginatively, after Ronald Dworkin and Richard Posner. The quasi-Dworkinian response is that statements about what the law *is* always rest, in part, on claims about what the law *should be*. Even the driest, most purely descriptive of legal claims rests necessarily on claims about the legal *ought*. For instance, claiming that the consideration

doctrine requires an exchange of values is also a claim about what contracts should be enforced. If Dworkin's account of legal argumentation is sound, then purely descriptive analytic work that purports to do nothing but say what the law is, is normative. I have a lot of sympathy for that position.

I believe that normative legal scholarship is important, has great social value, and is often moving. It is *sui generis*, meaning, it is not done well anywhere except for in law schools. It often influences our political environment, our history, and the world of ideas within the university.

The quasi-Posnerian defense, which many may be more familiar with today, is to tame, or rationalize, the normativity of traditional legal scholarship by re-characterizing normative claims through a cost-benefit analysis. The aim is to basically transform claims about what the law *should be* into claims of fact, with the benefits and costs of various policies, laws, and rules drawn from real cases. If successful, the result is that legal scholarship can be both normative and rational, or nonpolitical. Using the metrics of tabulating benefit and cost, and drawing inferences from the same, we can make claims about what the law ought to be, while avoiding the claim that we are pushing personal politics in the classroom or in the pages of law reviews.

I believe that normative legal scholarship, including the Dworkinian and Posnerian forms, is important, has great social value, and is often moving. It is *sui generis*, meaning, it is not done well anywhere except for in law schools. It often – consequentially and impactfully – influences our political environment, our history, and the world of ideas within the university.

However, I also believe that normative legal scholarship deserves a much more ro-

bust defense than either the Dworkinian or the Posnerian arguments described above provide. Normative legal scholarship, at root, is about what justice requires, and the degree to which law delivers on that requirement. The scholarship is, and should be, rooted in passion as well as intellect.

If the charge against normative scholarship is that it is political, ethical, moral, emotional, and impassioned, rather than rational, reasoned, intellectual, descriptive, and empirical, I would offer a suggestion: rather than try to limit normativity to only the forms that seem the most rational (the Dworkinian and the Posnerian), we instead should consider embracing the passionate

Normative scholarship, which aims to show what the law ought to be, is in need of defense today. However, it is itself a threat to a field even more marginalized by all of these forces – critical legal scholarship, or scholarship with no direct normative ambitions.

root of justice – or our understanding of it. To the degree that justice is itself a product of passion, it must also be impassioned. Justice is not captured in Posnerian fashion, in costs and benefits, nor is it captured in Dworkinian fashion, through the institutional decisions made in the past by precedent, even as discerned by the most herculean judges.

There is a significant problem with normative scholarship, as well as with the defense of it, that is entirely different from the Stanley Fish – inspired claim that we are inappropriately and unethically trying to save the world on the law students' and taxpayers' dime. When lawyers, as well as law professors, focus on what we could do with law to bring the world more into alignment with what we think the law ought to be, we sacrifice, to some degree, our critical voice. This is precisely because our sense of the way the law *ought to be* is so heavily influenced, if not determined, by the bulk of the law that is given a critical pass. When we focus on the normative and on our scholarship, we internalize a huge loss.

To correct for that loss, we – both in the legal academy and in society – need legal scholarship that has no normative ambition whatsoever, so that we can better understand, and therefore better criticize, the world that we inhabit. By focusing our work in the legal academy solely on our normative ambitions, and on law as a means to justice, we risk losing, to some degree, a focus on law as a means of exploitation, of le-

gitimation, of subordination, and of suffering. In other words, we lose our sight of law as a means to injustice, to promote the ends of power.

Normative scholarship, which aims to show what the law ought to be, is in need of defense today. However, it is itself a threat to a field even more marginalized by all of these forces – critical legal scholarship, or

scholarship with no direct normative ambitions. Critical legal scholarship has the aim of helping us better understand our own situation, which might be steeped in injustice and beyond the repair of a legal fix. If we want to understand our currently unjust milieu, and use law to further the ends of justice, I believe we need ambitious scholarship that is unabashedly critical, and unabashedly non-normative and non-pragmatic. We in the legal academy need to aggressively carve out space for that work; it will disappear if we do not.

At the current moment, normative legal scholarship, even of the rationalist Posnerian or Dworkinian variety, and *certainly* of the non-Posnerian and non-Dworkinian variety, is under severe and even vicious attack. But critical legal scholarship is in even worse shape. It has become so vilified that it has almost disappeared. At various points over the last half century, the legal academy has (to its credit) been a welcoming environment for both normative and critical legal scholarship. It has even understood such scholarship as central to its mission. We need to foster that environment once more. Doing so will not be easy; it will require self-consciously resolute conviction.



Patricia D. White

Patricia D. White is Dean and Professor of Law at the University of Miami School of Law School.

Given the frame of today's conversation about the legal crisis, in which the profession faces significant economic changes and diminishing applications, the question is: how do we keep our core values in legal education intact?

Certainly, these core values include training lawyers to appreciate, understand, and promote the rule of law, and to appreciate, understand, and promote equality, justice, due process, and the role of social justice for all, particularly for the less served. This commitment is fundamental to law schools and to the profession. We take it as a constant and a core.

But over the past number of years, this commitment has grown in its ambitions, and largely in ways that are deeply expensive. This was possible in part because we lived in a world in which the legal profession was thriving, much like the medical profession. We had built an infrastructure, which grew quite substantially, but also became ever more costly to maintain. We were then

suddenly struck by an economic recession, leading to a significant retrenchment within the legal profession.

Law schools started taking on an additional task, namely, the task of on-the-job training, under the pressure of law firms and judges, and the attendant needs of law students taking on sole practitioner roles. Historically, our role as law schools was to give people the basics, to teach them about legal analysis, and then to have them take that

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knowledge out into the world. On-the-job training occurred in different contexts, in law firms both big and small, and in public governmental settings. It did not normally occur in law school.

Around the time that the language about becoming "practice-ready" emerged, legal institutions, due largely to economic pressure, started to step back from providing on-the-job training. Suddenly, real "on-the-job" training was foisted upon law schools as an expectation. We needed to react. However, as a general matter, law schools are not particularly good at providing such training. That is not what they have historically been designed to do.

I want to comment generally about the economic reality of higher education. Schools come in two varieties: public and private. Private schools are traditionally funded by tuition, with some money coming from charitable giving. Public schools, historically, are deeply subsidized by the state, and are therefore affected by state re-trenchment.

were paid very well, but they were required to write more, and to do very complicated, broad-ranging scholarship. That expectation is still there.

The legal profession is changing, and demanding new skills. It is demanding efficiency. It is demanding technology. It has become deeply international. There are many more subjects that need to be taught.

Historically, our role as law schools was to give people the basics, to teach them about legal analysis, and then to have them take that knowledge out into the world.

In the private school world, for years tuitions have risen at a faster rate than inflation. We need now to look for other funding sources outside of tuition and charitable giving. What those sources will be is not at all clear. Our law schools are no different from colleges and universities that have to grapple with the same issues of funding; except that law does not have the grants and other government-sourced forms of income that the sciences, particularly medicine and engineering, benefit from.

Unfortunately, law schools stand at the forefront of a fundamental problem in American education. We need to find ways to change our funding structures. How can we scale back while keeping everything important in place?

When I first started teaching here at Georgetown in 1978, the standard teaching load was between three and four courses, and the classes were very big. We had more committee responsibilities and administrative duties than is now the case. At law schools outside the top 20, you would find that faculties generally ran the schools. They were very lean administratively, and teachers had a considerable teaching load. This was gradually scaled back; faculty

We in law schools need to rise to the challenge of these demands. We need to figure out how to meet these challenges while keeping the spirit of scholarship alive. ■

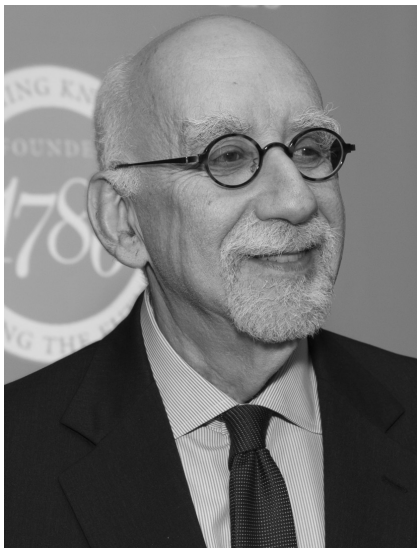
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To view or listen to the presentations, visit <https://www.amacad.org/legaleducation>.

Fear and Democracy: Reflections on Security and Freedom

On December 7, 2015, the Academy hosted a meeting at Columbia University on the topic of fear and democracy. **Ira Katznelson** (Ruggles Professor of Political Science and History at Columbia University and President of the Social Science Research Council) and **Samuel Issacharoff** (Bonnie and Richard Reiss Professor of Constitutional Law at New York University School of Law) discussed the state of security and freedom and the role of fear in a modern democracy. The program, which served as the Academy's 2029th Stated Meeting, included a welcome from **Jonathan F. Fanton** (President of the American Academy). The following is an edited transcript of the discussion.



Ira Katznelson

Ira Katznelson is the Ruggles Professor of Political Science and History at Columbia University and President of the Social Science Research Council. He was elected to the American Academy of Arts and Sciences in 2000.

Throughout our country's history, one could name many shocks that generated deep anxiety and fear. Generally, these were situations and circumstances of deep uncertainty, in which citizens felt they had little capacity to understand the parameters within which they were to appraise change. While today's terrorism willfully creates such circumstances, so, too, did the collapse of capitalism in 1929. Fear, as I would like to discuss it today, becomes a context

Fear becomes a context that questions the legitimacy of institutions in which there is no substantive status quo, in which there is a requirement to act in a speedy way without much reflection, and in which, at least in constitutional regimes, there is enormous pressure to find exceptions and to reach expedited decisions.

that questions the legitimacy of institutions in which there is no substantive status quo, in which there is a requirement to act in a speedy way without much reflection, and in which, at least in constitutional regimes, there is enormous pressure to find exceptions and to reach expedited decisions. Fear can also be a motivation to act. It often highlights anxiety over rationality, and creates intensities of feeling. It widens the scope of available models of acting. And it sometimes creates very strange bedfellows.

The most famous set of remarks in political life about fear was Franklin Delano Roosevelt's "Fear Itself" speech, his first inaugural address delivered in March 1933. He said, "Let me assert my firm belief that the only thing we have to fear is fear itself – nameless, unreasoned, unjustified terror which paralyzes needed efforts to convert retreat into advance." As an empirical matter, this was wrong. The fear of 1933 was not unjustified; it was deeply justified, just as many of our fears today are justified. The question, then, is how

to find a leadership of frankness and vigor – to use Roosevelt's language – that, with understanding and support of the people themselves, can navigate us through fear itself.

Fear, however, did not disappear with the end of the Roosevelt or Truman years. If we take a brief look at Eisenhower's inaugural address of January 20, 1953, we find this passage in the middle: "The world and we have passed the midway point of a century of continuing challenge. We sense with all our faculties that forces of good and evil are massed and armed and opposed as rarely before in history."

And he ends with some Manichean language: "Freedom is pitted against slavery, lightness against the dark." In this speech, the new president of the United States spoke of *atomic fear*, and the capacity of humankind to erase all human life from the planet. This was a speech with almost no reference to domestic politics whatsoever. Now contrast that with Franklin Roosevelt's remarks in 1933: foreign affairs are pressing, but they

are nothing like the domestic concerns at home. That, of course, did not quite hold.

Consider the kind of fear that existed in 1933. Walter Lippmann, the leading columnist in the United States at the time, counseled the president of the United States that the “danger we have to fear is not that Congress will give Franklin D. Roosevelt too much power, but that it will deny him the power he needs.” This was a period in which

the achievements of the New Deal, from the National Industrial Recovery Act (NIRA), to the Social Security Act, to the Fair Labor Standards Act, were legislative acts created through regular procedure. Having said that, there were a series of actions (that were not quite enabling acts) that *did* transfer capacity to the executive branch in a powerful way. For instance, in 1936, the president ordered surveillance of American citizens who were

from normal budgetary procedures. From then on, the CIA was no longer obliged to report the uses of its funds to Congress in any detail. The federal loyalty investigations in the Truman administration followed.

By the early 1950s, we had what might be called a dual state: a procedural state and a crusading state. Washington is thick with procedures; getting a law passed is almost impossible with congressional veto points, and there is a very thin sense of public interest. On the other side, we have a crusading state that is very thin on procedures: the president of the United States can declare – for good reasons or not – that it is necessary to kill an American citizen who happens to be in Yemen, and who is a terror threat, without trial. The president can do that. We also have a thick sense of unified public interest: to defend democracy, to fight dictatorship, and to protect citizens against terror.

We have many potential sources of fear, including fear for our sovereign security, fear for our internal safety, fear generated by the permanent war against terror, fear for the institutional capacity of our organizations, and fear, even, for the legitimacy of democratic life.

the known dictatorships, in Italy, and soon Germany, passed Enabling Acts that transferred all legislative power from the legislature to the executive. Lippmann, in his columns in *The New York Herald*, counseled Roosevelt to suspend temporarily the rule of Congress, and to limit, drastically, the right of amendment, to put the democratic majority in both houses at the time under the decisions of a party caucus.

Let us return to a part of Roosevelt’s speech that often is forgotten: “I shall ask the Congress for the one remaining instrument to meet the crisis – broad, Executive power to wage a war against the emergency, as great as the power that would be given to me if we were in fact invaded by a foreign foe.” This was not an abstract thought in 1933. During World War I, the U.S. government assumed enormous executive powers, including the power to restrict speech.

The greatest success of the New Deal was that these changes never happened. Congress was never suspended. Elections were never stopped. Constitutional democracy solved problems and met the emergency. All

suspected of having Communist and – especially then – Nazi sympathies, thus extending FBI activities beyond the investigation of specific crimes. Very quickly, FBI field offices began to work with the Office of Naval Intelligence and the Military Intelligence Division to track subversive activity. Ever since, the Bureau has conducted intelligence gathering of potentially destabilizing groups as a regular responsibility.

In 1941 and 1942, Congress passed remarkably expansive War Powers Acts that expanded the president’s economic authority, repealed the confidential status of census data, and authorized the censorship of mail, telegraph, cable communications, and radio broadcasts “when deemed necessary to the public safety.” After the war, the Atomic Energy Act lodged in the president full authority not only over the decision to drop or not drop an atomic bomb, but also full authority over anything to do with atomic energy. Likewise, the National Security Act of 1947 placed unprecedented powers in the executive branch; amended in 1949, the act exempted agencies such as the Central Intelligence Agency (CIA)

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So what do we do about these sources of fear? We might turn to German jurist Carl Schmitt, who suggested the most familiar model that we have for discussing emergency and states of exceptions. Schmitt wrote brilliant works on dictatorship, political theology, and the concept of the political. He believed that liberal democracies like ours were not capable of solving the dilemmas of fear, emergencies, and exceptions. He joined the Nazi Party, and became a leading jurist under Nazism. This fact makes it difficult, of course, to take him completely seriously within our context of liberal democracy. The reality with which we nonetheless have to reckon was his assertion that the exception could not be carried out under the rules of the normal. Liberal constitutional

orders must become consistent with tools of power that take necessary decisive action in sovereign dictatorships, which are placed outside of existing law. The emergency, as Schmitt defined it, is a state of nature that returns places and regimes to their original sovereignty, and in which the government governs in the name of an “abstract founding people,” espousing abstract values and moral principles, without the mediation of standard institutions, conflict, or debate.

Are there alternatives? For one, there is a forgotten American tradition. Political science scholars including Francis Lieber, a key founder of the modern discipline in the nineteenth century and an adviser to President Lincoln about constitutional exceptions, and mid-twentieth-century figures Lindsay Rogers, Frederick Watkins, and Clinton Rossiter, who sought an alternative to Schmitt’s position, all wanted issues of emergency conduct to be rooted in the lawful traditions of liberalism, including constitutional prerogative powers. They saw sovereignty as a matter of

To gauge the morality of an action, it might be asked not just what the president would do, but what would a group of reasonable people do.

legal competence, not as a matter that stood outside the law. They were in favor of very selective legislative delegations and limited time spans, including sunset provisions for any kind of emergency.

Today, we not only have a New Deal-era inheritance of a crusading state, but we also have the legacy of a post-9/11 world. In his wonderful essay “Political Safeguards in Democracies at War,” Samuel Issacharoff wrote, “During the presidencies of Lincoln and FDR, an effort was made to enlist Congress as an ally in policy decisions, even if this effort was made after the decision had been initiated. By contrast, during the Iraq

It is impossible to claim that we face no threat. We have to factor in some fear even when we are positioned outside the “zone of emergency.”

War, and through the controversial decisions over detentions and even torture, the persistent Bush executive claim was of exclusive and unaccountable powers flowing from the president’s role as commander-in-chief. Indeed, the claims of such executive prerogatives run well beyond any modern conceptions of constitutional democracy.”

In short, it is impossible to claim that we face no threat. We have to factor in some fear even when we are positioned outside the “zone of emergency.” So, what are the zones of possibility that we might think about? One involves a set of normative as well as practical arguments; we must never forget the distinction between the temporary and the permanent. It was the 13th Amendment, as an example, that permanently eliminated

slavery, not the Emancipation Proclamation based on war powers claims. As the American, non-Schmittian tradition instructs, we should think about emergency actions as ones to be mediated by law, guided by a constitutional community standard that recalls how the United States is a constitutional community, not just a security community. We might also think about exceptions requiring higher justifications, about tension-charged monitoring by different branches of government, and guidance by a norm of limitation, by the most prudent definitions of necessity. There could be a reasonable person standard, a concept both

Francis Lieber and, in our time, John Rawls suggested in different ways. To gauge the morality of an action, it might be asked not just what the president would do, but what would a group of reasonable people do. Finally, we might think, as Francis Lieber recommended, that retrospective judgment be brought into existence. The purpose would not be to punish those who went too far, but to learn, retrospectively, to come to some understanding of the strengths and weaknesses of different modes of acting under conditions of fear and emergency.

In *Federalist 24*, Alexander Hamilton announced that “the circumstances that endanger the safety of nations are infinite, and for this reason no constitutional shackles can wisely be imposed on the power to which the care of it is committed.” Clinton Rossiter closed his 1948 book, *Constitutional Dictatorship*, by averring that “no sacrifice is too great for our democracy, least of all the temporary sacrifice of democracy itself.” Unless richly specified within the ambit of constitutional democracy, these calls for exception, whether permanent or temporary, threaten more than a temporary sacrifice.



Samuel Issacharoff

Samuel Issacharoff is the Bonnie and Richard Reiss Professor of Constitutional Law at New York University School of Law. He was elected to the American Academy of Arts and Sciences in 2003.

Let me begin with a simple proposition. A healthy democracy is a porous political entity. Democracies need access: they need give and take; they need the ferment; they need the capacity to accommodate dissent; and they need to allow citizens to think and to act in order to survive, persist, and flourish. We begin with these givens, but we do not end there, because the other reality is that democracies under stress will turn against the very porousness that makes them flourish.

I am not proposing this as a normative statement. We know that democracies will act in this way because they always have. If we start with that proposition, then the question becomes: How should democracies react in times of stress when, for reasons of fear, for reasons of military challenge, for reasons of domestic unrest, they will have to clamp down on enemies – in-

A healthy democracy is a porous political entity. Democracies need access: they need the capacity to accommodate dissent; and they need to allow citizens to think and to act in order to survive, persist, and flourish. But the other reality is that democracies under stress will turn against the very porousness that makes them flourish.

ternal and external, and as a consequence, they will have to constrict the liberties that are available normally to their citizens, and the conditions under which they normally fashion their political affairs?

Let us begin by considering France, which provides the most recent, and also the most graphic and horrible of current affronts to democratic rule. Immediately after these recent assaults, there was a presidential decree, suspending for a period of twelve days all normal customary operations of law regarding public assembly, expression, entry and exit from the country, the capacity of citizens to gather, to speak, and to protest the government. This was the constitutional framework that France inherited with the Fifth Republic. After twelve days, that power was no longer held by President Hollande. Does that mean that things went back to normal? Quite clearly no. The national assembly voted in favor of a state of emergency for three months, which allows the government many of the powers that it had assumed during the initial twelve-day period of emergency.

This case in France is what is known as a constitutional state of emergency. This is the norm in democracies around the world. In a constitutional state of emergency, there are three questions that have to be asked. First, who declares the emergency? Second, what is the scope of the emergency powers? And third, when does the emergency end?

Typically, in modern constitutional orders, we separate those three questions, because we realize that democracies at such moments of fear and provocations will likely overreact; they may not be able to harness the resources they need, and organize all the instrumentalities of government to defend themselves successfully against the threat.

If we look at our allies, what do we see at this moment? We see that the German parliament has voted for the first time to send troops abroad. We also see that the British parliament voted on the same matter, which is significant because historically the deployment of troops in Britain was part of the prerogative power of the sovereign. After the fiasco in Iraq and the unilateralism of that period, Britain went through a period of reform in which they required parliament to be consulted on matters of sending troops overseas. Gordon Brown called this a part of the informal constitution of Britain, since Britain does not have a written constitution.

Here in the United States, we find we have no constitutional provision for a state of emergency. We have one formal provision for the suspension of the writ of habeas corpus. As it turns out, this is a very minor power in light of the powers that governments truly need in times of real emergency. Consider Lincoln's challenges in the run up to the Civil War, or Roosevelt's needs as a leader in the run up to World War II. The suspension of habeas corpus may be significant

for the government at any given point, but it is a secondary power compared to the mobilization that is necessary by executive leadership in a state of war. Again, we can always debate over whether we are in a state of war or not. We could also argue about whether we were really in a state of war in 1861. For this discussion, let us assume that at some point, we will have wars; there will be real emergencies; and there will be a need for institutional response.

The standard American response has been to improvise. We are very good, as a society, at making things up as we go along. It is interesting to contrast the decision of the framers not to build this flexibility into the American system, with the similar decision of the framers of the European constitutions that such flexibility was an essential feature of a constitutional order in Europe. Perhaps it is the proximity of the continental wars. Perhaps it is the influence of thinkers like Schmitt and before him Machiavelli, who suggested that there needed to be an

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institutional form of response, otherwise a country would be at risk of either failing to be able to mobilize itself militarily, or correspondingly, at risk of overreacting and compromising the institutions that give it its vigor.

How do we do this in the United States? There are three parts to this consideration: Who declares it? What are the powers? What is the duration? We have to keep in

How should democracies react in times of stress when, for reasons of fear, for reasons of military challenge, for reasons of domestic unrest, they will have to clamp down on enemies – internal and external, and as a consequence, they will have to constrict the liberties that are available normally to their citizens, and the conditions under which they normally fashion their political affairs?

mind that there has been only one constitutional order – Weimar Germany – in the last one hundred years that has tried to concentrate all these three powers in one person. Weimar Germany lived from exceptional decree to exceptional decree, from presidential authority of extraordinary measure to presidential authority of extraordinary measure, including the presidential appointment of Adolf Hitler as the Reich’s Chancellor.

During the 2000s, some in the U.S. administration claimed that it is inherent to the unilateral executive that there be the power to conduct military activities abroad, and that there be the power of a commander-in-chief centralized in the person of the president. That is clearly right. Roosevelt claimed that same authority, giving J. Edgar Hoover the powers to wiretap every individual he essentially did not like. This was also

the power asserted by Lincoln. In the 2000s, however, the difference was that the executive, in its unitary capacity, must be able to discharge all three functions: to proclaim, to determine the duration, and to determine what steps are necessary.

This process is not an American tradition, a fact that I have spent a fair amount of time over the last fifteen years writing about, and counseling the government on. In fact, the American tradition is quite distinct because we indirectly follow Machiavelli, in that the response to the state of emergency and the need for emergency powers is not an individual action, but rather an institutional one.

We can see how this process is laid out intellectually if we return to the thoughts written by Supreme Court Justice Robert Jackson in a famous set of papers that were delivered to Roosevelt. Robert Jackson was Roosevelt’s Attorney General during the run up to World War II. He was asked about the power of the president to embark upon foreign affairs on his own initiative as commander-in-chief; these ventures took the form of the Lend Lease Act with Britain, and the efforts to start shoring up Britain before there was ever a formal declaration of war. In the papers, Jackson outlined how presidential power can be exercised in the United States in times of emergency in a way that foreshadowed exactly what he would even-

usually write in his Youngstown Steel Seizure Case opinion. He outlined how the exercise of presidential authority needs to be divided according to the relationship with Congress, stressing that this authority is an institutional matter; it is not a question of the commander-in-chief's powers. When the president acts with the support and authorization of Congress, he is allowed to autho-

During the 2000s, some in the U.S. administration claimed that it is inherent to the unilateral executive that there be the power to conduct military activities abroad, and that there be the power of a commander-in-chief centralized in the person of the president.

alize the budget that allows for the buildup of troops, and to authorize the use of military force. Whatever form this takes, Jackson wrote, presidential power is at its zenith.

Alternately, when Congress has said no to the president, when it has enacted a prohibition – whether engaging in torture or in black site assassinations – then, wrote Jackson, the president's powers are the most diminished, and are subject to the most challenge. There is the gray area between these modes of power, an area in which temporal necessity and exigency demand action. This space allows us room to figure out what Congress might allow, so that we know whether we are in the domain of prohibited presidential conduct or in the domain of permitted presidential conduct.

Power Wars, a recent book by Charlie Savage about Obama's presidency after 9/11, is in large measure an indictment of some of the naiveté of the Obama administration in its early days. It addresses a popular theme, namely, the continuity or discontinuity of war between the Bush administration and the Obama administration. Savage's main argument is that threat and power disci-

pline us, that responsibility forces us to act in ways that we may not want to act. He argues that the main difference between the Obama and the Bush administrations is that the Obama administration believed in rule of law principles while the Bush administration did not. This, however, does not mean that we, currently under the Obama administration, still do not engage in warfare; it

does not mean that we are not using drones or are not still holding people in Guantanamo. Instead, the contentious acts of war enforced under Obama have all been put before the political process, to the extent the political processes in place can handle this measure of detail and exigency. In these circumstances, the Obama administration has distinguished itself from its predecessor in trying to engage Congress. This is the American institutional response: a bilateral process that forces political branches to be partners in a venture.

Let me conclude with a note of grave pessimism and warning about our capacity to sustain this model. The reason that the American institutional and pragmatic response to an informal state of emergency has worked is because our domestic political order required accountability. If you try to impose a draft in this country, you will see riots; we have seen this throughout history, in Western Pennsylvania, and then again in New York during the Civil War. If you want to force young men – and now, young men and women – into combat, you have to build up the political will and the body politic to

be able to do this. Going to war requires tremendous expenditure.

Today, conscripts are irrelevant. The last thing that we want to do is to put young American boys and girls on the ground in Iraq or Syria, because they would just be targets for kidnappings and beheadings. You need a professional and technologically sophisticated army, which is not costly in terms of our civilian population. And in this situation, accountability drops out. We might consider this in tandem with the institutional collapse of the Congress as a serious policy-making body. If the Syrian conflict had taken place when I was young, the news media would first go to the Senate Foreign Relations Committee, who were stewards of our national tradition, and who knew how to think about crises. Today, we would be hard pressed to name any one individual on the Senate Foreign Relations Committee, caught up as it is in a series of partisan dysfunctions. The consequence, then, is that there is tremendous incentive for the executive to go at it alone. With this responsibility, of course, comes the risk of mistakes, and the risk that the office might claim too much power. Finally, there is the risk that the president might not encounter enough institutional resistance to understand how to calibrate the fine relationship between democracy and the need for self-defense. ■

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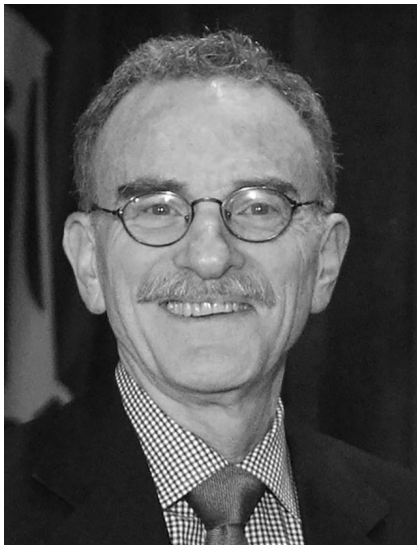


To view or listen to the presentations, visit <https://www.amacad.org/fearanddemocracy>.

Morton L. Mandel Public Lecture

Consensus & Controversy in Science: Genes, GMOs & Climate

On February 1, 2016, Randy W. Schekman (University Professor; Professor of Cell and Developmental Biology, University of California, Berkeley; Investigator, Howard Hughes Medical Institute) moderated a panel discussion on consensus and controversy in science with Jennifer Doudna (Li Ka Shing Chancellor's Chair in Biomedical and Health Sciences; Professor, Departments of Molecular & Cell Biology and Chemistry, University of California, Berkeley; Investigator, Howard Hughes Medical Institute), Richard A. Muller (Professor of Physics, University of California, Berkeley; Faculty Senior Scientist, Lawrence Berkeley National Laboratory), and Pamela Ronald (Professor in the Department of Plant Pathology and the Genome Center, University of California, Davis; Director, Grass Genetics, The Joint Bioenergy Institute). The program, the Morton L. Mandel Public Lecture, served as the Academy's 2031st Stated Meeting and included a welcome from Nicholas B. Dirks (Chancellor, University of California, Berkeley) and Jonathan F. Fanton (President, American Academy of Arts and Sciences). The following is an edited transcript of the presentations.



Randy W. Schekman

Randy W. Schekman is University Professor and Professor of Cell and Developmental Biology in the Department of Molecular and Cell Biology at the University of California, Berkeley. He has been a Howard Hughes Medical Institute Investigator since 1991. He was elected to the American Academy of Arts and Sciences in 2000.

I would like to start our program this evening with a discussion of the public's acceptance of science, and in particular, the challenge of the reproducibility of the work

Individuals feel significant pressure to publish some of their most important work in a very select few venues that cater to exclusivity. These venues are often fed by a small number of published works and the journal impact factor.

that scientists publish. There have been quite dramatic examples, over recent years, of papers that present manipulated data, or conducted outright fraud and misrepresentation, in crucial topics of research, such as cancer biology and psychology. Individuals feel significant pressure to publish some of their most important work in a very select few venues that cater to exclusivity. These venues are often fed by a small number of published works and the journal impact factor, which every postdoctorate student knows to three significant figures.

I will use *Nature* as my example. *Nature* is a very important journal that has published some outstanding discoveries. In 1953, the discovery of the structure of DNA was published in *Nature*. However, there are also a lot of papers that do not make it into *Nature*. Of the ones that do, some of their results cannot be reproduced, or they might be the result of manipulation. Two years ago, we

had a striking example of this: two papers were published in *Nature* amid great fanfare, claiming that adult human cells could be converted into embryonic stem cells by simply exposing them to low pH. These results immediately became a sensation, with coverage in *The New York Times*, *The Wall Street Journal*, and elsewhere. But within weeks, we learned that the results of this work were not reproducible; the data were manipulated, and there was evidence of plagiarism. The first author, although she returned to Japan as a conquering hero, was immediately humiliated by the experience. One of her senior co-authors was so embarrassed by the episode that he committed suicide. Some of this tragic fallout, I submit, is a result of the pressure that scholars feel to publish their work in these exclusive venues.

In another example, we can look at the situation in China. Consider award notices, published in bulletins by the Chinese Acad-

emy of Sciences, which claim that – and I have had them translated by my Chinese postdoctoral students – if you publish your work in prestigious journals such as *Cell*, *Nature*, and *Science*, you will receive the equivalent of U.S. \$33,000 as a personal cash reward. There are some very successful Chinese scholars who have earned over half of their income based on this award system; it does not matter what you have published, only that you, as a scholar, made it into the rare pages of these few select journals. This creates severe distortion in the reward system that many of us grew up with in our scholarship. The reward for scholarship is effectively now reduced to the impact factor and the numbers of papers appearing in prestigious journals – the only papers that seem to count.

Inevitably, I think this has led to an increase in irreproducibility, particularly of papers covering vital topics. Several years ago, Amgen, a pharmaceutical company, conducted a study in which they highlighted the fifty most important papers in cancer biology that they would have used as examples for drug discovery in cancer chemotherapy. They found that many of the papers that were published in very prominent journals were irreproducible. In short: they generated data that could not be used to justify their investment in the development of new drugs to attack cancer. Dr. Glenn Begley, the former head of Oncology Research at Amgen, conducted interviews of some of the senior authors of the papers. In one report, Begley said, “I met for breakfast at a cancer conference with the lead scientist of one of the problematic studies. We went through the paper line by line, figure by figure. I explained that we redid their experiments fifty times and never got their results. [The lead scientist] said they had done it six times and got the result [published in the problematic study] only once. They decided to put it in the paper because it made the best story.”

In order to try to capture the confidence of the public in the scientific enterprise, we must be willing, as scientists, to look very carefully at ourselves. We must be willing to challenge the work of others, and to find journals that are willing to publish negative results, or challenges to established well-known results.

Statistical anomalies, then, are not the dominant factor in affecting irreproducibility. The irreproducibility is a measure, instead, of the character and the influence of the very selective venues that young scholars feel that they must publish in, in order to succeed. I believe that this leads to a public mistrust of science. If the average non-scientist is reading in the newspaper that the National Institutes of Health is investing \$30 billion to create drugs to treat what ails us, but that these studies cannot be reproduced, we have a big problem.

Some of us are trying to tackle this issue directly. For example, I am personally involved in the Cancer Reproducibility Project. I am an editor of *eLife*, an online open access journal; we have partnered with an outfit called the Center for Open Science, which has garnered a donation from the Arnold Foundation to study, commission, and contract laboratories to repeat the key experiments that were published in fifty of these very prominent studies. Unfortunately, the Amgen study that I referred to was not published because, according to one of the principals at Amgen, they didn't find it of particular benefit for them to publish their negative results. It is also very difficult, of course, particularly with the very high profile journals, to have them accept and publish data and results that challenge papers that they have published.

But at *eLife*, we felt very strongly about commissioning, reviewing, and publishing papers that will attempt to reproduce key

experiments in these fifty papers. This turns out to be a very expensive, very labor intensive effort. Ultimately, in order to try to capture the confidence of the public in the scientific enterprise, we must be willing, as scientists, to look very carefully at ourselves. We must be willing, as well, to challenge the work of others, and to find journals that are willing to publish negative results, or challenges to established well-known results.



Jennifer Doudna

Jennifer Doudna is Professor of Chemistry and of Molecular and Cell Biology at the University of California, Berkeley, where she holds the Li Ka Shing Chancellor's Chair in Biomedical and Health Sciences. She has been a Howard Hughes Medical Institute Investigator since 1997. She was elected to the American Academy of Arts and Sciences in 2003.

I found myself in the field of genome editing after doing work here at the University of California, Berkeley, first in collaboration with Jill Banfield, and more recently with Emmanuelle Charpentier, who is based in Europe.

Genome editing is a technology that enables scientists to make changes to the DNA of cells, changes that are so precise that we can fix a single letter in the entire human genome that might give rise to a specific disease, like cystic fibrosis. We can use genome editing in much the way that you would use your word processing program to change a typo in a document.

This technology came about in both a remarkable and unassuming way, through a basic research project conducted to figure out how bacteria fight viral infection. My own

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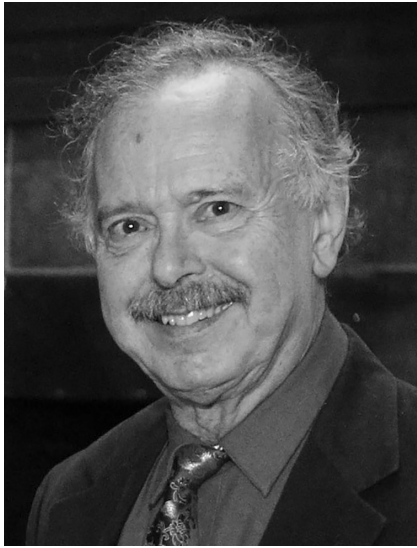
involvement in this project started almost ten years ago when Jill Banfield contacted me about some interesting DNA sequences she was finding in data her lab was producing, from bacteria that were isolated in various interesting environments. What was discovered through her work, and then through the research of a few labs around the world at that time, was that bacteria that have sequences called CRISPRs, which are repetitive arrays of short bits of DNA that include sequences from viruses, have an adaptive immune system. They have the ability to acquire DNA sequences from their invading parasites like viruses, and they can then keep a permanent record of those sequences in the genome in such a way that these bugs can defend themselves against future infections by the viruses.

At the time, Jill wondered whether those bits of DNA acquired from viruses were actually operating in this immune system at the level of a cousin of DNA called RNA. RNA are little molecules that are able to form chemical interactions with DNA in a sequence-specific way, allowing them to find matching DNA sequences. We started investigating this, and that line of research eventually led me to collaborate with Emmanuelle Charpentier. We worked together to figure out the function of a protein that is central to this pathway; it operates as an RNA-guided, DNA-cleaving protein.

As it turns out, the fact that cells like our own human cells, including plant and other kinds, have the ability to detect DNA breaks and repair them in a precise fashion has been appreciated for several decades now. These

discoveries were made through a great deal of research completed in other labs. By using an enzyme like the protein Cas9, a remarkable little molecular machine that can be programmed with sequences of RNA that match the sites of DNA sequences that we would like to change in the cell, we can trigger a break in the DNA that is then repaired in a precise fashion. If we zoom into a cell, right to the nucleus, we find the DNA is packaged in a structure called chromatin; the bacterial enzyme has to search through the entire sequence of the cell to find a site that matches the sequence in its guiding RNA. When that happens, the enzyme latches onto the DNA, unwinds it, and then makes a very precise break in the DNA sequence. At that point, the broken DNA is handed off to the repair machinery in the cell, and this leads to integration of new DNA sequences.

Once we understood the function of this bacterial enzyme, we suddenly appreciated that this could be adapted or harnessed as an effective technology for just this kind of genome engineering. This discovery, originally published in 2012 in *Science*, triggered research work in labs around the world, which began adopting genome editing techniques for all sorts of applications. The discovery has also led to a very important discussion about the ethics of using this kind of technology. What *should* we do, now that we have a simple, effective, and widely available technology for engineering genomes, including the genomes of human embryos?



Richard A. Muller

Richard A. Muller is Professor of Physics at the University of California, Berkeley, and Faculty Senior Scientist at the Lawrence Berkeley National Laboratory. He was elected to the American Academy of Arts and Sciences in 2010.

I have been working in serious scientific research now for fifty years. And in that time, the public's trust in science has declined and is at its lowest point right now. What went wrong?

I would like to give some illustrative anecdotes as a way to explain this decline in the public's trust in science. The first anecdote concerns the Chicago Museum of Science and Industry. Seven or eight years ago, the museum conducted a survey. People outside the museum were stopped and asked, "Name a great living scientist you would like your son or daughter to emulate." The name that came in first place was Al Gore. Tied for second place with Albert Einstein was Bill Gates. *This* is the public's understanding of what it means to be a scientist; it simply means that you know how to talk about the sciences.

In 2000, I wrote a book on the scientific field of paleoclimate, and soon after, as I be-

came more involved in global warming as a writer and a columnist, I was highly critical of Al Gore's *An Inconvenient Truth*. The reason was that I did not know yet whether climate change was real or not. I did know, however, that what was being presented in *An Inconvenient Truth* was largely incorrect: the information was exaggerated, distorted, misleading, and, in some cases, just plain wrong.

I received so many questions about global warming that I decided I had to do some substantial reading on the subject. That led to some substantial research. My daughter Elizabeth and I started our own research organization to study global warming, which we named "Berkeley Earth." After bringing in some other expert scientists, particularly in the discipline of data analysis, and nearly three years of research, we reached a conclusion: global warming is real. It is roughly of the same magnitude that everybody else has said it is and it is caused by humans. This was a solid scientific result. We found this result by addressing the issues that the skeptics were raising.

Let me provide another anecdote. In the physics department at Berkeley, there was a

Today, scientists find themselves using authority as their means of deciding on information, on conclusions.

mix of Nobel laureates alongside ordinary professors, like me. Over lunch one day, one of the Nobel laureates says, "Global warming is in the news again. Everybody here agrees that global warming is solidly established, right?" Now this was before I did my research on global warming. Most of the people gathered meekly raised their hands, but I did not. He asked me, "Rich, are you not agreeing?" And I said, "Well, I'm surprised, professor, that you were convinced

that the data choice bias was unimportant and that the poor siting of so many stations did not lead to a mistaken result." He replied, "Oh, is there a problem with data selection for the data?" He was a Nobel laureate, and people listened to his opinions, but this opinion was not based on his own careful scientific analysis (as had his work that led to his Nobel Prize) but on informal articles by journalists.

I imagined that had I not objected, others would have cited the fact that this famous Nobel laureate had been convinced, even though I now knew that his conviction was not based on careful scientific study.

Afterwards, several of my younger colleagues came up to me and said, "Thank you." There was the assumption that everyone would agree, that there would be a consensus even if you didn't know what the scientific issues were.

Today, scientists find themselves using authority as their means of deciding on information, on conclusions. A Nobel laureate might pass on a piece of information, and another person says, "This was told to me by a Nobel laureate, and therefore it must be true." I personally will tell you that glob-

al warming is real, but I will do so only after I did extensive, rigorous, difficult work.

Let me give you another example. A scientist, whose name you would likely recognize, invited Thomas Friedman to give a talk on campus. Friedman is not a scientist, and in my opinion he said many things that were absolutely not true. This prominent scientist sat, listened, made only positive comments, and then he thanked Friedman for his excellent talk. That was the end of it.

We need to learn again how to trust the public. We have to earn again our reputations for being absolutely objective. We cannot put a spin on facts or tell the public how to interpret them. Our job is only to give information, and trust that the public is smart enough to take that information in the right way.

I went up to this prominent scientist afterwards and I said, “You know that most of what Friedman said is not based on science. It is either an exaggeration, or a distortion, and it is just *not true*.” The scientist answered: “Yes, but it gets our people excited. It gets them to work on the subject.” I responded, “They are going to find out eventually that these claims are not right. They will then feel they were fooled.” His response was, “Trust in me; this will work out well.”

I think we are now at the point at which the public has learned it was fooled about global warming. People watched films like *An Inconvenient Truth*, and they now come up to me and say, “What do you mean the polar bears aren’t dying because of receding ice? What do you mean the rates of hurricanes are actually going down?” These extreme misrepresentations are pushed by some scientists, because the public doesn’t respond as well to the less dramatic truth, such as the one that the Berkeley Earth team verified, that there has been 1.5 degrees Celsius of warming in the last 250 years. They respond to the specters of Hurricane Katrina and Hurricane Sandy, though there is no solid scientific link between global warming and these events. Ironically, in these scenarios, we are abandoning the methods and criteria of science because the problem is so important! It should be just the opposite. When the issue is critical, that is precisely when we need to practice science in its most disciplined way.

A final anecdote for you: I went to Washington, D.C., to raise money for our global warming study, because I wanted to address

all of the issues raised by the skeptics, and to find out whether they were right or wrong. I talked to a top scientist working in the government. I was there to give advice on the status of global warming – what is known, what is not known. I described our (then) beginning Berkeley Earth project, in which we would reanalyze all the raw data, and assess the data selection bias.

The top scientist listened, then said, “This is perfect; this is just what we need.” “So, how much money can I get to support this work?” I asked. His answer was, “Don’t ask for any because you know we can’t fund you.” “And why not?” “If we were to fund you, then our opponents would say that there is still some skepticism left.” “But there *is* skepticism left.” “Yes, but we can’t say that publicly.” This is the terrible state of the public funding of global warming research right now. The subject is treated as settled, even though top scientists in government know better, and skeptics cannot get monetary support because of political impediments.

As scientists, we are partly at fault because we have not trusted the public; we do not trust that they will reach the right conclusions. We try to teach the public that they need to be told who to listen to, even though there is nothing more antithetical to science than an appeal to authority. We feel we have to put a spin on scientific facts, make them dramatic; in the case of global warming, we think we need to talk about drought, floods, and storms in order to get the public interested. In the end, it doesn’t work. I think the growing disbelief of global warming in the United States today is largely a result of the

scare stories previously put forth, which are now seen as exaggerations.

We need to learn again how to trust the public. We have to earn again our reputations for being absolutely objective. We cannot put a spin on facts or tell the public how to interpret them. Our job is only to give information, and trust that the public is smart enough to take that information in the right way.





Pamela Ronald

Pamela Ronald is Professor in the Department of Plant Pathology and the Genome Center at the University of California, Davis; and Director of Grass Genetics at The Joint Bioenergy Institute.

I am a plant geneticist, and I study genes that make plants resistant to disease and tolerant of stress. Over the years, many people have started to worry about plant genetic engineering.

Genetic improvement has been carried out for many thousands of years. Today, we are all familiar with modern corn. It yields about one hundredfold more grain than teosinte, the ancient ancestor of corn. I work on rice, which is the staple food for more than half of the world's people. Rice yields are reduced by diseases, pests, and environmental stresses. For example, although rice grows well in standing water, most varieties will die if they are completely submerged for more than three days. This is a big problem for farmers and their families in South and Southeast Asia, where there are 70 million farmers that live on less than \$2 a day. The Intergovernmental Panel on Climate Change predicts that not only will drought

and heat be shifting around the globe, but also that flooding will become more problematic in places like Bangladesh.

I was fortunate to have a colleague, David Mackill at the University of California, Davis, who had been working with his graduate student Kenong Xu (now a professor at Cornell University) to study an ancient variety of rice with an amazing property. This variety of rice could withstand two weeks of complete submergence under water. For about fifty years, breeders had been trying to introduce this trait using conventional breeding practices. Because they were drag-

Genetic engineering has been used for over forty years – in medicine, in the production of cheese – and without much controversy. In all that time, there hasn't been a single instance of harm to human health or the environment.

ging in lots of different genes at the same time, they were not able to deliver a variety that farmers would adopt. David asked if I would help them isolate the gene because we had some experience in isolating genes from rice. I hoped that if we were successful, we could help improve the lives of millions of farmers, who would be able to produce rice once their fields were flooded.

Through ten years of research, Kenong Xu and team were able to isolate the gene encoding this important trait. We showed that we could engineer rice with a gene named Submergence Tolerance 1A, or Sub1A, and that the resulting plants were tolerant of two weeks of flooding. This was really exciting, but this was only a laboratory experiment; our main goal was to help farmers.

So, breeders at the International Rice Research Institute carried out a field trial, using a different type of genetic technique called marker-assisted breeding. The breeders made

a time-lapse video that shows the results of one of their field trials that took place in the Philippines. Both the conventional variety of rice and the variety with the Sub1 gene grew well at first. However, when the field was flooded for two weeks, only the variety carrying the Sub1 gene thrived. In fact, through these controlled field experiments, the breeders were able to harvest threefold more grain from their field. Over the last few years, the Bill and Melinda Gates Foundation has helped to distribute this seed to farmers. Last year, three and a half million farmers grew this new rice variety and they were able

to see a threefold to fivefold increase in yield when their fields were flooded.

When it comes to inserting genes from bacteria and viruses into plants, people tend to get queasy. I often hear, "Yuck! Why would scientists do that?" The reason is that sometimes this approach is the safest, cheapest, and most effective technology to advance sustainable agriculture and enhance food security.

Consider the case of a common caterpillar pest in Bangladesh; this pest can destroy an entire eggplant crop if it is not controlled. For this reason, farmers spray very powerful insecticides several times a week. When infestations are bad, they spray the crops twice a day. We know that some insecticides can be very harmful to human health, especially when farmers and their families fail to use proper protection. The World Health Organization estimates that three hundred thousand people die every year because of misuse of insecticides.

As a scientist, I believe that we should celebrate scientific progress and use the most appropriate safe technology to advance the goals of sustainable agriculture. It is our responsibility to use our discoveries to alleviate human suffering and safeguard the environment.

To reduce chemical sprays on eggplant fields, a team of Cornell scientists working with Bangladeshi scientists decided to try a genetic approach that builds on an organic farming technique. Organic farmers often spray an insecticide called Bt, *Bacillus thuringiensis*, produced from bacteria. Bt is highly specific to caterpillar pests, but it is nontoxic to humans, fish, and birds; in fact, it is less toxic than table salt. This strategy, however, doesn't work well for eggplant farmers in Bangladesh, because Bt is difficult to find, expensive, and doesn't prevent the insect from getting inside the plant. With genetic engineering, scientists are able to cut the gene from the bacteria and insert it directly into the eggplant. After two years of field trials, researchers were able to ask farmers about the results. They have reported that they have been able to reduce their insecticide use, often down to zero. Further, they can save their seeds and replant each year.

People ask me how we can know, with certainty, that it is safe to eat new genes in our food. Genetic engineering has been used for over forty years – in medicine, in the production of cheese – and without much controversy. In all that time, there hasn't been a single instance of harm to human health or the environment. And after twenty years of study and rigorous peer review by thousands of scientists, every major scientific organization in the world has concluded that the crops that are currently on the market are safe to eat, and that the process itself of genetic engineering

is no more risky than conventional methods of genetic improvement. These are the same organizations that most of us trust when it comes to other scientific issues, like the safety of vaccines or the changing climate.

Each crop has to be looked at on a case by case basis. The FDA doesn't use the term "GMO," because it is so difficult to define. In my experience, the term "GMO" means something different to each person.

Instead of worrying about the genes in our food I believe that we need to focus instead on the three pillars of sustainability: the social, economic, and the environmental impacts. We must be sure that the poor have access to plentiful and nutritious food. We must ask if farmers in rural communities can thrive. We must make sure that everyone can afford the food. And we must minimize environmental degradation. We have a huge set of challenges in front of us. As a scientist, I believe that we should celebrate scientific progress and use the most appropriate safe technology to advance the goals of sustainable agriculture. It is our responsibility to use our discoveries to alleviate human suffering and safeguard the environment. ■

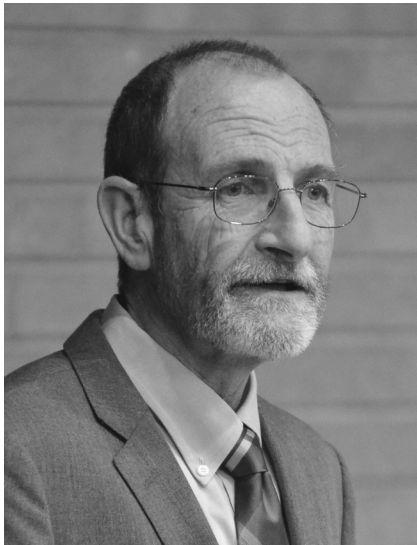
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To view or listen to the presentations, visit <https://www.amacad.org/consensusandcontroversy>.

Water: California in a Global Context

On February 2, 2016, **Christopher B. Field** (Founding Director of the Department of Global Ecology at the Carnegie Institution for Science and Melvin and Joan Lane Professor for Interdisciplinary Environmental Studies at Stanford University) and **Anna M. Michalak** (Faculty Member in the Department of Global Ecology at the Carnegie Institution for Science and Associate Professor in the Department of Earth System Science at Stanford University) led a panel discussion on *Water: California in a Global Context* with **Annie Maxwell** (President of the Skoll Global Threats Fund), **Joya Banerjee** (Senior Program Officer at the S. D. Bechtel, Jr. Foundation), **Holly Doremus** (James H. House and Hiram H. Hurd Professor of Environmental Regulation, Associate Dean for Faculty Development and Research, and Faculty Co-Director of the Center for Law, Energy, and the Environment at UC Berkeley School of Law), and **Isha Ray** (Associate Professor of Energy and Resources at the University of California, Berkeley and Co-Director of the Berkeley Water Center). The program, which served as the Academy's 2032nd Stated Meeting, followed from the Summer 2015 issue of *Dædalus* "On Water." The meeting included a welcome from **Jonathan F. Fanton** (President of the American Academy). The following is an edited transcript of the discussion.



Christopher B. Field

Christopher B. Field is Founding Director of the Department of Global Ecology at the Carnegie Institution for Science and Melvin and Joan Lane Professor for Interdisciplinary Environmental Studies at Stanford University. He is a guest editor, with Anna M. Michalak, of the Summer 2015 issue of Dædalus "On Water." He was elected a Fellow of the American Academy in 2010.

Warmer conditions drive greater amounts of evaporation. Greater amounts of evaporation mean less water in the soil, less in the lakes and rivers, and less runoff. So a warmer climate will always, as a result of increased evaporation, tend to push you toward drought.

In California, water is probably the topic we talk about more than any other. A few months ago people were talking about when will it ever rain, and now people are talking about when will it ever stop.

We have gathered this evening a group of water experts who approach the issue of water from a wide range of perspectives. We tend to think about water problems, but we rarely think about water opportunities. One of the things we will try to unfold in the conversation tonight is the science of water challenges: the physical and the human dimensions, but also the opportunities for solutions that involve legislation and collective action as well as engineering approaches.

More than anything else, we hope to transition from understanding water as primarily a problem to a balanced perspective that considers not only the problems but the solutions.



Anna M. Michalak

*Anna M. Michalak is a Faculty Member in the Department of Global Ecology at the Carnegie Institution for Science and an Associate Professor in the Department of Earth System Science at Stanford University. She is a guest editor, with Christopher B. Field, of the Summer 2015 issue of *Daedalus* “On Water.”*

As Chris mentioned, we have been talking about the drought in California for several years now, and I think most of us were actually asked to cut down on our personal domestic water use by a quarter to a third over the course of last summer. But now we are in the midst of this El Niño period, and news reports are suddenly focusing on the risk of flooding.

When either of these topics comes up, people tend to talk about them within the context of climate change, but how can both droughts and flooding be related to anthropogenic climate change? And are we really now in a period where any unusual weather event can be attributed to climate change, or do we need to consider other connections, especially within the context of California?

Christopher B. Field

As a specialist on climate change I am often confronted with the accusation that any unusual weather event gets attributed to climate change, but the fact of the matter is we really do know a lot about how climate change causes both droughts and floods. I want to talk about two mechanisms that cause droughts and two mechanisms that cause floods, both of which are important and pervasive.

The first important mechanism that drives a warming climate to produce droughts is that warmer conditions cause more evaporation. For water users ranging from plants to industry to people, the question is not how much water goes into the environ-

wintertime temperatures in California from below freezing, when we can acquire a snow pack, to above freezing, when we lose a snow pack. The recent conditions of severe water constraint in California have been driven mostly by the lack of snow pack – even more than by lack of precipitation.

What about floods? A warmer climate also will always generate more precipitation at the global scale. Evaporation is what drives water into the atmosphere, but it has to come out someplace. The problem is that it doesn’t always come out where it evaporates, and the atmosphere has a powerful ability to move water around. Even though more water is going to be deposited on average, it doesn’t come down in the same places it goes up.

As the atmosphere is warming, it is being supercharged to be able to deliver water in heavy rainfall events, the kind of events that can cause flooding.

ment but how much stays for all of the users to use. Warmer conditions drive greater amounts of evaporation. Greater amounts of evaporation mean less water in the soil, less in the lakes and rivers, and less runoff. So a warmer climate will always, as a result of increased evaporation, tend to push you toward drought.

A second factor that is really important, especially in a place like California, is that the snow pack is a critical component of our water storage system. We tend to think of it almost as water storage infrastructure, but it is really a fee subsidy provided by nature. And in California we have the fortunate circumstance of wonderful weather, with temperatures barely below freezing even in the mountains in the winter.

This has created some of the world’s best skiing environments, but it also means that only a small amount of warming transitions

A second factor that causes climate change to be associated with floods has to do with the fact that a warmer atmosphere can hold more water vapor. The effect is really strong. One degree Celsius of warming increases the amount of water that the atmosphere can hold by about 6 percent.

So as the atmosphere is warming, it is being supercharged to be able to deliver water in heavy rainfall events. What we have seen globally is a dramatic increase in the fraction of total precipitation that is occurring in the heaviest rainfall events. It is not that most places on earth are seeing more rainfall – a few are – but that almost everywhere more and more of the rainfall is coming in the heaviest events, the kind of events that can cause flooding.

More evaporation and less snow pack tend to emphasize drought, but more precipitation overall and the greater ability of

the atmosphere to hold water and deliver it in heavy rainfall events are causing floods. So you get both droughts and floods.

Anna M. Michalak

Holly, Chris has just described drought as well as flooding from a very scientific perspective, but I would imagine the definition of what a drought is depends on your context and perspective. When we think about drought within a policy context, does it differ from Chris's scientific description? Chris also argued that droughts can occur as a result of manmade climate change. Can they be manmade in other contexts, too, such as in a regulatory context? And how does that relate, if at all, to what we are seeing in California?



Holly Doremus

Holly Doremus is the James H. House and Hiram H. Hurd Professor of Environmental Regulation; Associate Dean for Faculty Development and Research; and Co-Director of the Center for Law, Energy, and the Environment at UC Berkeley School of Law.

The question of what a drought is and how we define a drought brings up one of my personal obsessions, which is that if we want to solve a policy problem we need to understand what it is. We need to know its contours. We need to be able to define it, at least roughly, and we need to be able to identify its causes in order to make progress.

If you go to the U.S. drought monitor website, which I highly recommend, it has great pictures of how bad the drought is. Based on those graphics, you might think that what a drought is and how severe it is are questions with only one type of answer: a numeric answer that can be easily represented in striking colors. That is not true, though.

There is no single agreed definition of what is a drought, and there never has been. In a classic paper from 1985, Donald Wilhite and Michael Glantz scoured the literature to

If the first feature of a drought is that demand exceeds supply, that means droughts absolutely can be human caused.

see how many definitions of drought they could find. They found more than 150 definitions, which varied depending on the perspective of the definer. Today, 30 years later, there are many more definitions.

For policy purposes, I think two main features define a drought. First, demand for water exceeds supply. And second, the condition of demand exceeding supply is not the norm. Something unusual is causing that to be the case.

If the first feature of a drought is that demand exceeds supply, that means droughts absolutely can be human caused. In fact, since people determine the demand for water, every drought is at least to some extent human caused. People determine how much water is needed for agriculture, how much is needed for industry, how much is needed for cities.

We even decide how much water is needed for fish. The fish might disagree, and they might have problems if human beings decide fish don't need as much as the fish think they need, but those decisions are in our hands and how much we think those fish deserve has changed over time.

Since people control demand, people control whether demand exceeds supply. People also control some aspects of supply. Not all aspects – although people can affect even the rain in ways they might not intend or realize – but people can directly affect supply through plumbing.

In California we are fortunate enough to have a giant free reservoir in the Sierras, or

at least to have *had* a giant free reservoir in the Sierras, but we also have big concrete reservoirs, and we have channels that move water all over the state, which means we are controlling supply, where it goes and how much. So droughts are not solely acts of God. They may be partially acts of God or nature or whatever, but they are always also partially acts of humanity.

The second feature of drought is that the condition of demand exceeding supply is not the norm. We don't think of drought as the usual condition for any part of the world. The term "drought" carries the implication of a temporary emergency. The distinction between emergencies and the norm is important to envisioning solutions to drought, in both a substantive and a procedural sense.

The term "drought" carries the implication of a temporary emergency. The distinction between emergencies and the norm is important to envisioning solutions to drought, in both a substantive and a procedural sense.

If demand temporarily exceeds supply, that argues for one set of responses. It argues for advance emergency planning for what to do if the rains don't come. It argues for providing disaster relief for people who are affected, who lose their livelihoods in a dry year. It argues for making easier the switch from one water source to another. In California we have historically made it quite easy to switch from surface water to groundwater, which is great if droughts are occasional and not too deep.

But if the world we are in today is the new normal – if California is going to get a lot less precipitation or parts of California are going to get less precipitation, or if the precipitation is going to fall as rain instead of

snow, or if we are going to get it in different seasons – that argues for different substantive solutions.

We might have to reallocate water rights. We might have to put caps on population growth, on how many people can live in various cities. We might have to impose new conservation regulations.

There is also a difference, I think, in the procedural way we approach temporary emergency conditions versus the new normal. With emergencies we understand that some of our ordinary decision-making rules should not apply because we have to do things in a hurry and perhaps without the level of deliberation we would otherwise use. But for the new normal we should not be constantly acting on an emergency basis, an emergency footing.

The governor of California, starting in January 2014, issued orders declaring that we are in a drought emergency, and those orders have allowed more flexibility in some of our laws. I think that is unobjectionable for an emergency, for a temporary situation, but if this is the new normal, we should make a new set of decisions differently.

Anna M. Michalak

Chris and Holly have talked about water from the perspective of too much or too little and how both of those conditions can be problematic. Another dimension to this discussion is water quality. Water is usable, whether by a plant, an animal, or a person, only if it is actually clean enough to use.

We need to consider the different scales at which human action impacts water quality as well as water quantity.

Last summer a toxic algal bloom on the west coast of the United States stretched from southern California all the way to Alaska. Consequences of that bloom ranged from fishery closures to sea lions that developed permanent neurological damage and seizures after eating fish that had consumed the toxins from the algal bloom.

In 2014, the water supply for Toledo, Ohio, was completely shut down for two or three days after a different species of phytoplankton caused the concentration of toxins in the city's water to reach levels tenfold higher than the World Health Organization standard. Today the city of Flint, Michigan, is experiencing its own tragic water crisis.

As we think about water, both in California and around the world, we need to consider water quality as well as water quantity. In thinking about our role in maintaining the usability of water, we need to consider the different scales at which human action impacts water quality as well as water quantity.

At the climatologic scale, changes in climate can affect not only water quantity, but also water quality. The harmful algal bloom that occurred last summer on the west coast of North

America is an example of how climate variability can impact water quality. The unusually warm waters along the West Coast likely created perfect conditions for the kind – and scale – of toxic bloom we saw last summer.

At the intermediate or regional scale, how we address land management has a huge impact on water quality. For example, the amount of fertilizer used in the agricultural sector can lead to excess nutrients in streams, lakes, and coastal areas. In the Great Lakes region, the runoff of phosphorus from agricultural fields is creating toxic algal blooms in Lake Erie year in and year out. The exact size and where they occur might change, but every year Lake Erie experiences a toxic algal bloom.

At the local scale, we often believe that municipalities are directly responsible for insuring a dependable source of safe water to residents. To me that point should be obvious, especially in a developed country such as the United States. But, as we have been seeing in Flint, Michigan, that is not a given to the extent we might think it ought to be.

Water quantity and water quality need to be thought about together when we think about water sustainability and water usability. Human activity affects the quality of water in ways we might not immediately think of and at scales we might not imagine – whether at the scale of the water at our tap or at the much vaster scale of water quality being affected by climate variability and climate change.

The example of Flint, Michigan, resonates with environmental justice issues. We usually think of access to safe water as a problem of developing countries, but is it also relevant to California? How do issues of equity and justice play out in California when it comes to accessing safe and plentiful water? How do these issues play out in California compared to other parts of the world?



Isha Ray

Isha Ray is Associate Professor of Energy and Resources at the University of California, Berkeley and Co-Director of the Berkeley Water Center.

Safe drinking water or the lack of the right to safe drinking water is, in the main, a problem of developing countries. When I started work in California, however, my colleagues and I found that, even though this right is granted to most Californians, maybe greater than 98 percent, it was not enjoyed by 100 percent of them. So where are these 2 percent of Californians? Why don't they have safe drinking water? And what happens when people don't have safe drinking water?

For the most part, these 2 percent of Californians who do not have safe drinking water live in the Central Valley. I gradually realized California is not as developed as I thought it was.

The Central Valley is beautiful and very agricultural. It also has the highest levels of nitrates in the groundwater of any place in California. And it is home to a significant Latino population that has been settled there for a long time. They are not necessarily recent migrants. They are often home-

For the most part, the 2 percent of Californians who do not have safe drinking water live in the Central Valley, which has the highest levels of nitrates in the groundwater of any place in California.

owners who have lived in the Central Valley for generations. Some of these communities started out as labor camps and then became farm worker communities.

Groundwater is the main source of drinking water for these people. Over 95 percent of the valley is dependent on groundwater. Even though several canals pass through the valley, residents, as opposed to farmers, have no right to touch that water. So they depend on groundwater. But the groundwater has very high levels of nitrates, regularly exceeding the maximum contaminant level, above which you can have blue baby syndrome if a very young child drinks that water. The groundwater also regularly exceeds the maximum contaminant level for arsenic.

Where do the nitrates come from? From agriculture, specifically the type of high-chemical-use agriculture the Central Valley has practiced for decades. (Arsenic is much more naturally occurring, so you can't blame arsenic contamination on human action to the same extent you might be able to blame high nitrate concentrations.)

What made this an environmental justice problem? When my student, my colleagues, and I started our work in the Central Valley, the dominant thinking was that small community systems would be the ones to get stuck with the nitrate and arsenic prob-

lems because they don't have the economies of scale needed to tackle the problem and actually solve it. What we found within these small communities was a clear racial divide. Areas with large Latino populations that depend on community water systems have a much higher likelihood of high rates of nitrates in their water than areas that are not predominantly Latino. Similarly, areas with predominantly Latino populations and low rates of home ownership – that is, with greater relative poverty (since home ownership is a proxy for wealth) – also had a higher likelihood of exceeding the maximum contaminant standards for arsenic.

After establishing what was happening, we asked, why? Why, despite the Safe Drinking Water Act, did these inequalities exist, and why had they persisted for decades?

The Safe Drinking Water Act wants water systems, system by system, to be responsible for the quality of their drinking water. But in small, poor systems in communities where not everybody speaks English well, there is no single entity able to cope with the scale and nature of the problem.

What we did not find was an egregious situation like in Flint, Michigan. Instead we found that no single entity was able to cope with the scale and nature of the problem. It was nobody's "mandate." The Safe Drinking Water Act wants water systems, system by system, to be responsible for the quality of their drinking water. But these are small, poor systems in communities where not everybody speaks English well. So they often are not able to make their case well enough – they cannot write a two-page proposal in English – to get some of the money that has been set aside for the small systems of California. The issue is not that no mon-

ey has been set aside but that these communities are not in a good position to lobby for that money.

The regulators at the county level know what is going on. They are frustrated because they know these people pay taxes, their children go to school with the regulators' children, but they cannot do anything for them. Why not? Because they are so underfunded, they are cherry-picking what they can do. They are coping the best they can with the funding they have, but that funding just doesn't stretch to all of these small, affected systems.

So what are the households doing? They can see what their water is like. Sometimes they can smell what their water is like. So they are buying water, which means they have two water bills, the utility bill and the

what solutions are not being proposed, we need to keep these small communities in mind, because on a system by system, contaminant by contaminant basis the Safe Drinking Water Act cannot actually be fulfilled in these communities.

Anna M. Michalak

Annie, you lead a philanthropic organization that describes its mission as "confront[ing] global threats imperiling humanity by seeking solutions, strengthening alliances, and spurring actions needed to safeguard the future." One of your areas of focus is water security. Given the drought and water supply issues here in California, how do you think about California's situation in relation to the global context? Do you think the problems we are experiencing in California are unique, or are they universal? And what strategies do you think might be effective at tackling these kinds of complex problems?

bottled water bill. In the poorest neighborhoods, the total of these bills is reaching approximately 7 percent of monthly income. The Environmental Protection Agency says the most a household should have to pay for its water is 2.5 percent of monthly income. Most of us pay much less than that, and 7 percent would feel like a fortune. For the people in these communities, 7 percent really is a fortune.

Unfortunately, this is the situation we find not just in the Central Valley, but in hundreds of small communities around the United States. As we think through what water solutions are being proposed and



Annie Maxwell

Annie Maxwell is President of the Skoll Global Threats Fund.

What is happening in California is highly relevant to the global context. Three images come to mind that I think really capture the issue. The first is of California Governor Jerry Brown last April standing in a dry, barren field in the Sierras, a field that in April is normally covered in several feet of snow. The governor was there to announce his historic restrictions on water usage. At the time, the Sierra snowpack measured just 5 percent of normal (compared to the previous record low of 25 percent). California was facing an epic drought.

This image shows that we can no longer look to the past to understand the future. Climate change is already contributing to greater uncertainty and variability about when and where water falls and in what form, whether snow or rain. So as we think toward solutions, we have to focus not only on the science and the modeling, but also on the tools and techniques we have to plan for the future.

At the Skoll Global Threats Fund one of the things we have looked at is the security

Climate change is already contributing to greater uncertainty and variability about when and where water falls and in what form, whether snow or rain. As we think toward solutions, we have to focus not only on the science and the modeling, but also on the tools and techniques we have to plan for the future.

space and how we can use war gaming and scenario planning to better understand the impacts of climate change in the far future. I often think back to the 9/11 Commission Report, which, despite being a very thick report, managed to capture in one line what had gone wrong with U.S. security: It was a failure of imagination. With climate change and the water challenges we are facing, we have to think about both the scientific foundation and how we capture our own imagination in thinking about the problem and the solution.

The second image I have in my head is of Alan Kurdi. He was the Syrian boy who washed up on the shores of Turkey. His journey out of Syria was driven by years of unrest and violence that have plagued the Middle East, but many scholars, journalists, and politicians have also pointed to the role of drought, in fact the worst ever recorded in the Middle East, as one of the catalysts of unrest in Syria.

For me, Alan's story is a reminder that we live in an increasingly interconnected and interdependent world. And while the rapid exchange of goods, information, and ideas has brought a lot of wealth to people, including many who live here in Silicon Valley, we also now face a network of risks in which floods in one region of the world may lead to high food prices in another, in which a drought in one region or country can contribute to migration to neighboring regions or countries.

Solving such a complex problem is going to involve looking not just at rainfall, not

just at the metric measurements we traditionally use when thinking about drought, but also looking at the complex water system in which we operate.

California presents an incredible opportunity to think about such systems, because our agriculture is connected to a larger global economy. We do not exist as an island. You cannot talk about water rights without also talking about exports to China, for example.

We also now face a network of risks in which floods in one region of the world may lead to high food prices in another, in which a drought in one region or country can contribute to migration to neighboring regions or countries.

I was born and raised in Santa Barbara, California, and one of the many things our city is known for is a defunct desalination plant. What this image means to me is not that desalination doesn't work or isn't important but that in order to solve these sorts of issues we have to think of the complexity of the problem and the complexity of the

solution. If we think we are going to solve our way out of this with a single technology and without thinking about interconnect- edness, we are going to be in a lot of trouble.

We have to be creative in how we define the problem, and we have to understand the complexity on both the problem side and the solution side. And we have to figure this out in California. Our state is incredibly well resourced, whether at a state level, in our local communities, or in our academic communities. If we don't figure this out, not only will California be in trouble; the whole world will be in trouble.



Joya Banerjee

Joya Banerjee is a Senior Program Officer at the S. D. Bechtel, Jr. Foundation.

Anna M. Michalak

Joya, you are also based at a philanthropic organization, and your specific focus is to catalyze advances in integrated management of California's water resources. From where you sit looking at the state's water challenges and solutions, is the glass half full or half empty? If it is half empty, what keeps you up at night? If it is half full, what makes you feel optimistic despite everything the rest of us have said thus far?

Water is a system, and we need to be thinking about it as a system. Here in California, the complex array of laws, institutions, and infrastructure that is our present-day water management system developed over a century. It reflects our semiarid climate. It reflects an ambitious and evolving economy, and it reflects shifting cultural norms and priorities. And it is not all bad. California's water management system has enabled incredible economic growth, it supports 30 million people, and in many ways it is the envy of developing countries. But the system is failing us for many reasons.

We are overpumping our groundwater basins to the point that land in the Central Valley is sinking due to subsidence. Our streams are being depleted, and we may lose iconic species like our salmon and steelhead. Farms are being fallowed, especially in the Central Valley, and people are losing their jobs. Entire communities lack access to safe drinking water.

When it comes to water, California has a nineteenth-century set of laws, uses twenti-

In 2014, California passed a sustainable groundwater management act that requires local basins to bring their basins into balance and to manage them sustainably.

eth-century infrastructure, and faces twenty-first-century challenges. Californians are concerned and for good reason. A recent poll by the Public Policy Institute of California asked respondents to name the number one issue the governor and the legislature should work on this year. Drought and water topped the list.

If you dig into those survey results, you find they don't follow partisan lines. Drought and water are not a Republican issue; they are not a Democratic issue. They are an issue for Californians – and, really, the globe.

What can be done? Water is at the core of so many of the issues California is grappling with; it impacts the environment, people, health, and energy. Because of this, finding solutions can seem too hard, too complicated. As someone recently told me, "Water has too many entrenched interests, and I just don't see a path forward."

My response was that you need to look more closely at what is happening. Take time to look, and you will see remarkable examples of progress. If you look north to the Sacramento Valley, you will see conservation organizations and rice farmers working together using crowdsourced data, scientific analysis, and economic incentives to flood fields in a way that supports a thriving agricultural economy but also provides critical wetland habitat for migratory birds.

Look south to Los Angeles, often known as the villain in California's water wars, and

There are remarkable examples of progress in California: Los Angeles is becoming a global leader in urban water management because of what they are doing on conservation and efficiency, but also what they are doing with projects to collect storm water, slow it down, clean it up, and put it in the ground for future use instead of flushing it to the ocean.

you will see a city that is becoming a global leader in urban water management because of what they are doing on conservation and efficiency, but also what they are doing with projects to collect storm water, slow it down, clean it up, and put it in the ground for future use instead of flushing it to the ocean. That has water supply benefits, improves water quality, and provides open space in traditionally park-poor neighborhoods in Los Angeles.

Look to Sacramento, where California's leaders have come together in recent years to do some really impressive things. In 2014, the state passed a sustainable groundwater management act that requires local basins to bring their basins into balance and to manage them sustainably. Prior to 2014, groundwater was not regulated in California and was often seen as the "third rail" in California water politics.

So, yes, I am an optimist, because in each of these examples – and in many more both in California and well beyond – you can find perseverance, you can find creativity, you can find ingenuity, and you can find incredible leadership. That gives me plenty of reason to think the glass is half full.

Anna M. Michalak

Water issues do not occur in isolation. They are linked to issues of food, issues of energy, issues of security, and so on. How are these linkages manifested in California, specifically within the context of the drought and El Niño conditions we have seen over the last few years?

Christopher B. Field

We often write about the nexus of water, energy, climate, and food, and without question we are looking at a series of densely interconnected linkages between water that is available for urban areas, water that is available for manufacturing, and water that is available for agriculture. Agriculture tends to dominate California's water demands, which means that being more efficient with agriculture can release a large fraction of other users' water demands.

In addition to the connections between water and human health, one other set of connections I encourage people to think about are social and economic teleconnections. The concept of teleconnection comes up in climate science, where we might talk about an El Niño event in the eastern Pacific causing a decrease in corn yields in eastern Africa. More locally, we might see that changes in the amount of lettuce that can be grown in California impacts food prices

in Texas, which has implications for how many people are moving back and forth across the border with Mexico. In a world that is as densely populated and as densely interconnected as ours is, we need to recognize that every issue has the potential to spiral into a global set of teleconnections.

Annie Maxwell

Something that sometimes gets lost in the nexus conversation, or even in the human health conversation, is what we are seeing with emerging infectious disease. Part of the reason we are seeing diseases like Zika and chikungunya emerge or have the potential to emerge in the southern United States is because we are seeing changes in climate.

Many of these emerging diseases are mosquito borne, which means that for them to emerge you need a habitat in which mosquitoes can live. Some of the interventions we talk about for addressing drought involve rainwater collection and standing water. Mosquitoes like standing water.

As we seek solutions, we need to think about connections like this. And we need to get a handle on things sooner rather than later, because the complexity is only spiraling out of control. ■

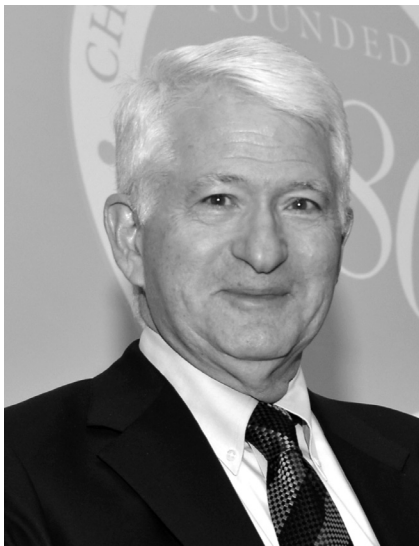
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To view or listen to the presentations, visit <https://www.amacad.org/watercalifornia>.

From Local to Global: Public Research Universities in the 21st Century

On February 4, 2016, the Academy hosted a meeting at the University of California, Los Angeles, on public research universities in the twenty-first century. The speakers included Gene Block (Chancellor of the University of California, Los Angeles), Marcelo Suárez-Orozco (Wasserman Dean of the UCLA Graduate School of Education and Information Studies), and Kim A. Wilcox (Chancellor of the University of California, Riverside). The program, which served as the Academy's 2033rd Stated Meeting, included a welcome from Jonathan F. Fanton (President of the American Academy). The following is an edited transcript of the discussion.



Gene Block

Gene Block is Chancellor of the University of California, Los Angeles. He was elected to the American Academy of Arts and Sciences in 2010.

Our discussion today goes to the heart of our identity as a public research university that is both local and global. That dual mission is a challenge and creates tension among our stakeholders. We must ask ourselves, as others are asking, what is the value proposition?

This year, UCLA received 97,000 applications for admissions. We will accept international students and nonresident domestic students, and not every qualified California resident will gain entry. Why are we educating international students when our

As a public institution, we are an engine of social mobility and economic opportunity, especially for deserving students from underrepresented populations, and much of the underrepresented population we serve comes from within the state.

own daughters and sons can't get in? I hear this regularly.

Why are faculty engaged in research in Asia and Africa when we have enormous problems right here in Los Angeles? Why are we so distributed in our research interests? These are important and relevant questions that we need to address before others come up with their own answers.

Adding to this tension, the California legislature has introduced legislation that would cap nonresident undergraduate enrollment in the University of California (UC) system at its current level of 15.5 percent for the nine undergraduate campuses. Assembly Bill (AB) 1711 would also require that 50 percent of revenue from international and out-of-state students be used to support the enrollment of more California students at all UC campuses. Should AB 1711 become law and were UC to exceed the imposed cap on nonresident students, the state legislature could withhold funds from the university.

I was struck by a comment made by one of the bill's sponsors. He was quoted in the media as saying, "Out-of-state and interna-

tional students enhance college campuses by bringing a diversity of experiences and perspectives." I agree with that; however, enrollment of nonresident students cannot come at the expense of access for Californians. How can we manage our responsibilities to a region and a state along with our efforts to remain competitive on the international stage?

As a public institution, we are an engine of social mobility and economic opportunity, especially for deserving students from underrepresented populations, and much of the underrepresented population we serve comes from within the state. Our healthcare and other human services improve the lives of countless members of our community.

We address big city challenges, from pollution to poverty. Our extension programs provide personal development and professional advancement to thousands who are striving to get ahead in life. UCLA's extension service is one of the nation's largest providers of professional continuing education, offering over five thousand diverse courses per year and serving approximately thirty thousand people as part of our ex-

We need to demonstrate to the public that the presence of international students and faculty enriches the classroom experience by teaching our local students about diversity and the increasing globalization of research.

tensive local role. Most important, we educate our students to be good citizens, people with an orientation toward service who participate fully in civic life.

A myriad of national college rankings track our efforts as a public university, applying a diverse set of metrics, many of which are important to the state. For instance, *Kiplinger's Personal Finance*, in its ranking of the best college values, takes into account admissions and retention rates, student-faculty ratio, and four-year graduation rates, as well as tuition and data on financial aid, and student debt load upon graduation.

Kiplinger's also looks at the financial outcomes for students who receive federal financial aid, using a salary yardstick to estimate the median earnings of each university's former students ten years after they enrolled in the institution. Other well-known national rankings focus on freshman retention rates or the economic diversity of the student body.

The metrics for measuring global excellence and influence are strikingly divergent from those used for national models. International rankings such as the *Times Higher Education World University Rankings* and the *Shanghai Jiao Tong University Academic Ranking of World Universities* do not recognize the many ways public universities serve the local community.

Instead they tend to focus on the research power of institutions, measuring research productivity, tallying citations and scholarly publications, and tracking research funding. Whatever one thinks of them, they have

increased in number and importance, and they affect our reputation and our ability to attract top students and faculty.

The challenge for us as leaders and faculty is to find a creative way to reconcile the local and the global roles of our institutions, especially in the minds of the general public for whom the value proposition of the public research university is not always clear. Many California citizens struggle to understand why we accept international students, why we are spread all over the world when so much needs to be done right here.

We need to demonstrate to the public that the presence of international students and faculty enriches the classroom experience by teaching our local students about diversity and the increasing globalization of research. Employers are looking to hire graduates who have cross-cultural competencies that enable them to learn and adapt to new situations and surroundings. Exposure to an international student body helps develop these skills.

We must show taxpayers that many of our international students will eventually settle in the United States. They represent a real potential for strong immigration to the state. But even those who return to their home countries may become our partners in international business, research, education, and healthcare – partnerships that can be valuable to our local economy.

We need to emphasize to our local community that research our faculty conducts overseas is directly beneficial to us here at home. From stopping the spread of pan-

demics to developing new solutions to issues that impact the environment, education, and the economy, this critical research activity has a local effect. Conversely, our local activities have global impacts. What makes for a better Los Angeles – in terms of sustainability, smart manufacturing, education, and disease prevention – makes for a better world as well.

We need to draw attention to and enhance the synergy that is present in this tension between the local and the global. We need to demonstrate that restricting one in favor of the other ultimately does a disservice to both. Let's pursue that synergy with all the creativity, focus, and vision we possess. This is our challenge. I think it is answerable, but we have to do a better job of explaining to our local community the importance of public research universities that have a truly global reach.



Marcelo Suárez-Orozco

Marcelo Suárez-Orozco is Wasserman Dean of the UCLA Graduate School of Education and Information Studies. He was elected to the American Academy of Arts and Sciences in 2014.

A few years ago, I was in Manhattan, Kansas, giving a university lecture on the anthropology of mass migration, the topic of my own scholarly work. After the lecture, after the dinner, after the receptions, I was politely asked by my host if I would mind spending an hour or so with the global education program office to talk about their global initiatives. From then on, I noticed a soft pattern.

Routinely during lectures, whether at Michigan State or the University of Nebraska or many other public and private research universities, the issue of globalization and global programs would come up. Even Santa Monica Community College here in Los Angeles advertises itself on NPR radio as a “global community college for the twenty-first century.”

To be a university, public or private, large or small, in the twenty-first century is to be in the business of global. The global now

In the twenty-first century, from the point of view of students, you are not having a culturally normative college experience if you don't have a menu of global options.

lives in the cognitive schemas, in the taken-for-granted practices of students, faculty, administrators, philanthropists, and many others. They live in these spaces for disparate and not always commendable reasons.

In the twenty-first century, from the point of view of students, you are not having a culturally normative college experience if you don't have a menu of global options. This is true in Manhattan, New York and in Manhattan, Kansas. This is actually less a case of “it's the economy, stupid” and more a case of “it's the culture.” To be a university now, to be a student now, is to have a global set of options.

In reflecting on the challenges and opportunities that public research universities face, I often get the feeling that what is true is not necessarily new, and what is new is not necessarily true. What we now call “global” is in the mitochondrial DNA of scholarship, of science, of the humanities, of the very spirit that animates the research university now and always.

We think of Einstein, von Neumann, and Gödel coming together at the Institute for Advanced Study to realize the brilliant dream of Abraham Flexner, Louis Bamberger, and Caroline Bamberger Fuld. We think of the Frankfurt School scholars at the University in Exile (The New School). We think of Claude Lévi-Strauss, and the other French intellectuals at the *École Libre des Hautes Études* during World War II. We think of the French, Lévi-Strauss, but also Fernand Braudel and Roger Bastide, along with scholars from Italy, Spain, Germany, and other European countries creating the nucleus of today's University of São Pau-

lo. We think of the Spanish Civil War refugees founding *La Casa de España en México*, which later became *El Colegio de México*. The list goes on and on. So when I hear the hype about NYU in Abu Dhabi or Yale in Singapore, my mind whispers, “Been there, done that.”

What do we mean by *globalization*? From the time you woke up this morning to the time you go to bed tonight, markets will have moved a trillion dollars, the equivalent of one-tenth to one-eighteenth of the entire U.S. economy, across national boundaries. That is the first of the three Ms of globalization. The second is media: the new information, communication, and media technologies that not only deterritorialize labor, which is new in human history, but also put a new premium on the knowledge-intensive work we do. The third M of globalization is mass migration, the human face of globalization.

This last M is, I believe, the most relevant to public research universities in our great cities in the twenty-first century. The dimensions of today's migrations are pharaonic, monumental. Over a billion people today live lives shaped by the experience of immigration, including 250 million transnational migrants – of whom, some 60 to 70 million, half women and children, have been forcefully displaced – and an estimated 800 million internal migrants.

By the middle of this century India alone will have migrated some 700 million people from the rural hinterlands to the cities, a population almost equivalent to two United States put together. In China, more children are impacted by immigration than there are

people in Canada, and hundreds of millions of people are separated from family members because one part of the family lives in Los Angeles, another in Armenia, another in Israel, another in Mexico, another in Guatemala.

For the first time in human history, every continent on earth is experiencing a mass movement of people. Unlike earlier mass migrations, however, such as those during World War II or the Cold War (e.g., the exoduses from Vietnam and Cuba), today's mass displacements of people result from collapsing or anemic states. We have all been witnessing the cataclysm unfolding in Europe as the displaced in Syria, Afghanistan, and Iraq (together representing 80 percent of new arrivals) seek new refuge.

Because of immigration worldwide, cities are more diverse than ever before. Leicester and Amsterdam will soon – probably this year – become the first European cities with nonwhite majorities. Europe's largest port, Rotterdam, is 45 percent immigrant. Frankfurt today is about 30 percent immigrant.

encompasses the entire range of the human condition. Although unique in human history, this is now the new normal. The same pattern was repeated this morning in Amsterdam, Rotterdam, and The Hague – and that's just the Netherlands.

Today Los Angeles is the world's second capital. Thomas Jefferson once said, "We all have two cities, our own and Paris." Today people around the world have two capitals, their own and LA. From Armenia to Korea, Mexico to Iran, Cambodia to Israel, LA is home to the second- or third-largest number of citizens of more than a dozen states. We are the other Armenia. We are the other Cambodia. We are the other Israel, the other Vietnam, the other El Salvador, the other Mexico.

University of California President Janet Napolitano says, "At UC, we teach for California. We research for the world." A way out of the contradictory demand to serve the local and remain players in the global is to create, to engineer more credible synergies between the global and our own backyards.

weekends to learn Spanish. He said, "You can't run the greatest city on earth if you don't speak Spanish in the twenty-first century." Secretary Clinton once told me that without Spanish you can't be an effective politician or a senator from New York City.

In the great cities of the twenty-first century, the global is the new local. We need to engineer better ways to make that reality work in the service of basic research, in the service of teaching, learning, creativity, and citizenship.

A way out of the contradictory demand to serve the local and remain players in the global is to create, to engineer more credible synergies between the global and our own backyards.

Sweden is a fascinating case. A century ago, Sweden sent over 1.5 million immigrants to the New World. Thanks to its 1.8 million new immigrants, it has now gained back nearly 100 percent of the population shed a century ago. In Stockholm today, 40 percent of schoolchildren come from non-Swedish refugee or immigrant homes.

In New York this morning, children from approximately 180 countries and territories got up, got into subways, got into cars, got into buses, and went to school. One city now

Better yet, the global in our backyard. Growing numbers of transnational citizens today live both "here" and "there." This is the fundamental reality of the twenty-first century.

Mexican history is made in Los Angeles. Haitian history is made in Miami. Dominican history is made in Manhattan. This, like the second law of thermodynamics, is not going away. You can't be a politician in the twenty-first century and not understand that. Michael Bloomberg once told me he would go to the Dominican Republic on the



Kim A. Wilcox

Kim A. Wilcox is Chancellor of the University of California, Riverside.

Most of us here are academics in one way or another. When we wear that hat, we can't do anything but agree that we have a responsibility to be globally engaged as universities in service to our students, our state, and our nation.

But I ask you to take off your academic regalia for a moment, put on a baseball cap, and imagine you are Joe- or Jane-six-pack. My mother, a daughter of the Great Depression, graduated valedictorian of her high school class of twenty-five people. Her father died when she was nine, and so she never researched going to college, never had a sense of what a university is or what it does. Let me tell you about a university as seen through my mom's eyes.

My university, the University of California, Riverside, is sixty years old, or about half as old as UCLA. We have twenty-two thousand students, a bit more than half of UCLA's forty-two thousand. And we are not too far away: an hour and 15 minutes some days, three hours on other days.

We all know the solutions. Find supportive and sustaining international partnerships. Find research collaborations that feed on one another so faculty members engage in a way that encourages students to engage. Create study abroad programs that complement that.

Our undergraduate student body is 97 percent California residents, 2 percent international, and 1 percent nonresident domestic. We are 86 percent students of color. We are 57 percent Pell eligible, the highest rate in the country. We are almost 60 percent first generation, and we are getting a lot of credit around the country for having graduation rates that are relatively comparable across all groups of students.

In most places, richer students graduate at a higher rate than poorer students, and African-American students don't graduate at the same rate as Caucasian students. At Riverside, they all graduate at about the same rate, which is amazing.

My mother would say, "Kim, you have done a great job. You are serving your state in a very inclusive way. You are assuring that students from all stripes and backgrounds succeed. I can't think of anything better for a state university to do than that."

Now put your academic hat back on.

I realize I basically have a large California high school running in Riverside. Most of the students are actually from Southern California. They have spent their whole life in the same political system, in the same environment, in the same culture with the same kind of people, first in grade school, then junior high, then high school, and now college.

If you think about the role of a public research university from the eyes of these students, I sincerely believe we have done our students a great injustice. People don't ap-

preciate how far behind California is in educational access at the advanced level. We are 47th in the nation in the percentage of our students who attend college, and 80 percent of those who do pursue a postsecondary education attend a public university: community college, Cal State, or UC. We owe it to the future of the state to think differently about this.

By running a large, research-oriented university that caters essentially to California residents, I am doing what my mother and many other citizens think is the right thing to do. But I know I am doing a disservice. So

We have a responsibility to be globally engaged as universities in service to our students, our state, and our nation.

what do we do? We all know the solutions. Find supportive and sustaining international partnerships. Find research collaborations that feed on one another so faculty members engage in a way that encourages students to engage. Create study abroad programs that complement that.

But those programs take investments. So now put on your chancellor's hat.

We probably receive between \$20,000 and \$25,000 more per student for an international student than for a California stu-

dent. If I had a thousand international students, that is as much as \$25 million. I could seed a whole bunch of the programs I need to make the environment whole for my California students. To get to where UCLA is, with about one-quarter of my students from outside California, I would need six thousand international students.

That is \$120 – \$150 million. Think of the transformation that sort of money would make on behalf of the twenty-two thousand California students who are there already, who will continue to be there. The rhetoric may sound like a chancellor grubbing for money, trying to balance a budget, but it is driven by an entirely different set of values. Part of our challenge in the twenty-first century as public research universities is to help shape that rhetoric in a way that is meaningful to all of our constituencies. I think it is clear that we have failed in large measure on this point.

Still, I have the benefit of being a part of the largest and best university system in the world. Many universities around the country don't have the research prowess Riverside does, they don't have the support systems Riverside does, but they have the same challenges, and their student populations are going to shape America in the future. As individual scholars and administrators we have an obligation, a responsibility, and an opportunity to think about this in the local sense. ■

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

The Federal Reserve as a “Political” Institution

Sarah Binder

When the Federal Reserve celebrated its centennial in December 2013, it bore only passing resemblance to the institution created by Democrats, Progressives, and Populists just a century before. In the wake of the devastating Panic of 1907, a Democratic Congress and President Woodrow Wilson enacted the Federal Reserve Act of 1913, overcoming Americans’ long-standing distrust of a national bank. As its name implies, the original Federal Reserve featured a decentralized reserve system with mixed public and private control of a new, elastic currency. Its Washington board also included the president’s top financial lieutenants. After the Fed failed to prevent the Great Depression of the 1930s, lawmakers rewrote the Act, centralizing control of monetary policy in Washington and taking tentative steps toward granting the Fed some independence within the government. Many decades later, the global financial crisis that began in 2007 tested the Fed’s institutional capacity to prevent financial crises. Congress again responded by significantly revamping the Fed’s powers – bolstering the central bank’s authority as a financial regulator while requiring more transparency and clipping its exigent lending powers. By the end of its first century, the Federal Reserve had become the crucial player sustaining and steering the nation’s economic and financial well-being – a remarkable progression given the Fed’s limited institutional beginnings.

What explains the Federal Reserve’s existential transformation? In ongoing work with Mark Spindel, former Deputy Treasurer and Chief Investment Officer at the World Bank’s International Finance Corporation, I explore political and economic catalysts that fueled the development of the Fed over its first century. Economic historians have provided excellent accounts of the Fed’s evolution and the successes and failures of monetary policy. Still, little has been written about *why* or *when* politicians battle with the Fed, each other, and the president over monetary policy and *who wins* these contests over the powers, autonomy, and governance of the Fed or *why*. Moreover, in the wake of economic and financial debacles in which the Federal Reserve is blamed, lawmakers often respond paradoxically by expanding the powers of the Fed and further concentrating control in Washington. Why do Congress and the president both reward the Fed with new powers and punish it for poor performance? In our research, we uncover the sometimes hidden role of Congress in historical efforts to construct, sustain, and reform the Federal Reserve. Contextualizing Congress’s role in driving the evolution of the Fed, we explain when, how, and why lawmakers seek to rebalance the tradeoff between the Fed’s independence and its accountability to Congress.

What does political science have to offer to a study of the Federal Reserve? After all, central banking is more often the preserve of macroeconomists and formal models of central bank decision-making. I would argue that studying the Fed from my van-

tage point as a student of American national institutions offers a new way to think about how politicians both empower and constrain the Federal Reserve. In short, digging up the Fed’s political history and examining its relationship with Congress over the Fed’s first century raises doubts about the Fed’s autonomy as a policy-maker and highlights the Fed’s reliance on political support for its policy choices, particularly in the wake of financial and economic crises when lawmakers blame the Fed for the economic morass. Here, I offer three contributions that political science can make to our understanding of the Fed and the politics of monetary policy in the United States.

First, acknowledging the Fed’s placement within a broader polity alters how we conceptualize the Fed as an institution. It is tempting to think of the Federal Reserve as an apolitical, technocratic institution divorced from the normal politics of policy-making in Washington. That is certainly the mental image that Fed officials would prefer we hold about the central bank. But the tense relationship between Congress and the Federal Reserve in the wake of the most recent global financial crisis reminds us that the Fed is inevitably a *political* institution. By labeling the Fed as “political,” I do not mean that the Fed’s policy choices are *politicized*. To be sure, policy-making within the Federal Open Market Committee (the Fed’s policy-making committee, more informally known as the FOMC) is rarely a matter of applying partisan prescriptions to generate FOMC positions, although accusations as such recur. Given internal frictions, especially during times of economic stress, the Fed chair faces the challenge of building a coalition within (and beyond) the FOMC to support a preferred policy outcome, just as committee or party leaders in Congress or Supreme Court justices

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work to secure majorities for their proposals or opinions. That said, the Fed is not a partisan body reflecting the views of presidents who appoint the Board of Governors or of boards of directors who select the reserve bank presidents who help craft monetary policy. Decision-making inside the Fed involves technocratic, macroeconomic policy expertise, even within a political institution.

Instead, I consider the Fed “political” because successive generations of legislators have made and remade the Federal Reserve System to reflect (often shifting) partisan, political, and economic priorities. Indeed, as the former chairman of the Fed’s Board of Governors, Ben Bernanke, emphasized at a ceremony in 2013 commemorating the Fed’s first centennial, the Federal Reserve’s power derives from and depends upon the support of elected officials precisely because the Fed is a product of and operates within the political system. Institutions are political not because they are permeated by partisan decision-making but because politicians endow them with the power to exercise public authority on behalf of a diverse and at times polarized nation.

Second, this perspective of the Fed as a political institution encourages us to think differently about central bank independence. Politicians face a dilemma in allocating power to a central bank. Given the impact on output, inflation, and employment, macroeconomic decisions made by central banks are among the most important policy choices rendered in a democracy. Monetary policy affects interest rates, which in turn shape the public’s borrowing costs, the availability of credit, and ultimately household wealth. As public demand for goods and services expands, economic growth ensues as businesses increase production and employ more workers. The dilemma arises from politicians’ electoral incentives, which lead them to want to stimulate the economy – particularly in the run up to an election. That short-term strategy, however, has long-term costs: it increases the chances of inflation and brings an inevitable economic recessionary payback.

The solution worldwide has been to insulate central bankers from political interference that might otherwise induce monetary policy-makers to keep interest rates too loose for too long. Indeed, many theorists of central bank independence suggest that lawmakers design central banks to constrain themselves from opportunistically inflating the economy for near-term electoral gain. Knowing that the economy will be better off in the future if inflation is tamed, politicians place their nation’s monetary printing press out of reach. And an added bonus: delegating monetary policy to an independent body prevents the opposition party from juicing the economy when it gains control of government. More autonomous central banks also offer convenient targets for politicians eager to avoid blame for a poor economy.

But a fully autonomous central bank is rarely politically optimal for legislators: independence precludes a role for lawmakers seeking re-election to oversee macroeconomic policy and to hold central bankers accountable for their policy choices. In short, lawmakers face a tradeoff between central bank independence and democratic accountability. Contrary to theory, lawmakers seldom sacrifice short-term interests for the longer view. The Federal Reserve Act has not been fixed in stone since its enactment in 1913: after sharp economic downturns, Congress routinely re-opened the Act to impose new responsibilities on the Fed, require greater transparency, and clip the Fed’s powers.

Third, paying heed to the Fed as a political institution helps us to identify the dynamics that underscore the Fed’s relationship with its congressional boss. In recent work, I show that congressional attention to the Fed is counter-cyclical. Efforts to rebalance the accountability and the autonomy of the Federal Reserve are directly tied to the Fed’s performance in sustaining the economy. In good economic times, lawmakers have little incentive to pay much attention to the Fed. But when the economy weakens, the Fed serves as a near perfect legislative punching bag. Faulting the Fed allows lawmakers to try to deflect blame from their own performance when the economy sours.

The counter-cyclical nature of congressional attention to monetary policy may seem obvious to legislative scholars accustomed to the pervasive impact of electoral motives on legislative behavior and outcomes. If there is little direct credit to be claimed when the Fed delivers a robust economy, then there is little payoff for electoral minded lawmakers to spend time or resources examining the Fed’s performance. But the counter-cyclical nature of congressional attention has an important, non-obvious implication for the nature of the Fed’s independence within the political system: Fed independence is strongest when congressional interest in monetary policy sinks. So long as the Fed delivers sound economic growth and stable prices, lawmakers rarely focus on the Fed’s conduct of monetary policy. Congressional indifference – not theory about economically optimal institutions – sustains central bank independence.

Ultimately, there is some irony in the Fed’s partial independence. In 1913, the framers of the Federal Reserve created a central bank to focus on the nation’s long-run financial and economic health. In writing the Federal Reserve Act, lawmakers devised a compromise intended to build durable political support for what was at the time a controversial idea: creating a central bank. Despite building an institution poised to secure financial stability in the longer term, legislators soon proved to central bankers that they were just as concerned about the short-term. The Fed found itself beholden to con-

gressional majorities who cared – and continue to care – at least as much about avoiding blame for a poor economy. Always a creature of Congress, the Fed has no choice but to ensure that it chooses policies broadly palatable to public and congressional majorities, lest Congress clip its powers or saddle it with even more responsibility.

As the Fed enters its second century, its leaders shoulder the burden of restoring the institution’s political capital and reputation in the long wake of the global financial crisis and Great Recession. Doing so will require the Fed to help engineer a full economic recovery by deciphering the macroeconomic mystery of low inflation, demand, and productivity that currently bedevils the economy and Fed policy-makers. Until a robust recovery takes root, the Fed will face continuing, and often conflicting, congressional criticism about the Fed’s preferred monetary policy path. All the while, the Fed’s weakened reputation leaves the institution vulnerable to legislative attack, which further weakens the Fed in public and political eyes. Ultimately, Congress’s counter-cyclical focus on the Fed endows it with independence when the economy is strong, but constrains it when the economy falters. At best, the Federal Reserve earns partial and contingent independence from Congress and therefore, some might reasonably conclude, barely any independence at all.

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The Journey Home

Felton Earls

Witnessing the death and destruction caused by Hurricane Katrina in my hometown of New Orleans a decade ago triggered an obligation to test the utility of all that I have learned in a long career as a public health scientist.

Looking back to my training in pediatrics and psychiatry, health became a more compelling concern than disease. It did not take long to decide that working in clinics and hospitals would not fulfill this aspiration. As I turned to the community and its institutions for answers, I recognized the need to extend my training to include population science and public health. Health promotion, as the process of enabling people to exercise control over the threats to well-being, became the discipline within public health that organized my thinking. This sense of purpose sustained me during the turbulent political climate of the 1960s and 1970s. Since then, I have spent decades searching for theories and methods to guide my understanding of how the social environment contributes to healthy growth and development of children in large cities.

In the early 1990s, I seized the opportunity to develop and direct the Project on Human Development in Chicago Neighborhoods (PHDCN). With substantial support from the John D. and Catherine T. MacArthur Foundation and the National Institute of Justice, the project was launched with the expectation that new knowledge on the causes of urban violence would be substantially advanced. As Principal Investigator, I became absorbed in forging a disciplinary alliance between public health and criminology, on the one hand, and sociology and psychology, on the other. This was a necessary starting point for progress to be made.

The study succeeded in launching a complex design in which a representative sample of Chicago's families and children were followed from infancy to adulthood. The personal development of these participants was evaluated within the distinctive neighborhoods in which they were growing up. Together with Academy Fellows Robert Sampson and Stephen Raudenbush, our report of the discovery of neighborhood *collective efficacy* was enthusiastically received.¹ This feature of neighborhoods is reflected in the willingness of residents to respond to social and physical threats of disorder and to take constructive, shared actions to achieve the common good. The attitudes and perception of adults toward the protection and supervision of local children is a key feature of collective efficacy.

This finding gives scientific credibility to neighborhood dynamics that operate beyond demographic characteristics, such as race/ethnicity and wealth, to impact levels of community disorder and violence. The same propensity that results in low rates of violence

proves to be beneficial for other health conditions, including birth weight, asthma, mental health, and age of sexual debut. Collective efficacy introduces a mechanism that could be the target of interventions to enhance health and well-being.

While entrenched in carrying out the PHDCN, I virtually ignored the historical United Nations endorsement of the Convention on the Rights of the Child (CRC) and its near universal ratification. It took nudging from Mary Carlson, my enduring companion and scientific colleague, to bring to light the potential significance of this manifesto to advance collective efficacy for children. The text of the CRC underscores a fundamental tension between the protection and participation rights of children.

By highlighting the protection and supervision of children, the PHDCN's finding on collective efficacy takes the perspective of adults. The potential contribution children can make to the common good was not taken into consideration in planning the study. Yet, the CRC's participatory rights require that the perspectives of children be given due weight in accordance with their age and maturity in efforts to enhance health and well-being. This unbalanced approach was recognized only after the PHDCN was in the field. While it was too late to include measures of collective efficacy from the child's point of view, we were able to make up some ground by engaging small groups of children in becoming active and informed participants in the research program.

Over the past decade, Carlson and I have been immersed in a study in which representative samples of young adolescents, ages 10 to 14, were provided with opportunities to be community agents in harnessing the progression of the HIV epidemic. A more balanced approach to the theory and measurement of collective efficacy was incorporated into this new study. This project was implemented and evaluated in Moshi, Tanzania, a municipality of 200,000 residents and 60 geopolitically defined neighborhoods.

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The research design was a cluster randomized controlled trial in which 30 of the municipality's neighborhoods were assigned to treatment or control conditions. In the treatment neighborhoods, young adolescents were engaged in a participatory curriculum. The modules of the curriculum were based on children learning to deliberate in groups, to know the political and civic structure of their communities, and to understand how to identify and address health conditions in their communities, such as HIV infection and malaria. They applied these skills in community-wide campaigns that engaged residents of all ages. Community drama was used to convey scientific facts of HIV infection and local health fairs were organized to promote HIV testing. The results of the trial went beyond our expectations by showing both enhanced self-efficacy of adolescents and higher levels of collective efficacy among adult residents.² Children had become recognized not just as effective health agents, but also as deliberative citizens.

In terms of amassing empirical evidence and articulating an ethical framework, the research has been gratifying. While the path charted by the findings from Chicago and Moshi may stimulate initial interest, they have not galvanized a firm belief in the capacity of children to effect social change among many of our colleagues. Sometimes I think our work would connect better to policy-makers and practitioners if we used expressions like social capital and building character rather than collective efficacy and deliberative citizenship. To do this, however, would undermine the importance of the ethical framework that guides our work.

What we have learned is that a developmental deficit, referred to as late social deprivation, is created by the failure to fully recognize the emerging social and cognitive capacities of children. This exclusion, or marginalization, as a function of age robs the larger society of the opportunity to promote the health and well-being of children and youth as well as the longer-term benefits of sustaining strong democratic ideals and practice.³

Much work remains to be done. Since 2006, Carlson and I have been making a determined effort to bring the 25-year experience of the research in Chicago and Moshi (and elsewhere) to bear on enhancing human development in the neighborhoods of New Orleans. As the city approaches its 300th anniversary, there is much to show in its commercial recovery from the devastation of the costliest hurricane ever to strike the United States. Yet, the majority African-American population remains heavily impacted by blighted neighborhoods, mass incarceration, pervasive unemployment, and the dismantling of neighborhood public schools. Our effort to apply the concepts of collective efficacy and child citizenship in New Orleans is severely challenged by the historical legacies of racism and its intersection with contemporary manifestations of ineq-

uity. The fact that this tragedy is on display in an advanced democracy, and in a place I still call home, makes it all the more compelling to settle.

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ENDNOTES

1. Robert J. Sampson, Stephen W. Raudenbush, and Felton Earls, "Neighborhoods and Violent Crime: A Multilevel Study of Collective Efficacy," *Science* 277 (1997): 918–924.
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Understanding Developmental Pathways from Adversity to Maladaptation, Psychopathology, or Resilience

Dante Cicchetti

I grew up in an Italian community in Pittsburgh, PA. Throughout my childhood, I was in contact with culturally and economically diverse groups, including children and families who were living in harsh conditions. Given these circumstances, I became consumed with understanding why some individuals function well despite experiencing significant adversity (known as resilience), whereas others get diverted onto lifelong negative pathways.

Much of my research has been influenced by my own experiences. Early encounters with poverty and harsh conditions played a major role in fueling my research on child maltreatment. I have always preferred addressing complexity over simplicity, and this has led to a multilevel approach in my research.

Virtually every biological and psychological system is impacted by pathogenic experiences in child maltreatment. This has allowed me to investigate the various multilevel mechanisms that contribute to resilience and psychopathology, and to translate this work into interventions that would help to allay the negative biological and psychological sequelae of child maltreatment.

Investigating the causes and consequences of child maltreatment by studying thousands of individual maltreated children, along with other topics I have examined for decades (e.g., depression, with and without maltreatment and trauma), also have contributed greatly to my personal growth by providing me with insight into the complexity of developmental processes. This insight has allowed me to devote time to developing and implementing developmentally sensitive, theoretically informed interventions that are designed and evaluated scientifically.

During my matriculation as a graduate student in the Developmental and Clinical Psychology programs at the University of Minnesota, I saw the importance of integrating the aforementioned fields of psychology into a unified perspective known as developmental psychopathology. Subsequently, during my first academic job at Harvard, I played a pivotal role in defining and shaping the field. I have continued to foster the growth of developmental psychopathology throughout my academic career from its roots at Harvard to the University of Rochester to today at the Institute of Child Development at Minnesota.

Although there is some divergence in defining developmental psychopathology, it can be conceptualized as an evolving scientific field that seeks to elucidate the interplay among the biological, psychological, and social-contextual aspects of normal and atypical development from infancy through senescence. A developmental analysis presupposes change and novelty, highlights the critical role of timing in the organization of behavior, underscores multiple de-

terminants, and cautions against expecting invariant relations between causes and outcomes.

My research has taken a multilevel developmental psychopathology perspective on the consequences of child maltreatment. Child maltreatment has been conceptualized as a pathogenic relational experience that represents one of the most adverse and stressful challenges that confront children. Child maltreatment constitutes a severe, if not the most severe, environmental hazard to children's mental and physical development. My research has shown that child maltreatment progressively contributes to compromised adaptation on a variety of stage-salient developmental tasks central to successful adjustment, including insecure attachment, difficulties in forming an autonomous sense of self, emotion dysregulation, problematic peer relations, behavior problems, and psychopathology.

These developmental failures pose significant risk for the emergence of psychopathology across the life course. In addition to the psychological consequences of maltreatment, a growing body of research has documented the deleterious effects of child abuse and neglect on biological processes. Multilevel investigations have been conducted recently that incorporate genetic, neural, physiological, and psychological domains in relation to maladaptation and resilient functioning.

The growth of basic research knowledge in developmental psychopathology has significantly exceeded its application to high-risk conditions such as child maltreatment and to mental disorders. To improve the health and well-being of individuals, scientific discoveries must be translated into practical applications. Translational research is defined as research designed to address how basic biological and behavioral processes inform the diagnosis, prevention, treatment, and delivery of services for mental illness and, conversely, how knowledge of mental illness increases our understanding of basic biological and behavioral processes. This formulation of translational research is in direct accord with principles of developmental psychopathology – namely, the reciprocal interplay between basic and applied research and between normal and atypical development.

Translational research is needed to impart more scientific knowledge of genetic, neurobiological, cognitive, social-cognitive, and

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emotional processes to the understanding and treatment of mental disorders. There must be a recognition and agreement that basic research should be conceived within a conceptual framework that understands the goal of informing future application. Thus, one of developmental psychopathology's potential contributions lies in the heuristic power it holds for translating facts into knowledge, understanding, and practical application. Such a developmental perspective may aid in the prevention and reduction of the individual and societal burden of mental disorder, alleviate the onus of suffering that mental illness engenders in individuals, their families, and the communities in which they reside, and contribute toward eliminating the stigma commonly associated with the presence of mental disorder.

Research on the efficacy of prevention and intervention approaches to child maltreatment is complicated by ethical, legal, and logistical problems, as well as by difficulties in isolating factors specifically associated with child abuse and neglect from a host of other factors present in multi-problem families. Moreover, because maltreated children often reside in families characterized by single parenting, economic disadvantage, social isolation, and minority status, factors such as ethnic discrimination, racism, oppression, social class bias, sexism, segregation, and social inequities all influence the development of a national agenda to protect maltreated children.

Historically, the "services" provided by many child-protective agencies have consisted almost solely of investigative and safety-monitoring activities, with significantly fewer resources or efforts directed toward the amelioration of the effects of child maltreatment. Unfortunately, increasingly limited child protective resources have resulted in a focus on the identification of maltreatment and on ensuring child safety. In fact, there has been a national trend toward screening maltreatment reports and prioritizing investigative activities as a function of the severity of the report. Not surprisingly, a reduction in services provided has also occurred. Moreover, children who are in foster care too often fail to receive mental health services despite the fact that these youngsters are among the most severely maltreated children in the nation.

Given limited resources, it is increasingly critical that services provided to victims of maltreatment are theoretically informed and evaluated for their effectiveness. Theory and research on the causes and consequences of child maltreatment have been used in our laboratory to inform prevention and intervention efforts with maltreated children. Furthermore, preventive intervention strategies can provide unprecedented and critical insights that can further the theoretical and empirical advances in child maltreatment. For example, if the developmental course of maltreated children is altered as a result of the implementation of preventive interventions and the risk for negative outcomes is reduced, then preven-

tion research has contributed to specifying the processes that are involved in the emergence of maladaptive developmental outcomes and psychopathology.

As knowledge on the biological and psychological sequelae of child maltreatment continues to accrue, it will be important to implement preventive interventions with these children. We will then be able to ascertain whether the provision of developmentally sensitive interventions prevent, ameliorate, or even reverse the adverse neurobiological and psychological consequences of child maltreatment. Is it possible for such preventive interventions to exert a positive effect of brain structure, function, and organization only during particular sensitive periods in development, or is neural plasticity operative throughout the lifespan? As the basic knowledge matures, researchers and clinicians will truly be able to provide maltreated children with a psychobiology and a neuropsychology of hope and optimism that can minimize or eradicate the adverse effects of their histories.

Society also must recognize the adverse trajectory toward mental illness, delinquency, and criminal behavior in adulthood that increases each time a child is maltreated. Although child maltreatment is not a diagnosable mental illness, its occurrence portends poor outcomes for mental and physical health.

Assessments of maltreated children should include biological as well as psychological measures to ensure that each maltreated child receives the best intervention possible. Mechanisms that allow for the early provision and subsequent continuity of services for maltreated children must be developed.

Currently I am undertaking a number of new research endeavors. I am very excited about these new ventures, and I believe my best work lies ahead. These new projects include incorporating DNA and RNA studies into basic and intervention research on maltreated infants and children. We are also investigating how the adverse experiences associated with maltreatment affect DNA methylation and gene expression. Finally, we are examining volumetric, structural, connectivity, and functional neuroimaging studies as part of longitudinal research that focuses on the multilevel contributors of resilient and nonresilient adaptation in maltreated adults. We have embarked on a multilevel randomized control trial (RCT) intervention aimed at preventing recurrent depression in adolescent girls, with and without a history of child maltreatment. We are enthusiastic about this new RCT because it will examine intervention efficacy across multiple levels of analysis, from the molecular to the neural and to the behavioral.

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Chiefs: A Perspective from Prehistory on Modern Failing States

Timothy Earle

There was a time before strong leaders, social inequality, and class systems. Coming of age in the 1960s, my motivation was to understand and hopefully help alter the world of unjust and unstable societies. This personal essay summarizes my career as an archaeologist studying the emergence of complex political systems.¹

My training was at Harvard (BA, 1969) and Michigan (PhD, 1973), where I was strongly influenced by a cadre of top anthropologists, many of whom were members of the American Academy, including Kent Flannery, Marshall Sahlins, Eric Wolf, and Gordon Willey. From these scholars, I learned the essential linkage between strong theory and a rich empirical record. My work has involved field archaeology in Hawai'i, Peru, Argentina, Denmark, and Hungary, and I am often asked what my assorted research regions have in common. My response is that they present three independent historical trajectories (Polynesia, Andes, and Europe) where larger-scale political institutions developed. This historical independence allows me to concentrate on general evolutionary processes of societal change.

My focus has been on the emergence of strong leaders (chiefs), who created institutions of support and control (chieftaincies). Prior to my research, the established belief was that leaders emerged in societies that had key problems, such as internal conflicts of interest, which required leaders to act for the general good. I decided instead to focus on the political economy, which allowed chiefs to mobilize goods to finance their power strategies and centralize control. These are topics included in social evolution, which is sometimes wrongly equated with biological evolution. In social evolution, societies are understood as open and interrelated social fields that change systemically. Social evolution has much in common with ecosystem change – involving energy flows, predation, mutual dependency, and anthropogenic interventions.

A chief's sovereignty is always problematic, and is based on three sources of elemental power: the economy, warrior might, and ideology.² Economic power derives from the ability to give or deny necessary and desired goods, which include food, housing, and prestige goods and wealth. Goods mobilized from the political economy support diverse actions of chiefs, such as rewarding supporters, constructing new agricultural facilities, maintaining a warrior cadre, and provisioning religious ceremonies. Warrior power is based on an ability to coerce by force or threat. Ideological power is based on the ability to present followers with religiously sanctioned narratives for compliance and support. To understand chiefdoms and archaic states is to understand the contested ways that the elemental powers were intertwined to centralize regional polities that eventually became formalized as governing institutions.

Emphasis on one source of power versus another creates much of the differences between complex societies in terms of the mechanism of control. In all cases, however, I emphasize the political

economy, because its resources finance specialists in the fields of power, including managers, craftspeople, warriors, and priests. Chiefs provided some services to their populations, but the extent of central power, its autocratic character, and the resulting nature of social inequality depended on the particular articulation with the political economy and its use in different spheres of control.³

Three independent cases of social evolution of chiefdoms, which I have studied, illustrate this diversity in power strategies. First, for the Hawaiian case, I showed that the existing functional explanations of emergent chiefs were wrong. The Hawaiian irrigations systems, thought by Wittfogel to require central management,⁴ were in fact small scale, organized at the village level, and requiring only cooperation among neighbors. Regional economic specialization, thought by Service to require management,⁵ was almost non-existent. The complex chiefdoms and subsequent archaic states of pre-contact Hawai'i emerged rather by controlling ownership of an engineered landscape in a feudal-like political economy with a highly stratified social system of divine chiefs and obligated farmers.⁶ Second, in highland Andes, I studied the formation of chiefdoms and their conquest by the Inca Empire. Here, the bottleneck was also ownership of improved land, but warfare played a different role. Community chiefs, who held power in times of war, organized defense of hillfort communities and associated lands. The society had little economic inequality, and the power of chiefs was limited. The conquest by the Inca state created the central power and inequality seen in the Hawaiian case. Third, in the Bronze Age of southern Scandinavia, I described how a class of warriors emerged to control exported special products, including animal products, amber, and probably furs and slaves. Their goal was to obtain metals used to fabricate status objects of dress and weapons. While these Nordic chiefdoms were quite unstable and small scale, their social inequality was quite high as evidenced in burial riches and impressive chiefly halls. My research illustrates how the spe-

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cific nature of the political economy resulted in the emergence of different types of chiefs with contrasting characteristics of power, stability, and instituted inequality. The basic process was, however, the same – controlling bottlenecks in the economy to mobilize surplus to finance power strategies.

Our knowledge of pre-state societies helps us to understand how all states, including modern ones, operate. As states evolve, chiefs do not disappear; rather they adapt creatively to state governance, retaining many of their previous dynamics. Derluguian and I looked at how chief-like actors have retained substantial powers – both in collaboration with and in opposition to modern states.⁷ The myth of the modern state rests on the exclusivity of territorial control, a monopoly of force, and effective judiciaries and bureaucracies. Using these measures, all states are in some sense failing. The American Revolution, for example, created a weak state through its rebellion against the British monarchy. Our ideology stresses principles encapsulated in the freedom to bear arms, free markets, and religious freedom, as means to counter the power of central government. Over the last two hundred years, the laws of the land have developed fitfully to retain these freedoms at the same time that they restrain the chief-like powers of political machines, oligarchs, and drug cartels.

An analysis of the insurgent Taliban suggests that, acting much as ancient chiefs, their success depends on an ability to recognize and seize pop-up revenue prospects to finance their grab for power. Each step in the opium trade in Afghanistan, for example, created revenue opportunities for the Taliban. *At the farm*: “Taliban commanders charge poppy farmers a 10 percent tax, and Taliban fighters can make extra money harvesting poppy from fields.” *At the lab*: “The Taliban get taxes from traders who collect opium paste from farmers and take it to labs, where it is turned into heroin. The Taliban are also paid to protect the labs.” *On the road*: “Truckers pay the Taliban a transit tariff on opium paste or heroin as it is smuggled out of the country.” *At the top*: “Drug trafficking organizations make large regular payments to the Quetta Shura, the Taliban governing body.”⁸ The Western coalition’s desire to suppress drug traffic has had the unintended consequence of creating opportunities for Taliban chiefs to offer up their services. Any time new opportunities crop up, these chiefs quickly step in to mobilize the resources to support their insurgency.

My conclusion is that the archaeologist’s long-term perspective on political systems provides a clear view of the full spectrum of chiefdoms and states and can help fashion the taming of chiefs for the general good of society. Chieftaincies reach up to the state to corrupt and tailor legal structures to enforce their advantages, but the state also reaches down to use its imbedded chieftains to out-

source state responsibility to meet the needs and desires of its populace. The relationships of Mafia dons, drug lords, oligarchs, and local political figures to the state continually morph through negotiated power derived from the economic and political landscape. The goal of the chieftain is to operate with minimum oversight. The goal of the state is to tame and sometimes co-opt the aggressive and creative initiative of the chiefs, whose ability to quickly maneuver around the restrained actions of state bureaucracies is legendary.⁹ The pathways toward effective modern states recognize the inherent power of sub-state actors to operate in their own interests and the necessity of a strong rule of law to tame them for the broader interests of society. ■

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ENDNOTES

1. For those interested in more detail on my methods and archaeological data, I recommend Timothy K. Earle, *How Chiefs Come to Power: The Political Economy in Prehistory* (Stanford: Stanford University Press, 1997) and Timothy K. Earle, *Bronze Age Economics* (Boulder: Westview Press, 2002), a collection of frequently cited articles.
2. Earle, *How Chiefs Come to Power: The Political Economy in Prehistory*; Michael Mann, *The Sources of Social Power* (Cambridge: Cambridge University Press, 1986).
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4. Karl Wittfogel, *Oriental Despotism* (New Haven, Conn.: Yale University Press, 1957).
5. Elman Service, *Primitive Social Organization: An Evolutionary Perspective* (New York: Random House, 1962).
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8. Senate Foreign Relations Committee, as quoted in Eric Schmitt, “Many Sources Feed Taliban’s War Chest,” *The New York Times*, October 19, 2009, A1.
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C. David Allis (Rockefeller University) was awarded the 2016 Gruber Genetics Prize. He shares the prize with **Michael Grunstein** (University of California, Los Angeles).

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Peter Bearman (Columbia University) was awarded a 2016 John Simon Guggenheim Memorial Fellowship.

Wendell Berry (Port Royal, KY) received the National Book Critics Circle Lifetime Achievement Award.

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Barry Coller (Rockefeller University) received the 2016 Gill Award, given by the University of Kentucky Gill Heart Institute.

Placido Domingo (New York, NY) is among the first inductees of Lincoln Center's Performing Arts Hall of Fame.

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Marian Wright Edelman (Children's Defense Fund) is the recipient of the Thomas Jefferson Foundation Medal in Citizen Leadership.

Richard W. Fisher (Federal Reserve Bank of Dallas) was decorated with the Order of the Aztec Eagle, First Order, by President Enrique Peña Nieto of Mexico (the highest honor given by the Government of Mexico to non-Mexican citizens). He also received the Woodrow Wilson Award for Public Service from the Wilson Center and the Neil Mallon Award for Distinguished Public Service from the Dallas Council on World Affairs.

M. Taylor Fravel (Massachusetts Institute of Technology; Visiting Scholar 2006–2007) was awarded a 2016 Andrew Carnegie Fellowship.

Frank Gehry (Frank O. Gehry & Associates) was awarded the 2016 Harvard Arts Medal.

Stephen Greenblatt (Harvard University) is the recipient of the 2016 Holberg Prize, awarded by the Norwegian government.

Michael Grunstein (University of California, Los Angeles) was awarded the 2016 Gruber Genetics Prize. He shares the prize with **C. David Allis** (Rockefeller University).

James Hartle (University of California, Santa Barbara) was elected a Fellow of the International Society for General Relativity and Gravitation (ISGRG).

Stephen Hawking (University of Cambridge) was elected a Fellow of the International Society for General Relativity and Gravitation (ISGRG).

Wick Haxton (University of California, Berkeley) was named a 2016 Simons Fellow in Theoretical Physics.

Eric Horvitz (Microsoft Research) is the recipient of the ACM-AAAI Allen Newell Award.

Marc Kamionkowski (Johns Hopkins University) was elected a Fellow of the International Society for General Relativity and Gravitation (ISGRG).

Victoria Kaspi (McGill University) is the recipient of the Gerhard Herzberg Canada Gold Medal for Science and Engineering, given by the Natural Sciences and Engineering Research Council of Canada.

Benita S. Katzenellenbogen (University of Illinois) and **John A. Katzenellenbogen** (University of Illinois) are the recipients of the 2016 Fred Conrad Koch Lifetime Achievement Award, given by the Endocrine Society.

Nancy Kleckner (Harvard University) was awarded the Thomas Hunt Morgan Medal by the Genetics Society of America.

János Kollár (Princeton University) is the recipient of the 2016 Frederic Esser Nemmers Prize in Mathematics.

Jay A. Levy (University of California, San Francisco) is the recipient of the 2016 Global Citizen Award, given by the Global AIDS Interfaith Alliance.

Jennifer A. Lewis (Harvard University) has been awarded a 2016 National Security Science and Engineering Faculty Fellowship by the U.S. Department of Defense.

Dan Littman (New York University School of Medicine) was awarded the 2016 Vilcek Prize in Biomedical Science by the Vilcek Foundation.

Tom Lubensky (University of Pennsylvania) was named a 2016 Simons Fellow in Theoretical Physics.

Kenneth M. Ludmerer (Washington University) received the 2015 Distinguished Medical Alumnus Award from the Johns Hopkins University School of Medicine and the 2016 Distinguished Service Award from the Washington University School of Medicine.

Yo-Yo Ma (Cambridge, MA) is among the first inductees of Lincoln Center's Performing Arts Hall of Fame.

Alan Marshall (Florida State University) has been named a 2016 inductee to the Florida Inventors Hall of Fame.

Margaret H. Marshall (Choate, Hall & Stewart LLP) was inducted into the Academy of Distinguished Bostonians by the Greater Boston Chamber of Commerce.

Audra McDonald (New York, NY) is among the first inductees of Lincoln Center's Performing Arts Hall of Fame.

W. James Mc Nerney, Jr. (Boeing Company) is the recipient of the 2016 Distinguished Achievement Award, given by the Wings Club Foundation, Inc.

Harry McSween (University of Tennessee) received the University of Tennessee's President's Award for Research.

Diana C. Mutz (University of Pennsylvania) was awarded a 2016 John Simon Guggenheim Memorial Fellowship.

William Nordhaus (Yale University) was awarded a 2016 Andrew Carnegie Fellowship.

Hiroshi Ooguri (California Institute of Technology) is the 2016 recipient of the Chunichi Cultural Award.

Sorin Popa (University of California, Los Angeles) was named a 2016 Simons Fellow in Mathematics.

Leontyne Price (New York, NY) is among the first inductees of Lincoln Center's Performing Arts Hall of Fame.

David Reznick (University of California, Riverside) was awarded a 2016 John Simon Guggenheim Memorial Fellowship.

Rebecca Richards-Kortum (Rice University) is the recipient of the 2016 Pierre Galletti Award, given by the American Institute for Medical and Biomedical Engineering (AIMBE).

Marilynne Robinson (University of Iowa) was awarded the 2016 Library of Congress Prize for American Fiction.

Richard Stallman (Free Software Foundation) is the recipient of the ACM Software System Award.

John Meurig Thomas (University of Cambridge) has been awarded the Gold Medal for Outstanding Scientific Research by the University of Florence.

Kip Thorne (California Institute of Technology) was elected a Fellow of the International Society for General Relativity and Gravitation (ISGRG). He was also awarded a Special Breakthrough Prize in Fundamental Physics. He shares the award with **Ronald P. Drever** (California Institute of Technology) and **Rainer Weiss** (Massachusetts Institute of Technology).

Mario Vargas Llosa (Madrid, Spain) is the recipient of the Library of Congress Living Legend Award.

Robert Weinberg (Massachusetts Institute of Technology) received the Salk Institute Medal for Research Excellence and the American Association of Cancer Research Lifetime Achievement Award for Cancer Research.

Rainer Weiss (Massachusetts Institute of Technology) was awarded a Special Breakthrough Prize in Fundamental Physics. He shares the award with **Ronald P. Drever** (California Institute of Technology) and **Kip Thorne** (California Institute of Technology).

Andrew Wiles (University of Oxford) is the recipient of the 2016 Abel Prize, given by the Norwegian Academy of Science and Letters.

Clifford Will (University of Florida) was elected a Fellow of the International Society for General Relativity and Gravitation (ISGRG).

Shou-Wu Zhang (Princeton University) was named a 2016 Simons Fellow in Mathematics.

New Appointments

Linda Abriola (Tufts University) was named Science Envoy by the U.S. Department of State.

Sangeeta Bhatia (Massachusetts Institute of Technology) has been appointed to the Scientific Advisory Board of Evelo Biosciences.

James S. Crown (Henry Crown and Company) has been elected Chairman of the Aspen Institute Board of Trustees.

Daniel Diermeier (University of Chicago) has been named Provost of the University of Chicago.

Laurie H. Glimcher (Weill Cornell Medical College) was named President and Chief Executive Officer of Dana-Farber Cancer Institute.

Annette Gordon-Reed (Harvard University) was elected to the Board of Trustees of the Colonial Williamsburg Foundation.

Charles O. Holliday, Jr. (Royal Dutch Shell plc) has been elected as a new Independent Director of HCA's Board of Directors.

Richard Lifton (Yale University) was named President of Rockefeller University.

Thomas Lovejoy (George Mason University) was named Science Envoy by the U.S. Department of State.

Terry Magnuson (University of North Carolina at Chapel Hill) has been appointed Vice Chancellor for Research at the University of North Carolina at Chapel Hill.

W. James McNERNEY, Jr. (Boeing Company) was appointed Senior Advisor to Clayton, Dubilier & Rice.

Steven E. Miller (Harvard University) was appointed to the Science and Security Board of the *Bulletin of the Atomic Scientists*.

Jeffrey Moore (University of Illinois at Urbana-Champaign) has been named Interim Director of the Beckman Institute for Advanced Science and Technology.

Erin O'Shea (Harvard University) was named President of the Howard Hughes Medical Institute (HHMI).

Hunter R. Rawlings III (Association of American Universities) has been appointed Interim President of Cornell University.

John S. Reed (Citi) was elected President of the Board of the Boston Athenaeum.

Debora L. Spar (Barnard College) has been appointed to the Board of Trustees of the Howard Hughes Medical Institute.

Marc Tessier-Lavigne (Rockefeller University) was named President of Stanford University.

Select Publications

Poetry

Rachel Hadas (Rutgers University-Newark). *Questions in the Vestibule*. Northwestern University Press, March 2016

Fiction

Jules Feiffer (Stony Brook University Southampton). *Cousin Joseph*. Liveright, July 2016

Anne Tyler (Baltimore, MD). *Vinegar Girl*. Hogarth, June 2016

Nonfiction

Russell Banks (Keene, NY). *Voyager: Travel Writings*. Ecco, June 2016

Noam Chomsky (Massachusetts Institute of Technology). *Who Rules the World?* Metropolitan Books, May 2016

Geoff Dyer (London, United Kingdom). *White Sands: Experiences from the Outside World*. Pantheon, May 2016

Stanley Fish (Florida International University). *Winning Arguments: What Works and Doesn't Work in Politics, the Bedroom, the Courtroom, and the Classroom*. Harper, July 2016

Michael J. Graetz (Columbia Law School) and **Linda Greenhouse** (Yale Law School). *The Burger Court and the Rise of the Judicial Right*. Simon & Schuster, June 2016

Rachel Hadas (Rutgers University-Newark). *Talking to the Dead*. Spuyten Duyvil Press, June 2015

Charles Hirschman (University of Washington). *From High School to College: Gender, Immigrant Generation, and Race-Ethnicity*. Russell Sage, August 2016

Jill Lepore (Harvard University). *Joe Gould's Teeth*. Knopf, May 2016

N. David Mermin (Cornell University). *Why Quark Rhymes with Pork, and Other Scientific Diversions*. Cambridge University Press, January 2016

James McBride (New York University). *Kill 'Em and Leave: Searching for James Brown and the American Soul*. Spiegel & Grau, April 2016

Alexander Nehamas (Princeton University). *On Friendship*. Basic Books, May 2016

Werner Sollors (Harvard University). *African American Writing: A Literary Approach*. Temple University Press, April 2016

James M. Stone (Plymouth Rock Companies). *5 Easy Theses: Commonsense Solutions to America's Greatest Economic Challenges*. Houghton Mifflin Harcourt, May 2016

Calvin Trillin (New Yorker). *Jackson, 1964: And Other Dispatches from Fifty Years of Reporting on Race in America*. Random House, June 2016

Brian William Vickers (School of Advanced Study, University of London, United Kingdom). *The One King Lear*. Harvard University Press, April 2016

We invite all Fellows and Foreign Honorary Members to send notices about their recent and forthcoming publications, scientific findings, exhibitions and performances, and honors and prizes to bulletin@amacad.org. ■

Remembrance

*It is with sadness that the Academy notes the passing of the following Members.**

Daniel Aaron – April 30, 2016; elected in 1973
Orville Gilbert Brim – April 15, 2016; elected in 1974
Ralph Cohen – February 23, 2016; elected in 1984
Harold Colyer Conklin – February 18, 2016; elected in 1976
Adam Marian Dziewonski – March 1, 2016; elected in 1988
Andrew S. Grove – March 21, 2016; elected in 1994
Michael S. Harper – May 7, 2016; elected in 1995
James T. Harrison – March 26, 2016; elected in 2015
Geoffrey Hartman – March 14, 2016; elected in 1972
Richard J. Havel – April 9, 2016; elected in 1992
Shirley Mount Hufstедler – March 30, 2016; elected in 1989
Walter Kohn – April 19, 2016; elected in 1963
Philip Alden Kuhn – February 15, 2016; elected in 1977
Ralph S. Larsen – March 9, 2016; elected in 2001
Edward L. Miles – May 7, 2016; elected in 2009
Hilary Whitehall Putnam – March 13, 2016; elected in 1966
Fred Colson Robinson – May 5, 2016; elected in 1976
Steven B. Sample – March 29, 2016; elected in 2003
Antonin Scalia – February 13, 2016; elected in 2003
Lloyd Shapley – March 13, 2016; elected in 1974
Barbara Sinclair – March 10, 2016; elected in 1992
Steven Stucky – February 14, 2016; elected in 2006
Lester Carl Thurow – March 25, 2016; elected in 1984

**Notice received from February 10, 2016, to May 16, 2016*

Ways of Giving to the American Academy of Arts & Sciences

The Academy depends on gifts and grants from members and other individuals, foundations, and corporations to support its work. Contributions may be made in a variety of ways.

Gifts of Cash and Securities

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Donor-Advised Funds

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Bequests

Bequests from Fellows and their spouses helped to create and build the Academy's endowment. Today, bequests continue this tradition and provide support for new initiatives, projects, and studies. Provision for including the Academy in an estate plan may be made in a new will, in a codicil to an existing will, or through trusts.

Other Planned Gifts and Naming Opportunities

Please contact the Development Office for additional information about planned gifts and naming opportunities, including life-income gifts and gifts of appreciated property.

For assistance in making a gift to the Academy please call Sonja Plesset, Chief Advancement Officer, at 617-576-5037.

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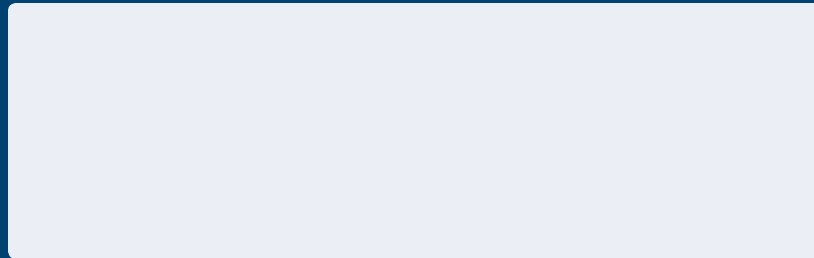
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