



[Union of
Concerned Scientists

UCC


Catalyst

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**STANDING UP
FOR SCIENCE**

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The Union of Concerned Scientists puts rigorous, independent science to work to solve our planet's most pressing problems. Joining with citizens across the country, we combine technical analysis and effective advocacy to create innovative, practical solutions for a healthy, safe, and sustainable future.

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Calling All Members



By Ken Kimmell

After a divisive and dispiriting election season, we face a political situation in Washington that threatens science, our democratic system of government, and our planet's ecosystems. There is no sugarcoating the fact that many of the hard-won gains we have made on climate change and many other issues now stand in jeopardy.

At UCS, we have already begun to mobilize with vigor and determination, making dramatic shifts in the organization to do everything in our power to prevent the rollback of laws that protect the health and safety of Americans. And we have only just begun. We will need your help in these efforts as never before, and will be reaching out to you frequently to help

us stand strong and fight for the principles we believe in.

Among these, we at UCS reject rhetoric and actions that divide the nation by race, religion, gender, geography, or any other factor. We stand shoulder to shoulder with people across the country who are facing increasing incidents of harassment and hate. We will work each day to

***We need your help to fight the rollback of laws
that protect the health and safety of Americans.***

dispel the utterly false notion that protecting our natural environment conflicts with boosting our economy. We will continue our work with states and companies across the country that are working to build a clean energy infrastructure and reassure anxious nations that the United States is still their partner. We will redouble our efforts to prevent a new, destabilizing nuclear arms race. And we will work with cities across the country to boost access to healthy, affordable, and sustainably grown food.

UCS has an indispensable role to play in championing the need to base our governmental decisions on the best possible scientific and technical data. Facts matter more than ever in the current environment, and you can count on UCS to stand up for them and the vital role they play in bridging the partisan divide and informing the practical policy solutions we need. {C}


Ken Kimmell is president of UCS.




WHAT OUR MEMBERS ARE SAYING


Our Facebook page and Twitter feed have been lighting up with statements from members and supporters who are standing up for science. Here's a sampling . . .


IN RESPONSE TO THE ELECTION

 @mfwells5:
Fellow #scientists are you scared yet? We must be louder and more active in the political system. The future of our work is at stake @ucsusa


 Natalie Helen Nucho:
I joined today! We can no longer afford to stay inactive. Glad to help in any way I can.


IN RESPONSE TO OUR CALL TO REJECT SCOTT PRUITT AS ADMINISTRATOR OF THE EPA


 Nancy Coscarelli:
You're going to have to change your name to the Union of Completely Freaked Out Scientists.

 Heather McDonald:
This is a critical point in our planet's future. We cannot be silent. We need a leader, we need organization, and we need courage stat!!!! We don't want to have to explain to our grandchildren why we didn't act when it mattered the most.

IN RESPONSE TO OUR OPEN LETTER TO FEDERAL SCIENTISTS (SEE P. 11)


 Robbie Emmet:
I love this! Thank you! I'm in grad school now, hoping to work as a quantitative ecologist for a government agency, so this is very heartening to read!

 Glenn Black:
This letter says it all so succinctly . . . I know about this because I worked as a government scientist for 34 years.

 Michele Blust:
And thank YOU SCIENTISTS for all your hard work!

OTHER FEEDBACK

 @SarahFRobinson:
World's top scientists are warning us about global warming—convincingly, eloquently @UCSUSA @NOAAClimate #climate

 @drbeba82:
@NBCNews Every part of this administration is showing its bias [against] scientific fact. WE AS SCIENTISTS MUST CHALLENGE THIS @UCSUSA.

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UCS is ready to respond when Trump administration policies threaten public health and safety.

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Announcing the 2016 Got Science? Champions

Now more than ever, science needs champions: those who defend science against powerful special interests, or practice science in service of a better world despite political backlash. The Union of Concerned Scientists proudly presents five inspiring groups and individuals who stood up for science in 2016.

EUGENE GU: STANDING STRONG AGAINST POLITICAL HARASSMENT

Dr. Eugene Gu believes the company he founded could help cure congenital conditions like heart defects. He was shocked when he received a subpoena from members of the House of Representatives this year, for using fetal tissue in his research. “I’m not giving up, even in the face of a witch hunt,” he says. “My advice for young career scientists: people like us will change the world.”

EDUARDO GARCIA: LEADING THE CHARGE FOR ENVIRONMENTAL JUSTICE

In 2016, California Assembly member Eduardo Garcia guided two landmark bills—SB 32 and AB 197—into law. These bills will lower carbon emissions 40 percent below 1990 levels by 2030, while prioritizing low-income communities.

“My district is Latino, young, and economically disenfranchised,” Garcia says. “Conversations about ice caps and polar bears don’t resonate. What does is air quality, environmental justice, and investment into job-creating renewable energy.”

EDDIE BERNICE JOHNSON, PAUL TONKO, DON BEYER, AND KATHERINE CLARK: DEFENDING SCIENCE AND FREE SPEECH

The House Science Committee’s current chair, Lamar Smith, has misused his power to issue subpoenas to several state attorneys general and nonprofit organizations (including UCS), demanding correspondence among those working to expose ExxonMobil’s campaign to suppress climate science. Other committee members—Representatives Johnson, Tonko, Beyer, and Clark—recognize the subpoenas for the harassment they are, and have presented a united front against this abuse of power.

LEEANNE WALTERS AND MONA HANNA-ATTISHA: PROTECTING FLINT’S CHILDREN

LeeAnne Walters is a mother of four whose fears about her drinking water were

minimized by Flint city officials for months. She was offered hush money, and was even threatened with losing custody of her children. Instead, she pressed for tests and federal involvement until, finally, the EPA came to Flint and the story broke nationally. “Everyday citizens can make a difference,” she says.

When Dr. Mona Hanna-Attisha heard about the possibility of lead contamination in Flint’s water, she researched her hospital’s records, finding an irrefutable correlation between the city’s switch to Flint River water and spiking diagnoses of lead poisoning in children. She went public with her results—and officials tried to discredit her. “I was put through the wringer,” Dr. Hanna-Attisha says. “But for 18 months Flint residents were ignored.”

ALEXA DELWICHE: CREATING A GOLD STANDARD FOR GOOD FOOD

For a profile of the work of Alexa Delwiche, executive director of the Center for Good Food Purchasing, see Ideas in Action on p. 20.

Congratulations to each of our champions!

UCS Scientist Featured on *Years of Living Dangerously* TV Series

One of Nicole Hernandez Hammer's many roles at UCS is to inform residents of low-lying areas in south-eastern Florida of the approaching dangers—and economic hardships—of sea level rise. Recently, she had a few new companions on her visits to neighborhoods already afflicted by flooding even on sunny days: a full film crew and actor Jack Black. For the “Gathering

Storm” episode of the documentary series *Years of Living Dangerously*, the producers featured Hammer explaining the science of sea level rise to Black, and introducing him to Miami residents. The series' second season premiered on the National Geographic Channel last fall; find viewing information at <http://channel.nationalgeographic.com/years-of-living-dangerously>.

At Key Meeting, UCS Helps Mobilize to Protect the Role of Science in Policymaking

UCS had a particularly strong presence at last year's meeting of the American Geophysical Union (AGU), held December 12 through 16 in San Francisco. The AGU meeting is the largest gathering of earth and space scientists in the world, drawing some 24,000 attendees. With a prominent UCS display asking scientists to join us in calling upon the incoming administration and Congress to protect the role of science in policymaking, we more than doubled our sign-ups from last year, recruiting nearly

300 new experts. The steady stream of visitors to our booth and presentations made it clear that many scientists are counting on UCS to stand up for science and to counter attacks on science and scientists.

Among other activities, Peter Frumhoff, UCS director of science and policy, spoke at a rally (pictured here) organized by The Natural History Museum and Climate Truth, in which several hundred attendees demonstrated their support for science.

Million-Dollar Match Met

A generous donor challenged UCS with a pledge of \$1,000,000 if we could add 200 new planned giving donors to the Kurt Gottfried Society in 2016.

We did it! Thank you to the more than 220 UCS supporters who helped UCS earn the million-dollar match by committing to a planned gift.

Your generosity will be felt far into the future: **\$1,000,000 now boosts our efforts to fight for a safer and healthier planet in these challenging times.** And each planned gift ensures that UCS will continue to harness the power of science to help build a better world, for generations to come.

To learn more about planned giving, visit www.ucsusa.org/legacy.



Kurt Gottfried Receives Top Award from AAAS



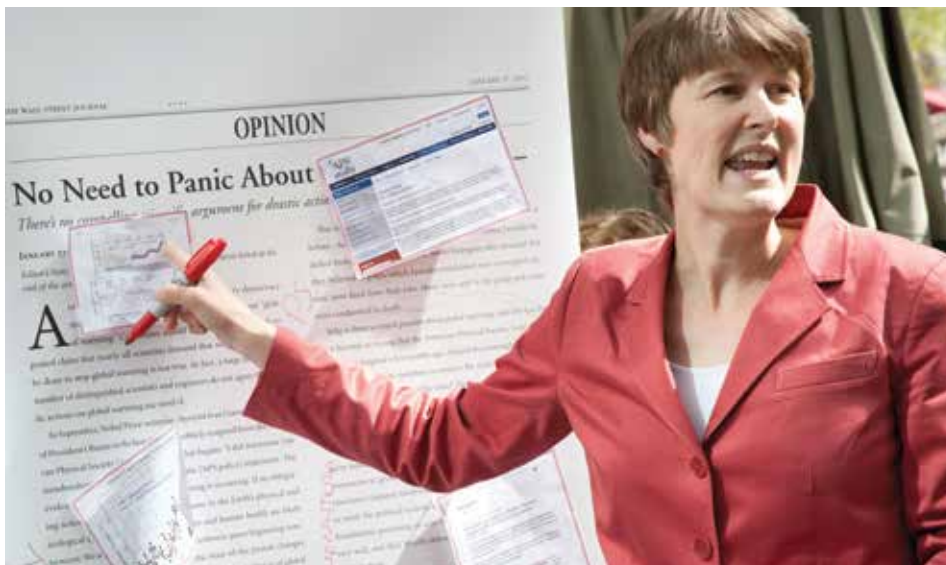
UCS cofounder and Board Chair Emeritus Kurt Gottfried, a former Cornell physicist and recognized leader on missile defense and nuclear weapons, was awarded the 2016 Scientific Freedom and Responsibility Award by the American Association for the Advancement of Science (AAAS), the world's largest general scientific society and publisher of the journal *Science*. Gottfried received the prestigious honor “for his long and

distinguished career as a ‘civic scientist,’ through his advocacy for arms control, human rights, and integrity in the use of science in public policy making.”

Gottfried cofounded UCS in 1969, acting on his concerns about the militarization of scientific research. He was among the first to publicly raise concerns about missile defense strategies and played a major role in developing the draft of a treaty to ban space weapons in 1983.

Announcing the award, Nobel Prize-winning scientist Harold Varmus noted that, under Gottfried’s leadership, UCS “set a high standard in fearlessly providing reliable, if often controversial, advice to the public and government.” AAAS also noted Gottfried’s key role in alerting the public when the government distorted science for political goals during the George W. Bush administration. That effort, which included a sign-on letter that drew the signatures of many prominent scientists and the February 2004 UCS statement *Restoring Scientific Integrity in Policy Making*, offered detailed examples in which the Bush administration had “manipulated the process through which science enters into its decisions.”

Neal Lane, former presidential science advisor during the Clinton administration and now senior fellow at Rice University’s Baker Institute for Public Policy, nominated Gottfried for the Scientific Freedom and Responsibility Award. As Lane put it, Gottfried “is an icon for what many of us have come to call the ‘civic scientist.’”



AAAS Names Brenda Ekwurzel a Fellow

AAAS recently named UCS Senior Climate Scientist Brenda Ekwurzel a AAAS fellow, an honor bestowed by her scientific peers. Ekwurzel was named as a fellow in the organization’s Impacts of Science and Engineering section, and cited for her “distinguished contributions to analysis and outreach aimed at strengthening support for sound U.S. climate policies and making the science of climate change accessible to diverse audiences.”

Clean Energy Victory in Illinois

In December, a bipartisan majority in the Illinois legislature passed the Future Energy Jobs Bill (SB 2814)—the most important climate bill in the state's history. As a member of the Illinois Clean Jobs Coalition, UCS has worked toward this outcome for nearly two years.

The bill requires Illinois' utilities to build a minimum of 3,000 megawatts of new solar power and 1,300 megawatts of new wind power in the state by 2025. And, by fixing flaws in the state's existing renewable energy standard, the bill ensures that more than \$200 million of the money Illinois residents spend on electricity annually will go toward building new solar and wind facilities in the state.

Among the bill's provisions are a suite of farsighted solar initiatives, such as a community solar program that allows those who cannot afford to install solar panels to subscribe to a shared project in their community; a comprehensive low-income solar deployment and job training program; and the preservation of net metering, by which a utility pays its customers for solar electricity they generate but do not use.

The bill also includes energy efficiency requirements, including a provision that will invest \$25 million per year in programs to help low-income households become more efficient. More controversially, the bill subsidizes two of the state's nuclear power plants for the next 10 years based on the economic value of the global warming emissions these facilities avoid. Notably, however, the bill stipulates that any financial assistance to existing nuclear power plants must not dilute or otherwise come at the expense of incentives for energy efficiency, grid modernization, or renewable resources.

The net result of Illinois' new energy legislation is a major victory in the fight against climate change, positioning the state to become a leader in clean energy and to capture jobs and investments in this burgeoning sector of the economy. The bipartisan support it demonstrated for clean energy also underscores the fact that, despite gridlock and backsliding at the federal level, states can continue to make significant progress on policies that combat climate change while promoting economic development.



UCS Midwest Field Director Melanie Moore at a press conference celebrating the passage of Illinois' new energy bill.

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STANDING STR SCIENCE AND



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UCS is ready to respond when Trump administration policies threaten public health and safety or weaken the role of science in policymaking.

BY SETH SHULMAN

Early on a wintry morning at the Cambridge, Massachusetts, headquarters of the Union of Concerned Scientists, as most staff members are just arriving at work, a dedicated team is already hunkered in a conference room, hard at work—as they have been each morning since the election—monitoring news about the incoming Trump administration, prioritizing available resources, and overseeing the organization’s rapid response. This morning’s top agenda item: responding to the dismaying announcement that then President-elect Donald Trump plans to appoint ExxonMobil CEO Rex Tillerson to head the US State Department.

The group readies a press response that includes a forceful statement from UCS President Ken Kimmell that Tillerson’s nomination is further evidence that “President-elect Trump is creating a government of, by, and for the oil and gas industry.” Before the day is out, the sound bite will reverberate in press accounts around the world.

PUBLIC HEALTH AND SAFETY AT STAKE

After one of the most contentious US elections in memory—and based on everything we know so far about the Trump administration—federal decisionmaking based on science, data, and evidence now faces an enormous threat. In no sense did American voters grant the new president a mandate to turn back the clock. And yet, the election results raise the specter of backsliding on the critical progress our nation has made on many vital issues.

UCS is mobilizing as fast as we can because we recognize how much is at stake.

Science. Evidence. Facts. Reason.

They form the very foundation of a strong democracy—indeed, of America itself. They protect our health. They keep our communities, families, and children safe. As an organization, we will not sit passively by when our health and safety are threatened. We will not be silent in the face of an administration that has already begun to fill its ranks with people like Tillerson, whose company has worked to confuse the public about climate change. Or politicians such as Scott Pruitt—the Trump nominee to head the Environmental Protection Agency—who has actively sued the agency in recent years to prevent it from enforcing clean air and clean water safeguards. We will stand strong for science and democracy.

“Scientists will pay close attention to how the Trump administration governs, and are prepared to fight any attempts to undermine the role of science in protecting public health and the environment,” says James McCarthy, UCS board chair emeritus, professor of biological oceanography at Harvard University, and former president of the American Association for the Advancement of Science. “We will hold them to a high standard from day one.”

“Americans recognize that science is critical to improving our quality of life, and when science is ignored or politically corrupted, it’s the American people who suffer,” says physicist

“SCIENTISTS ARE PREPARED TO FIGHT ANY ATTEMPTS TO UNDERMINE THE ROLE OF SCIENCE IN PROTECTING PUBLIC HEALTH AND THE ENVIRONMENT.”

JAMES MCCARTHY, UCS BOARD CHAIR EMERITUS

Lewis Branscomb, a UCS member and professor at the University of California–San Diego School of Global Policy and Strategy who has served as vice president and chief scientist at IBM and as director of the National Bureau of Standards under President Richard Nixon. “Respect for science in policy making should be a prerequisite for any cabinet position.”

Of paramount concern are climate change and other vital issues of public health and safety. As a UCS statement explains, without investments in science in the public interest and policies that draw upon scientific evidence, “children will be more vulnerable to lead poisoning, more people will be exposed to unsafe drugs and medical devices, and we will be less prepared to limit the impacts of increasing extreme weather and rising seas.”

But we also recognize that this new administration poses potential threats not just to science but to our democratic principles as well. “At UCS, we reject rhetoric and will resist actions that divide the nation by race, religion, gender, geography, or

any other factor,” says UCS President Ken Kimmell. “We cannot move forward to tackle the enormous challenges of our time without a cohesive, respectful, and pluralistic society.”

And that means, among other things, continuing the organization’s strong commitment to environmental justice and policies that help protect everyone—especially low-income communities, tribal communities, and communities of color who bear a disproportionate burden of climate impacts and environmental degradation.

A WATCHDOG FOR SCIENCE

Drawing upon nearly 50 years of experience, UCS is fast positioning itself as a leading watchdog of science-based public policy in the new administration. (For more on our track record fighting for scientific integrity during the George W. Bush administration, see the Then and Now column, p. 18.) In the months to come, we will scrutinize all legislation and proposed regulations that serve special interests above the public interest, we will expose the actors behind it, and we will mobilize the scientific community and the broader public to fight back as needed.

With impressive speed, UCS has already taken preemptive action. We released an open letter to the Trump administration and Congress urging them to set a high bar for integrity, transparency, and independence when using science to inform federal policies. The letter has now been signed by more than 5,500 scientists from all 50 states, including 25 Nobel Prize recipients and several advisors to Republican and Democratic presidents from Richard Nixon to Barack Obama (see the sidebar).

We’ve also released a report, *Preserving Scientific Integrity in Federal Policymaking*, that lays out the case for independent, impartial science in policy decisions, offers lessons from the past two administrations, and establishes a baseline assessment of the current state of scientific integrity at federal agencies, against which we can more effectively judge the actions of the Trump administration moving forward.

Meanwhile, the initial response from our members has been impressive. In just a matter of weeks since the election, 3,000 scientists joined our Science Network, swelling its ranks to more than 20,000. We have seen more people join



UCS Outreach Coordinator Liz Schmitt shows up for science in Washington, DC.

our webinars and visit our conference tables, and have been swamped with a heartening surge in unsolicited donations and offers of support. We know we'll be calling on our members and supporters like never before, so the increased interest gives us a strong start as a leading organization in the fights ahead. But we've only just begun.

USING SCIENCE TO BOLSTER OUR DEMOCRACY

As former New York Senator Daniel Patrick Moynihan famously put it, "We are each entitled to our own opinion, but no one is entitled to his own facts." You can count on UCS to closely monitor the Trump administration's activities and ensure its policies are grounded in the best available, impartial, and independent science, and to push back when they aren't. We will also continue, as we always have, to find ways to make progress. In particular, we'll expand our work on the state, regional, and municipal levels to promote smart science-based policies. This past summer, for example, we helped California and Massachusetts pass farsighted bills that go far beyond federal policies in moving us toward a clean energy future.

Equally important, we have a strong tailwind working in our favor on clean energy because the economics are improving so rapidly. Advances are possible in all the states, and the presidential election does not change that. For example, Texas has invested billions of dollars in transmission lines that take advantage of plentiful and inexpensive renewable energy—wind energy is now so inexpensive in some areas that it's being given away at night. And Illinois recently passed an impressive package committing the state to substantial increases in solar and wind power (see *Advances*, p. 7).

The bottom line is this: UCS will continue to work toward practical solutions and, regardless of whether or not our elected leaders choose to come together, we will stand up on behalf of science and democracy as forcefully as needed. We will call out elected officials and special interests when they ignore science and undermine safeguards that protect people's health and safety. We will expose fossil fuel companies when they deceive the public and their shareholders about climate change. We will connect members of our Science Network with local groups working to reduce the pollution that makes their children sick. We will provide research to communities on the front lines of climate change—threatened with rising seas, wildfires, floods, and drought.

In short, we will find ways to make progress on the issues that matter and, as always, will rely heavily on you for support—the more than 500,000 supporters who make possible our work toward a healthier planet and safer world. {C}

Scientists' Sign-On Letter

Excerpts from the Scientists' Letter to President Trump and the 115th Congress

"From disease outbreaks to climate change to national security to technology innovation, **people benefit when our nation's policies are informed by science** unfettered by inappropriate political or corporate influence. . . ."

"**First, creating a strong and open culture of science begins at the top.** Federal agencies should be led by officials with demonstrated track records of respecting science as a critical component of decision making. . . ."

"Second, Congress and the Trump administration should ensure our nation's bedrock public health and environmental laws—such as the Clean Air Act and the Endangered Species Act—**retain a strong scientific foundation**, and that agencies are able to freely collect and draw upon scientific data to effectively carry out statutory responsibilities established by these laws. . . ."

"Third, Congress and the Trump administration should **adhere to high standards of scientific integrity and independence** in responding to current and emerging public health and environmental threats. . . ."

IF YOU ARE A SCIENTIST, YOU CAN ADD YOUR NAME TO THE SCIENTIST SIGN-ON LETTER BY VISITING OUR WEBSITE AT WWW.UCSUSA.ORG/TRUMPSCIENTISTLETTER. AND SCIENTISTS AND NON-SCIENTISTS ALIKE CAN TAKE ACTION TO PROTECT SCIENCE-BASED SAFEGUARDS; LEARN MORE AT WWW.UCSUSA.ORG/ACTION.

Our Prosperity Depends on Protecting the Planet

INTERVIEW WITH GEOFFREY HEAL



GEOFFREY HEAL, a UCS board member, is a professor at Columbia Business School and a leading expert on economics and the environment. He chaired a National Academy of Sciences committee on ecosystem services and is a coordinating lead author for the Intergovernmental Panel on Climate Change. He is also the author of 19 books including *Endangered Economies: How the Neglect of Nature Threatens Our Prosperity*, recently published by Columbia University Press.

Your new book, *Endangered Economies*, makes a compelling argument that our current economic systems don't adequately take into account our dependence on the natural world. Can you explain that a bit more?

GEOFFREY HEAL: The natural world provides everything we depend on. We get our food from the natural world, we get our drinking water and our oxygen from

the natural world, and we evolved as part of it. We simply can't live without it. Plants create food, and they need pollination from insects and they need rain and they need soil. We can't synthesize these things. So we really are totally dependent on the natural world in the end.

The strange thing is that people don't acknowledge that more. You know, most of us now live in cities. We don't see much nature. We are very embedded in our latest technologies, such as our computer networks and our cell phones. There's a sense that we're so technologically sophisticated that we don't depend on the natural world anymore. But that's actually not true: we need it as much as our ancestors did, and for the same reasons.

So, what do you see as the consequences of ignoring nature?

GEOFFREY HEAL: Well, quite simply, if we don't make some changes in the way we organize our economic systems, I believe we will see catastrophic environmental change in our lifetimes—catastrophic for us. The good news is that, by making a few very achievable alterations to correct some egregious flaws in our economic system, we can go far toward ending this threat to our environment and our prosperity.

Let's talk more specifically about this. In the book, you call climate change the "greatest externality in history." What do you mean by that?

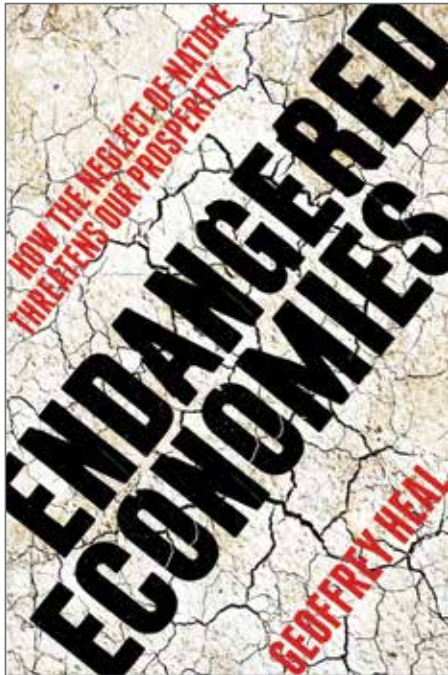
GEOFFREY HEAL: An "externality" is a word economists use to describe a situation in which my actions impose a cost on you but that cost is one that I don't take into account. So, in the case of climate

change, if you're an oil company and I'm a consumer buying gasoline for my car, neither of us takes into account the fact that this gasoline will change the climate. It is external to—or omitted from—the transaction. People who burn fossil fuels impose costs on virtually everyone else in the world by changing the climate. It's a massive impact because it is affecting every being in the world, changing the planet for everything that is alive on it.

One of the key points I make in the book is that external costs pose the biggest threat to the environment because they prevent nature and the economy from working together. We simply can't afford to continue to ignore this harmful error in our economic policies. The good news is that there are many ways to solve a problem like this.

In other words, you're saying there's a numbers-based, economic case for profiting from the conservation of the natural world?

GEOFFREY HEAL: Absolutely. There's a moral case for protecting the environment, of course, but I show in the book that correcting some relatively basic errors in the way we account for things can make a world of difference in terms of dollars and cents. I'm arguing, essentially, that we need to get back to our fundamental capitalist principles. For an economic system to be viable in the long run we need to make certain that everyone's accounting is done properly, to account for all the costs they generate. That's the way an economic system is supposed to work, going back to Adam Smith's ideas in 1776 in *The Wealth of Nations*. But we've drifted away from it. We are letting too



many people forget some of the important costs that they impose on us.

There's some prescient discussion in your book about the power of the fossil fuel lobby and antienvironmentalism in the fossil fuel industry, especially given the recent election.

GEOFFREY HEAL: Yes. Environmental issues really only became as partisan as they seem to be now relatively recently, since Ronald Reagan and coinciding with rise of the power of the fossil fuel industry.

A lot of the problem frankly has to do with the attempted manipulations of science by the tobacco industry and more recently the fossil fuel industry. These industries have sought to cast doubt on the scientific evidence that smoking causes cancer and that burning fossil fuels causes climate change. They have worked so hard to accomplish this that people have become reluctant to take that scientific evidence at face value.

One of the striking things in your book is your contention that preserving the natural world need not be expensive.

GEOFFREY HEAL: Right. Let's take the concrete example of climate change:

If we don't make some changes in the way we organize our economic systems, I believe we will see catastrophic environmental change in our lifetimes.

we all know that, to avoid the worst consequences, we have to move significantly away from fossil fuels. Well, today, the cheapest ways of producing electricity in significant parts of the world are by using wind and solar. In the southern United States, you can produce solar power for roughly four cents per kilowatt-hour; in the Middle East you can produce it for about three cents, whereas natural gas will cost you five or six cents and coal and oil will cost even more than that. The least expensive power stations in the United States today are wind power stations generating electricity that costs about 3.5 cents per kilowatt-hour—roughly half the price of what it costs from the latest efficient natural gas power station, even at a time when natural gas is selling at a historically low price.

Plus, of course, the cost of not moving away from fossil fuels is clearly

associated with huge costs from sea level rise, wildfires, droughts, potentially more serious storms, the spread of tropical and subtropical diseases, plus the extinction of a large number of species.

So, anyone looking at the full economic picture can see that changing to clean energy is going to lower our costs rather than raise them. There is an investment we have to make in new equipment, but once we do this our energy will be less expensive. The picture becomes even clearer if we count these costs currently considered “externalities,” if we consider the economic value of the natural capital involved in our economy, and if we shift the way we make economic measurements to more fully represent what's going on.

My point is that some of these simple changes that I elaborate on in the book can go far to allowing humans and nature to prosper together. {C}

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SCIENCE FOR ENVIRONMENTAL

UCS is partnering with groups in threatened communities on analysis tailored to meet their local needs—and achieve shared goals.

BY PAMELA WORTH



JUSTICE



The Union of Concerned Scientists is proud to partner with organizations working on environmental justice—the premise that all people deserve equal input into (and equitable outcomes from) policies, regulations, requirements, and activities that affect their health and safety.

The evidence is clear that the health burdens of coal-fired power plants, freight terminals, and unhealthy food are disproportionately borne by poorer communities and communities of color; our own research at UCS has demonstrated that these same communities are at heightened risk from climate change. While some people attribute these inequities solely to poverty or other social factors, the scientific evidence shows that people of color face greater environmental threats than white people, even when factoring in income or wealth.

This reality is the result of centuries of discriminatory policies, beginning with slavery and forced resettlement, and including unfair housing, education, and law enforcement practices—and science has not been an innocent bystander to these injustices. Science was misused to bolster white supremacy through craniometrics, which measured human skull sizes to “prove” intelligence disparities among races; to support the forced sterilization of indigenous, African American, and Latina women in the name of eugenics; and to allow the infamous Tuskegee Study

Health burdens from coal-fired power plants freight terminals, and unhealthy food are disproportionately borne by poorer communities and communities of color.

observing—but not treating—African American men suffering from syphilis. UCS was established by scientists to rectify what its founders viewed as the misuse of science to develop destructive technology; today we believe that science should be used to rectify structural racism. While neither science nor UCS alone can solve this problem, we are committed to offering our scientific expertise in partnership with those who confront environmental racism and injustice.

The environmental justice groups we work with seek to address the disproportionate effects of pollution, climate change, and environmental hazards, such as toxic chemical spills, on people of color, low-income communities, and other marginalized

WE WANT TO HEAR FROM YOU

There are many opportunities for scientists to collaborate with and join environmental justice movements. Have you observed or experienced environmental injustices locally? How do you think scientists could best support activism to address those injustices?

We will publish selected responses (edited for length) in the spring issue of Catalyst. Email your response to catalyst@ucsusa.org.

groups. In 2016, we were proud to produce reports in partnership with two such organizations: Houston-based Texas Environmental Justice Advocacy Services, also known as t.e.j.a.s., and The Greenlining Institute, a policy, research, and advocacy nonprofit headquartered in Berkeley, California.

IN HOUSTON, RESEARCH THAT EMPOWERS

Many environmental groups and scientists take a keen interest in Houston, Texas. “The city has a lot of problems,” says Charise Johnson, a research associate with the Center

A partnership between UCS and t.e.j.a.s. is helping to draw more attention to environmental injustice in Houston.

for Science and Democracy at UCS. She cites the prevalence of polluting facilities such as chemical plants and oil refineries—and the undue influence the chemical and fossil fuel industries have over local politics.

The nonprofit t.e.j.a.s. was founded to give Houston residents power through knowledge of the environmental and public health risks they face from big industry, along with the organizing skills to bring about change; UCS has worked in different capacities with its staff in recent years. When our two organizations agreed to collaborate more closely on a project addressing air pollution and health risks in Houston neighborhoods, Johnson says, she came to the process with preconceived notions of what would be most helpful.

“Going into the process, my idea was to conduct research on local emergency planning committees. We could have made recommendations for the EPA, and it would have been timely because of a policy ruling this year on the topic,” she says.

But when Johnson met with the staff at t.e.j.a.s., they expressed different needs. “They told me, ‘We live here and we’re telling you, that doesn’t help.’”

What t.e.j.a.s. most wanted from UCS was to apply staff analysts’ expertise to review existing data from the EPA and other sources to determine which chemicals were most prevalent in which Houston neighborhoods—and the resulting health risks to people living in communities with pollution-emitting facilities.

Yvette Arellano, a research fellow with t.e.j.a.s., says, “We wanted to give our community information about exposure [to toxic chemicals]. It felt like there was a misunderstanding: a lot of folks were saying, ‘I’m not dying and I don’t have cancer so I’m not affected.’”

This misunderstanding is partially due to unequal exchanges between research scientists and Houston residents, in which scientists rely on residents for data for a project, then leave without translating their results for the people who are actually at risk.

“So many times,” says Arellano, “research papers come out, and they’re great for academics and politicians—but they’re not made for communities. The information is valuable. But when you produce a product that can’t be understood, then it’s like you didn’t produce one at all.”

To avoid this scenario, UCS and t.e.j.a.s. committed to an equal collaboration, designing research questions, poring through the analysis, brainstorming what publications could be created, and planning an outreach strategy together.

The resulting fact sheet and report have been widely distributed by t.e.j.a.s. and have served as a starting point for change, with recommended policy solutions to address the problems. “It was the first time a piece of information was broken down to be digestible by the community,” Arellano says. “It was also the first time the affected communities—which are majority Spanish-speaking—had received this information in two languages.”

The continued collaboration also yielded an interactive map of chemical facilities and air pollution risks to Houston neighborhoods—and a 24-page report, titled *Double Jeopardy in Houston*, which provides damning evidence of higher risks of cancer and respiratory illnesses to Latino, African American, and lower-income Houston residents. The report also examines the risk of chemical spills from facilities located in predominantly Latino neighborhoods that are poorly equipped to handle emergency evacuations, and offers strong policy solutions to address these problems.

Johnson says the products of the UCS-t.e.j.a.s. partnership are helping to draw more attention to environmental injustice in Houston. Her team has met with congressional staff to share their findings, and Houston-based elected officials are responding as well, agreeing to meet with t.e.j.a.s.—in some cases for the first time.

In the actual neighborhoods affected, community members are rallying around the findings. Community meetings, according to Arellano, are drawing higher-than-ever turnout.

“At one presentation, people were shocked by the symptoms we listed. They were saying, ‘This whole time I thought it was sinus trouble,’ or, ‘My eyes and throat are always irritated in this way.’ It was an eye-opener. One person said, ‘This information makes me angry—but it makes me want to do something about it.’”

At UCS, staff scientists and analysts who worked on the t.e.j.a.s. project have gained a better understanding of the social dimensions of their work. “With that knowledge, we can develop research questions that will affect real-world issues,” says Johnson.

IN CALIFORNIA, MAKING CLEAN TECHNOLOGY INCLUSIVE

Nearly 40 percent of all cargo containers entering and leaving the United States pass through California. Much of this freight is transported in large trucks through low-income communities composed predominantly of African American and Latino residents. While innovations in clean freight—electric trucks and shipping vehicles that reduce exposure to harmful emissions—are slowly catching on, there is a real danger that the communities most affected by pollution and global warming emissions will be left behind.

“Taking the dot-com boom as just one example,” says UCS Vehicles Analyst Jimmy O’Dea, “there’s been very limited access to low-income communities, and for people of color, to transition to jobs in tech economies. As we make progress in clean freight, everyone needs to benefit.”

Joel Espino, legal counsel for environmental equity at The Greenlining Institute, agrees. “It’s part of our mission to make sure low-income communities of color are prioritized

(continued on page 21)



Children's soccer practice near a busy shipping port in California. Exposure to toxic air pollution has long been a concern for residents.

UCS Prepares to Defend Scientific Integrity—Again

By Gretchen Goldman

What should be done about a fast-spreading disease outbreak? How much lead is in that drinking water? What precautions are needed in the face of a dangerous incoming storm? Is that toy or medical device safe to use? Every day, representatives of the US federal government make policy decisions about issues vital to Americans' health and safety. These decisions require the best possible independent scientific and technical assessments. Science may not be the only consideration in a policy decision, but the government's unwavering commitment to the role of science in policymaking is crucial to its ability to respond effectively to complex

issues ranging from public health to national security. Equally important, the government's reliance on independent, impartial science is essential for ensuring public trust in government and for upholding the democratic principles upon which the nation was founded.

POLITICIZATION OF SCIENCE IN THE BUSH ADMINISTRATION

In the early 2000s, the Union of Concerned Scientists began to receive reports that the George W. Bush administration was misusing science. We heard from government scientists across federal agencies that their work was being

suppressed, manipulated, or distorted—from drug approvals and educational policies to endangered species determinations and climate change assessments. As an increasing number of cases surfaced, it eventually became clear: political interference in science throughout the government had never before been so pervasive.

The scientific community, initially caught off guard, fought back. UCS organized 15,000 scientists to tell the administration that this disrespect of science would not stand. We surveyed thousands of federal scientists to quantify and document the state of science in federal decisionmaking. We developed detailed policy

Scientific Integrity in Policymaking




**An Investigation into the Bush
Administration's Misuse of Science**

Preserving Scientific Integrity in Federal Policymaking

*Lessons from the Past Two Administrations
and What's at Stake under the Trump Administration*



Evidence-based policy is at risk at a level unseen since UCS released its first report in 2004 (left) investigating the federal government's politicization of science. UCS is prepared in 2017 to push back against public policy decisions based on special interests.

AGENCY	SCIENTIFIC INTEGRITY POLICY?	SCIENTIFIC INTEGRITY OFFICIAL?
 ENVIRONMENTAL PROTECTION AGENCY	GOOD	GOOD
 DEPARTMENT OF TRANSPORTATION	POOR	FAIR
 NATIONAL AERONAUTICS AND SPACE ADMINISTRATION	FAIR	POOR

This table offers a brief sample of the detailed assessment UCS has compiled to measure progress at federal agencies in establishing policies and practices to safeguard scientific integrity. Some agencies have put strong policies in place and put a designated official in charge of scientific integrity, while other agencies lag behind. The new UCS report, Preserving Scientific Integrity in Federal Policymaking, measures each agency on nine attributes, including communications policies, social media policies, peer review policies, and whistleblower protections, among others. For more, visit www.ucsusa.org/PreservingScientificIntegrity.

recommendations—many of which were ultimately enacted by the next administration. We drew widespread media coverage, pushed prominent voices to speak out on this issue, and raised the price of misusing science for political purposes. We called the Bush administration to account and ultimately forced it to walk back several political moves that undermined science.

PROGRESS IN THE OBAMA ADMINISTRATION

Due at least in part to our efforts, scientific integrity was high on President Obama's agenda. In his inaugural speech, he vowed to "restore science to its rightful place" and took several steps in his first hundred days to do so. While the work remains unfinished, scientific integrity policies UCS advocated have been instituted at more than 23 federal agencies. Though they vary in quality (see the table), these policies are designed to guard against the kind of abuse that arose during the Bush administration. Many federal scientists now have more rights written explicitly into their agencies' policies: rights to share their scientific work with the media and

public, rights to review the underlying science in documents before their public release, and rights to share their work in the scientific community. Many policies also explicitly prohibit political appointees and public affairs staff from manipulating agency science, and some agencies have installed scientific integrity officials to oversee the new policies.

We have a long way to go in terms of ensuring these policies are implemented, but we are certainly in a better place than we were eight years ago. The Obama administration laid the groundwork for ensuring greater scientific integrity across the government.

WE'RE WATCHING CLOSELY

In the new Trump administration, science in the federal government faces perhaps its biggest threat ever. But this time we're ready. Unlike the creeping problem that arose during the Bush administration, we already recognize the potential threat to our health and safety and to the US scientific enterprise. UCS mobilized with unprecedented speed to issue a report, *Preserving Scientific Integrity in Federal Policymaking: Lessons from the Past Two Administrations and What's at*

Stake under the Trump Administration. The report provides a baseline against which any new problems can be measured. And we have already organized thousands of scientists, including 25 Nobel laureates, to send a letter to the incoming administration explaining the importance of independent, impartial science in federal policymaking, and pledging to monitor the administration closely to make sure this standard is upheld.

We still don't know how President Trump's administration will treat science and whether it will be similar to what we saw in the Bush era. But we know that this time we're in a better position to respond. UCS and the entire scientific community are watching closely and we know how to spot interference if it happens. We know how to organize. We are keenly aware of

Federal science and scientists face perhaps their biggest threat ever in the new Trump administration. But this time we're ready.

the proper role of science in our world and we stand ready to defend science, drawing upon our growing Science Network (now more than 20,000 strong) as well as our dedicated 500,000 supporters. Despite the uncertainty of the current political moment, we've never been more prepared. {C}

CREATING A GOLD STANDARD FOR GOOD FOOD



If we are to fix this country's broken system of producing and consuming food, we must deal with its complex and interconnected problems holistically. In other words, better nutrition cannot be achieved without also considering the sustainability of farming practices; conditions for farm workers cannot be improved without also considering the way food is distributed and sold.

One promising innovation to help meet these challenges is the Good Food Purchasing Program, which was cocreated under the auspices of the Los Angeles Food Policy Council by Alexa

Delwiche, whom UCS has recognized for her efforts with the title of 2016 Got Science? champion. The program encourages institutions with large food budgets, such as school districts, to align their spending with five core values: nutrition, sustainability, a valued workforce, local economies, and animal welfare.

"It's designed to do for food what LEED did for energy efficiency in buildings," says Delwiche, referring to the well-known certification system for buildings developed by the US Green Building Council.

The Los Angeles Unified School District is the largest purchaser of food in

the city and was the first to adopt the Good Food Purchasing Program. In the first year after implementation, the district redirected \$12 million in produce purchases to local growers, its suppliers created more than 150 new well-paying jobs, drivers' minimum wage increased, and students participated in "meatless Mondays." The district has also worked to improve the nutritional quality of the 650,000 daily meals it serves its students, the vast majority of whom qualify for free or reduced-price lunches.

SUCCESS IS CONTAGIOUS

The Good Food Purchasing Program has since been adopted by the school districts of Oakland and San Francisco, which, together with Los Angeles, represent \$200 million in food purchasing power. Delwiche and her team are now working with public institutions in Austin, Chicago, Cincinnati, Madison, Minneapolis/St. Paul, and New York City to spread the program.

"Each model for implementation is different, but what is so inspiring is that they all share the same vision and road map," she says—toward a better, more just, and more sustainable food system. UCS applauds Alexa Delwiche and our four other 2016 Got Science? champions, who practice or defend science in the service of a healthier and safer world (see p. 4 for the full list). {C}



Former School Board Commissioner Sandra Fewer signed the San Francisco Unified School District's commitment to the Good Food Purchasing Policy in a ceremony last fall.

Science for Environmental Justice

(continued from page 17)

when deploying clean technologies like electric trucks and buses, since these are the communities impacted the most by climate change and vehicle pollution,” he says.

UCS and The Greenlining Institute were ideal partners for producing an inclusive analysis of the health and potential economic benefits of electrifying California’s freight, titled *Delivering Opportunity*. “UCS brings expertise on emissions and vehicles, and Greenlining thinks about issues from a racial and economic equity lens. Air pollution is where we overlap. We have a mutual interest in solving the problems associated with this issue,” O’Dea says.

The collaborative report also features a detailed guide to creating inclusive and well-paying jobs in the assembly and maintenance of electric fleets and their associated infrastructure. In this way, the report demonstrates that sensible investments in electric vehicles, and easily implemented job training programs in the industry, are a win-win for all Californians: improving air quality and putting people to work.

O’Dea has since found it easier to make a case for emissions reductions in the freight sector. “Being in the room with The Greenlining Institute, and listening to their conversations with folks on the jobs side of the issue, has benefited how I think about what we’re advocating,” he says. Conversely, UCS’s technical chops have helped The Greenlining Institute frame the problem of freight emissions.

“We’d be the first to say that you don’t necessarily need technical analysis to know that living next to a freeway is bad,” says O’Dea. “But putting numbers to what communities are already experiencing helps when you’re trying to convince policymakers to invest in clean technologies.”

A CONTINUING PRIORITY

Close and equal collaboration with environmental justice partners is and will continue to be a priority for UCS, as we share the same ultimate goal of creating a healthier and safer world. And the benefits of such partnerships extend both ways.

“In California, for UCS and The Greenlining Institute, our trustworthiness and our reputation in the state benefit from working with each other. Our networks have opened up greatly,” says O’Dea.

Given that the effects of climate change are felt most profoundly in communities of color and low-income communities—those who are affected “first and worst”—UCS is ready to support groups serving those communities in any way that our scientific expertise can be helpful to them.

“Environmental justice is something we should all care about,” Johnson says, “but people don’t want to be saved. They want to save themselves. They want everyone to know that we’re in this together.” {C}

THANK YOU

You’ve responded to attacks on science with an outpouring of support. Together, we’re ready to take on any challenge.



UCS Board Member Wins Presidential Medal of Freedom

By David Wright



Former President Barack Obama presents Richard Garwin with the Presidential Medal of Freedom at a White House ceremony on November 22, 2016.

The nation's highest civilian honor, for a distinguished scientist and UCS leader.

Dick has worked tirelessly to support arms control efforts and reduce the risks posed by these weapons. In an interview 50 years after building the H-bomb, he told the *New York Times*, “If I could wave a wand” to make the H-bomb and the nuclear age go away, “I would do that.”

WORKING WITH UCS

Dick has been on the UCS board of directors for more than 15 years, and has worked with UCS for much longer. For example, in 1983 he joined with UCS cofounder Kurt Gottfried in advocating a treaty to prevent the development of antisatellite weapons, and he continues working to limit space weapons.

Dick was a student and later a colleague of the great physicist Enrico Fermi. He recounts that another student once said, “We were all smarter when Fermi was around.” My own experience—and I think everyone at UCS would agree—is that we’re all smarter when Dick is around. {C}

David Wright is senior scientist and codirector of the UCS Global Security Program. Read more from David on our blogs, The Equation (<http://blog.ucsusa.org>) and All Things Nuclear (<http://allthingsnuclear.org>).



In November 2016, President Obama awarded UCS board member Richard Garwin the Medal of Freedom (the nation’s highest civilian honor) for his many contributions to science—

alongside Michael Jordan, Diana Ross, Bruce Springsteen, Bill and Melinda Gates, and others.

Dick may not have won Grammy Awards or NBA championship rings, but he has had a fascinating, distinguished career. An advisor to presidents from Eisenhower through Obama, Dick is one of the very few people elected to the National Academy of Sciences, the National Academy of Medicine, and the National Academy of Engineering.

President George W. Bush awarded him the National Medal of Science in 2003. While few in the general public may have heard of him, they benefit daily from technologies he’s helped develop over the years: touch screens, laser printers, the GPS navigation system, earth-imaging satellites, and many others.

NUCLEAR WEAPONS AND INTERNATIONAL SECURITY

In 1951, Dick designed and help build the first hydrogen bomb—at age 23, when he was spending summers at Los Alamos—displaying an unusual combination of theoretical insights and practical engineering skills. The goal of the project was to see if the theory behind the bomb worked, and he showed it did.

That started a lifetime of grappling with issues related to nuclear weapons.

PUT YOUR VALUES TO WORK FOR FUTURE GENERATIONS

Help build a healthier, safer, and more just world by making a legacy gift to UCS.

You can name UCS in your will or living trust—or simply designate UCS as a beneficiary of your retirement account, bank account, or insurance policy.

TO LEARN MORE, contact Director of Planned Giving Ken Dolbashian at (617) 301-8014 or kdolbashian@ucsusa.org.

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