

# One Hundred Seconds



# Bulletin of the Atomic Scientists

## Annual Report 2019

### **The Mission**

At our core, the Bulletin of the Atomic Scientists is a media organization, publishing a free-access website and a bimonthly magazine. But we are much more. The Bulletin's website, iconic Doomsday Clock, and regular events equip the public, policymakers, and scientists with the information needed to reduce manmade threats to our existence. The Bulletin focuses on three main areas: nuclear risk, climate change, and disruptive technologies. What connects these topics is a driving belief that because humans created them, we can control them.

The Bulletin is an independent, nonprofit 501(c)(3) organization. We gather the most informed and influential voices tracking manmade threats and bring their innovative thinking to a global audience. We apply intellectual rigor to the conversation, and we do not shrink from alarming truths.

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# From the Executive Chair

Edmund G. Brown Jr.

## Wake up the world

It's very hard to find the words to express the moment we now are in. Speaking of danger and destruction is never easy. Worse, what is being said is not being heard. It's being ignored, it's being denied, and it's being belittled because it's too awful and people think you sound like a crackpot. We're not supposed to utter the truth about the power of mankind to destroy itself. It is profoundly deviant to our contemporary culture.

I think back to the prophets of old, to Isaiah to Jeremiah—they weren't listened to either. Prophets may not know the future, but they warn of the danger that they see ahead. If there is even just a one in one hundred chance that the warnings from scientists and experts are correct, then we are truly in a dangerous moment.

We are in this predicament because the power that mankind has generated is completely at variance with the seriousness with which it's understood. We live in a world of vast, deep and pervasive complacency. So that's why the Bulletin of the Atomic Scientists has the Clock and that's why it has been moved closer to midnight than at any other time.

Now critics will say this is just a gimmick. Well, how else can we communicate where we're at and the seriousness of the moment? How else can we sound the alarm to the Democrats, the Republicans, the independents, the millionaires, the billionaires, and the media owners who carry on as if nothing is wrong? How else can we communicate that we're on the Titanic about ready to hit an iceberg?

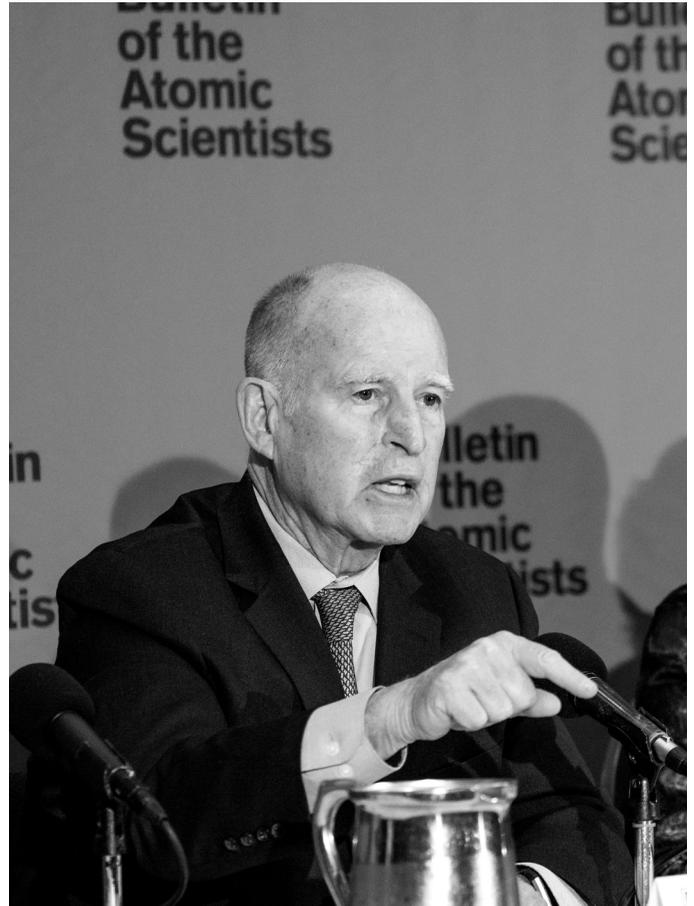
The Clock demands attention. But it also demands action. And setting the Clock is a reminder that each of us can still do something to turn things around. We have an incredible opportunity to reverse the nuclear arms race, carbon emissions, and the headlong rush to ever more dangerous technology. It's within human hands.

So let's not allow this moment to pass. We can still pull back from the brink. But we have to do what we're not doing. We have to change the design of how we're behaving. So the task is to wake up. Wake up America. Wake up the world.

It is 100 seconds before doomsday.



Edmund G. Brown Jr.



**So let's not allow this moment to pass. We can still pull back from the brink. But we have to do what we're not doing. We have to change the design of how we're behaving.**

# From the President & CEO

Rachel Bronson



**If decisionmakers continue to fail to act—pretending that being inside two minutes is no more urgent than the preceding period—citizens around the world should rightly echo the words of climate activist Greta Thunberg and ask: “How dare you?”**

## We are inside the two-minute warning

The Bulletin’s Science and Security Board convened in Chicago in November 2019 with a keen recognition that we live in a deeply troubling era, with the risk of nuclear accident growing by the day as the time available to responsibly stem the climate crisis shrinks. Scientific expertise is under assault, and facts are hard to find in the murk of misinformation.

This year, the Board moved the time from two minutes to midnight to 100 seconds to midnight, a decision taken in full recognition of its historic nature. You will see in the following statement why board members reset the Clock, and what they suggest leaders and citizens around the world can do to eventually begin moving it away from midnight.

US sports terminology provides an analogy for the current moment. As fans who watch it know, American football incorporates a two-minute warning, a break at the end of each half that differentiates the last two minutes from all that came before. Decisions are made with different strategic reference points, and expectations are raised for decisive action. The last two minutes bring newfound vigilance and focus to participants and viewers alike. Every second matters.

Public engagement and civic action are needed, and needed urgently. Science and technology can bring enormous benefits, but without constant vigilance, they bring enormous risks as well. The Bulletin is grateful to our supporters, who empower that vigilance. You allow us to generate straight-up, facts-based assessments and evidence to share with our growing global audience.

More people came to the Bulletin’s website in 2019 than any prior year, and our magazine continues to be read by followers around the world, thanks to you. The resurgent interest in issues of nuclear risk, climate change, and other disruptive technologies, especially among those age 35 years and younger, shows that tomorrow’s leaders are seeking new images, messages, policies, and approaches. They no longer assume that today’s leaders will keep them safe and secure.

In the year 2020, several important anniversaries should cause us all to assess progress, or lack thereof, toward a safer and more secure planet. April marks the 50th anniversary of Earth Day, established to advocate for a healthy and sustainable environment. On the first Earth Day—April 22, 1970—20 million Americans, almost 10 percent of the US population, took to the streets in support of more sustainable practices. May 2020 also marks the 50th

anniversary of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), which became the bedrock for global efforts at nuclear arms control. August 2020 will also mark the 75th anniversary of the use of nuclear weapons in Hiroshima and Nagasaki—the first and only time such weapons have been brandished as instruments of war.

Although humanity has come perilously close to obliterating itself, it has also experienced moments of exquisite forethought, well-planned efforts to protect the planet accomplished by determined people like you. In the Bulletin’s own 75th anniversary year, we are redoubling our efforts to encourage more such moments. We need your support and engagement more than ever.

The danger is high, and the margin for error is low. If decisionmakers continue to fail to act—pretending that being inside two minutes is no more urgent than the preceding period—citizens around the world should rightly echo the words of climate activist Greta Thunberg and ask: “How dare you?”

*Rachel Bronson*

Rachel Bronson

# **OUR VALUES**

**TO BE UNDERSTANDABLE AND INFLUENTIAL.**

**TO BE VIGILANT.**

**TO BE SOLUTION-ORIENTED.**

**TO BE FAIR-MINDED.**

# From the Editor-in-Chief

## John Mecklin

### Looming threats and pandemic reality

Traffic to the Bulletin's website hit an all-time high in 2019, totaling more than 2.83 million visits, a showing that reflects quality content and expanded outreach across our coverage areas—nuclear risk, climate change, and disruptive technologies. In the first quarter of 2020, our readership skyrocketed from that record level as people around the world sought—and the Bulletin provided—authoritative information on the coronavirus pandemic.

Throughout 2019, our open website, <https://thebulletin.org/>, played host to a near-continual stream of cutting-edge and widely viewed articles, videos, and multimedia presentations. A quick sample of a few of the best:

In February, MIT missile expert Ted Postol revealed in compelling detail why Russia's claims—that US missile defense sites in Eastern Europe have offensive nuclear capabilities—are credible. Postol's piece, "Russia may have violated the INF Treaty. Here's how the United States may have done the same," garnered attention across the national security commentariat and racked up more than 10,000 views.

Our consistently strong climate change coverage was highlighted in March by "Adults won't take climate change seriously. So we, the youth, are forced to strike," a piece written by four members of the US Youth Climate Strike group (three of them teenagers and the fourth a pre-teen). This article drew more than 80,000 pageviews.

As summer merged into the fall, Matt Field, the associate editor who oversees our disruptive technology content, wrote a story focused on two American experts advocating for use of artificial intelligence in US nuclear command and control, and published another by Filippa Lentzos about an explosion at a Russian bioresearch facility known for housing the smallpox virus. Together, the articles drew more than 40,000 website views.

Late in September, we published deputy editor Dan Drollette's special report, "Tilting toward windmills," an in-depth multimedia presentation on US wind energy efforts off the East Coast.

And as 2019 wound down, the enormously popular "Fact-check: Five claims about thorium made by Andrew Yang," combined questions about an unconventional presidential candidate with a subject—thorium as commercial nuclear fuel—that has long been intellectual catnip for a significant and dedicated segment of Bulletin readers. The piece drew more than 28,000 pageviews. But it was hardly a freak readership breakout; in 2019, more than 20 website articles drew more than 10,000 pageviews each.

The Bulletin's online subscription magazine also offered a wide range of authoritative and influential coverage last year.

The January 2019 issue of the subscription magazine put a spotlight on nuclear modernization efforts around the world and was, by design, free of charge to all readers for two months. The quality of the issue—which included the world's top experts on nuclear modernization—drove nearly 20,000 pageviews.

However, the magazine's hit of the summer was clearly an article about public opinion polling on US attitudes toward war with North Korea, authored by Stanford University's Scott Sagan and colleagues. "What do Americans really think about conflict with nuclear North Korea? The answer is both reassuring and disturbing" drew 11,000-plus views at our magazine site.

A traffic leader from the September issue, Bulletin Science and Security Board member Ray Pierrehumbert's "There is no Plan B for dealing with the climate crisis," received almost 10,000 views.

Throughout 2019 and into 2020, the Bulletin also expanded its reach via collaborations with a wide variety of media organizations:

- We continued our Climate Desk content-sharing partnership with 17 other quality news organizations that cover climate change.
- We published the first two pieces in our partnership with the Northwestern/Medill School of Journalism graduate science journalism program: "Puerto Rico's clean-energy and



grid-restoration efforts still in doubt" and "How boulders in Mongolian mountains reveal the pace of climate change."

- And last but not least, early in 2020 we co-published, in partnership with *The New Yorker* magazine, Elisabeth Eaves' "Hot zone in the heartland?"—an investigation into the reliability of biosafety laboratories around the world that has direct relevance to the coronavirus pandemic.

As I write this letter, the COVID-19 pandemic is—sadly, tragically—ravaging the world. Because of its decades-long history of publishing top experts in the biosecurity field—experts who have long warned of the dangers of zoonotic disease outbreaks—the Bulletin has been looked to as a leading source for authoritative information on the pandemic. Our readership in March 2020 was more than triple our readership in March 2019. You can view a collection of our coverage of the coronavirus crisis at <https://thebulletin.org/>.

Thanks to your continued support—which everyone on the editorial staff appreciates—the Bulletin is well positioned to expand the amount and types of innovative content that it produces, to forge new media partnerships that provide ways for us to reach ever-larger audiences, and to continue to provide the authoritative information that humanity needs if it is to manage and survive the global risks and crises it faces.

John Mecklin

Providing lucid facts and accessible commentary

The Bulletin publishes for a broad and diverse international community, with half of our website visitors coming from outside the United States. The community is also young. Half are under the age of 35. The growing number of readers and followers include the general public, policymakers, and scientists themselves.

2.8 million website visitors, up 22% from 2018

4.3 million pageviews, up 21% from 2018

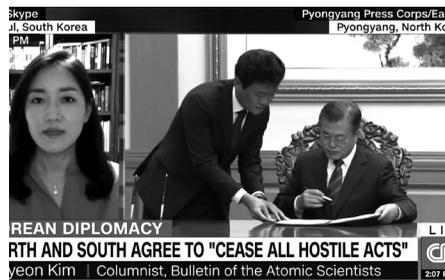
50% of our audience is from outside the US; 50% under the age of 35.

15% increase in Twitter followers

The Bulletin gathers the most informed and influential voices tracking manmade threats and brings their innovative thinking to a global audience. We apply intellectual rigor to the conversation, and we do not shrink from alarming truths. Our award-winning magazine and website, the Doomsday Clock setting, and timely events promote policy debates essential to healthy democracies and a safe and livable planet.

Nuclear risks escalate

2019 was full of unsettling nuclear news. A wide array of experts contributed valuable stories on the website to help Bulletin readers make sense of these major issues. Here are just a few.



Duyeon Kim on Trump-Kim meeting

Columnist Duyeon Kim was in Seoul to cover the June 2019 meeting of Donald Trump and Kim Jong-un at the demilitarized zone separating the two Koreas. She was interviewed by CNN and Bulletin Editor-in-Chief John Mecklin, among others.



We need a Green New Deal for nuclear weapons

Matt Korda

Progressive voters will be looking for a candidate who has a bold vision for the future of US nuclear policy. Such a policy might mirror the Green New Deal for climate change, suggests Korda, who prepares the Nuclear Notebook with Hans M. Kristensen, both of the Federation of American Scientists.

The entwined Cold War roots of missile defense and climate geoengineering

Jurgen Scheffran

Nuclear weapons and global warming stand out as two principal threats to the survival of humanity. In each of these existential cases, two strategies born during the Cold War years are competing. One is to abandon the systems: eliminate nuclear weapons and drastically reduce carbon emissions. The second strategy is to continue business as usual, but develop new technologies to deal with the consequences.



North Korean ballistic missile tests are very standard. Say WHAT?

Thomas Gaulkin, John Krzyzaniak

Donald Trump rocked the nuclear non-proliferation boat by withdrawing the US from the Joint Comprehensive Plan of Action—a hard-won agreement widely seen as a successful restraint on Iran's nuclear program—marking a major shift in American foreign policy. He also became the first US president to meet a North Korean leader, reversing decades of strategy aimed at isolating and containing that nation's military ambitions. Since 2018, both Iran and North Korea have tested ballistic missiles. But while Iran's activities draw unyielding scorn from the White House, North Korea's sometimes yield little more than a shrug.

In an installment of **Say WHAT?**—the Bulletin's video series that was introduced in 2018 to take clear-eyed looks at fuzzy policy—non-proliferation expert Alexandra Bell explained the dangerous consequences of the Trump administration's inconsistent nuclear relations.

## Nuclear risks continue

### A new, hopeful moment for US nuclear policy

Joe Cirincione

Although the 2020 National Defense Authorization Act that Congress passed in December 2019 allows the Trump administration's nuclear modernization plans, including the deployment of a low-yield nuclear warhead, to continue apace, Ploughshares President Joe Cirincione sees five trends that bode well for the world's survival—trends that may gain strength in 2020.



### Things you shouldn't nuke

Thomas Gaulkin

Many commentators challenged President Trump's suggestion of using nuclear weapons to stop hurricanes, but the sheer power of a nuclear explosion has inspired a lot of other bad ideas over time.

### The human cost of nuclear weapons is not only a "feminine concern"

Lilly Adams

In the male-dominated field of arms control, gender dynamics contribute to the sidelining of frontline communities, perpetuating the systems of oppression and marginalization that caused them to be harmed in the first place. Adams describes how to change that.

## Climate crisis heats up

Quick: What do windmills, the Titanic, Plan B, and the 97 percent all have in common? They were each part of the Bulletin's extensive climate coverage of 2019—and that's just the tip of the (melting) iceberg.

### There is no Plan B for dealing with the climate crisis

Ray Pierrehumbert

Science and Security Board member Ray Pierrehumbert opened his August 2019 magazine article with this: "Let's get this on the table right away, without mincing words... With regard to the climate crisis, yes, it's time to panic... We are in deep trouble... To understand why, it is necessary to understand something about carbon budgets."



### Tilting toward windmills

A special report by Dan Drollette

To learn more about the latest in offshore wind power, you have to go offshore—specifically, to the waters just off Block Island, Rhode Island. Here, one of the biggest experiments in renewable energy in North America is wrapping up, setting the stage for what could be a rapid explosion in the number of commercial offshore windmills on the entire East Coast of the United States, assuming they leap the latest set of ever-changing legal hurdles set by fossil-fuel friendly regulators in Washington, DC.

Drollette's in-depth article is part of Covering Climate Now, a global collaboration of more than 300 news outlets to strengthen coverage of the climate story.

With additional funding, the Bulletin is able to commission and share more original and long-form material to illuminate manmade risks to the world, and identify potential solutions.

### Millions of times later, 97 percent climate consensus still faces denial

Dana Nuccitelli

The public, even when alarmed about climate change, underestimates the scientific consensus on it being a manmade problem. That's largely due to a sustained misinformation campaign. This article attracted the third largest readership of all the Bulletin's website news in 2019.



### Climate change and the Titanic

Peter Gleick

The author, a member of the US National Academy of Sciences and a hydroclimatologist, compares political leaders and climate change deniers to the crew and passengers on the Titanic.

## Disruptive tech coverage

The category of disruptive technologies covers a wide range of potential global threats, and over the last year, the Bulletin has ranged widely to explore them. Here are a few samples.

Disruptive tech coverage

The existential threat from cyber-enabled information warfare

Herb Lin

Science and Security Board member Herb Lin, an expert in cyber policy and security at Stanford University, argues that corruption of the information ecosystem through cyber-enabled information warfare is not just a phenomenon that increases the risk of nuclear war or further hampers efforts to fight climate change. It's also an existential threat in its own right.



What happened after an explosion at a Russian disease research lab called VECTOR?

Filippa Lentzos

The author talked to experts at the World Health Organization and dug deep into archival resources to deliver this story on what happened after an explosion rocked a Russian disease research center that housed the smallpox-causing variola virus.

A nuclear detonation in the South China Sea? No, more Twitter conspiracy nonsense

Matt Field

That Hal Turner, a nighttime AM radio host, white supremacist, and federal convict, pushed a conspiracy theory that China had detonated a nuclear weapon in the ocean was perhaps not all that surprising. What is surprising is that a news account on Twitter, followed by academics and journalists alike, helped amplify Turner's whopping falsehood and made it go viral.



Hey, let's fight global pandemics by maybe starting one... Say WHAT?

Thomas Gaulkin

We took a look at the study of potentially pandemic viruses by altering their genetic code so that they could more easily spread among new species, including (gulp) the human species. While at least one pair of elite researchers thought this "gain of function" experimentation sounded like a great idea, some of us had only one response: Say WHAT?

Get out the (well-informed) vote in 2020

With the 2020 elections looming, the Bulletin began offering new tools and features in 2019 to help prepare for this all-important milestone.



Why nuclear decision-making should be a focus of the 2020 campaign

The Bulletin published a free-access issue of the magazine in January 2020 that lays out the nuclear weapons topics that voters should raise with all US presidential candidates.



Is breaking up big tech the solution to online hate or election meddling?

Matt Field, with University of Chicago Law Professor Randy Picker

Should the same antitrust powers that the government used to break up Standard Oil in 1911 be applied to Facebook? Would breaking up companies solve the problems that many have with the tech sector? Antitrust expert Randy Picker responded "No" in this Bulletin interview.

Table titled 'Bulletin of the Atomic Scientists EXISTENTIAL THREAT SCORECARD' with columns for candidates and rows for various issues like Climate Change, Nuclear Weapons, and Disruptive Technologies.

An existential threat scorecard for the Democratic presidential debates

John Mecklin and Thomas Gaulkin

As candidates began a series of Democratic debates for the 2020 presidential election last June, the Bulletin published a scorecard to help voters assess which candidate was best placed to respond to the daunting dangers the next president will confront.

# The Bulletin online magazine 2019

## In-depth, long-form journalism

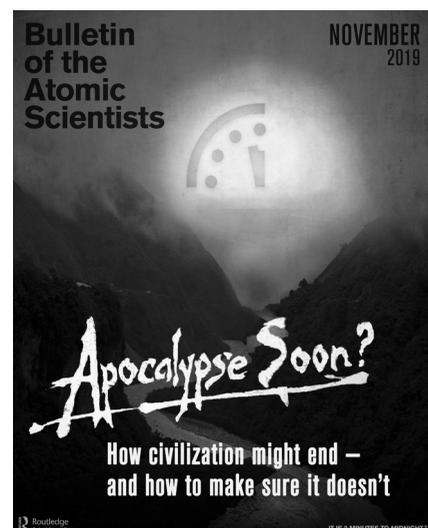
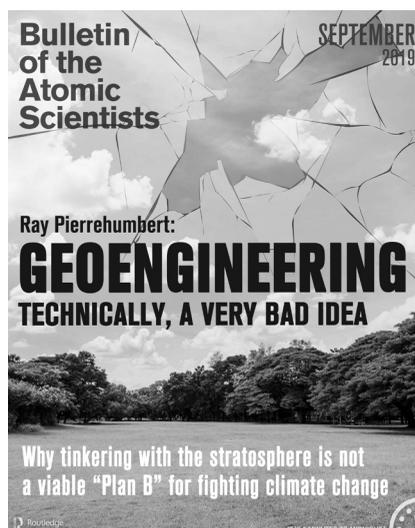
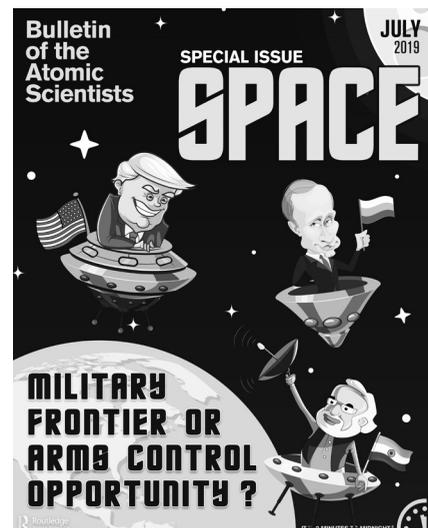
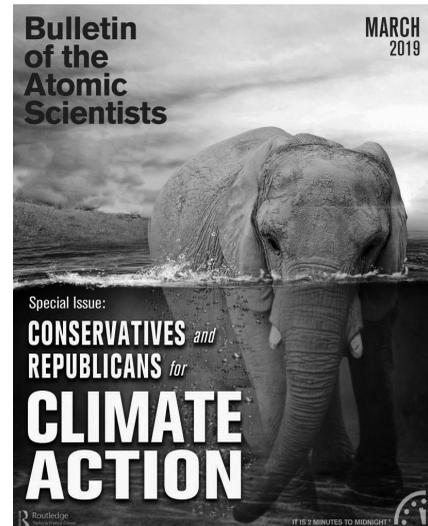
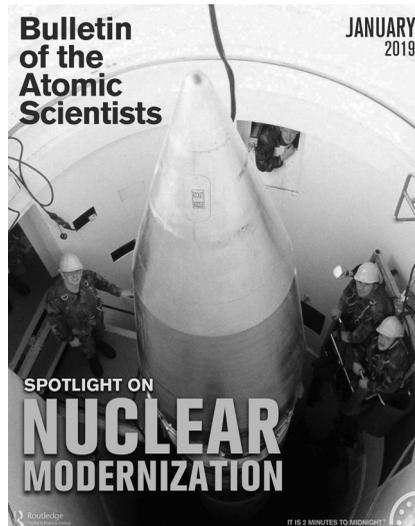
The *Bulletin's* bimonthly online magazine can be found in more than 10,000 leading universities and institutions worldwide. It is published in partnership with the **Taylor & Francis Group**, one of the world's leading publishers of scholarly journals, books, e-books, and reference works.

First published in November 1945 as a 6-page black-and-white bulletin, the magazine has twice received the National Magazine Award and is widely regarded as an authoritative source that offers the best scientific and policy thinking on solving the globe's most challenging problems.

In 2019 we continued the restoration of strong visual covers, seen here, all designed by Bulletin Multimedia Editor Thomas Gaulkin.

One of the most widely consulted features in the magazine, always on a free-to-access basis, is The Nuclear Notebook. This authoritative accounting of global nuclear warheads is compiled by Hans M. Kristensen and Matt Korda, two top experts from the Federation of American Scientists. The Nuclear Notebook provides a reliable look at the arsenals of all nine nuclear weapons states: United States, Russia, United Kingdom, France, China, Israel, India, Pakistan, and North Korea.

**Exciting changes are coming to the magazine in 2020. Watch the website for more magazine updates!**



# Voices of tomorrow/Rieser Fellow

## What kind of world do we want?

### 2019 Rieser Award recipient: Haven Coleman



The Bulletin named Haven Coleman (above) as its 2019 Leonard M. Rieser Award recipient for her contributions to a March 7, essay “Adults won’t take climate change seriously. So we, the youth, are forced to strike.”

Coleman and her co-authors were the lead organizers of US Youth Climate Strike, part of a global student movement inspired by 16-year-old climate activist Greta Thunberg’s weekly school strikes in Sweden and other European countries. In their essay, the authors passionately describe their frustration with the utter lack of commitment that world leaders have demonstrated when confronting the climate crisis.

“This article is an absolutely stirring essay that calls not just a generation, but a world to action to diminish the dire threat that unchecked climate change poses to humanity,” Bulletin Editor-in-Chief John Mecklin said. “The eloquence and urgency exemplify the Bulletin tradition of speaking truth to power and made it easy to name this piece the winner of this year’s Rieser Award.”

The Rieser Award is the capstone of the Bulletin’s Next Generation Program, created



to ensure that new voices, steeped in science and public policy, have a trusted platform from which to address existential challenges. It is named for physicist Leonard M. Rieser (1922-1998), board chair at the Bulletin from 1984 until his death in 1998.

“Our hope for the Leonard Rieser Award is that it will inspire others to act, in whatever ways they can, to address today’s greatest threats to global security,” said Tim Rieser who, along with his brother Len and sister Abby, helped to establish the Rieser Award in their father’s honor. “By choosing this essay, the Bulletin is amplifying the voices of the next generation’s leaders, who recognize the gravity of the threat that climate change poses to the world they will inherit. If my father were alive today, he would share their sense of urgency and exasperation with the shameful inaction of today’s political leaders, and he would support the Global Climate Strike as a way to sound an alarm—much as he did when moving the hands of the Doomsday Clock.”

The Rieser Award includes a \$1,000 cash prize and a one-year subscription to the Bulletin’s online magazine.

**Our hope for the Leonard Rieser Award is that it will inspire others to act, in whatever ways they can, to address today’s greatest threats to global security.**

### Rieser Award-winning essay 2019

*Editor’s note: Haven Coleman and her co-authors Maddy Fernands, Isra Hirsi, and Alexandria Villaseñor were the lead organizers of US Youth Climate Strike.*

We, the youth of America, are fed up with decades of inaction on climate change. On Friday, March 15, young people like us across the United States will strike from school. We strike to bring attention to the millions of our generation who will most suffer the consequences of increased global temperatures, rising seas, and extreme weather. But this isn’t a message only to America. It’s a message from the world, to the world, as students in dozens of countries on every continent will be striking together for the first time.

For decades, the fossil fuel industry has pumped greenhouse gas emissions into our atmosphere. Thirty years ago, climate scientist James Hansen warned Congress about climate change. Now, according to the most recent Intergovernmental Panel on Climate Change report on global temperature rise, we have only 11 years to prevent even worse effects of climate change. And that is why we strike.

We strike to support the Green New Deal. Outrage has swept across the United States over the proposed legislation. Some balk at the cost of transitioning the country to renewable energy, while others recognize its far greater benefit to society as a whole. The Green New Deal is an investment in our future—and the future of

# Voices of tomorrow

## What kind of world do we want?

generations beyond us—that will provide jobs, critical new infrastructure, and, most importantly, the drastic reduction in greenhouse gas emissions essential to limit global warming. And that is why we strike.

To many people, the Green New Deal seems like a radical, dangerous idea. That same sentiment was felt in 1933, when Franklin D. Roosevelt proposed the New Deal—a drastic piece of legislation credited with ending the Great Depression that threatened (and cost) many lives in this country. Robber-barons, ordinary citizens, and many in between were enraged by the policies enacted by the New Deal. But looking back at how it changed the United States, it's impossible to ignore that the New Deal brought an end to the worst economic disaster in history by creating fundamental programs like Social Security and establishing new regulatory agencies such as the Securities and Exchange Commission. The Works Progress Administration mobilized workers across the nation to build important infrastructure—including thousands of schools—that has improved Americans' everyday life for generations.

Change is always difficult, but it shouldn't be feared or shied away from. Even for its detractors, Roosevelt's New Deal ended up working out quite well. The United States has led the world's economy throughout the many decades since. The changes proposed in the Green New Deal will help ensure that our entire species has the opportunity to thrive in the decades (and centuries) to come. As the original New Deal was to the declining US economy, the Green New Deal is to our changing climate. And that is why we strike.

The popular arguments against the Green New Deal include preposterous claims that it will ban airplanes, 'burgers, and cow flatulence—claims that are spread even by some of the most powerful leaders in our nation, such as Senate Majority Leader Mitch McConnell. Although these outlandish claims are clearly false, they reveal a larger truth apparent in the American, and world, populations: Instead of taking action on the imminent threat of climate change, our leaders play political games. Because adults won't take our future seriously, we, the youth, are forced to. And that is why we strike.

The alarming symptoms of Climate Denialism—a serious condition affecting both the hallways of government and the general population—mark our current historical crossroads of make-it-or-break-it action on climate change. Although there are many reasons for this affliction—such as difficulty grasping the abstract concept of a globally changed climate, or paralysis in the face of overwhelming environmental catastrophe—the primary mode of Climate Denialism contagion involves lies spouted by politicians, large corporations, and interest groups. People in power, such as Senator McConnell and the Koch brothers, have used money and power strategically, to shift the narrative on climate change and spread lies that allow themselves and other fossil fuel industry beneficiaries to keep the fortunes they've built on burning fossil fuels and degrading the environment.

The current US president is a rabid climate change denier himself. President Trump pulled out of the historic Paris Agreement and repeatedly tweets about weather phenomena that he claims somehow disprove the existence of climate change—despite the fact that his own administration has reported the facts of climate change and its impact on the United States.

We are also concerned that top Democrats demonstrate their own lack of urgency about the existential threat of climate change. California senator Dianne Feinstein's recent dismissal of a group of schoolchildren visiting her office to beg her support for the Green New Deal was very disturbing for us young people. Feinstein will not have to face the consequences of her inaction on climate change. She suggested that the children one day run for the Senate themselves if they wish to pass aggressive climate legislation. Sadly, that may not be an option for us, if she and other Democrats, like House Speaker Nancy Pelosi, continue to dismiss the pleas of our generation. Faced with politicians on both sides of the aisle who belittle and ignore us, we're forced to take a stand, and we're doing it together on a global scale. And that is why we strike.

We strike because our world leaders haven't acknowledged, prioritized, or properly addressed the climate crisis. We strike because marginalized

communities across our nation—especially communities of color and low income communities—are already disproportionately impacted by climate change. We strike because if the societal order is disrupted by our refusal to attend school, then influential adults will be forced to take note, face the urgency of the climate crisis, and enact change. With our future at stake, we call for radical legislative action—now—to combat climate change and its countless detrimental effects on the American people. We strike for the Green New Deal, for a fair and just transition to a 100 percent renewable economy, and to stop creation of new fossil fuel infrastructure. We strike because we believe the climate crisis should be called what it really is: A national emergency, because we are running out of time.

**We strike because our world leaders haven't acknowledged, prioritized, or properly addressed the climate crisis.**

## “How dare you?” Greta Thunberg challenges world leaders

Bulletin multi-media editor Thomas Gaulkin posted a brief from the United Nations Climate Action Summit in New York City on September 23, recounting how 16-year-old Swedish climate activist Greta Thunberg spoke up, giving her already eloquent demands for adult accountability a new, intensely moving, ferocity.



# Voices of tomorrow

What kind of world do we want?

## Honorable mention



The Bulletin is also pleased to announce an Honorable Mention for the first time in the history of the Rieser Award. That honor goes to Ivan Andriushin, Cecilia Eiroa-Lledo, Patricia Schuster, and Evgenii Varseev for their essay "Nuclear power and global climate change." It is part of a cross-country collaboration from the US-Russia Young Professionals Nuclear Forum, a forum established

by Siegfried Hecker and Alla Kassianova to encourage dialogue on critical nuclear issues of concern to both countries.

## 2019 Voices of Tomorrow Authors

Ivan Andriushin  
Leonardo Bandarra  
Lisa A. Bergstrom  
Haven Coleman  
Cecilia Eiroa-Lledo  
Rachel Emond  
Maddy Fernands  
Alessandro Ford  
Isra Hirsi  
Deverrick Holmes  
Catherine Killough  
Josh Klein  
Arielle Martinez-Cohen  
Gregory Niguidula  
Tereza Novotná  
Maxime Polleri  
Lindsay Rand  
Patricia Schuster  
Justin Sherman  
US-Russia Young Professionals  
Nuclear Forum  
Evgenii Varseev  
Alexandria Villaseñor  
Talia Weiss  
Editor: Dawn Stover

## Past Rieser Award winners meet and greet at Annual Dinner



Yangyang Cheng (second from right), the 2017 Rieser Award winner, who is now a postdoctoral research associate at Cornell University and a member of the CMS experiment at the Large Hadron Collider, attended the 2019 Annual Dinner as the Bulletin's guest. With her from left are: Matt Field, Bulletin associate editor; Brian Schwartz; and John Krzyzaniak, Bulletin associate editor.



2018 Rieser Award winners Kate Hewitt (left) and Erin Connolly (right), spoke at the 2019 Annual Dinner. Hewitt is a federal contractor at the National Nuclear Security Administration and is a former Herbert Scoville Peace Fellow at The Brookings Institution. Connolly is a master's candidate at the Keough School of Global Affairs, International Peace Studies at the University of Notre Dame and former research analyst at the Center for Arms Control and Non-Proliferation.

# The Doomsday Clock announcement

## It is 100 seconds to midnight

At an international news conference in January, from Washington, DC, the Bulletin moved the Doomsday Clock closer to midnight than at any point since its creation in 1947, in seconds rather than minutes, to underscore the urgency of finding solutions.

The Bulletin's Science and Security Board, in consultation with the Board of Sponsors, concluded that: "Humanity continues to face two simultaneous existential dangers—nuclear war and climate change—that are compounded by a threat multiplier, cyber-enabled information warfare, that undercuts society's ability to respond. The international security situation is dire, not just because these threats exist, but because world leaders have allowed the international political infrastructure for managing them to erode."

At the announcement, Bulletin experts were joined by two members of The Elders: Former UN Secretary-General Ban Ki-moon, deputy chair, and former South Korean Foreign Minister; and Former President of Ireland Mary Robinson, chair, who previously served as UN High Commissioner for Human Rights. Founded by Nelson Mandela in 2007, The Elders are

independent global leaders working together for peace and human rights.

The public interest in the Clock announcement was extraordinary. The announcement was covered in nearly 7,000 print and broadcast stories in the first week, including a CNN op-ed co-authored by Ban Ki-moon, Mary Robinson, Jerry Brown, and William Perry. We conducted town halls at Georgetown University and the University of Chicago, and hosted a Reddit "Ask Me Anything" with our Science and Security Board members. Brown and Bronson also visited with the Washington bureaus of the *Washington Post* and *New York Times*.

**"Dangerous rivalry and hostility among the superpowers increases the likelihood of nuclear blunder. Climate change just compounds the crisis. If there's ever a time to wake up, it's now."**  
Jerry Brown



**"We share a common concern over the failure of the multilateral system to address the existential threats we face. From the US withdrawal from the Paris Agreement and the Iran Nuclear Deal, to deadlock at nuclear disarmament talks and division at the UN Security Council – our mechanisms for collaboration are being undermined when we need them most."**  
Ban Ki-moon

**"We now face a true emergency—an absolutely unacceptable state of world affairs that has eliminated any margin for error or further delay."** Rachel Bronson



# The Doomsday Clock announcement

## It is 100 seconds to midnight

### The world gets the message

**Notes:** 7,580 earned-media stories in the first two weeks; print and online news coverage now totals 6,404; 1,176 broadcast news mentions.

Views of the full live feed continue to rise.  
 Bulletin YouTube: 65k views  
 Bulletin Facebook: 15k views  
 Bloomberg QuickTake: 1.8 million views  
 Good Morning America (Facebook): 372k views  
 NowThis Politics: 300k views  
 ABC OnLocation: 372k views

#### ABC News

'Doomsday Clock' moved 20 seconds closer to catastrophe

#### Agencia EFE

El "Reloj del Apocalipsis" avanza: La humanidad está a 100 segundos de su fin

#### Dainik Bhaskar

Number 1 Indian newspaper—circulation 4.3 million

#### Deutsche Welle

Doomsday Clock suggests the end is closer than ever

#### Fox News

Doomsday Clock moves to 100 seconds to midnight—closest point to nuclear annihilation since Cold War

#### The Guardian

Doomsday clock lurches to 100 seconds to midnight—closest to catastrophe yet

#### The Guardian Editorial

The Guardian view on Trump's folly

#### Hindustan Times

Doomsday Clock is just 100 seconds away from 'midnight'

#### New York Times

Tick, Tock, Tick. Why the Doomsday Clock is Moving Closer to Midnight

#### NBC News

Scientists move Doomsday Clock closer to midnight

#### Philadelphia Inquirer

The end of the world: A guide for worriers | Satire

#### USA Today

We're closer to destruction than ever before: Doomsday clock reset to 100 seconds to midnight

#### Vox

The Doomsday Clock is now at '100 seconds to midnight.' Here's what that means.

#### Washington Post

The Doomsday Clock ticks closer to midnight

#### Radio/Broadcast Highlights:

Bloomberg Radio Network  
 BBC WorldNews  
 Breakfast with Norman Swan (Australia ABC Radio)  
 CBS Morning News  
 CSPAN  
 Five Things/USA Today Podcast  
 Friday News Roundup WAMU NPR  
 Jimmy Kimmel Live  
 NPR Morning Edition  
 The Weather Channel  
 Today-BBC  
 Wait Wait Don't Tell Me (NPR show)

#### Newsletter Highlights:

Heated (Emily Atkins' important climate newsletter)  
 Climate News Nexus  
 Critical State  
 CSIS Project on Nuclear Issues  
 UN Wire



**“We ask world leaders to join us in 2020 as we work to pull humanity back from the brink. The Doomsday Clock now stands at 100 seconds to midnight, the most dangerous situation that humanity has ever faced. Now is the time to come together – to unite and to act.”**  
 Mary Robinson





# The 2020 Clock Statement

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## To: Leaders and citizens of the world

Humanity continues to face two simultaneous existential dangers—nuclear war and climate change—that are compounded by a threat multiplier, cyber-enabled information warfare, that undercuts society's ability to respond. The international security situation is dire, not just because these threats exist, but because world leaders have allowed the international political infrastructure for managing them to erode.

In the nuclear realm, national leaders have ended or undermined several major arms control treaties and negotiations during the last year, creating an environment conducive to a renewed nuclear arms race, to the proliferation of nuclear weapons, and to lowered barriers to nuclear war. Political conflicts regarding nuclear programs in Iran and North Korea remain unresolved and are, if anything, worsening. US-Russia cooperation on arms control and disarmament is all but nonexistent.

Public awareness of the climate crisis grew over the course of 2019, largely because of mass protests by young people around the world. Just the same, governmental action on climate change still falls far short of meeting the challenge at hand. At UN climate meetings last year, national delegates made fine speeches but put forward few concrete plans to further limit the carbon dioxide emissions that are disrupting Earth's climate. This limited political response came during a year when the effects of manmade climate change were manifested by one of the warmest years on record, extensive wildfires, and quicker-than-expected melting of glacial ice.

Continued corruption of the information ecosphere on which democracy and public decision making depend has heightened the nuclear and climate threats. In the last year, many governments used cyber-enabled disinformation campaigns to sow distrust in institutions and among nations, undermining domestic and international efforts to foster peace and protect the planet.

This situation—two major threats to human civilization, amplified by sophisticated, technology-propelled propaganda—would be serious enough if leaders around the world were focused on managing the danger and reducing the risk of catastrophe. Instead, over the last two years, we have seen influential leaders denigrate and discard the most effective methods for addressing complex threats—international agreements with strong verification regimes—in favor of their own narrow interests and domestic political gain. By undermining cooperative, science- and law-based approaches

to managing the most urgent threats to humanity, these leaders have helped to create a situation that will, if unaddressed, lead to catastrophe, sooner rather than later.

Faced with this daunting threat landscape and a new willingness of political leaders to reject the negotiations and institutions that can protect civilization over the long term, the Bulletin of the Atomic Scientists Science and Security Board today moves the Doomsday Clock 20 seconds closer to midnight—closer to apocalypse than ever. In so doing, board members are explicitly warning leaders and citizens around the world that the international security situation is now more dangerous than it has ever been, even at the height of the Cold War.

Civilization-ending nuclear war—whether started by design, blunder, or simple miscommunication—is a genuine possibility. Climate change that could devastate the planet is undeniably happening. And for a variety of reasons that include a corrupted and manipulated media environment, democratic governments and other institutions that should be working to address these threats have failed to rise to the challenge.

The Bulletin believes that human beings can manage the dangers posed by the technology that humans create. Indeed, in the 1990s leaders in the United States and the Soviet Union took bold actions that made nuclear war markedly less likely—and as a result the Bulletin moved the minute hand of the Doomsday Clock the farthest it has been from midnight.

But given the inaction—and in too many cases counterproductive actions—of international leaders, the members of the Science and Security Board are compelled to declare a state of emergency that requires the immediate, focused, and unrelenting attention of the entire world. It is 100 seconds to midnight. The Clock continues to tick. Immediate action is required.



# It is one hundred seconds to midnight

## A retreat from arms control creates a dangerous nuclear reality

The world is sleepwalking its way through a newly unstable nuclear landscape. The arms control boundaries that have helped prevent nuclear catastrophe for the last half-century are being steadily dismantled.

In several areas, a bad situation continues to worsen. Throughout 2019, Iran increased its stockpile of low-enriched uranium, increased its uranium enrichment levels, and added new and improved centrifuges—all to express its frustration that the United States had withdrawn from the Iran nuclear deal (formally known as the Joint Comprehensive Plan of Action, or JCPOA), re-imposed economic sanctions on Iran, and pressured other parties to the Iran nuclear agreement to stop their compliance with the agreement. Early this year, amid high US-Iranian tensions, the US military conducted a drone air strike that killed a prominent Iranian general in Iraq. Iranian leaders vowed to exact “severe revenge” on US military forces, and the Iranian government announced it would no longer observe limits, imposed by the JCPOA, on the number of centrifuges that it uses to enrich uranium.

Although Iran has not formally exited the nuclear deal, its actions appear likely to reduce the “breakout time” it would need to build a nuclear weapon, to less than the 12 months envisioned by parties to the JCPOA. At that point, other parties to the nuclear agreement—including the European Union and possibly Russia and China—may be compelled to acknowledge that Iran is not complying. What little is left of the agreement could crumble, reducing constraints on the Iranian nuclear program and increasing the likelihood of military conflict with the United States.

The demise of the Intermediate-Range Nuclear Forces (INF) Treaty became official in 2019, and, as predicted, the United States and Russia have begun a new competition to develop and deploy weapons the treaty had long banned. Meanwhile, the United States continues to suggest that it will not extend New START, the agreement that limits US and Russian deployed strategic nuclear weapons and delivery systems, and that it may withdraw from the Open Skies Treaty, which provides aerial overflights to build confidence and transparency around the world. Russia, meanwhile, continues to support an extension of New START.

The assault on arms control is exacerbated by the decay of great power relations. Despite declaring its intent to bring China into an arms control agreement, the United States has adopted a bullying and derisive tone toward its Chinese and Russian competitors. The three countries disagree on whether to pursue negotiations on outer space, missile defenses, and cyberwarfare. One of the few issues they do agree on: They all oppose the Treaty on the Prohibition of Nuclear Weapons, which opened for signature in 2017. As an alternative, the United States has promoted, within the context of the review conference process of the Nuclear Non-Proliferation Treaty (NPT), an initiative called “Creating the Environment for Nuclear Disarmament.” The success of this initiative may depend on its reception at the 2020 NPT Review Conference—a landmark 50th anniversary of the treaty.

US efforts to reach agreement with North Korea made little progress in 2019, despite an early summit in Hanoi and subsequent working-level meetings. After a North Korean deadline for end-of-year progress passed, Kim Jong Un announced he would demonstrate a new “strategic weapon” and indicated that North Korea would forge ahead without sanctions relief. Until now, the willingness of both sides to continue a dialogue was positive, but Chairman Kim seems to have lost faith in President Trump’s willingness to come to an agreement.

Without conscious efforts to reinvigorate arms control, the world is headed into an unregulated nuclear environment. Such an outcome could reproduce the intense arms race that was the hallmark of the early decades of the nuclear age. Both the United States and Russia have massive stockpiles of warheads and fissile material in reserve from which to draw, if they choose. Should China decide to build up to US and Russian arsenal levels—a development previously dismissed as unlikely, but now being debated—deterrence calculations could become more complicated, making the situation more dangerous. An unconstrained North Korea, coupled with a more assertive China, could further destabilize Northeast Asian security.

As we wrote last year and re-emphasize now, any belief that the threat of nuclear war has been vanquished is a mirage.

## An insufficient response to an increasingly threatened climate

In the past year, some countries have taken action to combat climate change, but others—including the United States, which formalized its withdrawal from the Paris Agreement, and Brazil, which dismantled policies that had protected the Amazon rainforest—have taken major steps backward. The highly anticipated UN Climate Action Summit in September fell far short of Secretary-General António Guterres’ request that countries come not with “beautiful speeches, but with concrete plans.” The 60 or so countries that have committed (in more or less vague terms) to net zero emissions of carbon dioxide account for just 11 percent of global emissions. The UN climate conference in Madrid similarly disappointed. The countries involved in negotiations there barely reached an agreement, and the result was little more than a weak nudge, asking countries to consider further curbing their emissions. The agreement made no advances in providing further support to poorer countries to cut emissions and deal with increasingly damaging climate impacts.

Lip service continued, with some governments now echoing many scientists’ use of the term “climate emergency.” But the policies and actions that governments proposed were hardly commensurate to an emergency. Exploration and exploitation of fossil fuels continue to grow. A recent UN report finds that global governmental support and private sector investment have put fossil fuels on course to be over-produced at more than twice the level needed to meet the emissions-reduction goals set out in Paris.

Unsurprisingly, these continuing trends are reflected in our atmosphere and environment: Greenhouse gas emissions rose



# It is one hundred seconds to midnight

again over the past year, taking both annual emissions and atmospheric concentrations of greenhouse gases to record highs. The world is heading in the opposite direction from the clear demands of climate science and plain arithmetic: Net carbon dioxide emissions need to go down to zero if the world is to stop the continuing buildup of greenhouse gases. World emissions are going in the wrong direction.

The consequences of climate change in the lives of people around the world have been striking and tragic. India was ravaged in 2019 both by record-breaking heat waves and record-breaking floods, each taking a heavy toll on human lives. Wildfires from the Arctic to Australia, and many regions in between, have erupted with a frequency, intensity, extent, and duration that further degrade ecosystems and endanger people. It is not good news when wildfires spring up simultaneously in both the northern and southern hemispheres, making the notion of a limited “fire season” increasingly a thing of the past.

The dramatic effects of a changing climate, alongside the glacial progress of government responses, have unsurprisingly led to rising concern and anger among growing numbers of people. Climate change has catalyzed a wave of youth engagement, activism, and protest that seems akin to the mobilization triggered by nuclear disaster and nuclear weapons fears in the 1970s and 1980s. Politicians are taking notice, and, in some cases, starting to propose policies scaled to the urgency and magnitude of the climate problem. We hope that public support for strong climate policies will continue to spread, corporations will accelerate their investments in low-carbon technologies, the price of renewable energy will continue to decline, and politicians will take action. We also hope that these developments will happen rapidly enough to lead to the major transformation that is needed to check climate change.

But the actions of many world leaders continue to increase global risk, at a time when the opposite is urgently needed.

## The increased threat of information warfare and other disruptive technologies

Nuclear war and climate change are major threats to the physical world. But information is an essential aspect of human interaction, and threats to the information ecosphere—especially when coupled with the emergence of new destabilizing technologies in artificial intelligence, space, hypersonics, and biology—portend a dangerous and multifaceted global instability.

In recent years, national leaders have increasingly dismissed information with which they do not agree as fake news, promulgating their own untruths, exaggerations, and misrepresentations in response. Unfortunately, this trend accelerated in 2019. Leaders claimed their lies to be truth, calling into question the integrity of, and creating public distrust in, national institutions that have historically provided societal stability and cohesion.

In the United States, there is active political antagonism toward science and a growing sense of government-sanctioned disdain for expert opinion, creating fear and doubt regarding well-established science about climate change and other urgent challenges. Countries have long attempted to employ propaganda in service of their political agendas. Now, however, the internet provides widespread, inexpensive access to worldwide audiences, facilitating the broadcast of false and manipulative messages to large populations and enabling millions of individuals to indulge in their prejudices, biases, and ideological differences.

The recent emergence of so-called “deepfakes”—audio and video recordings that are essentially undetectable as false—threatens to further undermine the ability of citizens and decision makers to separate truth from fiction. The resulting falsehoods hold the potential to create economic, social, and military chaos, increasing the possibility of misunderstandings or provocations that could lead to war, and fomenting public confusion that leads to inaction on serious issues facing the planet. Agreement on facts is essential to democracy and effective collective action.

Other new technologies, including developments in biological engineering, high-speed (hypersonic) weapons, and space weapons, present further opportunities for disruption.

Genetic engineering and synthetic biology technologies are now increasingly affordable, readily available, and spreading rapidly. Globally, governments and companies are collecting vast amounts of health-related data, including genomic data, ostensibly for the purpose of improving healthcare and increasing profits. But the same data could also be useful in developing highly effective biological weapons, and disagreements regarding verification of the Biological and Toxin Weapons Convention continue to place the world at risk.

Artificial intelligence is progressing at a frenzied pace. In addition to the concern about marginally controlled AI development and its incorporation into weaponry that would make kill decisions without human supervision, AI is now being used in military command and control systems. Research and experience have demonstrated the vulnerability of these systems to hacking and manipulation. Given AI's known shortcomings, it is crucial that the nuclear command and control system remain firmly in the hands of human decision makers.

There is increasing investment in and deployment of hypersonic weapons that will severely limit response times available to targeted nations and create a dangerous degree of ambiguity and uncertainty, at least in part because of their likely ability to carry either nuclear or conventional warheads. This uncertainty could lead to rapid escalation of military conflicts. At a minimum, these weapons are highly destabilizing and presage a new arms race.

Meanwhile, space has become a new arena for weapons development, with multiple countries testing and deploying kinetic, laser, and radiofrequency anti-satellite capabilities, and the United States creating a new military service, the Space Force.



# It is one hundred seconds to midnight

The overall global trend is toward complex, high-tech, highly automated, high-speed warfare. The computerized and increasingly AI-assisted nature of militaries, the sophistication of their weapons, and the new, more aggressive military doctrines asserted by the most heavily armed countries could result in global catastrophe.

## How the world should respond

To say the world is nearer to doomsday today than during the Cold War—when the United States and Soviet Union had tens of thousands more nuclear weapons than they now possess—is to make a profound assertion that demands serious explanation. After much deliberation, the members of the Science and Security Board have concluded that the complex technological threats the world faces are at least as dangerous today as they were last year and the year before, when we set the Clock at two minutes to midnight (as close as it had ever been, and the same setting that was announced in 1953, after the United States and the Soviet Union tested their first thermonuclear weapons).

But this year, we move the Clock 20 seconds closer to midnight not just because trends in our major areas of concern—nuclear weapons and climate change—have failed to improve significantly over the last two years. We move the Clock toward midnight because the means by which political leaders had previously managed these potentially civilization-ending dangers are themselves being dismantled or undermined, without a realistic effort to replace them with new or better management regimes. In effect, the international political infrastructure for controlling existential risk is degrading, leaving the world in a situation of high and rising threat. Global leaders are not responding appropriately to reduce this threat level and counteract the hollowing-out of international political institutions, negotiations, and agreements that aim to contain it. The result is a heightened and growing risk of disaster.

To be sure, some of these negative trends have been long in development. That they could be seen coming miles in the distance but still were allowed to occur is not just disheartening but also a sign of fundamental dysfunction in the world's efforts to manage and reduce existential risk.

Last year, we called the extremely troubling state of world security an untenable “new abnormal.”

“In this extraordinarily dangerous state of affairs, nuclear war and climate change pose severe threats to humanity, yet go largely unaddressed,” we wrote. “Meanwhile, the use of cyber-enabled information warfare by countries, leaders, and subnational groups of many stripes around the world exacerbates these enormous threats and endangers the information ecosystem that underpins democracy and civilization as we know it. At the same time, other disruptive technologies complicate and further darken the world security situation.”

This dangerous situation remains—and continues to deteriorate. Compounding the nuclear, climate, and information warfare threats, the world's institutional and political capacity for dealing with these

threats and reducing the possibility of civilization-scale catastrophe has been diminished. Because of the worldwide governmental trend toward dysfunction in dealing with global threats, we feel compelled to move the Doomsday Clock forward. The need for emergency action is urgent.

There are many practical, concrete steps that leaders could take—and citizens should demand—to improve the current, absolutely unacceptable state of world security affairs. Among them:

- US and Russian leaders can return to the negotiating table to: reinstate the INF Treaty or take other action to restrain an unnecessary arms race in medium-range missiles; extend the limits of New START beyond 2021; seek further reductions in nuclear arms; discuss a lowering of the alert status of the nuclear arsenals of both countries; limit nuclear modernization programs that threaten to create a new nuclear arms race; and start talks on cyber warfare, missile defenses, the militarization of space, hypersonic technology, and the elimination of battlefield nuclear weapons.
- The countries of the world should publicly rededicate themselves to the temperature goal of the Paris climate agreement, which is restricting warming “well below” 2 degrees Celsius higher than the preindustrial level. That goal is consistent with consensus views on climate science, and, notwithstanding the inadequate climate action to date, it may well remain within reach if major changes in the worldwide energy system and land use are undertaken promptly. If that goal is to be attained, industrialized countries will need to curb emissions rapidly, going beyond their initial, inadequate pledges and supporting developing countries so they can leapfrog the entrenched, fossil fuel-intensive patterns previously pursued by industrialized countries.
- US citizens should demand climate action from their government. Climate change is a serious and worsening threat to humanity. Citizens should insist that their government acknowledge it and act accordingly. President Trump's decision to withdraw the United States from the Paris climate change agreement was a dire mistake. Whoever wins the 2020 US presidential election should reverse that decision.
- The United States and other signatories of the Iran nuclear deal can work together to restrain nuclear proliferation in the Middle East. Iran is poised to violate key thresholds of the deal. Whoever wins the United States' 2020 presidential election must prioritize dealing with this problem, whether through a return to the original nuclear agreement or via negotiation of a new and broader accord.
- The international community should begin multilateral discussions aimed at establishing norms of behavior, both domestic and international, that discourage and penalize the misuse of science. Science provides the world's searchlight in times of fog and confusion. Furthermore, focused attention is needed to prevent information technology from undermining public trust in political institutions, in the media, and in the existence of objective reality itself. Cyber-enabled information



# It is one hundred seconds to midnight

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warfare is a threat to the common good. Deception campaigns—and leaders intent on blurring the line between fact and politically motivated fantasy—are a profound threat to effective democracies, reducing their ability to address nuclear weapons, climate change, and other existential dangers.

The global security situation is unsustainable and extremely dangerous, but that situation can be improved, if leaders seek change and citizens demand it. There is no reason the Doomsday Clock cannot move away from midnight. It has done so in the past when wise leaders acted, under pressure from informed and engaged citizens around the world. We believe that mass civic engagement will be necessary to compel the change the world needs.

Citizens around the world have the power to unmask social media disinformation and improve the long-term prospects of their children and grandchildren. They can insist on facts, and discount nonsense. They can demand—through public protest, at the ballot box, and in many other creative ways—that their leaders take immediate steps to reduce the existential threats of nuclear war and climate change. It is now 100 seconds to midnight, the most dangerous situation that humanity has ever faced. Now is the time to unite—and act.

# Out front and in person

## Extending the Bulletin's reach

Bulletin leaders recognize that opinion shapers are not limited to experts, but come from all sectors of society. As MIT faculty members Erik Brynjolfsson and Andrew McAfee have written, the “crowd” is as important as the “core.” As the Bulletin’s audience grows, it will become easier to attract leading thinkers and writers. In turn, those leading thinkers and writers will attract a larger audience. Ultimately it is the audience—the crowd—that attracts policy makers.

The success of our efforts lies with the “crowd,” and ensuring that they are informed by the “core” and support and amplify its messages. To do this we must reach out beyond the website and magazine, meeting audiences face to face and on their preferred platforms, and recognizing Bulletin stakeholders who stand for the values we share.



### World Press Institute Fellows receive Bulletin briefing

From South Africa, Bulgaria, Belarus, Algeria, Romania, India, Uganda, Finland, Uruguay and Hungary, journalists from around the world met with Bulletin CEO and President Rachel Bronson in October “to learn about journalism and life in the world’s most powerful democracy.” As part of their two months together as World Press Institute fellows, they sought answers to a broad range of questions, including:

- What is the role of journalists in the Trump era?
- How are American institutions and the US government dealing with current nuclear threats and security?
- What is the role and influence of social media in journalism and politics?



### “Turn Back the Clock” comes back to life

During its successful two-year run at Chicago’s Museum of Science and Industry, from 2017 to 2019, tens of thousands of visitors visited the Bulletin’s Turn Back the Clock exhibit. One museum visitor to Turn Back the Clock wrote, “I can’t believe we’re still facing these issues in 2019. Everyone should see this exhibit.”

Now everyone will have a chance, thanks to a generous gift from past Governing Board Chair Lee Francis and his wife, Michelle Gittler. Employing new technology that allows visitors to feel as if they are walking through the museum, the Turn Back the Clock virtual tour is found on our website.



### On the road in Denver

Stewart Vanderwilt, President and CEO, Colorado Public Radio (left) and George Sparks, President and CEO, Denver Museum of Nature & Science, heard from Rachel Bronson in September, at a briefing co-sponsored by the Bulletin, museum, and public radio. Governing Board Chair and Denver resident John Balkcom was a key promoter of the event.



### Evanston, Illinois, moves to lower nuclear risk

2017 Bulletin honoree and Evanston, Illinois, Alderman Eleanor Revelle recently supported the Evanston City Council’s unanimous approval of a resolution supporting nationwide denuclearization as part of the international Back from the Brink movement. The resolution calls for Congress to take up the United Nations Treaty on the Prohibition of Nuclear Weapons. The treaty was approved by the United Nations in July 2017, and has since been in circulation for ratification. Fifty countries need to ratify the treaty in order for it to take effect, and 33 have already ratified it.



### Dr. Dieter Gruen honored

On November 21, 2019, Dieter Gruen’s 97th birthday, U.S. Representative Sean Casten (IL-06) entered the name of longtime friend-of-the-Bulletin Dr. Dieter Gruen into the Congressional Record by nominating him for the Presidential Medal of Freedom. David Wargowski, a friend of Gruen’s and supporter of the Bulletin, spearheaded the nomination, with strong backing from the Bulletin.

“At 97, Dr. Gruen still sees the world as a place of vast opportunities for technological innovation,” said Casten, who is also a scientist and clean energy entrepreneur. Casten appears above in the center, with Gruen, left, and US Senator Richard Durbin.

# Annual Meeting

## Exploring actionable solutions to manmade threats

More than 150 participants gathered at the Bulletin's Annual Meeting on November 7, 2019, to discuss evidence-based, actionable solutions to manmade threats to our existence with some of the world's leading experts in their fields. What connects these topics is the driving belief that because humans created these risks, we can control them. In that spirit, attendees chose from a variety of topics, listed below.

### Engaging "Generation Possible" on today's nuclear threat

Elizabeth Talerman  
Partner, The Nucleus Group

### Urban AI: Lessons from the Chicago Police Department

Brett Goldstein  
Senior Advisor to The Pearson Institute and Special Advisor to the Provost, University of Chicago.

### Can Artists Help Scientists Save the World?

Mika Tosca  
Climate Scientist, Humanist, Activist and Assistant Professor at the School of the Art Institute of Chicago

### How disruptive technologies are changing the nuclear landscape

Judith Reppy  
Professor Emerita in the Department of Science and Technology Studies, Cornell University

### Unstable equilibrium: Resisting war in a hyperconnected world

Robert Latiff\*  
US Air Force Major General, retired

### Climate justice: A slogan? A distraction? A necessity?

Sivan Kartha\*  
Senior Scientist at the Stockholm Environmental Institute

### Is technology undermining nuclear stability?

Steven Miller\*  
Director of the International Security Program, Belfer Center for Science and International Affairs, Harvard University Kennedy School of Government

### Everything old is new again

Asha George\*  
Executive Director, Bipartisan Commission on Biodefense; Adjunct Professor, Johns Hopkins Bloomberg School of Public Health, Security professional

### The risks of climate solutions

Robert Socolow\*  
Professor Emeritus, Department of Mechanical and Aerospace Engineering, Princeton University



### Plenary Conversation

**Edmund G. Brown Jr.**  
Executive Chair, Bulletin of the Atomic Scientists; Former Governor, State of California

**Emma Belcher**, Director, Nuclear Challenges, John D. and Catherine T. MacArthur Foundation

\*Member of the Science and Security Board



# Annual Meeting

Exploring actionable solutions to manmade threats



- 1. Governor Jerry Brown and Emma Belcher at Plenary Session
- 2. Mika Tosca and Cyndi Conn
- 3. Brett Goldstein
- 4. Steven Miller
- 5. Elizabeth Talerman
- 6. Judith Reppy
- 7. Robert Latiff
- 8. Shazeeda Bhola
- 9. Annual Meeting Room
- 10. Adele Simmons and Sivan Kartha
- 11. Asha George
- 12. Robert Cohen
- 13. Rob Socolow
- 14. Joel Friedman and Peter Rabinowitch
- 15. Mika Tosca, Beth Beloff, Cyndi Conn, Robert Rosner, and Rob Ewing
- 16. Reporters, scientists, and editors



# Annual Dinner 2019

## Celebrating scientific, security, and civic leaders

We welcomed more than 350 attendees, including those traveling from California, North Carolina, Texas, Washington, DC, Canada, England, and Japan, among other places, to the Annual Dinner immediately following the afternoon meeting. The evening featured an all-star lineup that began with inspiring words from our 2018 Rieser Award recipients, Erin Connolly and Kate Hewitt.

Lisa Perry delivered an acceptance speech on behalf of her grandfather, Board of Sponsors Chair William Perry, who received the Bulletin's Lifetime Achievement Award. Her tribute was a touching reminder of how the work of the Bulletin, so effectively championed by her grandfather, is advanced each year by new generations who are acutely aware of the need to turn back the Clock.

Board Chair John Balkcom recognized Governing Board members Austin Hirsch and Lowell Sachnoff, and their law firm Reed Smith LLP, as this year's Annual Dinner honorees. In their acceptance remarks, these remarkable men recounted the Cold War experiences that led them to devote decades of energy and resources to the Bulletin and its mission.

A keynote address from Board of Sponsors member Eric Horvitz, technical fellow and director of Microsoft Research Labs, capped off the evening with an intriguing look at the ethics of artificial intelligence.

### Honoring a decade of service to science and global security

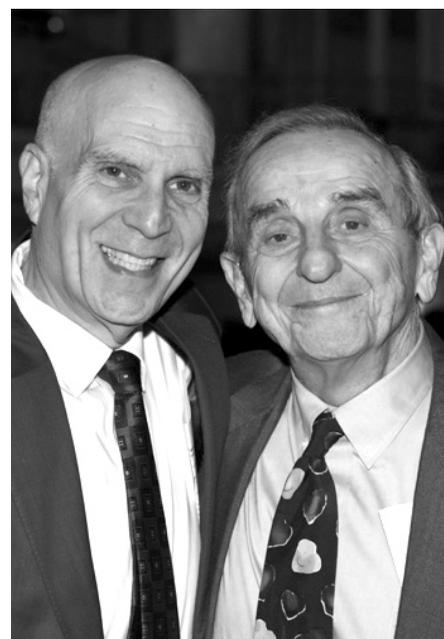
At the Annual Dinner, the Bulletin recognized Reed Smith, and its global corporate partner Austin Hirsch and senior counsel Lowell Sachnoff, for their extraordinary ongoing support.

Reed Smith lawyers from multiple offices have contributed more than 250 pro bono hours to negotiate the Bulletin's publishing contracts and help to protect the intellectual property rights of the Bulletin's trademarks. Reed Smith also helped the Bulletin with respect to its governance and bylaws, assisted in returning the Bulletin to its roots at the University of Chicago, and provided global advice for data security.

Sachnoff, senior counsel in Reed Smith's Chicago office and founding member of Reed Smith's legacy firm Sachnoff and Weaver, is a two-time member of the Bulletin's Governing Board—from 2005 to 2014 and from 2015 to 2019. He is now a consultant to the Governing Board. Hirsch has served on the Governing Board since 2010, and he currently serves on the Bulletin's Executive Committee as Board Treasurer and Chair of its Finance Committee.

# ReedSmith

Driving progress  
through partnership



From left: Austin Hirsch with Lowell Sachnoff



Hirsch family, from left: Danielle Hirsch (seated), Bruni Hirsch, Austin Hirsch, Beth Gomberg-Hirsch, and Fred Muram.



From left, Congressman Brad Schneider, Lowell Sachnoff, Lance Rogers, and Fay Clayton.

# Annual Dinner 2019

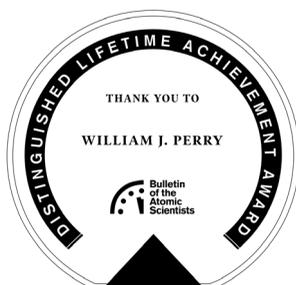
## First Lifetime Achievement Award presented

### Board of Sponsors Chair William Perry honored



As Executive Chair Jerry Brown presented the Bulletin's Lifetime Achievement Award to Board of Sponsors Chair William J. Perry, he called Perry "a truly great American, an extraordinary but deeply human individual with great ethical values, vision, smarts, and tireless energy." Perry's granddaughter Lisa Perry received the award on Perry's behalf and read his acceptance speech, reprinted at right.

Perry's career has spanned academia, industry, entrepreneurship, government, and diplomacy. He served as the 19th Secretary of Defense for the US. In 2007, Perry, George Shultz, Sam Nunn, and Henry Kissinger together formed the Nuclear Security Project, articulating practical steps to reduce current nuclear dangers. In 2013, he founded the William J. Perry Project in order to engage and educate the public on these issues, and in 2015 published *My Journey at the Nuclear Brink*, a personal account of his lifelong effort to reduce the threat of nuclear catastrophe. Perry continues to lead the Perry Project and is currently the Michael and Barbara Berberian Professor Emeritus at Stanford University.



### Secretary Perry Acceptance Speech

I am a child of the Cold War.

I lived through every Cold War crisis and deeply participated in the most dangerous of these—the Cuban missile crisis, where odds were about even that this crisis would get out of control and destroy civilization. I can remember the enormous relief I felt when the Cold War ended, and I have always believed that we avoided a nuclear catastrophe more by good luck than by good management. So it is beyond my comprehension that we have decided to roll the dice again on a second Cold War. I can only believe that we're doing this because most of our citizens simply do not understand that the danger of a nuclear catastrophe today is equal to the darkest days of the Cold War. That danger is of course reflected in the 2019 setting of the Doomsday Clock.

So I believe that a serious information campaign is imperative, and I have devoted the remainder of my life to this cause. I have taught classes and given countless lectures on these new nuclear dangers. The most important consequence of my Stanford classes was that it led to the nuclear education of Ted Lieu, who has gone from Stanford to the Congress, where he co-sponsored legislation that if passed would make us all safer.

Also, I have written books papers and op-eds. The most important consequence of *My Journey at the Nuclear Brink* was that it was read by Governor Brown, who then became a tireless crusader for the cause, initially by writing a review of the book for the *New York Review of Books*, which did more to publicize these ideas than the book itself.

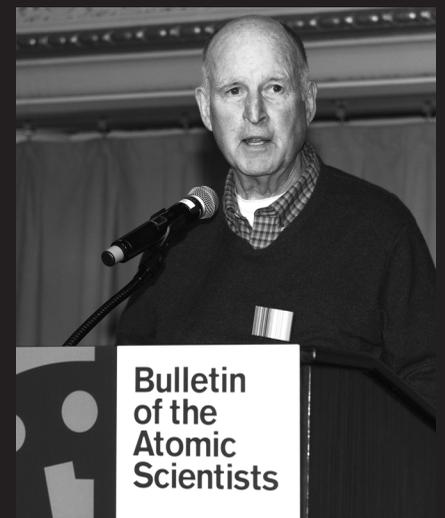
But my generation has failed to contain the nuclear genie that we let out of the bottle. The continued existence of our civilization depends on the youth. That is why I persuaded some of my children and grandchildren to work with me, and that is why it is entirely appropriate that my granddaughter represents me here tonight.

Through all of this I have understood that one person cannot solve this problem. It takes a village, and the nuclear village is well represented here tonight, including the Nuclear Threat Initiative, and the Ploughshares Fund, in addition to our own Bulletin of the Atomic Scientists. I am proud to be associated with all three of these organizations working tirelessly to stem the tide of existential dangers, without whom I dare not imagine where we would be today.

Thank you very much.

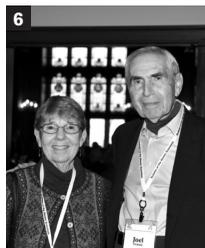


Lisa Perry, Executive Chair Jerry Brown



# Annual Dinner 2019

Celebrating scientific, security, and civic leaders



## Contributing donors

### Lead

Carnegie Corporation of New York  
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Ploughshares Fund  
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John and Trish Strauss  
Lisa Warshauer

# Annual Dinner 2019

Celebrating scientific, security, and civic leaders



1. Axiom Consulting Partners: back row left to right: Garrett Sheridan; Dave Kuhlman; Maggie Ackell; Ian Burke; Paul Giedraitis; Mark Masson; Donncha Carroll; Landon Petersen. Front row left to right: Stephen Allen; Smruti Rajagopalan; Kate Gordon; Elisabeth Moore
2. Ellen Sandor, left, and Melissa Sage Fadim, with CheerNoble water bottle gifts
3. Hirokazu Miyazaki at left, with Fumihiko Yoshida
4. Emma Belcher, Marjorie Benton, and Robert Rosner
5. William Woodson and Stephanie Woodson
6. Joel and Elizabeth Ticknor
7. James Fino with Debra Petrides Lyons, who donated the CheerNoble water bottles
8. John Balkcom, whose \$25,000 Annual Dinner challenge raised another \$46,000
9. Teachers from the Francis Parker School in Chicago: Marcie Frasz, Tim O'Connor, Kampton Woodard, Patrick Stanton, and David Fuder with Evelyn Bronson, third from left
10. Jerry Brown has some fun with selfies
11. Patricia Moore Nicholas
12. Keynote Speaker and Board of Sponsors member Eric Horvitz
13. Mary Page and Marti Rabinowitch
14. From left: Tom McMahon, Steve Ramsey, and Jim Cahan
15. Dinner guests included Bulletin friends from the MacArthur Foundation
16. JoAnn Seagren, Brenda Shapiro, Joan Porat
17. Paul Sievert and Penelope Rosemont
18. Reporter and essayist Tammy Kim with Bill Revelle
19. Misho Ceko, right, with Marina Shmarova, left, and Cheistha Kochhar
20. Gabe Schoenbach with Judith Reppy and Lynn Eden
21. Tim Rieser, left, with Enid Rieser and David Rieser
22. Mary Patricia Dougherty

# With gratitude

## Bulletin remembers past leaders

### In memoriam



#### Victor Rabinowitch

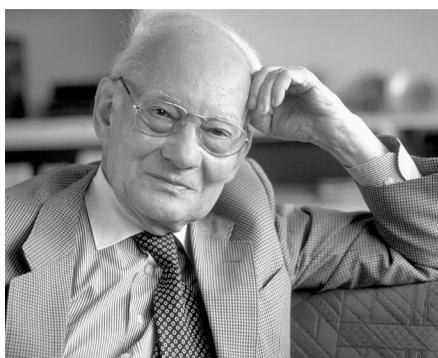
1934–2019

Former senior vice president of the John D. and Catherine T. MacArthur Foundation  
Bulletin of the Atomic Scientists,  
Board of Sponsors

Victor Rabinowitch was former senior vice president of the John D. and Catherine T. MacArthur Foundation; former chair of the Bulletin's Governing Board; and a member of the Board of Sponsors. He was trained as an ecologist and received his doctorate in the unlikely combination of zoology and international relations. He was an active participant in the Pugwash Conferences on Science and World Affairs for more than 30 years.

Son of Bulletin co-founder Eugene Rabinowitch, Victor Rabinowitch's dedication to science and diplomacy went well beyond his involvement with the Bulletin. For more than 25 years, he was associated with the National Academy of Sciences/ National Research Council (NAS/NRC), where he directed several boards and committees. His commitment to the sciences, however, was just as strong as his commitment to his family. He is greatly missed.

## Bulletin of the Atomic Scientists 75 years and counting



#### Manfred Eigen

1927–2019

1967 Nobel Laureate in Chemistry  
Founder of the Max Planck Institute for Biophysical Chemistry  
Bulletin of the Atomic Scientists,  
Board of Sponsors

By the age of 24, Manfred Eigen had already completed his doctorate in physical chemistry. He was honored with the Nobel Prize in Chemistry in 1967 and a few years later founded the Max Planck Institute for Biophysical Chemistry, where he headed the Department of Biochemical Kinetics until his retirement in 1995. An avid researcher, he always worked toward and demanded the highest scientific standards, often producing work that was ahead of its time.

Eigen was a believer in the idea that scientists must communicate their research, and he was always willing to share his enthusiasm for science, particularly with the general public. He was a dedicated pianist, performing in public concerts and even as a soloist in Mozart piano concert recordings with the Basel Chamber Orchestra. His energy and ability to inspire those around him are part of his legacy and leave a lasting impact on the communities he touched.

### Looking ahead

Annual Meeting and Dinner  
Thursday, November 12, 2020  
Palmer House Hilton  
Chicago

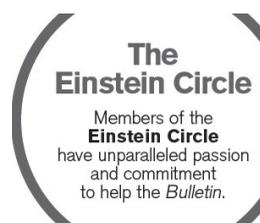
### Create your own legacy

Consider a future planned gift that will help secure a more peaceful future--a future based on scientific inquiry, rational debate, and the reduction of existential risks. Your foresight and generosity will create a meaningful legacy--ensuring that independent, fact-based journalism is here for generations to come.



### The Legacy Society

A legacy gift makes a significant impact that costs you nothing in your lifetime. Consider including the Bulletin in your will or trust, or by naming the organization as a beneficiary of your life insurance, IRA, or other financial vehicle. Our Legacy Society was established to recognize and honor friends who have provided for the Bulletin's future through their estate plans. Join the Legacy Society and help advance the Bulletin's belief that advances in science and technology should make life on earth better, not worse.



### Einstein Circle

The Bulletin recognizes leadership gifts of \$1000 or more with membership in the Einstein Circle, which celebrates and honors those who offer their financial support at the highest level.

Einstein Circle members make a personal statement about their belief in the inherent value of evidence-based research and education to address the most pressing challenges facing our planet and its inhabitants. Members receive access to special briefings, exclusive invitations, and personalized communications.

# Financial Overview

## Management Discussion and Analysis

This Management Discussion and Analysis (MD&A) aims to help readers of our financial statements make reasonable inferences about the Bulletin's progress in accomplishing our mission in a financially responsible way. This narrative supplements the financial statements on pages 28 and 29.

As you will see, individual, corporate and foundation giving fueled the Bulletin's work in 2019. Examples of our efforts are presented throughout the pages of this annual report. I'm pleased to share that contributions to the Bulletin grew by 26% between 2018 and 2019, providing nearly three quarters of a million dollars to support our mission-critical work. The chart on the next page labeled "Individual Donor and Corporate Support 2015-2019" shows the growth in our support over time. The extraordinary spike in 2017 includes a major gift from Mary Patricia Dougherty, the largest gift from an individual ever received by the Bulletin.

The Bulletin was also fortunate to receive multiyear grants from several major foundations in 2019, capping off a strong year in overall fundraising. The requirements of Generally Accepted Accounting Principles (GAAP) make the presentation of this success challenging. We—like our counterparts—are required by GAAP to recognize a full multi-year gift in the first year in which it is awarded even though the funds may not be received or used until later years of the grant's disbursement.

In 2019, for example, the Bulletin received two two-year foundation grants of \$550K and \$700K respectively. These were reported in accordance with GAAP as \$1.25M of revenue in 2019, although the Bulletin did not receive, and does not intend to use a significant portion of these funds, until 2020 and 2021, spanning a 24-month period.

To manage the cyclical nature of GAAP's required revenue recognition, the Bulletin temporarily restricts revenue in the first year of a multi-year grant, in anticipation of planned expenses in the following years, as can be seen under "Net assets with donor restrictions" in our Statement of Financial Position and in "Revenue released from restrictions" in our Statement of Activities. The chart of "Foundation Support 2015-2019" on the next page shows both the cyclical nature of our Foundation Support (Foundation grants, new represented by the solid vertical bars), as well as how we manage it (Foundation grants after restriction adjustments, represented by the grey line). The chart's grey line shows a decline in our foundation grants after restriction adjustment in 2019, in anticipation of higher than usual programmatic spending in 2020 and 2021 during the Bulletin's historic 75th anniversary year.

Our ability to secure multiyear support is a strong endorsement of our efforts, notwithstanding the required accounting treatment. In making multiyear commitments, our supporters are providing external validation of our strategy, governance, and impact.

The reader will note an increase of \$50,458 in long-term liabilities under "Liabilities and net assets" in our Statement of Financial Position. In late 2019, the Bulletin self-identified a discrepancy in its employee matching program that requires additional funding to keep us in compliance with federal requirements for SIMPLE IRA retirement plans. The liability is a correction that we expect to pay in 2020 or 2021, pending IRS approval.

With the help of the Bulletin's new independent auditing firm Miller Cooper LLP, the Bulletin determined that expenses associated with its 2018 website redesign should have been capitalized rather than expensed. The Bulletin's 2018 financial statements will be revised to recognize this reclassification. Expenses in 2018 will decrease by \$98,591 and the asset balance of property and equipment will increase by the same amount. The table on the next page shows the adjustments.

Our financial reporting is designed to provide donors and the public with a transparent overview of our finances. The Bulletin's financial statements were audited by Miller Cooper LLP. The complete audited financial statements for calendar year 2019 are available by request or on GuideStar. If you have any questions about this report or need additional financial information, please do not hesitate to contact the Bulletin at [finance@thebulletin.org](mailto:finance@thebulletin.org).

Thank you for your generous and sustained support. We couldn't do this without you.

Sincerely,

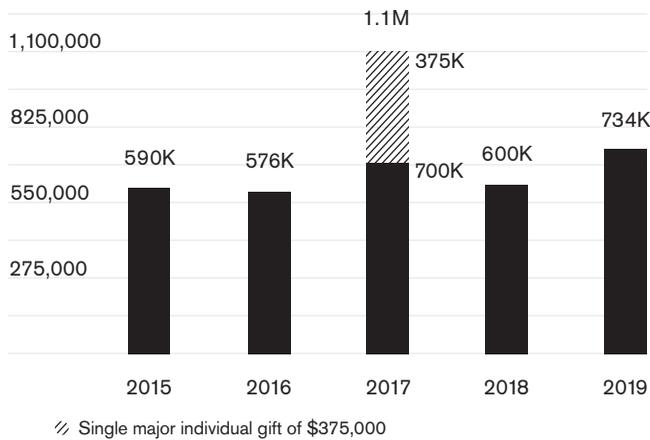


Rachel Bronson, PhD  
President and CEO

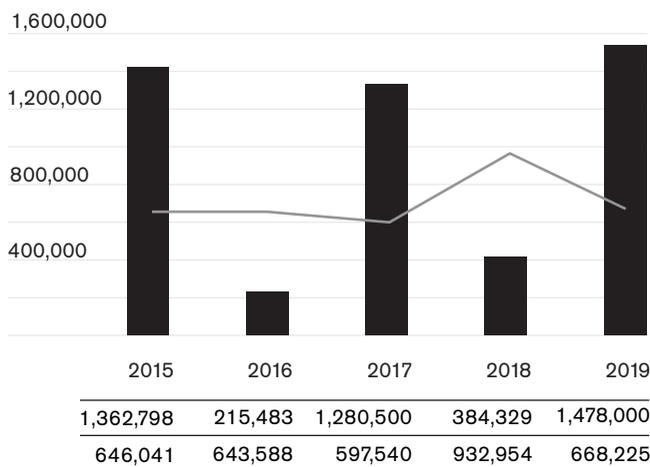
**I'm pleased to share that contributions to the Bulletin grew by 26% between 2018 and 2019, providing nearly three quarters of a million dollars to support our mission-critical work.**

# Charts

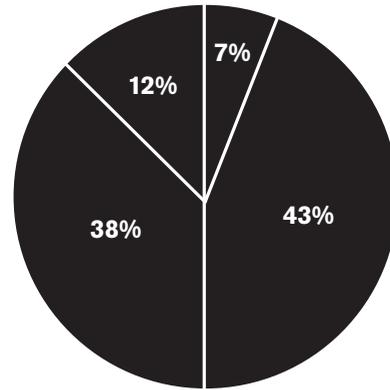
## NEW DONOR AND CORPORATE SUPPORT 2015-2019



## FOUNDATION SUPPORT 2015-2019

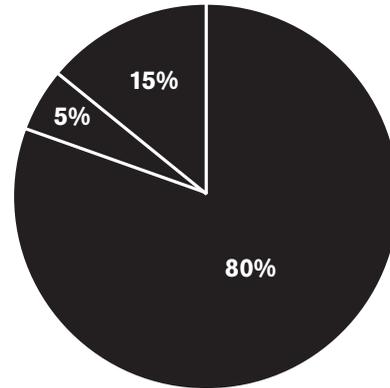


- Foundation Grants New
- Foundation Grants After Restriction Adjustments



### Operating Revenue

Donor Support	43%
Foundation Grants	38%
Magazine	12%
Other Revenue	7%



### Operating Expenses

Publication and Website Program	80%
Management and General	15%
Fundraising	5%

## 2018 PRIOR PERIOD ADJUSTMENT FOR CAPITALIZING WEBSITE DEVELOPMENT COSTS

	2018 Original	2018 Adjustments	2018 Restated
<b>Statement of Activities</b>			
Publication and Website Expense	453,687	(109,551)	344,135
Depreciation and Amortization	7,059	10,960	18,019
Net Income from Operations	22,200	98,591	120,791
<b>Statement of Financial Position</b>			
Fixed Assets (Net)	11,430	98,591	110,021
Net Assets Without Donor Restrictions	834,400	98,591	932,991

# Statements

## STATEMENT OF FINANCIAL POSITION For the Year Ended December 31, 2019

	2019	2018
<b>Assets</b>		
Cash/Certificates of Deposit	1,153,870	1,073,243
Accounts Receivable, Net of Allowance	82,240	72,785
Pledges Receivable	698,837	217,143
Prepaid Expenses	26,793	12,978
<b>Total Current Assets</b>	<b>1,961,740</b>	<b>1,376,149</b>
Property and Equipment	95,074	110,021
<b>Total Assets</b>	<b>2,056,814</b>	<b>1,486,170</b>
<b>Liabilities and net assets</b>		
Accounts Payable	57,104	104,535
Accrued Expenses	15,366	20,870
Deferred Subscription Revenue	1,690	1,437
Long-Term Liabilities	35,458	—
<b>Total Liabilities</b>	<b>109,618</b>	<b>126,842</b>
<b>Net Assets</b>		
Without Donor Restrictions	818,484	932,991
With Donor Restrictions	1,128,712	426,337
<b>Total Net Assets</b>	<b>1,947,196</b>	<b>1,359,327</b>
<b>Total Liabilities and Net Assets</b>	<b>2,056,814</b>	<b>1,486,170</b>

## STATEMENT OF ACTIVITIES AND CHANGES IN NET ASSETS For the year ended December 31, 2019

	Without Donor Restrictions			With Donor Restrictions	Total
	Operating Funds	Board Designated Reserves Operating	Strategic		
<b>Revenue &amp; other support</b>					
Magazine Royalties and Subscriptions	213,535				213,535
Individual Donations	642,184				642,184
Foundation Grants	43,000				43,000
Corporation Support	90,000				90,000
Interest Income	19,970				19,970
Other Revenue	6,020				6,020
In-kind	634,321				634,321
Released of Board Restrictions	124,000	(124,000)			—
Board Designated Transfer		(25,000)	25,000		—
Net Assets Released from Restrictions	734,225			(734,225)	—
Net Assets with Donor Restrictions				1,436,600	1,436,600
<b>Total Revenues</b>	<b>2,507,254</b>	<b>(149,000)</b>	<b>25,000</b>	<b>702,375</b>	<b>3,085,629</b>
<b>Expenses</b>					
Publication and Website Program	2,001,891				2,001,891
Management and General	134,742				134,742
Fundraising	361,129				361,129
<b>Total Expenses</b>	<b>2,497,762</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>2,497,762</b>
Changes in Net Assets	9,492	(149,000)	25,000	702,375	587,867
<b>Net Assets, Beginning of Year</b>		<b>557,991</b>	<b>375,000</b>	<b>426,337</b>	<b>1,359,328</b>
<b>Net Assets, End of Year</b>	<b>9,492</b>	<b>408,991</b>	<b>400,000</b>	<b>1,128,712</b>	<b>1,947,195</b>

# Thank You

## To our generous donors

For more than seven decades, a dedicated network of board members, advisors, foundations, and donors have sustained the Bulletin of the Atomic Scientists. We extend our deepest gratitude to the board leaders, individuals, and institutions who made contributions between January 1 and December 31, 2019. Their names are listed here, with our sincere thanks for making everything we do possible.

### \$100,000+

Carnegie Corporation of New York  
Holthues Trust  
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### \$50,000 – \$99,999

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Reed Smith LLP  
William and Eleanor Revelle\*

### \$25,000 – \$49,999

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### \$10,000 – \$24,999

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Mr. and Mrs. William S. Woodson III\*

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JoAnn Seagren and Scott Lang  
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William Weaver

### \$250 – 499

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David Lee  
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Fay Hartog Levin and Daniel Levin  
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