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THE NEW ABNORMAL

Bulletin of the Atomic Scientists

Annual Report 2018

The Mission

The *Bulletin of the Atomic Scientists* believes that advances in science and technology should make life on earth better, not worse.

We equip the public, policy makers, and scientists with the information needed to demand, recognize, and support public policies that reduce manmade existential threats such as nuclear war, climate change, and disruptive technologies.

Our award-winning magazine, iconic Doomsday Clock, open-access website, and timely events promote evidence-based policy debates essential to healthy democracies and a safe and livable planet.

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From the Executive Chair

Edmund G. Brown Jr.

It is late.

I have been in American politics for almost 50 years, and I know how daily news stories block out the sustained public awareness needed to tackle big, hard-to-solve problems. One such huge problem is getting rid of the thousands of nuclear weapons on high alert that could—any day now—be launched by mistake or miscommunication.

I joined the *Bulletin of the Atomic Scientist* as its executive chair in November 2018 to deal with nuclear risks and the large challenges to humanity brought about by climate change and the new—and potentially catastrophic—disruptive technologies that are advancing around the world.

At the *Bulletin's* press conference in January, when we set the Doomsday Clock to two minutes to midnight, I asked why more people are not more concerned with today's nuclear threat, given the mounting danger. Tragically, it seems too many people in high places are rather comfortable living on the brink of catastrophe. They are like travelers on the Titanic. They don't see the iceberg ahead because they are so enjoying the elegant dining and music.

When I visit Capitol Hill, I often meet with leaders, some of whom are very concerned about the state of nuclear security and diplomacy. But there are not nearly enough of them. We need Republicans and Democrats, and the president and his staff, to fully grasp the moment that is upon us.

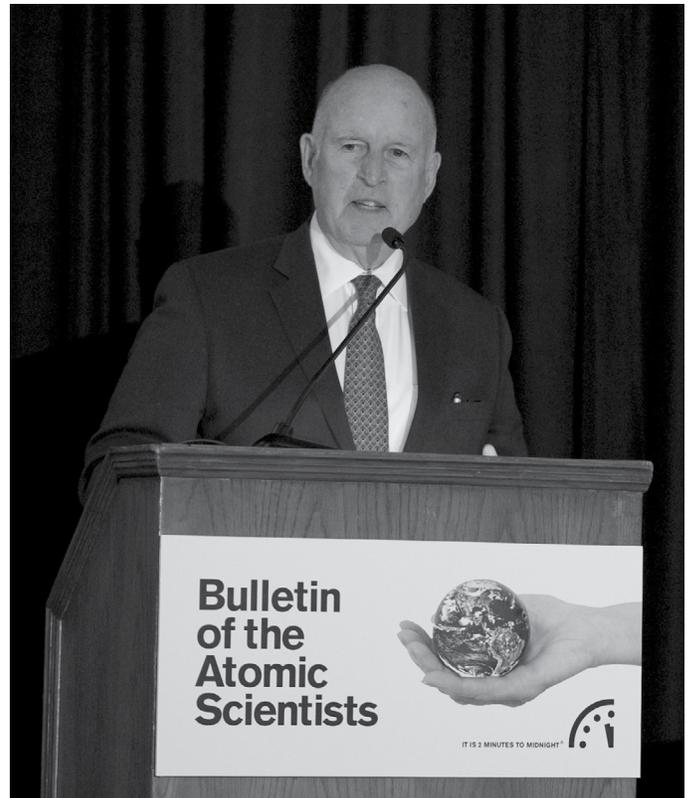
It is not just politicians who are distracted. We are literally surrounded by journalists who endlessly follow tweets, rehearse the “news” of the day, and chase digital clicks. We forget that the next click—the final click—could be a nuclear blunder.

The scientists at the *Bulletin* know what they are talking about, and based on my understanding of the political process, I'd say that at this moment, most politicians do not when it comes to these huge, existential issues. These are the very issues that the *Bulletin* explores, and it does so in ways that make them understandable to congressional leaders, governors, corporate executives, and ordinary citizens alike.

It is late. We have to wake up America, wake up the world, and do what is needed, based on our understanding of science and our responsibility to future generations. The *Bulletin* is advancing this mission every day, and I urge you to do whatever you can to get the United States and the world back on the track of dialogue, international collaboration, arms control, and real climate action. We must turn back the Clock.



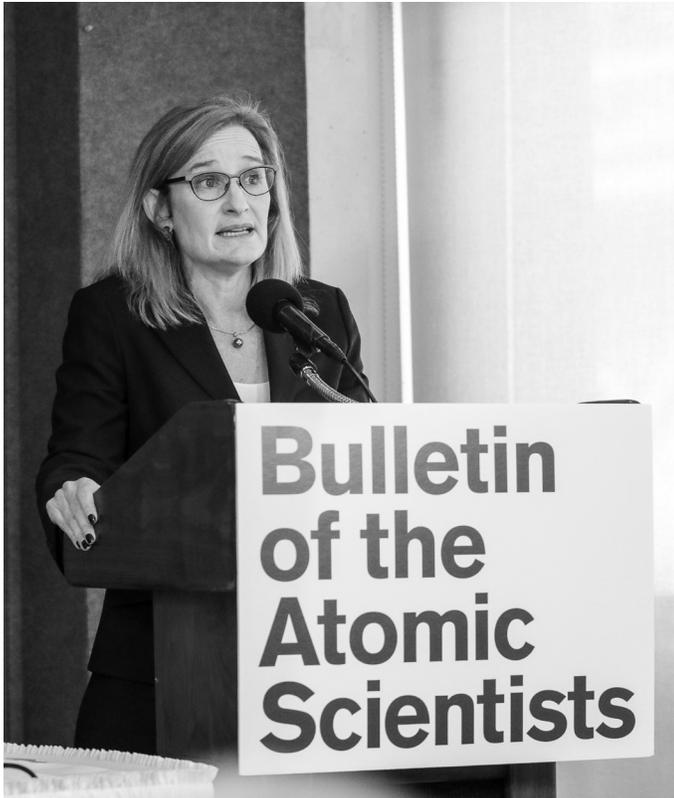
Edmund G. Brown Jr.



“They are like travelers on the Titanic. They don’t see the iceberg up ahead because they are so enjoying the elegant dining and music.”

From the President & CEO

Rachel Bronson



“The current dilemma about how to manage science and technology’s risks, so we may enjoy their benefits, is reminiscent of similar struggles faced by Manhattan Project scientists after the creation of the atomic bomb.”

We need to talk—and act.

Today’s headlines argue for a robust and vibrant *Bulletin*. The nuclear landscape is fraught and will remain so for years to come. The United States has unilaterally withdrawn from the Joint Comprehensive Plan of Action (Iran nuclear deal), the Intermediate-range Nuclear Forces Treaty (INF) is in tatters, the Korean Peninsula’s nuclear future is precarious, as is South Asia’s, and nuclear states around the globe are investing heavily in their nuclear arsenals.

While today’s nuclear landscape argues for an active and assertive *Bulletin*, advances in science and technology demand it. Current debate on mitigating the effects of climate change include controversial technologies like geo-engineering, an effort to manipulate the Earth’s ecosystem or what some have called “hacking the planet.” Developments in artificial intelligence promise enormous benefits but have the potential to create global-scale unemployment, remove agency from the battlefield, and as *Bulletin* Board of Sponsors member Jaan Tallinn fears, “erase humans from the narrative.”

Related challenges abound in bio-engineering, where improvements in gene editing technology promise public health windfalls but pose similarly outsized risks.

The current dilemma about how to manage science and technology’s risks, so we may enjoy their benefits, is reminiscent of similar struggles faced by Manhattan Project scientists after the creation of the atomic bomb. It demands similar global engagement. Yet it is precisely when the need for well-crafted policy has become urgent that scientists and experts have come under assault, as has the free press and the tools needed to distinguish rigorous analysis from casual opinion and “fake news.” At the *Bulletin*, we have defined this period as “the new abnormal,” and it does not bode well for the health and safety of our planet.

We stand at a pivotal moment, in which the need could not be greater for civic leaders and organizations to engage in public policy discussions about science’s advancement. The *Bulletin* was created to serve as a guide through such times—to provide evidence-based, rigorously sober solutions to

man-made existential challenges. What you will see in the pages that follow is how the *Bulletin* is responding to today’s challenges by engaging new audiences, creating new partnerships, joining new platforms and reshaping our messaging to support and mobilize a new generation of citizen engagement. We are doing so to combat growing fears about science and technology and to address very real concerns that are mounting. The *Bulletin*’s young and growing audience is demanding that science and technology serve the ends of global peace and security, and we aim to support their efforts.

If we remain clear in our purpose and bold in our vision, the *Bulletin* has a tremendous opportunity to contribute to a safer and healthier planet. At the *Bulletin*, we are deeply grateful for your ongoing support to help reach this goal. We are in this together, and we are on the right side of history.

Rachel Bronson
Rachel Bronson

WE MUST TURN BACK THE CLOCK

We need to talk—and act

In galleries, panels, and museums



In programs across the country, the *Bulletin* initiated public conversations to combat the high-risk, fact-denying conditions of “the new abnormal,” and generate the will to turn back the Clock.

A collaboration with Chicago’s Weinberg/ Newton Gallery included the May opening of a virtual reality exhibit by Ellen Sandor and (art)n titled “*It is two minutes to midnight.*”

The Gallery also hosted a subsequent discussion as part of the Terra Foundation’s “Art Design Chicago” year-long series, exploring Martyl Langsdorf’s role as a Chicago artist, and the mid-century modern influences that helped her create the iconic Clock. The program featured leading experts from the disciplines of art, design, and history.

At the Commonwealth Club in San Francisco, Rachel Bronson addressed the question: “Can we turn back the hands of the Doomsday Clock?” with Philip Yun, executive director and chief operating officer of the Ploughshares Fund.



Chicago’s Goodman Theatre presented *Blind Date* by Rogelio Martinez, portraying the historic 1986 Reykjavik summit between Ronald Reagan and Mikhail Gorbachev, which focused on the possibility of eliminating their nuclear arsenals. The summit eventually led to the 1987 Intermediate-range Nuclear Forces Treaty between the US and the Soviet Union. Eric Isaacs from the University of Chicago, Emma Belcher from the MacArthur Foundation, and Tanya Palmer from the Goodman joined Rachel Bronson in a discussion with the audience about that significant turning point in the Cold War.

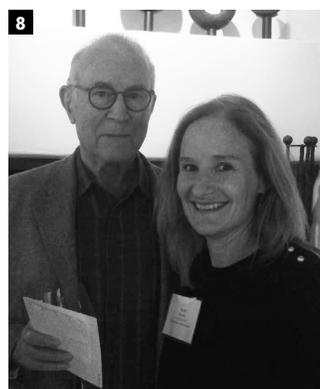


Bulletin staff met hundreds of people at the Chicago Field Museum at the April 14 Speak Up for Science event, sequel to the 2017 March for Science.



We need to talk—and act

At operas, films, and dining room tables



The *Bulletin* featured prominently in three events during the "Tech and The West" symposium in Santa Fe, New Mexico, where Rachel Bronson delivered the keynote address "Welcome Back to the New Nuclear Future." *Bulletin* guests also attended a private reception with author Richard Rhodes previewing the speech he delivered on "The Mystery and Mystique of Robert Oppenheimer."

The highlight of the symposium was the Santa Fe Opera's presentation of *Doctor Atomic*, by John Adams, composer, and Peter Sellars, librettist. The entire event was produced in association with the Los Alamos Historical Society, the New Mexico History Museum, Santa Fe Institute, the School for Advanced Research, the Santa Fe Opera and the Carl & Marilyn Thoma Art Foundation.

Chicago's Museum of Science and Industry extended through mid-year 2019 the *Bulletin*'s extraordinary "Turn Back the Clock" interactive multi-media exhibit, which has attracted tens of thousands of visitors since it opened in May of 2017.

1. Scenes from the Weinberg/Newton Gallery exhibit
2. Ibid
3. Philip Yun, Rachel Bronson
4. Promotion for the Goodman Theatre's presentation of *Blind Date* by Rogelio Martinez.
5. *Bulletin* outreach at the Speak Up for Science public event at the Chicago Field Museum
6. Ryan McKinny as J. Robert Oppenheimer in *Doctor Atomic* in the Santa Fe Opera production, with the metallic sphere representing nuclear weapons
7. Michael McCally, Santa Fe resident and former *Bulletin* board member
8. Richard Rhodes and Rachel Bronson in Santa Fe.
9. Patricia Ward from the Chicago Museum of Science and Industry describes the "Turn Back the Clock" exhibit to visiting high school students

We need to talk—and act

Insisting on facts, refuting nonsense



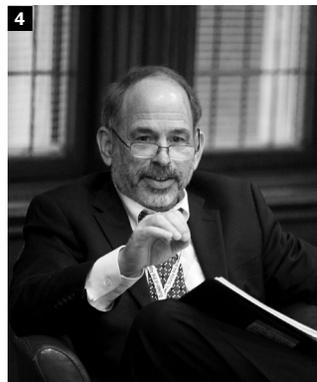
“A mind-boggling compendium of misinformation that was aimed at selling nuclear war to the postwar American public like a new brand of laundry detergent.”



Acknowledging that “Fake News” is not a recent phenomenon, the *Bulletin* hosted a panel discussion following a September screening of *The Atomic Café* documentary at the Gene Siskel Film Center in Chicago. Filmmaker Jayne Loader compiled “newsreel footage, government archives, and pop-culture artifacts” into “a mind-boggling compendium of misinformation that was aimed at selling nuclear war to the postwar American public like a new brand of laundry detergent.”



Puzzle Editor Will Shortz at *The New York Times* reminded crossword puzzlers about the Doomsday Clock in the answer to 32 across on June 15.



Editor-in-Chief John Mecklin engaged with a group at Stanford University’s Center for International Security and Cooperation on the *Bulletin’s* role in the 21st century at a seminar in March.

Anthropologist and *Bulletin* columnist Hugh Gusterson spoke to a group of stakeholders in a discussion touching on drone warfare, the science of war, and America’s nuclear complex at a fall luncheon in Chicago.



1. *The Atomic Café* promotion piece
2. Jayne Loader with members of the audience at the Gene Siskel Film Center
3. Puzzle from *The New York Times*, June 15
4. John Mecklin
5. Hugh Gusterson

< **32 Across:** It counts down to disaster >

We need to talk—and act

With world leaders and public officials



Former Secretary of State Madeleine Albright answered questions from Rachel Bronson and the audience during a wide-ranging public interview organized by the University of Chicago's Institute of Politics.

During the Pivot Arts Festival in Chicago, the Rude Mechs theatre collective presented *Not Every Mountain*, described as “a presentation of the life cycle of mountains and the processes by which they are born and eventually laid to rest, an invocation of tectonic force and geologic time.” Playwright Kirk Lynn participated in a discussion about the work with climate experts including the *Bulletin*.



U.S. Congressional Representatives from Northern Illinois Bill Foster (11th District), Mike Quigley (5th District), and Jan Schakowsky (9th District) were out in force at a July panel discussion on proposed “low-yield” nuclear weapons and the replacement of the entire US nuclear arsenal. The event was organized by the Union of Concerned Scientists, and was followed by a conversation between UCS's Lisbeth Gronlund and Rachel Bronson.



Former Los Alamos Director Sig Hecker reviewed his first-hand interactions with North Korean nuclear scientists, what went wrong in past dealings with the Kim dynasty, and possible outcomes of the 2018 Trump/Kim summit, in a conversation with *Bulletin* Science and Security Board Member Lynn Eden for a June dinner gathering in San Francisco.

The Arts Club of Chicago welcomed Rachel Bronson to speak on the Doomsday Clock, created by longtime Arts Club member, the late Martyl Langsdorf. “Martyl's greatest legacy,” Bronson said, “is that she created an image that evolves as we need it to and reminds us of our agency in responding to the most vexing challenges on the planet.”



T H E A R T S
C L U B
O F
C H I C A G O

6. Rachel Bronson, left, with former Secretary of State Madeleine Albright
7. Scene from *Not Every Mountain*
8. US Representatives Bill Foster, left, Jan Schakowsky, and Mike Quigley
9. Sig Hecker

Voices of tomorrow

What kind of world do we want?

Louder Than a Bomb



At Louder Than a Bomb, an annual poetry slam tournament for youth in Chicago, students from Senn High School were inspired by the Doomsday Clock. Drawing on the Clock's history, the Senn team cast

new metaphors for concerns like school shootings, police brutality, and the water crisis in Flint, Michigan. The Senn Arts team made it to the semi-final round with their poem, excerpts of which appear below.

New staff clock in

The *Bulletin* welcomed new editors and additional communications, fundraising, and administrative staff in 2018 to build capacity and expand coverage.



1. Matt Field
2. Thomas Gaulkin
3. Delilah Marto
4. Halley Posner
5. Gayle Spinazze

Clock display in Oregon

University of Oregon students Liana Hu, Natalie Perez, and Abha Joshi organized a display of Doomsday Clocks across the campus, showing the minute hands inching closer to midnight.



Doomsday at Midnight, By Senn Arts

The Bulletin of Atomic Scientists
 Advanced the symbolic doomsday clock a notch
 closer to the end of humanity
 There are two minutes until the apocalypse
 Yet we don't know the velocity of this time keeper
 How fast or slow our life could come to a close . . .
 we always remember
 call it the time we got coming to us
 do not shoot the messenger
 do not throw the alarm across the room when it
 blares to the end of a dream you set it to
 2 minutes until midnight
 Full sprint
 Doomsday has become the noise that wakes us
 every morning
 Makes us get out of bed
 And get ready to be thrown in the destruction
 Try and shift the time to something allowing us to
 wake up walking
 But we still know when we try and change a waging
 war we will be turned into debris...

Voices of tomorrow

What kind of world do we want?

Rieser winners school the next generation

The *Bulletin* named Erin Connolly, (left, below) and Kate Hewitt, (right) its 2018 Leonard M. Rieser Award recipients for their June 11 essay “American students aren’t taught nuclear weapons policy in school. Here’s how to fix that problem.”

In their essay, Connolly and Hewitt said: “Recognizing the need to increase both exposure and accessibility, we became determined to educate the next generation by providing enough background and information so that students could engage on the issue and feel comfortable looking deeper than the headlines. Over the course of 22 presentations in four days, we found students to be engaged and curious, but also surprised by the information we presented.”

In making the selection, Editor-in-Chief John Mecklin said: “This article is sophisticated in its thinking, accessible in its writing, and aimed at solving a problem, rather than wallowing in it. It is precisely the type of work we hope *Bulletin* writers of all ages and experience levels aspire to produce.”

The Rieser Award was 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 Leonard M. Rieser (1922-1998), board chair of the *Bulletin* from 1984 until his death.

The award recipients shared a case prize, will each receive an annual subscription to the *Bulletin*’s digital magazine, and will speak at the 2019 Annual Dinner.

2018 Voices of Tomorrow Authors

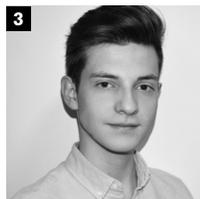
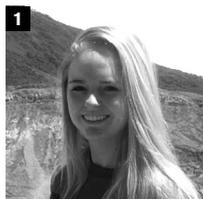
Wardah Amir
Egeman Bezci
Aaron J. Bonovitch
Nicholas Borroz
Amar Causevic
Yangyang Cheng
Kenshin Cho
Erin Connolly
Christopher Dunlap
Ezra Friedman
Kate Hewitt
Kristina Hook
Catherine Killough
Rahul Krishna
Khia Kurtenbach
Alexander Lubkin

Richard Marcantonio
Arielle Martinez Cohen.
Leah Matchett
Tahir Nazir
Louis Reitmann
Alanna Richards
Joseph Schofield
Emma Scotty
Sahil Shah
Zoe Stanley-Lockman
Abigail Stowe-Thurston
Eva Uribe
Grace Vedock
Cassandra Williams
Felix Wimmer
Alicia Sanders-Zakre



Interns get active

Highly motivated students again served as *Bulletin* interns during the past year, gaining essential experience in communications, data collection, research, and fundraising. In March, interns attended a special luncheon with Dieter Gruen, a dedicated *Bulletin* supporter and senior scientist emeritus from Argonne National Laboratory. As a young researcher, Gruen joined the Manhattan Project at Oak Ridge, Tennessee.



1. Olivia Louthen
2. Arielle Martinez Cohen
3. Louis Reitmann
4. Ethan Gelfer
5. Bree McCabe



The Doomsday Clock announcement

“Absolutely unacceptable state of affairs”

At a live international press conference from Washington, DC on January 24, *Bulletin* leaders set the Doomsday Clock at two minutes to midnight, and called for intense public engagement with nuclear and climate threats. They proceeded to Capitol Hill after the announcement to engage with Congressional representatives.

The 2019 Doomsday Clock statement noted: “Humanity now faces two simultaneous existential threats, either of which would be cause for extreme concern and immediate attention.

These major threats—nuclear weapons and climate change—were exacerbated this past year by the increased use of information warfare to undermine democracy around the world, amplifying risk from these and other threats and putting the future of civilization in extraordinary danger...

“The world security situation can be improved, if leaders seek change and citizens demand it!”

“There are many concrete steps that leaders could take—and citizens should demand—to improve the abnormal and absolutely unacceptable state of world security affairs.”



Sample media coverage

News outlets and social media platforms published the news about the Doomsday Clock setting, reaching millions of readers around the globe.

CNN

The Doomsday Clock says it's almost the end of the world as we know it. (And that's not fine.)

OpEd by Jerry Brown and William Perry: The world is two minutes from doom

Vox

Doomsday clock creators: “We're playing Russian roulette with humanity”

Fox News

Eve of Destruction: Doomsday Clock hovers at 2 minutes to ‘midnight’

The Guardian

The view on Trump and arms: Can the doomsday clock be stopped?

Gizmodo

The Doomsday Clock is just two minutes to midnight, again

New York Times

Nuclear, climate threats keep Doomsday Clock close to Apocalypse

OpEd by Rachel Bronson: Welcome to the new age of nuclear instability

Washington Post

The Doomsday Clock is stuck at 2 minutes to ‘midnight,’ the symbolic hour of the Apocalypse

Quartz

The 2019 Doomsday Clock shows we've entered a “new abnormal”

BBC

Doomsday Clock frozen at two minutes to Apocalypse

Independent

Doomsday Clock: Humanity is still as close to catastrophe as it has ever been, scientists say

Bloomberg

Doomsday Clock scientists see dual risks of global annihilation

CSO Online

Add cybersecurity to Doomsday Clock concerns, says *Bulletin of Atomic Scientists*

IT IS STILL TWO MINUTES TO MIDNIGHT



The 2019 Clock Statement

To: Leaders and citizens of the world

Humanity now faces two simultaneous existential threats, either of which would be cause for extreme concern and immediate attention. These major threats—nuclear weapons and climate change—were exacerbated this past year by the increased use of information warfare to undermine democracy around the world, amplifying risk from these and other threats and putting the future of civilization in extraordinary danger.

In the nuclear realm, the United States abandoned the Iran nuclear deal and announced it would withdraw from the Intermediate-range Nuclear Forces Treaty (INF), grave steps towards a complete dismantlement of the global arms control process. Although the United States and North Korea moved away from the bellicose rhetoric of 2017, the urgent North Korean nuclear dilemma remains unresolved. Meanwhile, the world's nuclear nations proceeded with programs of “nuclear modernization” that are all but indistinguishable from a worldwide arms race, and the military doctrines of Russia and the United States have increasingly eroded the long-held taboo against the use of nuclear weapons.

On the climate change front, global carbon dioxide emissions—which seemed to plateau earlier this decade—resumed an upward climb in 2017 and 2018. To halt the worst effects of climate change, the countries of the world must cut net worldwide carbon dioxide emissions to zero by well before the end of the century. By such a measure, the world community failed dismally last year. At the same time, the main global accord on addressing climate change—the 2015 Paris agreement—has become increasingly beleaguered. The United States announced it will withdraw from that pact, and at the December climate summit in Poland, the United States allied itself with Russia, Saudi Arabia, and Kuwait (all major petroleum-producing countries) to undercut an expert report on climate change impacts that the Paris climate conference had itself commissioned.

Amid these unfortunate nuclear and climate developments, there was a rise during the last year in the intentional corruption of the information ecosystem on which modern civilization depends. In many forums, including particularly social media, nationalist leaders and their surrogates lied shamelessly, insisting that their lies were truth, and the truth “fake news.”

These intentional attempts to distort reality exaggerate social divisions, undermine trust in science, and diminish confidence in elections and democratic institutions. Because these distortions attack the rational discourse required for solving the complex problems facing humanity, cyber-enabled information warfare aggravates other major global dangers—including those posed by nuclear weapons and climate change—as it undermines civilization generally.

There is nothing normal about the complex and frightening reality just described.

The *Bulletin of the Atomic Scientists* Science and Security Board today sets the Doomsday Clock at two minutes to midnight—the closest it has ever been to apocalypse. Though unchanged from 2018, this setting should be taken not as a sign of stability but as a stark warning to leaders and citizens around the world. The current international security situation—what we call the “new abnormal”—has extended over two years now. It's a state as worrisome as the most dangerous times of the Cold War, a state that features an unpredictable and shifting landscape of simmering disputes that multiply the chances for major military conflict to erupt.

This new abnormal is simply too volatile and dangerous to accept as a continuing state of world affairs.

Dire as the present may seem, there is nothing hopeless or predestined about the future. The *Bulletin* resolutely 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 action that made nuclear war markedly less likely—and that led the *Bulletin* to move the minute hand of the Doomsday Clock far from midnight.

But threats must be acknowledged before they can be effectively confronted. The current situation—in which intersecting nuclear, climate, and information warfare threats all go insufficiently recognized and addressed, when they are not simply ignored or denied—is unsustainable. The longer world leaders and citizens carelessly inhabit this new and abnormal reality, the more likely the world is to experience catastrophe of historic proportions.



It is still two minutes to midnight

Worrisome nuclear trends continue

The global nuclear order has been deteriorating for many years, and 2018 was no exception to this trend. Relations between the United States and both Russia and China have grown more fraught. The architecture of nuclear arms control built up over half a century continues to decay, while the process of negotiating reductions in nuclear weapons and fissile material stockpiles is moribund. The nuclear-armed states remain committed to their arsenals, are determined to modernize their capabilities, and have increasingly espoused doctrines that envision nuclear use.

Brash leaders, intense diplomatic disputes, and regional instabilities combine to create an international context in which nuclear dangers are all too real.

A number of negative developments colored the nuclear story in 2018.

First, the United States abandoned the Joint Comprehensive Plan of Action, the multilateral agreement that imposed unprecedented constraints on Iran's nuclear program and allowed unprecedented verification of Iran's nuclear facilities and activities. On May 8, President Trump announced that the United States would cease to observe the agreement and would instead launch a campaign of "maximum pressure" against Iran. So far, Iran and the other parties have continued to comply with the agreement, despite the absence of US participation.

It is unclear whether they will keep the agreement alive, but one thing is certain: The Trump administration has launched an assault on one of the major nuclear nonproliferation successes of recent years and done so in a way that increases the likelihood of conflict with Iran and further heightens tensions with long-term allies.

Second, in October the Trump administration announced that it intends to withdraw from the INF Treaty, which bans missiles of intermediate range. Though bedeviled by reciprocal complaints about compliance, the INF agreement has been in force for more than 30 years and has contributed to stability in Europe. Its potential death foreshadows a new competition to deploy weapons long banned. Unfortunately, while treaties are being eliminated, there is no process in place that will create a new regime of negotiated constraints on nuclear behavior. For the first time since the 1980s, it appears the world is headed into an unregulated nuclear environment—an outcome that could reproduce the intense arms racing that was the hallmark of the early, unregulated decades of the nuclear age.

Third, the longstanding, urgent North Korean nuclear issue remains unresolved. Some good news did emerge in 2018. The bellicose rhetoric of 2017, which had raised fears of war, is largely gone. The summit between President Trump and President Kim in Singapore in June 2018 appears to have been a diplomatic step forward.

But not a single substantive and enduring concrete step was taken to constrain or roll back North Korea's nuclear program, and modernization of its nuclear capabilities continues. The chummy exchanges between the two leaders have reverted to wary challenges, and the potential for nuclear instability in Northeast Asia persists, largely unabated.

Fourth, even as arms control efforts wane, modernization of nuclear forces around the world continues apace. In his Presidential Address to the Federal Assembly on March 1, Russian President Vladimir Putin described an extensive nuclear modernization program, justified as a response to US missile defense efforts.

The Trump administration has added to the enormously expensive comprehensive nuclear modernization program it inherited from the Obama administration. Meanwhile, the nuclear capabilities of the other seven nuclear armed states are not governed by any negotiated constraints, and several of them—notably India and Pakistan—continue to expand and modernize their capabilities. These long-term modernization programs envision the possession of substantial nuclear capabilities for decades to come, with little indication of interest in reducing or constraining nuclear forces.

Fifth, reliance on nuclear weapons appears to be growing, and military doctrines are evolving in ways that increase the focus on actually using nuclear weapons. The Trump administration's most recent Nuclear Posture Review is doubly worrisome from this point of view. It spotlights the claim that Russia has adopted a highly escalatory nuclear doctrine. And it insists that the United States too must be prepared to use nuclear weapons in a wide array of circumstances, and so should invest in new, more-usable nuclear weapons. The longstanding hopes that nuclear weapons would recede into the background of international politics are being dashed.

The disturbing developments in 2018 are the latest indications that the nuclear order is deteriorating and that nuclear risks are increasing. Urgent action is necessary to reverse the trends that are taking the world down a perilous nuclear path.

Ominous climate change trends

The existential threat from human-caused global warming is ominous and getting worse. Every year that human activities continue to add carbon dioxide to the atmosphere irreversibly ratchets up the future level of human suffering and ecosystem destruction that will be wrought by global climate disruption. The key measure of improvement on the climate front is the extent of progress toward bringing global net carbon dioxide emissions to zero. On this measure, the countries of the world have failed dismally.

Global carbon dioxide emissions rates had been rising exponentially until 2012 but ceased growing from 2013 to 2016. Even if this emissions plateau had continued, it would not have halted the growth of warming.



It is still two minutes to midnight

Net emissions need to ultimately be brought to zero to do so, given the persistence of carbon dioxide in the atmosphere for up to thousands of years. The ominous news from 2017 and 2018 is that world emissions appear to have resumed their upward climb.

Even nations that have strongly supported the need to decarbonize are not doing enough.

Preliminary estimates show that almost all countries contributed to the rise in emissions. Some countries, including the United States and some members of the EU, increased their emissions after years of making progress in reducing them.

The United States has also abandoned its responsibilities to lead the world decarbonization effort. The United States has more resources than poorer nations have; its failure to ambitiously reduce emissions represents an act of gross negligence. The United States stood alone while the other G20 countries signed on to a portion of a joint statement reaffirming their commitment to tackle climate change. Then in 2018, at the United Nations Climate Change Conference in Poland, the United States joined with Russia, Saudi Arabia, and Kuwait—all major oil producers—to undercut a report on the impacts of climate change.

Although emissions estimates for 2018 are preliminary, what is known supports a continuation of an ominous trend. That the world is losing ground in its efforts to achieve net zero emissions is set against a backdrop of increasing scientific evidence for the severity of impacts of warming of Earth. Despite the waning of El Niño early in the year, 2018 is likely to be the fourth warmest year on record as measured by global mean temperature, with previous record highs in 2015, 2016, and 2017. Greenland ice is melting at an unprecedented rate.

Global warming has contributed to the occurrence of catastrophes, including the massive wildfires seen this year in California, Greece, and Sweden, and the deadly heat waves suffered by Asia, Australia, Europe, and North America. The US National Climate Assessment has forecast increasingly severe impacts on the economy, human health, agriculture, and natural ecosystems. An Intergovernmental Panel on Climate Change report has shown that even a modest increase in global mean warming—from 1.5 degrees Celsius to 2 degrees—will bring severe impacts. Yet if the world were on track to fulfill its commitments under the Paris climate accords, which it clearly is not, that would be insufficient to halt warming at 2 degrees.

As long as there is carbon left in the ground, efforts to keep it there will reduce the toll of future suffering from climate change. But even amid the worsening manifestations of an increasingly disrupted climate, denialists continue to stymie action. President Trump, dismissing the National Climate Assessment prepared by his own agencies, declared stubbornly, “I don’t believe it.”

There is still time to rescue the world from truly catastrophic effects of climate change. For such a rescue to become reality, however, progress toward decarbonization must pick up pace dramatically, and very soon.

The threat of information warfare and other disruptive technologies

Nuclear war and climate change threaten the physical infrastructure that provides the food, energy, and other necessities required for human life. But to thrive, prosper, and advance, people also need reliable information about their world—factual information, in abundance.

Today, however, chaos reigns in much of the information ecosystem on which modern civilization depends. In many forums for political and societal discourse, we now see national leaders shouting about fake news, by which they mean information they do not like. These same leaders lie shamelessly, calling their lies truth.

Acting across national boundaries, these leaders and their surrogates exacerbate existing divisions, creating rage and increasing distrust in public and private institutions. Using unsupported anecdotes and sketchy rhetoric, denialists raise fear and doubt regarding well-established science about climate change and other urgent issues.

Established institutions of the government, journalism, and education—institutions that have traditionally provided stability—are under attack precisely because they have provided stability.

In this environment, communication inflames passions rather than informing reason.

Many countries have long employed propaganda and lies—otherwise known as information warfare—to advance their interests. But a quantitative change of sufficient magnitude qualifies as a qualitative change. In the Internet age, the volume and velocity of information has increased by orders of magnitude. Modern information technology and social media allow users easy connectivity and high degrees of anonymity across national borders. This widespread, inexpensive access to worldwide audiences has allowed practitioners of information warfare to broadcast false and manipulative messages to large populations at low cost, and at the same time to tailor political messages to narrow interest groups.

By manipulating the natural cognitive predispositions of human beings, information warriors can exacerbate prejudices, biases, and ideological differences. They can invoke “alternative facts” to advance political positions based on outright falsehoods. Rather than a cyber Armageddon that causes financial meltdown or nationwide electrical blackouts, this is the more insidious use of cyber tools to target and exploit human insecurities and vulnerabilities, eroding the trust and cohesion on which civilized societies rely.



It is still two minutes to midnight

The Enlightenment sought to establish reason as the foundational pillar of civilized discourse. In this conception, logical argument matters, and the truth of a statement is tested by examination of values, assumptions, and facts, not by how many people believe it. Cyber-enabled information warfare threatens to replace these pillars of logic and truth with fantasy and rage. If unchecked, such distortion will undermine the world's ability to acknowledge and address the urgent threats posed by nuclear weapons and climate change and will increase the potential for an end to civilization as we know it.

The international community should begin multilateral discussions that aim to discourage cyber-enabled information warfare and to buttress institutions dedicated to rational, fact-based discourse and governance.

The world faces other major threats from disruptive technologies; developments in synthetic biology, artificial intelligence, and cyber sabotage are of particular concern. The velocity of change across these and other technological fronts is extremely high; the international effort to manage these rapid advances has been, to date, grossly insufficient.

A signal event of 2018 was the editing of a human genome in China, an unfortunate demonstration of the weakness of institutional constraints on genetic engineering and other biotechnological research. The advent of “designer” human beings would constitute a truly history-changing event with a significant potential for unforeseen, large, and dangerous consequences. The international community has a common interest in delaying experimentation into the editing of human genomes until such research can receive the highest level of scientific and ethical review. At the same time, other biological hazards—ranging from biological terrorist attacks to the emergence of deadly, rapidly spreading diseases—continue to threaten world security. The management of synthetic biology and other biothreats must become a world priority.

Advances in machine intelligence—often called artificial intelligence or AI—are also progressing at a rapid and largely unmanaged pace. The Science and Security Board is particularly concerned about the incorporation of AI into autonomous weaponry that makes “kill” decisions without human supervision. But AI research and development cut across a wide array of human activities. Because AI will have increasingly large military, economic, and social effects in coming decades, the international community must develop a cooperative system that maximizes the positive potential of advances in machine cognition while diminishing potential downsides.

Beyond the information warfare previously described, the sabotage of computing networks via cyber hacking constitutes a multifaceted threat to global security. The sophisticated sabotage of the “Internet of Things”—computer networks that control major financial and power infrastructure and have access to more than 20 billion personal devices—could have impacts so severe as to inspire military responses, potentially involving nuclear weapons. Here, too, more effective international management regimes are desperately needed.

Toward a safer, more sustainable world

The Doomsday Clock was first set at two minutes to midnight in 1953, after the Soviet Union exploded a thermonuclear device within a year of the first US hydrogen bomb test. In ensuing decades, the two nations engaged in a furious arms race that culminated in the 1980s, when the world inventory of nuclear warheads topped 60,000.

From that point until fairly recently, the leaders of the United States and the Soviet Union (and Russia, after the dissolution of the Soviet Union) crafted a series of arms control agreements that drastically reduced the number of nuclear weapons deployed.

These agreements were based not merely on trust, but also on verification and consultation, and as they were expanded over time, the threat of a global nuclear holocaust seemed to fade into the background, a concern of the past, dealt with long ago.

The belief that the threat of nuclear war has been vanquished was and is a mirage.

The continuing danger posed by nuclear weapons burst into world news headlines in 2017, as Donald Trump and Kim Jong-un exchanged bombastic threats of nuclear attack and the US-Russia nuclear rivalry re-emerged. In January 2018, the Science and Security Board moved the hands of the Clock to two minutes before midnight. At that time, the board asked that its judgement “be interpreted exactly as it is meant—as an urgent warning of global danger.” By keeping the Clock at two minutes—the closest it has ever been to apocalypse—the Science and Security Board today highlights an unacceptable reality that remains largely unrecognized by the public at large: The future of the world is now in extreme danger from multiple intersecting and potentially existential threats.

This situation—what we call “the new abnormal”—is untenable. In this extraordinarily dangerous state of affairs, nuclear war and climate change pose severe threats to humanity, yet go largely unaddressed. 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 situation cannot—must not—continue. And it need not. As the Science and Security Board noted last year: “The means for managing dangerous technology and reducing global-scale risk exist; indeed, many of them are well-known and within society’s reach, if leaders pay reasonable attention to preserving the long-term prospects of humanity, and if citizens demand that they do so.”



It is still two minutes to midnight

US President Trump and North Korean Chairman Kim made progress in cooling tensions on the Korea Peninsula in the last year, toning down their provocative rhetoric, reducing behavior that could lead to conflict, and opening talks on Pyongyang's nuclear program. The Science and Security Board applauds these efforts but notes that little real progress on dismantling the North Korean nuclear program has been made. We urge the United States and North Korea to move forward with the difficult negotiations that will be necessary to reach agreement on concrete steps toward a denuclearization process that will benefit the North and the rest of the world.

Beyond the Korean situation, there are many practical, concrete steps that leaders could take—and citizens should demand—to improve the current, abnormal, and absolutely unacceptable state of world security affairs.

These common-sense actions would make the world safer:

- US and Russian leaders should return to the negotiating table to resolve differences over the INF treaty; to extend the nuclear arsenal limits of New START beyond 2021 and to seek further reductions in nuclear arms; to discuss a lowering of the alert status of the nuclear arsenals of both countries; to limit nuclear modernization programs that threaten to create a new nuclear arms race; and to start talks aiming toward elimination of battlefield nuclear weapons.
- The United States and Russia should discuss and adopt measures to prevent peacetime military incidents along the borders of NATO. Provocative military exercises and maneuvers hold the potential for crisis escalation. Both militaries must exercise restraint and professionalism, adhering to all norms developed to avoid conflict and accidental encounters.
- US citizens should demand climate action from their government. Climate change is a serious and worsening threat to humanity. Citizens should insist that their governments acknowledge it and act accordingly. President Trump's decision to withdraw the United States from the Paris climate change agreement was a dire mistake. The Trump administration should revisit that decision, which runs counter to credible science.
- The temperature goal of the Paris climate agreement—to keep warming below 2 degrees Celsius and, ideally, below 1.5 degrees—is consistent with consensus views on climate science, eminently achievable, and economically viable, if poor countries are given the support they need. But countries have to act promptly and redouble their efforts to reduce greenhouse gas emissions well beyond their initial inadequate pledges to the Paris agreement.
- The Trump administration should revisit its lamentable decision to exit the Joint Comprehensive Plan of Action for limiting Iran's nuclear program. The Iran agreement is not perfect, but it serves the interest of the international community in restraining the spread of nuclear weapons.

- The international community should begin multilateral discussions aimed at establishing norms of behavior, both domestic and international, that discourage and penalize the misuse of information technology to undermine public trust in political institutions, in the media, in science, and in the existence of objective reality itself. Cyber-enabled information 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 “new abnormal” that we describe, and that the world now inhabits, is unsustainable and extremely dangerous. The world security situation can be improved, if leaders seek change and citizens demand it. It is two minutes to midnight, but there is no reason the Doomsday Clock cannot move away from catastrophe. It has done so in the past, because wise leaders acted—under pressure from informed and engaged citizens around the world. Today, citizens in every country can use the power of the internet to fight against 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 action to reduce the existential threat of nuclear war and unchecked climate change.

Given the inaction of their leaders to date, citizens of the world should make a loud and clear demand:
#RewindTheDoomsdayClock.

From the Editor-in-Chief

John Mecklin

Extraordinary coverage of an extraordinary year

The *Bulletin's* coverage areas—nuclear risk, climate change, and disruptive technologies—dominated world headlines in 2018, and the *Bulletin* staff and contributors responded with a broad and deep stream of quality reportage and analysis, presented in a variety of formats across multiple digital platforms. Because of its authoritative combination of depth and timeliness, *Bulletin* content now is distributed not just through our open-access website and subscription magazine but also via partnerships with major media organizations like *Mother Jones* and *The Nation* magazines and the Apple News channel.

Our website played host to a near-continuous stream of cutting-edge and widely viewed articles, videos, and multimedia presentations through last year. A quick sample of a few of the best:

In April, the *Bulletin* published an authoritative package, “Military applications of artificial intelligence” as part of a collaboration with the Stanley Foundation. The package included articles written by five top AI experts from around the world.

In May, within hours of President Trump's decision to pull the United States out of the Iran nuclear deal, the *Bulletin* began posting commentary from 17 experts at leading institutions in the United States and Europe. The collection has drawn thousands of readers and notice from prominent media organizations and think tanks.

In June, *Bulletin* deputy editor Dan Drollette's story, “How fast is the Arctic ice retreating? Just listen to it melt,” on the sound of icebergs melting seemed to strike a chord (pun quite intended) with climate change experts and a large lay audience. That same month, *Bulletin* staff and contributors produced an exemplary and well-read collection of commentary and analysis on the US-North Korea summit in Singapore.

In August, “Dawn of a new Armageddon”—Cynthia Lazaroff's chilling account of 38 minutes in January when she and her neighbors on Kaua'i thought they were

under nuclear ballistic missile attack—made a truly international splash. While drawing tens of thousands of pageviews on our website, this article has been republished in translation by the Russian national newspaper *Kommersant*, the Russian International Affairs Council, one of that country's leading think tanks, and the Gorbachev Foundation.

In October, we posted a wide-ranging collection of expert commentary on the Trump administration's plan to withdraw from the Intermediate-range Nuclear Forces Treaty (INF), one of the foundational agreements of the world arms control regime.

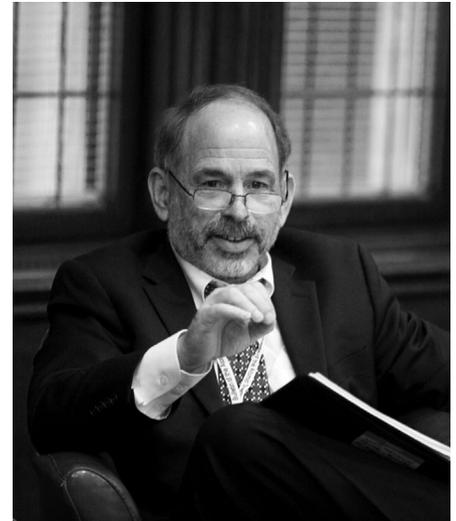
And early in December, the *Bulletin* published its first full-scale multimedia storytelling project, “Facing nuclear reality: 35 years after *The Day After*.” The package, written by *Bulletin* contributing editor Dawn Stover, focused on the 1983 movie that riveted America to its television screens and drew tens of thousands of views and rave reviews on social media for its innovative presentation. The main article in the package was co-published by *The Nation* magazine.

The *Bulletin's* subscription magazine also displayed a wide range of authoritative and impactful coverage last year.

For example, the March issue, “Resilience and the climate threat,” was guest-edited by Alice C. Hill, a research fellow at Stanford University's Hoover Institution and a former special assistant to President Obama. The Hoover Institution distributed a reprint of parts of the issue for a briefing on resilience for national journalists.

And our July issue, which focused on missile defense, was published in concert with the launch of a new *Bulletin* website and promoted on social media via a video trailer. These efforts drove more than 30,000 page views on the *Bulletin's* open and subscription platforms.

As part of our effort to expand the ways in which we reach our varied audience, last year the *Bulletin* also debuted the first episode of a video series, “Say What?” Produced by our multimedia editor Thomas Gaulkin, the series—subtitled “A clear-eyed



look at fuzzy policy”—offers substantive but entertaining (at times even humorous) examinations of questionable public policies and officials in the *Bulletin's* areas of interest. Thanks to your continued support—which everyone on the editorial staff appreciates—the *Bulletin* is well positioned to continue to expand the amount and types of authoritative and innovative content that it produces, and to forge new media partnerships that will provide even more ways for us to reach an expanding audience around the world.

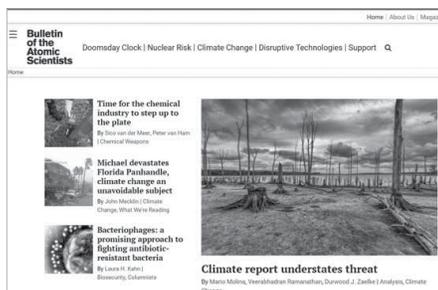
A handwritten signature in black ink that reads "John Mecklin". The signature is fluid and cursive, with a long horizontal stroke at the end.

John Mecklin

@thebulletin.org

From our platform onto many more

Introducing a new website



The *Bulletin* launched its new mobile-friendly website in June 2018, featuring a streamlined design, improved navigation, and new interactives to better engage its energized followers.

New face at the Nuclear Notebook

The *Bulletin* expressed its thanks to Robert Standish (Stan) Norris (below, left) for 31 years of exceptional service as co-author of the Nuclear Notebook, the authoritative accounting of the world nuclear arsenals, compiled by top experts from the Federation of American Scientists. In his place we welcomed Matt Korda (right) to the Nuclear Notebook team.



Experts on nuclear threats

In 2018, the world's arms control architecture teetered on the brink of collapse as the United States withdrew from the Iran nuclear deal and threatened withdrawal from the landmark Intermediate-range Nuclear Forces Treaty. Negotiations between the United States and North Korea over Pyongyang's nuclear program stalled. And Hawaii went through 38 dreadful minutes of believing it was under nuclear missile attack.

Prime examples of the *Bulletin's* coverage appear here and at thebulletin.org.

Nuclear issues: Sobering past, unstable present, and perilous future

Expert comment: The INF and the future of arms control

John Mecklin

A collection of extraordinary experts, including Alexandra Bell, Larry Korb, Steven Miller, Zia Mian, Sharon Squassoni, and Pavel Podvig assessed the import of the Trump administration's declared interest in leaving the landmark Intermediate-range Nuclear Forces Treaty, a foundation of the world's arms control regime.

Dawn of a new Armageddon

Cynthia Lazaroff

The truly gripping account of 38 minutes of chaos that ensued after Hawaii received an all-too-believable warning that it was under what appeared to be a nuclear missile attack.

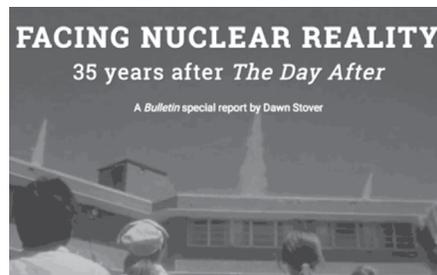
Under siege: Safety in the nuclear weapons complex

Robert Alvarez

One of the premier experts on the US nuclear weapons complex explores an Energy Department attack on the Defense Nuclear Facilities Safety Board, which oversees and reports on safety practices in the complex.

Hiroshima & Nagasaki A collection

Through the decades, the *Bulletin* has been home to distinguished analysis of the US atomic bombing of two Japanese cities at the end of World War II. This collection provides an authoritative starting point.



Facing nuclear reality, 35 years after The Day After

Dawn Stover

A multi-media special report looked at the meaning of a landmark TV movie, including an interview with Ted Koppel, who led an expert panel discussion after the airing of a film that changed world nuclear history.

George H.W. Bush worked toward a soft nuclear landing for the dissolving Soviet Union

Sigfried S. Hecker

How the late president aided the effort to secure the Soviet Union's nuclear material and scientists as the USSR dissolved.

Robert Oppenheimer: The myth and the mystery

Richard Rhodes

The Pulitzer Prize-winning author of *The Making of the Atomic Bomb* explains, in brilliant detail, the reality of J. Robert Oppenheimer, in contrast with his portrayal in the opera *Dr. Atomic*.

2.3 million
website visitors

Over 3.6 million
website page views

Nearly half of our
audience is from
outside the US.



+15%
Facebook likes



+24%
Twitter followers

Climate conditions worsen

Scientists note worsening climate conditions

The *Bulletin's* climate change stories from 2018 made an indelible impression. If you want to see more than the samples here, check out the website's home page.



Our new "Say WHAT?" series, casts a wry eye on the devaluation of scientific expertise by government agencies. In its debut, Sean Hecht of the UCLA Emmett Institute on Climate Change and the Environment, assessed controversial decisions made by former Secretary of the Interior Ryan Zinke.

Florence and the 5 states of climate change acceptance

Dan Drollette Jr.

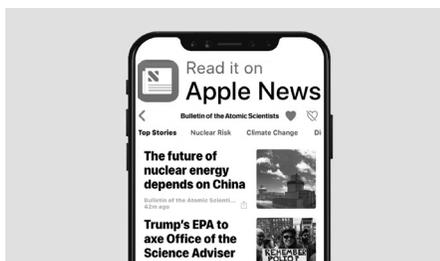
Now that we've gotten through Hurricane Florence, Americans should be completely up to speed when it comes to dealing with disasters that have been amplified by anthropogenic climate change, right?

Little Ice Age? No. Big warming age? Yes.

Dana Nuccitelli

The 'imminent mini ice age' myth rears its ugly head in the conservative media like clockwork every year or two. But every single part of the myth is wrong.

Partner platforms extend reach



Columnists go deep

Experts in their respective fields, *Bulletin* columnists excel at context and backstory. Their pieces explain not only what is happening now, but what to expect tomorrow and beyond.

What are Iranian hardliners saying on social media?

Ariana Tabatabai

Tabatabai has covered the day-by-day of the Iranian nuclear agreement for the last several years, but in this story, illustrated with Instagram posts, she distills the political messaging behind the memes.

The promise and peril of military applications of artificial intelligence

Michael C. Horowitz

Horowitz wrote, "Artificial intelligence is not a weapon." From a military perspective, it "is an enabler, much like electricity and the combustion engine." Since it was published in April, this piece has become an essential reference on how militaries are exploiting AI.

A plant that could save civilization, if we let it

Laura H. Kahn

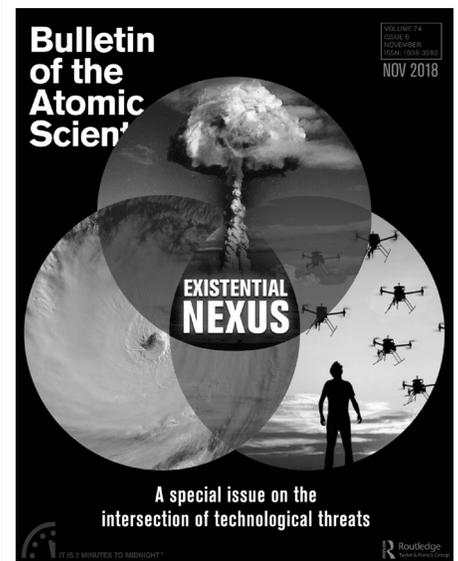
We publish good news, too. Kahn's piece tells the story of a scientist breeding a "super plant"—a type of chick pea—to feed the masses and remove carbon dioxide from the atmosphere.



Duyeon Kim, a *Bulletin* columnist based in Seoul, is frequently consulted by major media outlets for her expertise on Korean security issues, which she regularly covers for the *Bulletin*.

Digital magazine restores covers

In partnership with our digital magazine publishers Taylor & Francis Group, the *Bulletin* has renewed its tradition of using creative artwork on the bimonthly issues.



January-February 2018

The good news on reducing global risks

March-April 2018

Resilience and the climate threat

May-June 2018

The wages of climate inaction: Ever-rising seas

July-August 2018

Missile defense, around the world and perhaps in space

September-October 2018

The verification of arms control agreements

November-December 2018

Existential nexus: The intersection of technological risks

Financials

Management Discussion and Analysis

The *Bulletin* had a successful 2018, achieving longterm growth in both donor and foundation support. Increasing contributions from *Bulletin* stakeholders in 2017 and 2018 allowed us to make significant investments in human capital, programmatic activities and infrastructure while still ending the year with a positive net income from operations. Examples of our stepped-up efforts are presented throughout the pages of this annual report.

The *Bulletin's* improving financial position is somewhat obscured by our financial statement which compares only the past two years of donor support, an extraordinary year in 2017 to a good one in 2018. As readers of this report will remember from last year, the *Bulletin* was fortunate to receive a large gift in 2017. Fundraising continued to grow throughout 2018, but the comparison of 2018 to 2017 in the financial statements makes it difficult to see that. The chart to the right on "Donor Support 2014–2018" shows the longterm growth more clearly.

The *Bulletin* was also fortunate to receive multiyear grants from several major foundations in 2015 and 2017, but the requirements of generally accepted accounting principles (GAAP) also make it hard to show the benefits. We—like our counterparts—are required to recognize a full multiyear gift in the year in which it is awarded, although the funds may not be received and will not be used until the later years of the grant-cycle. In 2017, the *Bulletin* received two two-year foundation grants of \$540K and \$500K. These were reported in accordance with GAAP as just over one million dollars of revenue in 2017. No part of these grants appeared as revenue in 2018, even as grant related support was received and expenses were accrued evenly over the course of 2018. For the *Bulletin*, this accounting treatment appears as a decrease in total net assets in 2018 of about \$500K, and an increase in expenses of about \$400K on the "Statement of Activities" on page 21.

To manage the unevenness of such 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" and in "Revenue released from restrictions" in our Statement of Activities. The chart on "Foundation Support 2015-2018" to the right shows both the cyclical nature of our foundation support (Foundation grants new), as well as how we manage it (Foundation grants after restriction adjustments). It also shows that we restricted more grant-related money than usual in 2017, in anticipation of investments in staff, programs, and infrastructure that were planned for 2018 to help us further our mission.

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

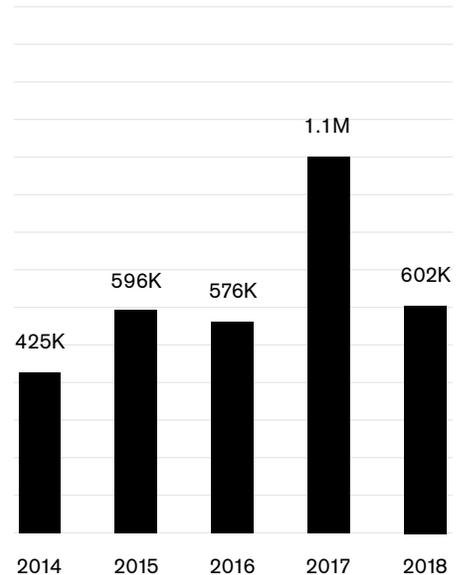
Our financial reporting is designed to provide donors and the public with a transparent overview of our finances. If you have any questions about this report or need additional financial information, please contact the *Bulletin* at finance@thebulletin.org.

Sincerely,



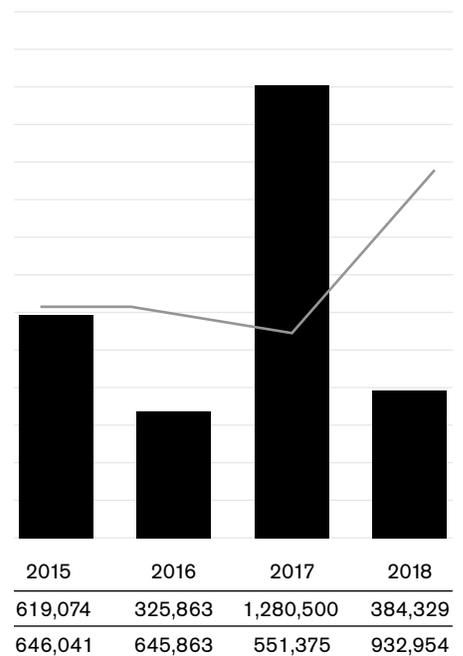
Rachel Bronson, PhD
President and CEO

**DONOR SUPPORT
2014–2018**



Donor support includes Individual support, Corporate support and the portion of "Net assets with donor restrictions" associated with Individual and Corporate contributions.

**FOUNDATION SUPPORT
2015–2018**



● Foundation grants new
● Foundation grants after restriction adjustments

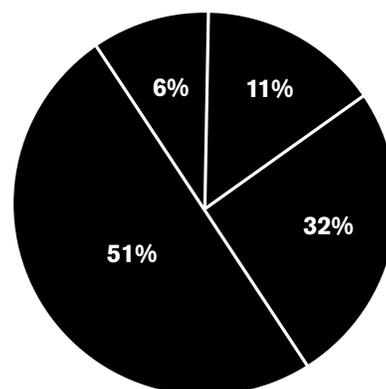
Financials

STATEMENT OF FINANCIAL POSITION

	2018	2017
Assets		
Cash/certificates of deposit	1,073,243	1,106,612
Accounts receivable, net of allowance	72,785	61,960
Pledges receivable	217,143	662,597
Prepaid expenses	12,978	11,438
Total current assets	1,376,149	1,842,605
Property and equipment	11,430	7,800
Total assets	1,387,578	1,850,405
Liabilities and net assets		
Accounts payable	104,535	65,639
Accrued expenses	20,870	—
Deferred subscription revenue	1,437	1,305
Total liabilities	126,842	66,944
Net assets		
Without donor restrictions	834,399	812,199
With donor restrictions	426,337	971,262
Total net assets	1,260,736	1,738,461
Total liabilities and net assets	1,387,578	1,850,405

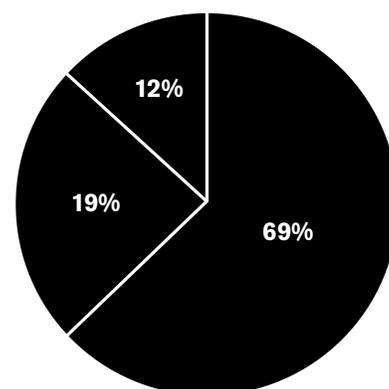
STATEMENT OF ACTIVITIES

	2018	2017
Revenue & other support		
Magazine	205,735	180,412
Donor support	510,890	941,010
Foundation grants	187,500	421,375
Corporation support	13,000	37,000
Other revenue	85,502	21,921
In-kind	768,376	660,000
Total revenue without donor restrictions	1,771,003	2,261,718
Revenue released from restrictions	817,454	263,165
Total revenue and support without donor restrictions	2,588,457	2,524,884
Operating expenses by function		
Program	1,779,592	1,370,034
Fundraising	294,287	263,567
Management and general	492,378	512,692
Total operating expenses	2,566,257	2,146,293
Net income from operations	22,200	378,591
Net assets with donor restrictions	272,529	956,357
Increase (decrease) in net assets	(522,725)	1,071,783



Operating Revenue

Foundation Grants	51%
Donor Support	32%
Magazine	11%
Other Revenue	6%



Operating Expenses

Program	69%
Management and general	19%
Fundraising	12%

Annual Meeting Highlights

An active and assertive *Bulletin*

The *Bulletin's* 2018 Annual Meeting took place at an unstable moment in history—when the institutions that we rely on to keep us safe are struggling, the arms control architecture is crumbling, and threats to democracy abound. *Bulletin* stakeholders engaged with members of the Science and Security Board (SASB) to discuss responses.

Group sessions

Welcome to the Fourth Industrial Revolution

Steve Fetter, Associate Provost and Dean of the Graduate School, University of Maryland; Professor, School of Public Policy, University of Maryland; SASB



“Happy” birthday NPT

Bonnie Jenkins, Founder and Executive Director, Women of Color Advancing Peace, Security and Conflict Transformation; Non-resident Senior Fellow, Brookings Institution; Previously Ambassador, US Department of State



Carbon budgets: How much can we emit without trashing the climate?

Ray Pierrehumbert, Halley Professor of Physics, University of Oxford; SASB



Cyber insecurity and its implications for the future global order

Chris Demchak, Grace M. Hopper Chair of Cyber Security and Director, U.S. Naval War College



The day I woke up to a phone call from two black holes colliding

Daniel Holz, Associate Professor in Physics, Astronomy & Astrophysics, Enrico Fermi Institute, Kavli Institute for Cosmological Physics, University of Chicago; SASB



Nuclear risks: a perspective from South Asia

Ramamurti Rajaraman, Professor Emeritus of Physics, Jawaharlal Nehru University; SASB

Public health emergency preparedness: approaches for the real world

Suzet McKinney, CEO and Executive Director, Illinois Medical District Commission; SASB



What must happen to limit climate change?

Richard Somerville, Distinguished Professor Emeritus and Research Professor, Scripps Institution of Oceanography, University of California, San Diego; SASB

Back to the future: the new nuclear landscape

Jon Wolfsthal, Director, Nuclear Crisis Group, (independent project) Global Zero; SASB

Annual Dinner highlights

“Democracy is fragile, and freedom is not free”

Bulletin supporters, authors, and sponsors gathered at the 2018 Annual Dinner in November, which included a virtual reality tour of the Doomsday Clock during the cocktail reception, presented by 2017 Honoree Ellen Sandor and her colleagues at (art)n.

Executive Chair Jerry Brown exhorted the crowd to close the gap between “the curve of ever increasingly powerful technology, going up at a very steep rate, and the curve of wisdom and self-restraint, which remains flat.”

Tim Rieser, foreign policy aide to US Senator Patrick Leahy and the son of Leonard Rieser, longtime board chair of the *Bulletin* until his death in 1998, introduced Fermilab physicist Yangyang Cheng, recipient of the 2017 Leonard Rieser Award.

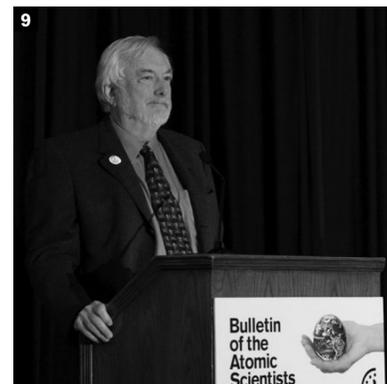
Cheng brought the audience to its feet in affirmation of her statement that “Democracy is fragile, freedom is not free, and nothing is to be taken for granted.”

Governing Board member Steve Ramsey thanked supporters for contributing 85 percent of what the *Bulletin* earns every year. He gave a particular shout out to Patricia Dougherty, “who last year, after this particular event, made what we believe is the largest individual contribution, ever, to the *Bulletin*.” Ramsey also thanked former Executive Director Kennette Benedict “for her courage in taking the *Bulletin* out of the economic fire pit of print journalism over a decade ago and giving us the opportunity to become the thriving online nonprofit we are today.”

CEO and President Rachel Bronson led a spirited conversation on the dais between Board of Sponsors Chair William J. Perry, the 19th U.S. Secretary of Defense, and Joseph Y. Yun, senior advisor to The Asia Group and a Global Affairs Analyst for CNN.

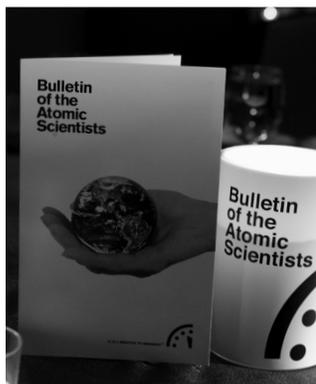
The evening also included remarks from US Representative Jan Schakowsky, and concluded with reflections from the 2018 Annual Dinner Honoree, Immediate Past Chair of the Governing Board Lee Francis, president and CEO of Erie Family Health Center, whose philanthropy and guidance has sustained the *Bulletin* for more than a decade.

1. Kennette Benedict and other guests
2. SASB members Steven Miller and Rod Ewing
3. Anne Gust Brown, corporate executive and former First Lady of California
4. SASB member Steve Fetter
5. SASB member Ray Pierrehumbert
6. Dion Heinz, SASB member Daniel Holz, Jessica Jerome, SASB member Herb Lin, SASB member Jon Wolfsthal, Peter Knutson and John Cabral
7. From left: Joseph Yun, William Perry, Rachel Bronson
8. Yangyang Cheng
9. Governing Board member Steve Ramsey
10. 2018 Honoree Lee Francis, center, with family, from left: Paul Francis, Lolli Zarlín, Julie Francis, Michelle Gittler, Hannah Francis, Sheila Schultz
11. Sissy Farenthold, Patricia Dougherty, Tim Rieser



Annual Dinner highlights

“Democracy is fragile, and freedom is not free”



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Looking ahead

Annual Meeting and Dinner
Thursday, November 7, 2019
The University Club, Chicago

1. Left to right: Joshua Kruskal, Josh Laven, Prabhat Singh, Devon Reber Drehmer, Siddhant Ramakrishna and Misho Ceko, COO of the University of Chicago Harris School of Public Policy
2. Chris Demchak, Elinor Williams, and Bill Obenshain
3. Austin Hirsch, Beth Gomberg-Hirsch, Adrienne Furniss, Bob Furniss
4. Ramamurti Rajaraman, Pushpalatha Bhat, and Chandra Bhat

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Recognizing leaders and donors

Board leaders focus on future

John Balkcom, a longtime civic and business leader in Chicago and Evanston, Illinois, was named chair of the *Bulletin's* Governing Board in 2018. Board member Marjorie Craig Benton was elected secretary.



Balkcom, seen above with new board member David Kuhlman, has a distinguished record as an adviser to management and boards. He retired in 2000 after 25 years as a management consultant and since then has served as a corporate director and advisory board member for a number of public and private enterprises.

Benton (top photo), who was the *Bulletin's* 2015 Annual Dinner honoree, brings a wealth of experience and contacts to the organization, having served as the Public Delegate to the United Nations, a Delegate to the Special Session on Disarmament, a Co-Chair of Americans for SALT, and Special Advisor to the United Nations Disarmament Commission.

"*Bulletin* donors sustain an organization that exists to encourage the world to address complex and sometimes terrifying issues," said Balkcom. "Our mission is not light, but we do believe that radical improvements are possible."

Special recognition groups

The Legacy Society and Einstein Circle members receive access to special briefings, exclusive invitations, and personalized communications.

The Legacy Society

The *Bulletin* is grateful for the confidence and generous support provided by our Legacy Society members. The Society was established to recognize and honor *Bulletin* friends who have thoughtfully provided for the *Bulletin* through their estate plans. Society members can make a significant impact that costs nothing in their lifetime--including a charitable bequest under a will or by designating the *Bulletin of the Atomic Scientists* as a beneficiary of a life insurance policy, retirement plan, or other instrument.

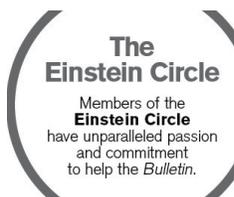
These meaningful gifts inspire confidence while ensuring that the *Bulletin* will be here for the next generation and beyond.



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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.



In memoriam



Stephen Hawking

The *Bulletin* was saddened to learn of the death of Board of Sponsors member Stephen Hawking in March 2018. At the 2007 Doomsday Clock Announcement, from London, he stated: "We foresee great perils if governments and society do not take action now to render nuclear weapons obsolete and prevent further climate change."

Bulletin Science and Security Board member Daniel Holz said: "Stephen Hawking was revered both by his fellow scientists and by the public."



Leon Lederman

We also said a sad goodbye in October 2018 to Leon Lederman, Director Emeritus of Fermilab and Chair Emeritus of the *Bulletin's* Board of Sponsors.

Lederman received the Nobel Prize in Physics in 1988; the National Medal of Science; the Enrico Fermi Prize; and many others. Perhaps less well known was his accessibility and a passion for communicating the joy of science.

"Leon had an uncanny ability to focus in on the most important aspects of any issue, said Majorie Benton, a close friend of Lederman's and his wife Ellen, who survives him. "He is greatly missed."

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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, 2018. Their names are listed here, with our sincere thanks for making everything we do possible.

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