

Special Section: Clear Thinking about Climate

A Triple Threat to Humanity: Climate Change, Pandemics, and Anti-Science

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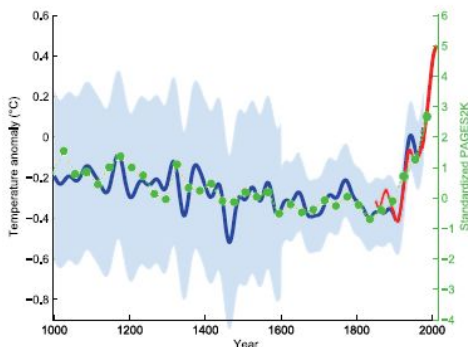
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Over the past decade, many of us in the scientific community have come to appreciate the existential threat we face today—a threat unlike any we’ve witnessed since the days of the U.S. and Soviet Cold War in the last half of the twentieth century. While even today the specter of nuclear annihilation remains, especially given the escalation of hot wars in Ukraine-Russia and Israel-Iran, we now face entirely new twenty-first-century forces that place the future of humankind in even greater peril.

Our newest and gravest challenge may not feel as acute as the 1980s Cold War threat of mutual assured destruction (MAD). There are no missiles with nuclear warheads crisscrossing the oceans. But it is every bit as real, posing a threat to civilization and our planet. This NextGen MAD consists of three synergistic components.

The first component is the unprecedented warming of our planet and temperatures that one of us (Michael Mann) highlighted more than two decades ago while still a postdoctoral researcher in the form of the now-famous “hockey stick” curve. The warming of the planet and its impacts—which include coastal inundation from melting ice and intensified more deadly hurricanes, droughts, heat waves, and wildfires—is taking an increasing toll on our civilization by any measure, be it loss of life (which can be measured in millions of lives per year) or economic costs (which can be measured in trillions of dollars per year in lost GDP globally). Look no further than deadly temperatures that exceeded 50°C (122°F) this past summer. More than 2,000 Americans died from extreme heat in 2023, a tragic new record. The death and destruction will continue to accelerate as long as we fail to address the problem at its source: chiefly, our ongoing reliance on fossil fuels for energy and transportation.



The famous “hockey stick graph” from Mann, Bradley, and Hughes (1999)

A “hockey stick” description also applies to the new pattern or cadence of pandemic threats—the second component. One of the most common questions that one of us (Peter Hotez) is asked: “Hey doc, what the heck is going on?” Why are we seeing three major coronavirus global epidemics—SARS, MERS, and now COVID-19 (caused by SARS-2), or Ebola epidemics in West Africa in 2014 or in DR Congo in 2019? These viruses all originate from bats; a part of this accelerating cadence of pandemics may be shifts in bat habitats that bring them closer to humans in concert with expanding human populations in formerly forested areas due to urbanization. Similar expansions in urbanizations, together with climate change, also explains why we’re seeing more mosquito-transmitted virus infections such as dengue or chikungunya and also parasitic infections such as malaria along the Gulf of Mexico, including in the United States (Hotez and LaBeaud 2023). This is

also occurring in southern Europe and elsewhere.

This brings us to the third and perhaps the most insidious component of all: a well-organized, financed, politically motivated, and steadily globalizing campaign of disinformation and attacks against mainstream science that makes it extremely difficult to mount an effective global response to the climate and pandemic threats. We witnessed an early instance decades ago as one of us (Michael Mann) described in his book *The Hockey Stick and the Climate Wars* when he and his colleagues came under vicious attack by forces linked to the oil and gas industry who viewed the hockey stick curve as a direct threat to their future profits and business ventures. As a pediatrician-scientist, Peter Hotez came under attack for his staunch defense of vaccines. Hotez's book, *Vaccines Did Not Cause Rachel's Autism*, about his youngest daughter, was a threat to a group that became known as the "disinformation dozen" (named by the Center for Countering Digital Hate, see also Nick Tiller's piece in SI's September/October 2022 issue), monetizing the internet through sales of nutritional supplements, spectacular cures, or anti-vaccine books on Amazon. Anti-vaccine activism took an even darker turn during the COVID-19 pandemic when more than 200,000 Americans needlessly perished because they refused COVID-19 vaccines during the delta and BA.1 omicron waves of 2021–2022. This occurred when the anti-vaccine movement fell under a new banner of "health freedom" in conservative circles.

Increasingly, we recognize how the forces behind the attacks on climate science and biomedicine (around vaccines and pandemics) have begun to converge. Unfortunately, they also include not only attacks on the science but also the scientists themselves. Tragically this even includes personal attacks from high-ranking public officials and even members of the U.S. Congress and U.S. Presidential candidates. They also include attacks from billionaires and the conservative media, especially Fox News and the *Wall Street Journal* editorial pages. However, even the mainstream media has increasingly helped spread anti-scientific disinformation and has platformed activists seeking to discredit both science and scientists.



In all, we have identified five major forces that have advanced attacks on science and scientists and promoted anti-science disinformation. We call them the "5 Ps," the plutocrats and petrostates (billionaires and state actors, respectively, who fund the attacks), the pros (the hired guns), the propagandists (industry shills and opportunists posing as experts), and—as we've already explained above—the press. Together they compose a coordinated, powerful, and formidable anti-science leviathan that threatens our future.

Although we are first and foremost researchers and academicians, this is far more than an arcane discussion for our faculty and students. Anti-science is now a lethal force that threatens human civilization. We can no longer fight climate change and pandemics unless we can find a means to defuse the anti-science bomb that threatens our future. So far, we are losing this battle. While time remains, the window of opportunity is beginning to close, and it is absolutely critical that we take action now.

Reference

Hotez, Peter J., and Angelle Desiree LaBeaud. 2023. Yellow Jack's potential return to the American South. *New England Journal of Medicine* 389(16):1445–1447. Online at <https://www.nejm.org/doi/full/10.1056/NEJMp2308420>.

Michael E. Mann and Peter J. Hotez

Michael E. Mann, PhD, is Presidential Distinguished Professor in the Department of Earth and Environmental Science at the University of Pennsylvania, with a secondary appointment in the Annenberg School for Communication. He also serves as vice provost for Climate Science, Policy, and Action and director of the Penn Center for Science, Sustainability, and the Media (PCSSM). He contributed, with other Intergovernmental Panel on Climate Change (IPCC) authors, to the award of the 2007 Nobel Peace Prize. He's author of numerous books, including *Dire Predictions*, *The Madhouse Effect*, *The New Climate War*, *Our Fragile Moment*, and *Science under Siege: How to Fight the Five Most Powerful Forces That Threaten Our World* (forthcoming and coauthored with Peter J. Hotez).

Peter J. Hotez, MD, PhD, is dean of the National School of Tropical Medicine and professor of Pediatrics and Molecular Virology & Microbiology at Baylor College of Medicine, where he is also the codirector of the Texas Children's Center for Vaccine Development (CVD) and Texas Children's Hospital Endowed Chair of Tropical Pediatrics. He is also University Professor at Baylor University. In 2022, Hotez and his colleague, Dr. Maria Elena Bottazzi, were nominated for the Nobel Peace Prize for "their work to develop and distribute a low-cost COVID-19 vaccine to people of the world without patent limitation." His books include *Blue Marble Health; Poverty and the Impact of COVID-19; Preventing the Next Pandemic; Forgotten People, Forgotten Diseases*; and *The Deadly Rise of Anti-science*.

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