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## FACULTY

# Princeton Climate Scientists Tried to Ignore a Campus Skeptic. Then He Went to the White House.

By *Marc Parry* | AUGUST 16, 2019

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## PRINCETON, N.J.



Jabin Botsford, The Washington Post, Getty Images

The physicist William Happer in the lobby of Trump Tower in New York City, January 2017

**I**t was a curious phenomenon on a campus famous for climate science.

In March 2010, Princeton University's alumni magazine featured a small group of scientists on the faculty who bucked the global consensus that human-spewed emissions are warming the planet, with alarming consequences. One of them, a physicist named William Happer, likened that consensus to Nazi propaganda.

The story presented Princeton's climatologists with a dilemma: how to respond to the skepticism of their academic colleagues when the issue at stake is the future of the planet. Should they try to open up a personal dialogue with the skeptics, in the hopes of bringing them around? Ignore them? Discredit them?

The climate scientists chose to go with a public takedown. Eight of them wrote a letter attacking the "many errors" made by Happer's circle of skeptics, none of them actual climate scientists. The letter also held up Happer's Nazi quote as evidence that he had

lost all objectivity. His judgment, the letter suggested, could not be trusted.

The scientists' broadside against Happer was an exception, though. "The general attitude on campus is he's someone who's best ignored," Michael Oppenheimer, a professor of geosciences and international affairs at Princeton, a faculty member in the Princeton Environmental Institute, and one of the letter's signatories, later told *The Chronicle*.

But that has become impossible. The campus gadfly is now a White House science adviser — the only person known to have briefed President Trump on climate science, according to a story in *E&E News*, an environmental media outlet. Happer, now an emeritus professor, has reportedly used his White House position to push for a climate-review panel that would challenge the government's own global-warming studies.

Among the Princeton colleagues who have interacted with Happer for decades, his Washington move has stirred a mix of despair, concerted indifference, and (qualified) hope. It has also rekindled a larger discussion about communicating climate research, a challenge that resonates with any community of scholars facing outsiders' attacks on its foundational knowledge.

Researchers are arguing about who has a right to be heard on climate science, how to articulate the uncertainty within that research, why scientifically sophisticated climate skeptics still exist, and whether fresh strategies may be needed to deal with them.

Princeton, because of its contrasts, is a unique lens on these problems. The university houses one of the country's leading climate-modeling centers, the Geophysical Fluid Dynamics Laboratory, part of the federal National Oceanic and Atmospheric Administration. The lab and university are home to renowned scientists who have devoted their lives to understanding the climate problem and figuring out how to mitigate it.

But Princeton is also a locus of dissent. At least four current or emeritus Princeton scientists have publicly challenged the climate consensus. At the Institute for Advanced Study, in Princeton, N.J., but independent of the university, a close friend of Happer's, the prominent physicist Freeman J. Dyson, is also a vocal climate skeptic.

Climatologists and their critics have worked across from each other on either side of Washington Road, a main artery through the Gothic campus.

“Maybe this is an overreach, but I see the breakdown in communication with Will as symptomatic of the breakdown in the larger climate conversation in the country,” says Nadir Jeevanjee, a climate scientist who works for the NOAA lab at Princeton. “We can’t even talk to someone across the street. No wonder this country is so divided on the issue.”

**I**n 2017, students in Steve Pacala’s environmental-studies class came to their professor with a concern. They had just heard Happer speak at a Climate Day event. *We don’t feel like we know how to respond to contrarians*, they told Pacala.

Pacala, an ecologist who studies the interaction of the biosphere and climate, was one of the scientists who had eviscerated Happer in that 2010 letter. He generally preferred not to focus on Happer at all. It was better, Pacala felt, to prepare for a time when Americans take this issue seriously than to spend one’s energy continuing to argue with the same skeptics. But now the media buzzed with reports that an infamous “denier” could be joining the White House. And Pacala weighed how to explain skeptics like Happer to his students.

Happer’s renown as an atomic physicist made him a particularly vexing case. His research generated improvements in the clarity of telescopes and new technology to scan images of human lungs. He’s a member of the National Academy of Sciences. He led the committee that counsels Princeton’s president on all university research. He was director of energy research in the Department of Energy from 1991 to 1993, overseeing a \$3-billion budget and a broad portfolio of scientific studies, including environmental ones.

Happer, who said he was not authorized to be interviewed for this article, has described how that 1990s federal job soured him on climate research. As director, he would ask the leaders of agency-backed projects to brief him. Most answered questions eagerly. But environmental scientists were generally reluctant to come in, he said in an interview with TheBestSchools, a website that focuses on secondary and higher education, and were

“evasive about answering the questions.” He was fired in 1993 after disputing then-Vice President Al Gore’s views on the dangers of ozone depletion and greenhouse gases, according to a report in *Physics Today*.

Returning to Princeton, Happer began to articulate a conspiratorial view of the climate-science establishment. He depicts that scholarly community as “glassy-eyed” and a “cult” that is incentivized to alarmism by money and prestige; that depends on unreliable models whose predictions are exaggerated; and that muzzles dissent. Although Happer is not a climatologist, he defends his right to pronounce on climate issues. “I have spent my professional life studying the interactions of visible and infrared radiation with gases — one of the main physical phenomena behind the greenhouse effect,” he testified during a 2009 Senate hearing.

Happer doesn’t dispute that humans are pumping more carbon dioxide into the atmosphere, or that the planet has warmed. But he attributes a large portion of that warming to natural causes. He also says carbon dioxide has been wrongly demonized as a “dangerous pollutant.” More carbon dioxide in the atmosphere will warm the planet somewhat in the future, he acknowledges. But those emissions will also help stimulate the growth of plants, he has written, leading to more food, wood, fiber, and other products for the planet’s growing population. Such benefits “will easily outweigh any negative effects.”

In contrast, the Fifth Assessment Report of the United Nations Intergovernmental Panel on Climate Change, the authoritative judgment of hundreds of scientists, concluded that human emissions were “extremely likely” to have caused most of the warming since the mid-20th century. As to the supposed benefits of more CO<sub>2</sub>, scientists describe this as a misleading claim that “misrepresents a complex reality.” It’s true that plants feed on CO<sub>2</sub>, and that its increase in the atmosphere has greened the earth in recent decades. It’s also true that a warmer climate will boost farming in some places. But plants need a delicate balance of water, sunshine, and nutrients. What happens when climate change disrupts that equilibrium, bringing, say, heat waves? The scientific literature indicates that in

many places — probably most — the agricultural benefits of high CO<sub>2</sub> “are going to be offset by strong decreases in yield from climate impacts,” says Pacala, a specialist in this domain.

Pacala dismisses Happer as a political intruder into the realm of climate science. That realm, he says, is adversarial, not conspiratorial. Top accolades go to those who can tear down an established order. A scientist who could show a tragic flaw in the global-warming story would be showered with prizes and grant money, he says. Plenty of uncertainty remains about the climate, such as how fast and how much the world will warm this century. But after decades of research and debate, Pacala says, the scientific underpinning of the global-warming narrative has become overwhelmingly strong.

In response to his students, Pacala created a lesson in the sociology of climate contrarianism. He showed slides of six “scientifically sophisticated critics,” with head shots of each and climate data to parry their claims. For Pacala, a key piece of data in rebutting climate-change doubts is that the skeptics are late in their careers. Happer is 80; Dyson, 95. The absence of “shiny credentialed young people” from the dissidents’ ranks is evidence that the scientific debate over global warming has ended, he says. Ambitious young people see no margin in attacking the foundation of climate science.

“Every debate has some people who fight on the losing side to the very end,” Pacala says. “And, eventually, they don’t become convinced. They just disappear.”

**H**apper isn’t disappearing yet. He serves on the National Security Council as senior director for emerging technologies. He has used that perch to promote various plans for a debate between climate scientists and their critics. One version, reported by *The Washington Post*, would create a presidential committee to review intelligence agencies’ conclusion that climate change presents a major security threat. A more-recent iteration would generate “dueling white papers” between skeptics and mainstream scientists, according to *E&E News*, though the effort has been shelved as Democrats criticize Trump’s record on the environment.

At Princeton, the dialogue between Happer and his critics has hardened over years of ad hominem attacks. Happer has repeatedly made statements that seemingly compare the behavior of climatologists to that of the Nazis. “The demonization of carbon dioxide is just like the demonization of the poor Jews under Hitler,” he said in a 2014 CNBC interview. Climate scientists on campus tend to view Happer as a nuisance who should not be engaged. In response to an interview request, Isaac M. Held, a longtime scientist at the NOAA climate lab who is the son of a Holocaust survivor, said in an email that he preferred to “stay out of any discussion of this sort” and “let the science speak for itself.”

Oppenheimer, an author of IPCC climate reports, says he stopped doing public debates with contrarians like Happer some two decades ago. These “fruitless” discussions don’t convince many people and may just drive them to the positions that align with their politics, he says. The better way to defend science, in his view, is to explain it to people, like journalists, who put aside the time to listen carefully.

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Oppenheimer argues that the scientists who deserve to be heard on climate matters are generally the ones who roll up their sleeves, do the research, and publish findings in peer-reviewed journals. Skepticism in that vein can be healthy, he says, citing the example of Richard A. Muller, a physics professor at the University of California at Berkeley who had been dubious about the accuracy of the temperature measurements that underlie climate science. Muller put together a team of scientists to re-analyze those records. He eventually reached the same broad conclusion as everyone else — “global warming is real” — and other scientists now use the data he produced.

Oppenheimer contrasts that with Happer and Dyson, who make pronouncements on the details of climate science despite scant peer-reviewed publications in the field. Scientists, because of the credibility they enjoy with the public, must be extra careful when treading beyond their specific expertise, he argues.

“If you use your Ph.D. in physics to pronounce on the science of the field that you really don’t know much about,” he says, “you’re being dishonest.”

Dyson, however, calls his outsider status a virtue. Experts, he has said, often succumb to the conventional wisdom. They believe in the reality of their own models. The thrust of Dyson’s position on climate change is uncertainty: how little those models truly tell us.

“The nonexperts are very often more likely to see the truth,” Dyson says. “They see it better, because they are on the outside looking in.”

**F**or climate scientists on the inside looking out, one reaction to the skeptic advising President Trump is self-reflection. Is there something about how climate science gets communicated — something, that is, beyond the political muscle of the fossil-fuel industry — that contributes to skepticism about its findings?

That question is being asked by two of Happer’s Princeton colleagues, one a veteran climate analyst who has long advocated changes in how climate science is presented, the other a young atmospheric physicist who is taking that campaign in new directions. Their message: Climate scientists could build trust by being more open about the incompleteness of their research and more welcoming of opportunities to engage with their critics.

“There’s people in our community who feel that if we show any chinks in the armor, then that’s going to open the door to questioning and to a lack of action on climate,” says Nadir Jeevanjee of the NOAA climate lab on campus, who until recently was a postdoctoral fellow in Princeton’s geosciences department. “But what we’re seeing is a lack of action because we’re politically polarized. And part of the polarization is because climate change has become a religion. And we just ask people to believe it. And we’re not willing to engage with skeptics.”



For Jeevanjee's senior colleague, Robert H. Socolow, Happer is emblematic of a distrust of climate science within the fields Socolow knows firsthand, physics and aerospace engineering. Socolow decamped from theoretical physics decades ago to lead interdisciplinary environmental-research efforts at Princeton. A professor emeritus of mechanical and aerospace engineering, he is known as the author, with Pacala, of an influential blueprint for mitigating the climate crisis with existing technologies. Over lunch with Jeevanjee at Princeton's faculty club, Socolow lamented that climate research is "not given the benefit of the doubt by other science disciplines."



André Chung for the Chronicle

Nadir Jeevanjee, a climate scientist (left) at a NOAA lab at Princeton, and grad students talk to a group at the York Friends Meetinghouse, in York, Penn., as part of Climate Up Close, which seeks to educate people about climate science.

When Socolow speaks of physicists' distrust, the main evidence he cites is a controversy over the climate statements of the American Physical Society, a top professional group. In 2007, the 55,000-member society declared, "The evidence is incontrovertible: Global warming is occurring. If no mitigating actions are taken, significant disruptions in the Earth's physical and ecological systems, social systems, security and human health are likely to occur. We must reduce emissions of greenhouse gases, beginning now."

In response, more than 160 past and present members of the group, including Happer and three other Princeton scientists, signed a petition to replace that statement with one casting doubt on global warming, according to media reports. That failed, but the issue refused to die. In 2015, after a new skirmish, the society issued a more equivocal statement that scotched the word "incontrovertible" and played up the uncertainty over global warming's future effects.

What physicists think is important because climate science is rooted in the physics of atmosphere, ocean, and ice. Physicists like Jeevanjee provide much of the brainpower for climate research.

Socolow notes that no comparable debate embroiled the American Geophysical Union, which includes earth and space scholars from fields like atmospheric sciences, ocean sciences, and hydrology.

**S**o what is it with physicists? Charitable theories chalk up their doubts to an independent streak and high evidentiary standards. Less charitable ones observe the workings of a scientific caste system, one described years ago by the paleontologist Stephen Jay Gould. At the top of that hierarchy sit the mathematicians and physicists, says George Philander, a professor emeritus of geosciences at Princeton. Next come the chemists, then, lower down, the biologists and geologists, and then, even lower, the psychologists. Arrogant quantitative types at the top want to reduce things to “a few equations or physical principles,” Philander says. They’re skeptical of the “holistic” types lower down, he says, who weave stories based on gathering data. The climate problem, he says, is so complex that reductionist principles “can’t get you very far.”

The vast majority of physicists have now become convinced of the reality of human-caused global warming, Philander adds.

Still, Socolow says he is discouraged that climate research remains insufficiently valued by the science community as a whole. Part of the difficulty, as he sees it, is the emphasis on consensus in the communication of climate science. He points, for example, to a statistic that has become iconic: According to a 2013 literature review, 97 percent of peer-reviewed climate papers that expressed an opinion “endorsed the consensus position that humans are causing global warming.” Socolow sees such claims as “counterproductive” to the goal of elevating the status of climate research among scientists from neighboring disciplines.

“When a scientist in another field hears ‘97 percent,’ she worries whether this is a field seeking consensus rather than searching for disruptive insights: She worries, even, that there may be coercion,” he writes in a draft paper based on a talk he gave at a Princeton conference on the ethics of climate-change communication. “From my perch, I find the norms of science practiced and defended by climate scientists as much as in any other field. Still, no other area of science is shackled by anything resembling ‘97 percent,’ as far as I know.”

Climate scientists, though, aren’t just communicating with other scientists. They’re targeting lay people, too. The 97-percent figure, as Socolow acknowledges, is a powerful way of persuading nonscientists that climate change is real, and humans are causing it.

Climate scientists also contend with a lavishly funded campaign by fossil-fuel interests and their allies to stave off regulations by manipulating public opinion. That campaign has recruited skeptical scientists, amplified their message through a network of think tanks and advocacy groups, and harassed mainstream climatologists, according to the investigative journalist Jane Mayer’s book *Dark Money*. A core element of its strategy has been to promote the idea that there is no scientific consensus on global warming.

Happer is part of that machinery of doubt. He founded the CO<sub>2</sub> Coalition, an advocacy group that spreads his ideas about the benefits of fossil-fuel consumption. The group, according to an *E&E News* analysis, has “received more than \$1 million from energy executives and conservative foundations that fight regulations.”

In a 2015 sting operation, undercover Greenpeace operatives posing as representatives of a Middle Eastern oil company found that Happer was willing to write a paper for the company about the benefits of CO<sub>2</sub>, while hiding the firm’s role in funding that paper. Happer has countered that he intended to use the oil company to advance his own agenda, not vice versa, and that he has not benefited financially from his pro-CO<sub>2</sub> advocacy.

**J**eevanjee believes that climate scientists’ dismissive response to skeptics exacerbates the problem. The skeptics grow more bitter. They feel climate scientists have something to hide. In 2017, as Happer’s name began to surface for a potential

White House job, he decided to try a different approach: an experiment in civility.

He would go talk to the notorious skeptic across the street.

Jeevanjee focused on one issue: Happer's claim that the climate community was incorrectly modeling a particular aspect of the greenhouse effect, making the climate-change problem look more serious. In an email, Jeevanjee introduced himself as a fellow physicist who shared Happer's frustrations with the "the opacity of climate modeling." He invited Happer to a campus talk he was giving. He visited Happer's office. He listened to Happer complain about the journal reviewers who had thwarted his effort to publish a critique of the modeling problem — a "cover-up," Happer wrote in an email to Jeevanjee.

Then Jeevanjee worked with experts at the NOAA lab to reanalyze Happer's calculations. Happer believed that climate modelers had neglected important physics about the way that carbon dioxide molecules absorb infrared radiation leaving Earth. The reality was different: Climate scientists had long ago incorporated that physics into their models. Jeevanjee documented that fact in an email to Happer.

Next time Jeevanjee visited Happer, his reception was less friendly. Happer changed the subject when Jeevanjee brought up his email. In public, though, Happer did stop claiming that models got this detail wrong, Jeevanjee says. (Happer has not retracted the claim in print.)

The exercise was, from Jeevanjee's perspective, a mini version of the kind of climate-science review that Happer might end up creating from within the White House, an approach that is sometimes referred to as a "red team, blue team" debate. Climate scientists generally scoff at that idea. Their reports are already vetted through peer review, they point out, and don't need a redo. They worry about lending credibility to skeptics.

Pacala writes off Happer's climate-review project as a "sideshow" that is out of step with changing attitudes among both the public at large and Republicans in Congress. Seventy-three percent of Americans now think global warming is occurring, a rise of 10 percentage points since 2015, according to a survey published in January by the Yale Program on

Climate Change Communication. The same poll found that almost half of Americans believe that they have felt global warming's effects in their own lives, a leap of 15 percentage points since 2015. In the GOP, long a bastion of opposition to climate action, more and more lawmakers are talking about ways to deal with climate change.

But Jeevanjee and Socolow are open to Happer's idea. Socolow has long advocated, without success, that the IPCC include a section in its climate reports responding to criticisms of external dissidents.

This month, in the spirit of his interactions with Happer, Jeevanjee tried to expand his engagement with skeptics. He and other young climate scientists got out of their liberal elite campus bubbles to stage public forums in small towns and cities across south-central Pennsylvania, most of them located in counties President Trump carried in 2016. The idea was to give ordinary people the chance to interact with climate scientists, something they rarely do.

The effort, called Climate Up Close, did attract a few skeptics. Mostly, though, Jeevanjee and his colleagues found themselves speaking to liberals who were already concerned about climate change. Some of those people expressed frustration that the scientists' carefully sourced presentation was not alarming enough.

Jeevanjee had hoped to make a small dent in America's dysfunctional climate conversation. He learned how difficult it would be to achieve even that modest goal.

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