

reports

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NCSE LAUNCHES NATIONWIDE TWO-YEAR CURRICULUM STUDY p. 3



HOW SCIENTISTS RESPOND TO NEW EVIDENCE

**UNITY & DIVERSITY OF
LIFE ON EARTH**

PREDICTING AND PREPARING

THE FUTURE & CLIMATE CHANGE

**EVIDENCE-BASED
REASONING**

NATURAL PROCESSES

MISCONCEPTIONS

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Dear NCSE Members,

I hope that all of you are enjoying a summer full of the ordinary pleasures we missed so much last year: family gatherings, movies, even a stroll with an ice cream cone (so hard to eat through a mask!) ... All of us at NCSE are happy to see our colleagues, neighbors, and friends again, and we look forward to a return to honest-to-goodness classrooms for the nation's teachers and students in the fall.

Ever since the pandemic started, we've been working hard to ensure we'd be ready as soon as teachers were ready to try new approaches to teaching evolution and climate change. We also created an entirely new curriculum to address misconceptions about the nature of science. (Gee, what do you think gave us the idea that misconceptions about science might be a problem?) Now we're ready to find out how all that hard work will pay off.

As you'll read in this issue, we've recruited 32 teachers from across the U.S. to serve as field testers of our new curriculum units. They'll be getting together (virtually) later this summer to learn how to use the lessons and then they'll be providing us with feedback all year on how the lessons are working, both for students and for them. DeeDee Wright, NCSE's Postdoctoral Fellow in Science Education Research and Evaluation, has designed assessments that we will use to back up their feedback with plenty of cold, hard data. Next summer these teachers will meet together (in person, we hope!) to implement a final round of revisions to the lessons.

Some of these teachers will then be trained to provide professional development on the lessons themselves. We'll work with their school districts to get the teachers in front of and supporting their local colleagues. Our goal is for NCSE to become known as a premier provider of transformative evolution, climate change, and nature of science teacher professional development.

We can't do any of this without you, our members. You'll meet some of these amazing field testers in this issue of *RNCSE* (p. 3) and I think you'll come away proud that your support is making their work possible.

As great new things start, some great old things are going away. As you can read on p. 13, we are winding down our informal science outreach efforts. Kate Carter has done an amazing job (as her predecessor Emily Schoerning did before her), and we are confident that the graduate students she has trained will become lifelong leaders in effective informal science outreach.

Thank you again for sticking with us through such a tough year. We've really appreciated your notes and phone calls offering kind and encouraging words. We are thankful for all of you who make up the NCSE family.



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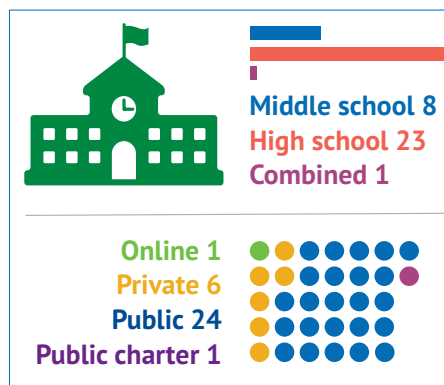
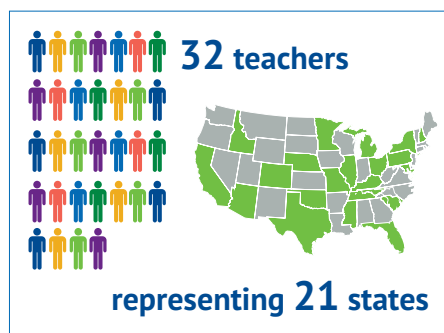


NCSE LAUNCHES CURRICULUM STUDY TO INVESTIGATE EFFICACY OF LESSONS

- How do scientists respond to new evidence that challenges existing beliefs?
- How can the past help us predict and prepare for a future affected by climate change?
- How do natural processes create and shape the unity and diversity of life on Earth?

These are the big questions that underlie NCSE's new nature of science, climate change, and evolution [lesson sets](#). To test the efficacy of these middle and high school lessons, and to gain valuable feedback on how best to revise them, NCSE is launching a two-year curriculum study starting in July 2021. In the meantime, the curriculum will be publicly available for any teacher to use at the Supporting Teachers section of the NCSE website.

At the heart of the curriculum study is a cohort of 32 teachers from across the U.S. who will be mentored by NCSE staff and NCSE teacher ambassadors (see "Teacher Ambassadors Take on a New Challenge: Mentorship" on p. 11). The cohort will receive virtual professional development in the summer of 2021 to help them to understand the content and implement the lessons, and to prepare them to address student misconceptions about the three topic areas. During the 2021–2022 school year, the cohort will field-test the lessons by teaching some or all of them in their classrooms. They will provide feedback on their experiences and ideas for improvement. Additionally, they will be collecting data from



their students to look for changes in knowledge and attitudes. NCSE will use the data from teachers and students to evaluate the effectiveness of the curriculum and modify individual lessons accordingly.

"NCSE teacher ambassadors identified the misconceptions targeted in these new lesson sets," explains NCSE Director of Teacher Support Lin Andrews. "These misconceptions were seen as the main sources of contention our master teachers had to tackle every year. The knowledge gained from this study will allow us to fine-tune the lesson sets to ensure that teachers can effectively use them to dispel their students' misconceptions about these vital topics in science."

In the second year of the study, the cohort of teachers will have the opportunity to gather in person for professional development to review the revised lesson sets and deepen their understanding of teaching socially controversial topics in science. Teachers will then implement the revised NCSE lessons during the 2022–2023 school year, continuing to provide feedback on their experiences. The study will wrap up in June 2023, when cohort members will recount their two-year journey with school and district peers and administrators.

The ultimate goals of this study are to (1) develop and provide research-based lesson sets on socially controversial topics in science for schools and (2) expand and support a community of teachers who are equipped to recognize and address science misconceptions in their classrooms.

“We want NCSE to be the go-to place for evolution, climate change, and the nature of science professional development that helps teachers who struggle with these often

contentious topics become confident and effective at helping their students overcome their misconceptions,” explains NCSE Executive Director Ann Reid. “The curriculum study is the first step in proving that our lessons are truly able to change teaching practices and learning outcomes.”

DeeDee Wright is a Postdoctoral Fellow in Science Education Research and Evaluation. wright@ncse.ngo



Meet a Few of the NCSE Curriculum Field Testers

REACHING NEW AND EXPERIENCED TEACHERS



Chandler Missig,
Year 4,
Frederick
V. Pankow
Center School,
Clinton Town-
ship, Michigan

As a novice teacher with a background in molecular biology, Missig says she struggles with teaching climate change and evolution. She is looking forward to diving into the NCSE study to expand her science pedagogy and engage her students in high-quality macrobiology experiences.



Dawn Fuelberth,
Year 21
Skutt Catholic
High School,
Omaha,
Nebraska

Fuelberth brings her previous experience as a molecular biology researcher studying gene therapy on Alzheimer’s disease to integrate high-level biotechnology into her classes. She is anticipating the exchange of information, research, and resources that participation in a nationwide curriculum study can provide.

EXPANDING THE NCSE MAP



Shatavia Harris,
Year 10
West Point High
School, North
Campus, West
Point, Mississippi
In the Golden

Triangle of northeast Mississippi, Harris describes evolution as an almost “forbidden topic” and climate change as often being overlooked or rushed through. Harris applied to participate in the NCSE study to find new ways to spark student interest and engagement in these topics.



Robin Wilson,
Year 7
Emmett High
School, Emmett,
Idaho

Wilson describes teaching climate change and evolution in her rural, conservative community as a complex affair, leading to a superficial treatment of the science and inadequate retention of this critical information. Her goal is to learn how to teach socially controversial topics in science in a scientifically accurate yet non-conflictual manner that leads to deeper understanding and scientific literacy.

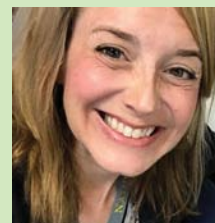
TAKING A TEAM APPROACH



**Century High
School,
Rochester,
Minnesota
Janelle Milliken,**
Year 23



Cheryl Moertel,
Year 27



**Laura
Unterholzner,**
Year 23

This dynamic trio has teamed up at Century High School for the past 20 years. Now they are taking on the challenge to develop a new 9th-grade

environmental science course. They chose to participate in the NCSE curriculum study to deepen their understanding of how to address misconceptions on the topic as well as to make connections with like-minded educators.





Jacquelyn Gill is Associate Professor of Paleocology and Plant Ecology at the University of Maine. Her research involves understanding how forces such as climate change have affected species and ecosystems over time. She is also co-host of the “Warm Regards” podcast, a co-founder of the March for Science, and a 2020 recipient of NCSE’s [Friend of the Planet](#) award. We spoke with Gill recently about her work as a researcher, science communicator, and activist. The interview has been edited for length and clarity.

Paul Oh: Your research involves understanding how forces such as climate change have affected species and ecosystems over time, which seems especially relevant today. Can you say more about this?

Jacquelyn Gill: It often feels like we’re heading into this period of deep uncertainty, and that can be really scary, thinking about the challenges of climate change going into the next century. It often feels like Earth has never gone through anything like this before, and in a lot of ways that’s true, but we’re not going into the future completely blindfolded. There are what we like to call natural experiments in the fossil record: events like abrupt climate change on the same order of magnitude of what we’re expecting in the future. We know from the rich fossil record and the archaeological record how human societies and biodiversity responded. There are clues about what makes some species really vulnerable to extinction from climate change while others have survived or thrived and about the properties of ecosystems that make them really vulnerable or resilient. That information is incredibly valuable, and we can leverage it to help us make more informed decisions.

PO: Alongside your research interests, you actively engage in science communication. What motivates you to do this?

JG: Growing up, there were not a lot of women scientists on my radar. The ones that really inspired me the most were two

fictional scientists: Ellie Sattler from *Jurassic Park* and Dana Scully from *The X-Files*. They’re both amazing role models, but they’re not real, unfortunately, as much as we would love them to be. I didn’t have the sense from an early age that I was going to go into the sciences, and not having scientists on my radar who looked like me contributed to that. So that’s part of the reason—to ensure that young girls have women scientists on their radar. And part of it is that I’m a first-generation college student. I come from a rural working-class background. I went to a public university for graduate school. I’m at a public university now. So I feel a sense of responsibility to make the work that I do accessible to everyone, including the people who I grew up with in the kinds of communities I came out of, people who often might not have access to high-quality science experiences in the way that we often think about them, but may have spent their childhoods rambling through the forest or hunting with their families or have other kinds of deep relationships with the land that we often overlook when we think of our flashy science museums or high-tech experiences.

PO: Can you describe the “Warm Regards” podcast for readers who aren’t familiar with it?

JG: When we started the podcast in the summer of 2016, there were only one or two podcasts on climate change—and none was having the messy or heartfelt or nuanced conversations about climate science we wanted to have. We wanted to interview people on the frontlines of climate change to humanize the climate crisis, to show by example that you can have these conversations, even as “experts,” and not know all the things, and that the conversations can be messy and uncertain. Because I think one of the things that really contributed to climate change misunderstanding was this expectation that you had to be a complete and total expert in every facet of climate change to understand the issue. Since we began “Warm Regards” in 2016, many more podcasts have joined the conversation. It’s just been really really nice to see

that this conversation is growing and more and more people feel like they can be a part of it.

PO: You spoke at NCSE’s 2020 Friend of Darwin and Friend of the Planet online celebration about the important role education plays in understanding climate change. What do you think needs to happen to ensure that young people everywhere have the tools they need to comprehend that it’s real, it’s us, it’s bad, and there’s hope?

JG: Young people get it. They get that it’s bad and it’s urgent. I think part of the problem is that as educators and people who do public outreach and advocacy, we have been slow to catch up with the reality that people, especially younger generations, are already on board with the message that climate change is real and it’s bad and it’s us. We know that public attitudes about climate change have been changing rapidly in the last few years and the doubtful and dismissive folks are now less than 10% of the population. And yet we still act like they’re a majority. At this point we need to be pivoting. We have a new challenge. The challenge is not to convince youth that climate change is real, it’s to convince them that there’s something they can do about it. What we have to do now is not fight denial; we have to fight despair. Because climate change is such a big structural problem, it can feel like it’s completely beyond our agency to address it. So we have to remember that if we’re going to spend time talking about why climate change is happening and what its impacts are, we need to spend at least as much time on solutions. Telling stories of people who are contributing to positive climate action in their communities, personal stories that people can connect to. Giving students a sense of agency. Letting them know that the problem has a large scope, but that individual action can be powerful when it’s collective action. This is the next horizon in climate education and outreach.

Paul Oh is NCSE’s Director of Communications. oh@ncse.ngo





Members in the SPOTLIGHT



NCSE is pleased to congratulate **Michael E. Mann** of Pennsylvania State University, a member of NCSE's board of directors,

on receiving the 2020 World Sustainability Award, funded by the MDPI Sustainability Foundation and conferred to researchers "who have made an outstanding academic or societal contribution to sustainability in general or to a sustainability-relevant issue in particular." Mann shared the award with the medical researcher Antonella Santuccioni Chadha; a monetary prize of \$100,000 was divided between them.

Michael E. Mann of Pennsylvania State University and **Benjamin D. Santer** of Lawrence Livermore National Laboratory, both members of NCSE's board of directors, were recently honored by the American Geophysical Union's Global



Environmental Change Section. Mann was invited to give the Steven Schneider Lecture at the AGU Fall Meeting in 2020

in recognition of his outstanding scientific accomplishments in global environmental change and in communicating scientific results to the public. Santer was honored with the Bert Bolin Award, which recognizes groundbreaking research or leadership in global environmental change through cross-disciplinary, interdisciplinary, and trans-disciplinary research, and invited to give the Bert Bolin Lecture at the AGU Fall Meeting in 2020.

NCSE is pleased to congratulate **Bob Melton**, who was named as the 2020 Honorary Member—the organization's highest award—by the National Association of Biology Teachers. A long-time member

of NABT, Melton served as the organization's president in 2016. The announcement commented, "Just as NABT helped make Bob Melton a better educator, he helped make NABT a better organization."

Daniel Phelps received the Outstanding Geologist of the Year Award from the Kentucky Section of the American Institute of Professional Geologists for 2020. He received the award previously, in 2004, as well as NCSE's Friend of Darwin award in 2017.

NCSE is pleased to congratulate **Elliott Sober**, the Hans Reichenbach Professor and William F. Vilas Research Professor in the Department of Philosophy of the University of Wisconsin, Madison, on his election as a Corresponding Fellow of the British Academy in recognition of his "outstanding contributions to subjects within the humanities and social sciences." His latest book is *The Design Argument* (Cambridge University Press, 2018).

Joseph L. Graves Jr. Joins NCSE's Board

NCSE is pleased to announce the addition of Joseph L. Graves Jr. of North Carolina Agricultural and Technical State University to its board of directors. The first African American to earn a Ph.D. in evolutionary biology in the U.S., Graves studies the genomics of adaptation as well as biological and social concepts of race in humans. He is the author of *The Emperor's New Clothes: Biological Theories of Race at the Millennium* (2003), *The Race Myth: Why We Pretend Race Exists in America* (2004), and (with Alan Goodman) *Racism, Not Race: Answers to Frequently Asked Questions* (2021). "I couldn't be more pleased to join NCSE's board," Graves commented, "and I'm looking forward to helping to steer NCSE's future efforts to protect and improve the teaching of science, especially in historically underserved communities."

On NCSE's board of directors Graves joins president Kenneth R. Miller, secretary Benjamin D. Santer, treasurer Michael

Haas, Vicki Chandler, Sarah George, Michael B. Lubic, Michael E. Mann, Naomi Oreskes, and Barry Polisky. At the same time that Graves joined the board, Lorne Trottier, the co-founder of the computer hardware company Matrox, departed, having served on the board since 2009, as treasurer from 2013 to 2019, and as vice president since 2013. "Having benefited for so long from Lorne Trottier's wisdom and generosity, we're sorry to bid him adieu," NCSE's executive director Ann Reid commented. "But we are delighted to welcome Joe Graves, with his unparalleled record of effective advocacy and outreach on behalf of science education, to the board."



THE FOUNDERING OF CREATION SCIENCE'S FLAGSHIP?

The Creation Research Society, founded in 1963, is distinctive among creationist organizations in requiring its voting members to “hold an earned post-graduate degree in a recognized area of science.” The requirement enables it to describe itself as a scientific society under the guidance of qualified scientists and to serve as a scientific flagship for the otherwise disorganized creationist armada.

Even *Answers in Genesis*, which increasingly dominates the market for creationism in the United States, acknowledged, in a 2005 plug for the CRS, “In fact, much of the scientific data presented by *Answers in Genesis* in conferences, books and other resources was initially explored by the Creation Research Society” (emphasis in original).

How is the CRS faring? From 1970 onward, albeit with a few exceptions, membership data, including voting membership data, were provided yearly in the minutes of the CRS’s annual board of directors meetings published in *Creation Research Society Quarterly*. As Figure 1 shows, voting membership climbed to 600 by 1979 and has never fallen below that mark since (data from the CRS).

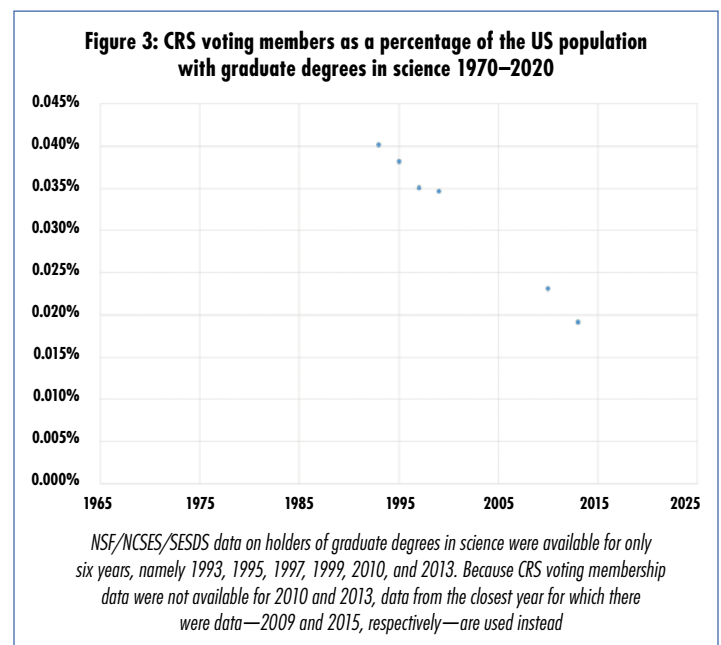
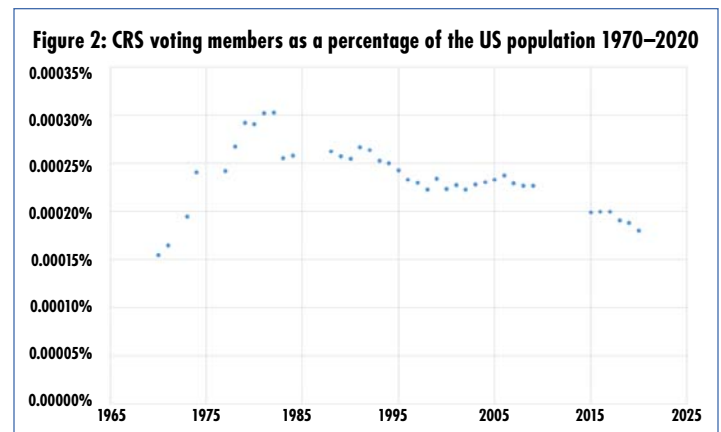
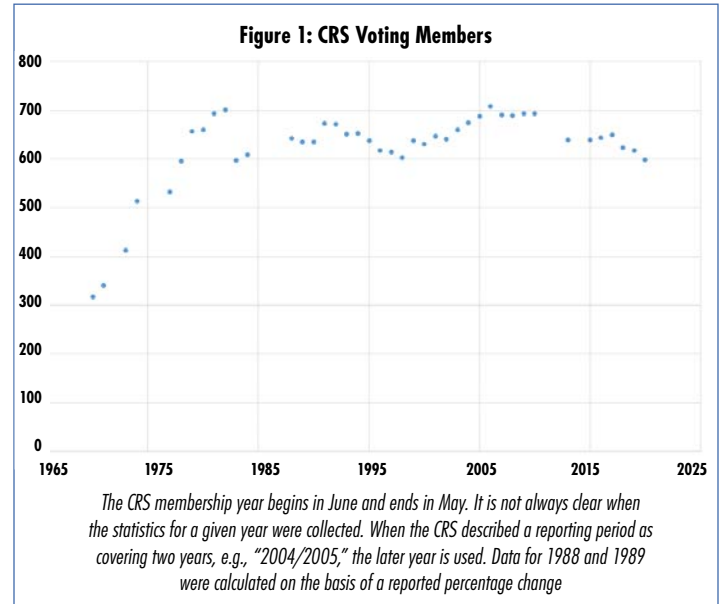
But the rough constancy of the CRS’s voting membership since 1979 obscures the fact that membership is dwindling as a percentage of the general population, as Figure 2 shows (data from the CRS and the U.S. Census Bureau). In 2020, the percentage was 0.00018%: lower than that for all but the first three years (1970, 1971, and 1973) for which data are available.

The situation is even worse for the CRS when the comparison is not with the general population but with the segment of the general population with a graduate degree in science, as Figure 3 shows (data from the CRS and the Scientists and Engineers Statistical Data System of the National Science Foundation’s National Center for Science and Engineering Statistics).

The most striking result is that over the twenty-year span from 1993 to 2013, the proportion of qualified Americans who belonged to the CRS plummeted from about 1 in 2500 (0.04016%) to about 1 in 5000 (0.01919%). True, the 1993 percentage was not impressive to start with, but the drop from 1993 to 2013 is more than half.

Is the CRS simply ineffective at recruiting new voting members, or is young-earth creationism—never a plausible view—increasingly difficult for a scientifically educated American to believe? The CRS membership data are not capable of answering the question, but they strongly suggest that the scientific flagship of creation science is on its way to foundering.

Glenn Branch is deputy director of NCSE. branch@ncse.ngo



UPDATES

Are there threats to effective science education near you? Do you have a story of success or cause for celebration to share? E-mail any member of staff or info@ncse.ngo.

ARKANSAS

Arkansas's House Bill 1701 would have allowed—although not required—teachers in the state's public and open-enrollment charter schools to "teach creationism as a theory of how the earth came to exist." The bill's primary sponsor was Mary Bentley (R-District 73). After passing the House Education Committee on a voice vote and the House of Representatives on a 72–21 vote, the bill was defeated on a 3–3 vote in the Senate Education Committee on April 21, 2021.

CALIFORNIA, SOUTH LAKE TAHOE

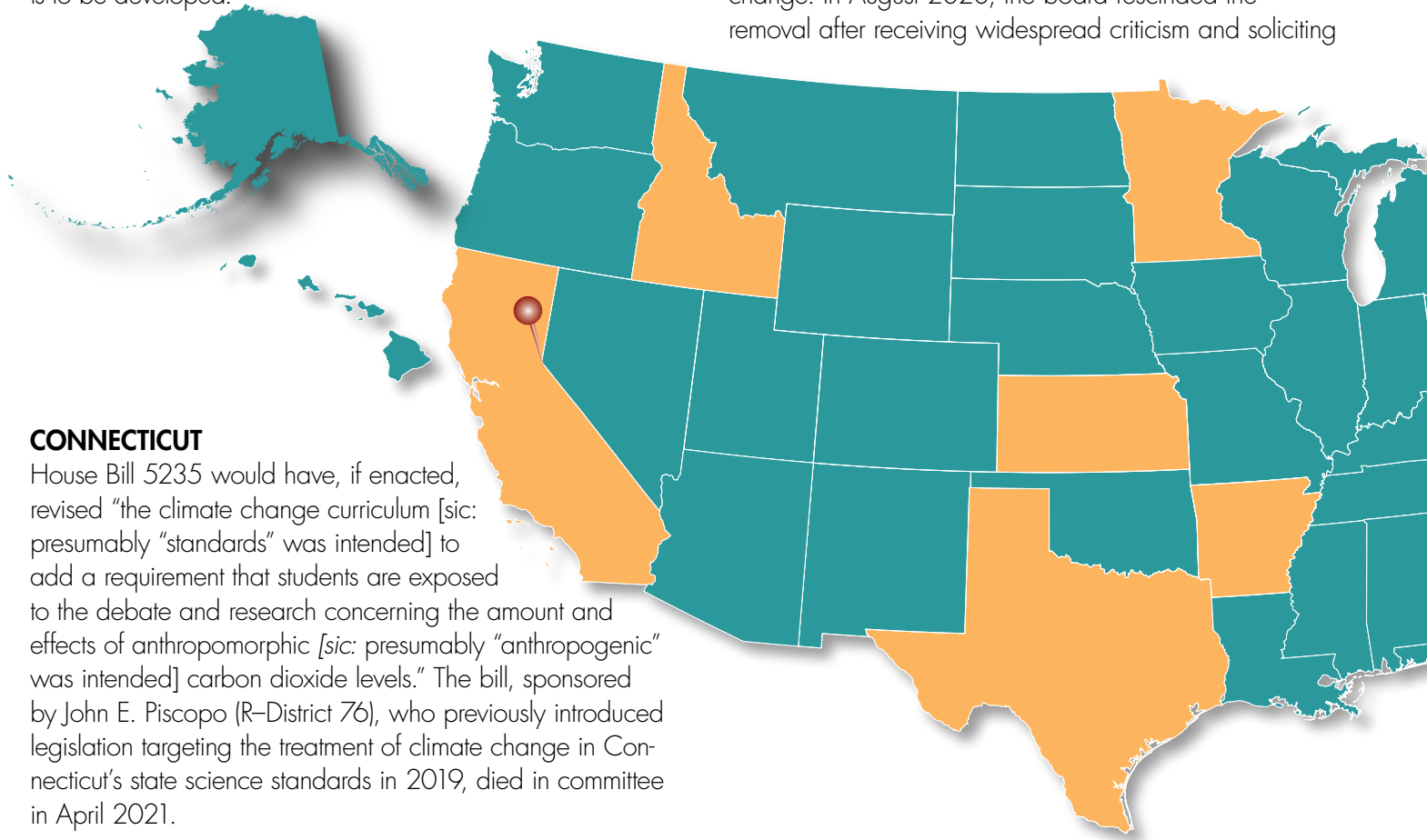
In September 2020, at the prompting of student activists, the Lake Tahoe Unified School District unanimously adopted a resolution in support of climate literacy, with the goal of ensuring "that all high school students graduate climate literate beginning with the graduating class of 2025." A comprehensive climate literacy program, to include relevant material in history, civics, and mathematics courses as well as a two-week stand-alone unit on climate change for science and social studies courses, is to be developed.

CONNECTICUT, NEW HAVEN

Students affiliated with New Haven Climate Movement are lobbying the New Haven Board of Education to adopt a Climate Justice Schools program, consonant with a climate emergency resolution adopted by the city in 2019. The program would include the incorporation of at least 30 hours of climate change and climate justice education at each grade level in the schools. At its July 30, 2020, meeting, the board was broadly receptive, referring further discussion to its Teaching and Learning Committee.

IDAHO

In June 2020, the state board of education removed the supporting content from the state science standards, describing the change as a technical correction, although the supporting content forms a significant portion of the standards. The removal was apparently motivated by the legislature's ongoing animosity to the discussion of climate change. In August 2020, the board rescinded the removal after receiving widespread criticism and soliciting



CONNECTICUT

House Bill 5235 would have, if enacted, revised "the climate change curriculum [sic: presumably "standards" was intended] to add a requirement that students are exposed to the debate and research concerning the amount and effects of anthropomorphic [sic: presumably "anthropogenic" was intended] carbon dioxide levels." The bill, sponsored by John E. Piscopo (R-District 76), who previously introduced legislation targeting the treatment of climate change in Connecticut's state science standards in 2019, died in committee in April 2021.

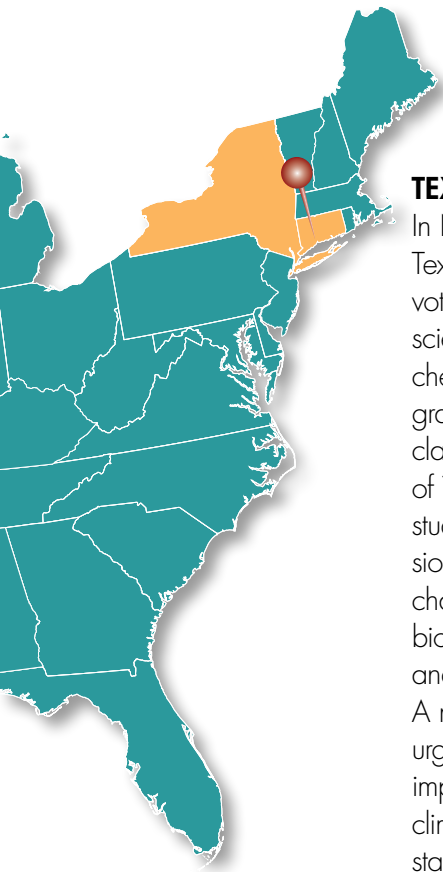
advice from the state attorney general. Future changes to the standards are expected to follow the established process.

KANSAS

The candidates seeking the District 2 seat on the state board of education were asked by the *Shawnee Mission Post* about the teaching of evolution and “intelligent design.” The Democratic candidate, Melanie Haas, replied that evolution is “settled science” and that “intelligent design” “has no basis in factual science and therefore does not have a place in our science classrooms,” while the Republican candidate, Benjamin Hodge, failed to respond. In the November 3, 2020, general election, Haas prevailed.

NEW YORK

Five pro-climate-change-education bills died in committee when the New York legislature officially adjourned in December 2020. Assembly Bill 9831 and Senate Bill 6347 would have established a climate change education grant program; Assembly Bill 9886 and Senate Bill 7441 would have established a model climate change curriculum in all public elementary and secondary schools; and Senate Bill 6877 would have required the commissioner of education to make recommendations about the inclusion of climate science in senior high schools.



TEXAS

In November 2020, the Texas state board of education voted to adopt revised state science standards for biology, chemistry, physics, and integrated physics and chemistry—classes taken by the majority of Texas public high school students. As part of the revision, two references to climate change were added to the biology and integrated physics and chemistry standards. A majority of those testifying urged the board to further improve the limited treatment of climate change in the science standards, but to no avail.

CANADA, ALBERTA

Recommended changes to the provincial curricula for K–4 social studies are sparking controversy, in part because students would “listen to, memorize, and tell parts of” the creation accounts of Genesis. Students would do the same for First Nations and Inuit creation accounts, however, and none of these would be “taught as doctrine.” The Alberta Ministry of Education, which solicited the recommendations, is not bound by them; curriculum working groups will offer their feedback before the ministry makes a decision.



ISRAEL

The Education Ministry of Israel is to receive 10.7 million Israeli new shekels—about 3.15 million dollars—from the Environmental Ministry to fund environmental and sustainability education, including climate change education. Environmental Protection Minister Gila Gamliel told the *Jerusalem Post*, “We are proud to invest significant sums of money so that as many students as possible will be exposed in the education system to important content, such as the climate crisis ... and more.” Funding for coursework for teachers is included.

TAIWAN

A survey of Taiwanese high school teachers conducted by Greenpeace Taiwan found “a low degree of satisfaction” with the environmental education teaching materials and textbooks provided by the nation’s schools, according to the *Taipei Times*, in part because the materials are brief and simplistic, and only four hours of instruction are required. Additionally, most high school teachers believe that their students are generally uninterested in climate change. The organization plans to propose a climate change and environmental program for high schools.

TURKEY

Adnan Oktar, the controversial Islamic creationist who publishes under the name Harun Yahya, was sentenced to serve more than a millennium in prison on January 11, 2020. The charges on which he was convicted included founding and leading a criminal organization, espionage, and sexual abuse. Through the Scientific Research Foundation (Bilim Araştırma Vakfı), Oktar and his followers produced a steady stream of publications, such as *The Atlas of Creation*, and audiovisual material aimed at dismissing evolution as baseless and pernicious.

PLACE & TIME

Howard Gale Byrd (1893–1973)

Smithsonian Institution Archives, Record Unit 7091,
Science Service Records, Image No. SIA2008-1095)



Scopes Trial instigator George Rappleyea (left), Dayton preacher Howard Gale Byrd (center), and New York preacher Charles Potter (right) in front of Byrd's First Methodist Episcopal Church (North) during the Scopes Trial, July 1925.

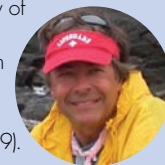
At the time of the Scopes trial in 1925, the 31-year-old Howard Gale Byrd had worked for three years in Dayton, Tennessee, as a Methodist preacher. The instigator of the Scopes trial, George Rappleyea, taught Sunday School at Byrd's Five Points Methodist Church. When Rappleyea was shunned after members there learned of his views about evolution, he joined Byrd's other church, Dayton's First Methodist Episcopal Church (North). Byrd, who with Rappleyea constituted "the only evolutionists in town," led the prayer at John Scopes's hearing on May 25, 1925 ("Ousted pastor at Dayton hit knockout blow," *Anniston* (Alabama) *Star*, July 26, 1925, 1). Rappleyea later claimed that Byrd's advocacy of evolution and modernism had inspired him to initiate the Scopes Trial ("Rappleyea says Byrd responsible for case," *Chattanooga Times*, July 1, 1925, 1).

When New York City's Unitarian preacher Charles Potter came to Dayton in July 1925 to help the defense team, Byrd invited him to speak about evolution at his Dayton church. Byrd's congregation learned of the invitation and was outraged, threatening to "wreck the church" if Potter was allowed to speak there. Not wanting to cause trouble, Potter posted a sign at a popular drugstore downtown announcing that his sermon had been canceled "owing to the threat of the congregation." Byrd then announced that his congregation's "state of unfairness requires another pastor," adding that "I have quit [as pastor]. I have not resigned; I have quit." Byrd's congregation did not try to change his mind ("Pastor of Dayton church quits when congregation bans modernist lecture," *Atlanta Constitution*, July 13, 1925, 1.b, 21). Byrd and his family then left for Alabama, where he was certain

he could "earn a better living at cabinet-making until I find a more liberal church" (quoted in Charles Francis Potter's *The Preacher and I: An Autobiography*, New York: Crown, 1951).

On July 26, 1925, when Scopes trial prosecutor William Jennings Bryan died just a few blocks from Byrd's former church in Dayton, Byrd got into an argument and "was knocked out ... in a fist fight with a fundamentalist" ("Ousted pastor"). Byrd later enrolled in DePauw University and pastored churches in Alabama. He died on October 12, 1973, in Giles, Virginia, and is buried in Mt. Hope Church Cemetery in Mount Hope, Virginia.

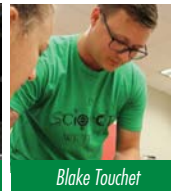
Randy Moore is the H. T. Morse–Alumni Professor of Biology at the University of Minnesota, Twin Cities. His most recent book, coauthored with Roslyn Cameron, is *Galápagos Revealed: Finding the Places that Most People Miss* (Galapagos Conservancy, 2019). Rmoore@umn.edu



Teacher Ambassadors Take On a New Challenge: Mentorship



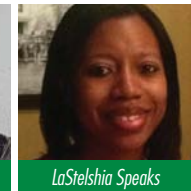
Melissa Lau



Blake Touchet



Rebecca Brewer



LaStelshia Speaks

We ask our teacher ambassadors to do many things on behalf of NCSE and accurate science education: talk to the press, develop lessons, and lead professional development for colleagues. And to all these requests, they invariably and cheerfully say, “Yes!”

Most recently, we asked a group of experienced teacher ambassadors—master science teachers who have been collaborating closely with NCSE for the past several years—to act as mentors to a group of 32 teachers from across the country who are field-testing our soon-to-be-minted climate change, evolution, and nature of science lessons. (Read more about this two-year curriculum study on p. 3.) Recently, we spoke to several of them about their role as mentor, how they plan to leverage their wealth of knowledge and experience to support their colleagues, and what they hope the curriculum study will accomplish.

First and foremost, the mentors want to help the curriculum study participants understand and effectively implement the curriculum, developed with the aid of many of the mentors themselves. “Just creating free quality resources and posting them on a website doesn’t translate into the lessons reaching students in the classroom,” explains **Melissa Lau**, a sixth-grade science teacher in Piedmont, Oklahoma. “Teachers need training and support to be able to successfully and confidently facilitate new curriculum.”

Just as importantly, the mentors recognize that they are in a position to learn from this new cohort of teachers. “I am going into this to help guide other teachers through the

curriculum study process, but I am also fully expecting to learn just as much from them,” says **Blake Touchet**, a dual enrollment biology and environmental science teacher in Maurice, Louisiana. “Mentorship is much more about collaboration and active problem-solving than anything else.”

The mentors are also supporting the curriculum study teachers as they gather data on the efficacy of the lessons and report back results. Based on this information, NCSE staff, the mentors, and the cohort of teachers will revise the lessons to better meet the needs of students and ensure that they are aligned to the Next Generation Science Standards. In the second year of the study, the cohort of teachers will implement the lessons again to determine whether the changes lead to improved outcomes. In this way, adds mentor **Rebecca Brewer**, an Advanced Placement biology teacher in Troy, Michigan, “The curriculum study is essential for NCSE to promote our educational resources as NGSS-designed and effective.”

The teacher ambassadors recognize that the curriculum study participants will have many questions—and, perhaps, many concerns, such as whether the NCSE lessons will fit within their scope and sequence and pacing guide for the year. “These are concerns that I think the mentors at NCSE can help to address,” Touchet says. “For instance, we created these units to fully address the evolution and climate change standards that teachers need to cover, which means that they will use these lessons in place of, not in addition to, their traditional units.”

In this first year of the study, all professional development meetings and mentor-

ing sessions will happen online, continuing a practice that Brewer says most teachers are now very much comfortable with. Regardless of the medium, Touchet observes, the most critical element for success in mentoring is effective communication “that is conducive to both sides asking questions, giving feedback, and troubleshooting solutions together.” The mentors, in fact, all see their role as one of relationship building. “This will be an amazing opportunity to collaborate and help to inspire others in the awesome work they are already doing,” says **LaStelshia Speaks**, a special education teacher in Baltimore, Maryland. Brewer plans to encourage the curriculum study teachers to “step outside of their comfort zones” while also being a cheerleader for their successes. And Lau says she hopes to “bring an empathetic and encouraging voice” to the teachers as they implement the NCSE lessons.

Ultimately, Touchet speaks for the entire group of mentors when he says he hopes the curriculum study “will be the start of a long-lasting, widespread movement that builds a network of science teachers who are confident in tackling climate change, evolution, and the nature of science, collaborating with one another across the country, and communicating complex scientific ideas both within their classrooms and out in their communities.” He adds, “I think the team at NCSE is in a good position to lead this movement to support teachers and develop them into leaders of science communication within their local spaces.”

Paul Oh is NCSE’s Director of Communications. oh@ncse.ngo



CUNY Grad Students Throw Themselves into NCSE Climate Game

During a recent spring week, hundreds of City University of New York (CUNY) undergrads were glued to their devices, engaged in a class assignment. But instead of watching a lecture or a PowerPoint presentation, they were debating how to spend \$100,000 to best equip their town to deal with climate change.

"With solar panels you guys are personally getting affected, save money, save environment, save time," argued one student in the online chat.

"I have solar panels and they barely do anything. Another [Hurricane] [S]andy and those panels are gone," countered a student who championed disaster preparedness.

"#EDUCATEYOURKIDS!" urged another, signaling that the funds should go toward climate change education.

The students spent the better part of three hours participating in NCSE's [Climate Change Summit: 100K Challenge](#), a role-playing game that asks participants to assume a persona tasked with understanding more about one of five climate change mitigation strategies for a hypothetical town: K-12 education, reforestation, disaster preparedness, solar installation, and wastewater management. After conversation and debate, the participants vote and the strategy that receives the most votes is the one that will be (fictionally) implemented.

The game was conceived by Director of Community Science Education Kate Carter, who wanted to create an online experience that made climate change and its implications understandable, engaging, and relatable. "Far too often, we stop at sharing the facts with students," Carter explains. "But this leaves them largely unprepared to integrate the science into the everyday, where social values and lived experience are often equally important. Climate Change Summit gives students a chance to make the science of climate change their own."

Carter, who created the game in 2020 with the help of NCSE intern EJ Herdmann and NCSE Graduate Student Outreach Fellow [Annie Stoeth](#), has implemented Climate Change Summit several times before, but the CUNY week-long event was the largest implementation by far. Carter collaborated with Stoeth—a doctoral student in earth and environmental sciences at CUNY's Graduate Center—to plan and conduct the event, as a lab for a general education-level environmental science class. The scale of the CUNY event also enabled research into



the efficacy of the game. (A paper on the findings is under review at *Environmental Education Research*.)

"It was really exciting to be able to interact with that many non-majors, who are basically seeing environmental science for the first time at a college level," Stoeth remarks. "Every class has a different personality, and during the Climate Change Summit, that was highly evident. Some classes were data-driven and careful and some classes were salty and debated really hotly."

Stoeth says the pandemic was one of the driving forces behind the CUNY collaboration. Professors were looking for ways to make their lab sessions interactive, despite the lack of physical proximity due to coronavirus restrictions. Stoeth suggested Climate Change Summit as the lab for the course Planet Earth: Resources (and Hazards) for the 21st Century, which had scheduled to devote a week to climate change, and the instructor agreed.

Once students understood the parameters of the game and were given their specific character roles, they dove in—enthusiastically. "The very first session, one of the students who was assigned stormwater management redrew her character crying with tears of grief and gave this emotional appeal that was eye-catching and kept the students engaged for the rest of the session," Stoeth recalls. Even the lab teaching assistants, who were supposed to be objective facilitators, got so into the game that they began advocating for one strategy or another.

This was all exactly as intended.

"Changing your mind—whether the change is to listen to the science or to make a more environmentally friendly choice—that's truly hard work," Carter says. "Role-playing can provide a way to avoid having to admit that your previous position might have been wrong, and an opportunity to fully empathize with another perspective."

As one student reflected after the game, "At first I thought my character's proposal and the group he was part of was good and had a chance at winning. But then hearing everyone else talk about their groups and proposals made me realize that stormwater management was not really beneficial to everyone but only to certain groups."

As part of their research effort, Carter and Stoeth are examining how taking on the role of a character with views different from your own builds empathy and invites a change in perspective.

“Unsurprisingly,” Carter notes, “the people who were most likely to change their minds in the game [e.g., voting for another proposal than the one assigned to them] are the people who had relatively low levels of knowledge about climate change but high motivation to learn. Hopefully this game helped them to form an identity as a climate activist and informed citizen.”

If the students’ reflections are any indication, the game did just that. “The Climate Change Summit made me realize how much of a difference one can make in their community by making their voice heard and coming together to face environmental issues,” wrote one student, mirroring a sentiment widespread among participants.

Stoeth is planning to use the data she and Carter collected to improve the game by refining the data provided to players about the mitigation strategies and by tweaking the game’s various characters. She plans to implement the game in future CUNY courses and hopes other educators will take up Climate Change Summit and offer it to their students.

After all, despite the challenges associated with distance learning, Climate Change Summit proved to Stoeth that engaging, inquiry-driven learning about climate change is possible online. “It is so hard to forge connections with remote learning,” Stoeth says, “and we were able to create meaning and fun, even in the midst of COVID.”

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Winding Down NCSE’s Outreach Program

NCSE exists to make it easier for teachers to present socially controversial topics in science, such as evolution and climate change, accurately, especially in places where community understanding and acceptance of these well-established areas of science is low. For forty years, NCSE has worked to block efforts to interfere directly in classrooms and to support teachers who face pressure to avoid or downplay these topics. More recently, having determined that there are many teachers who need support to teach these topics with confidence, we have invested substantial resources into developing a program to help those teachers directly.

But we have also always believed that another way to help reduce pressure on teachers would be to reduce community distrust through effective outreach focused on evolution and climate change in places where opportunities for meaningful encounters with science are low. Over

the last seven years, we have piloted several programs to determine whether NCSE could catalyze informal science outreach by mobilizing local scientists, volunteers, and graduate students. As you’ve read in *RNCSE*, a lot of terrific, positive, mind-changing interactions have been facilitated by NCSE-trained and -supported outreach leaders.

However, sadly, we have not been able to find a way to grow these pilot efforts into self-sustaining, community-led outreach programs. We reluctantly have come to the conclusion that NCSE is too small to seed community science throughout the nation, especially to achieve our true goal—bringing evolution and climate change science into those communities where we are least likely to find local partners.

I still hope that someday NCSE can help spark a movement that would see local science outreach become as taken for granted as youth soccer leagues and

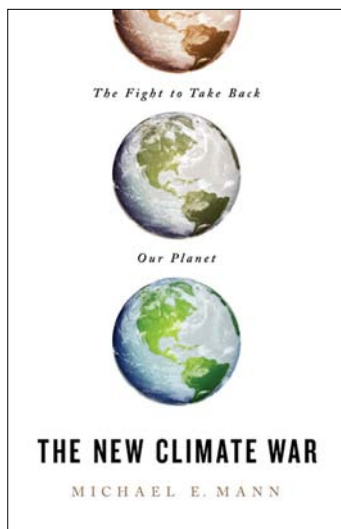
4-H clubs, but for now, NCSE is going to suspend its community outreach efforts, while redoubling its efforts to support teachers directly.

As we wind this program down, I would like to ask you to join me in thanking Emily Schoerning and Kate Carter, who both worked very hard to bring a sustainable outreach program into existence. Their creativity, drive, and ability to inspire and equip dozens of volunteers and graduate students to bring fantastic science opportunities into local communities changed lives. As a result, many NCSE volunteers and fellows will continue to make outreach a central part of their scientific careers. And many children, parents, and community members surely had an “aha” moment about science thanks to NCSE’s outreach efforts.

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THE RNCSE REVIEW



The New Climate War: The Fight to Take Back Our Planet

author: **Michael E. Mann**

publisher: **Public Affairs**

reviewed by: **Oliver Lazarus**

On September 22, 2017, two days after Hurricane Maria made landfall in Puerto Rico, The Takeaway, a national public radio show where I was working at the time, interviewed Bjørn Lomborg, president of the innocuous-sounding Copenhagen Consensus Center. The topic was climate change, and Lomborg, in New York to speak at the United Nations General Assembly, seemed like the ideal guest. He was presented as a climate economist who could discuss level-headed, novel solutions in the hurricane's wake, and who was actively engaged in international policy. The issue was not carbon emissions, according to Lomborg, but rather "resiliency." "The honest answer," Lomborg told the show's audience of three million, "is that if you want to help these people, it's much more about building resilient structures."

Unbeknown to the producers and to the audience, the fossil fuel industry had been funding Lomborg's work for years, helping to mainstream a notion that climate change is better fought by "adaptation" instead of cutting car-

bon. The episode is a classic example of climate "inactivism" that climate scientist Michael Mann exposes in his new book, *The New Climate War*. According to Mann, the fossil fuel industry has recognized the untenability of outright denialism, and has shifted to a more subtle politics of inaction in recent years. The landscape of this "new climate war," as Mann terms it, is varied and complex: from the "adaptation" of Bjørn Lomborg, to pitting different factions of the climate movement against one another, to deflecting attention away from corporations and onto individuals in the form of personal carbon footprint calculators. While the public is still looking for outright denialism, this multi-pronged offensive of the "new climate war" is where the real action is, language that Mann acknowledges might be uncomfortable for some, but signifies the high stakes of the fight: "[T]he surest way to lose a war is to refuse to recognize you're in one in the first place" (p. 7).

Mann's book, aimed at everyone from young students to longtime activists,

alerts the public to the tactics and stakes of this new climate war, and arms readers with the weapons to fight it. Over nine chapters divided largely by the development of different tactics, Mann begins by tracing the history of corporate denialist and deflection campaigns back to the early twentieth century. He then turns to more recent histories of industry-funded environmental campaigns, explaining how he found himself on the frontlines of the new climate war following the publication of his "hockey stick graph" of carbon emissions in 1998. The book is as much a landscape of the current climate fight as it is a history. While Mann is often too eager to suggest that anti-capitalist progressives are fueled by Russian disinformation campaigns, his analysis is at its best when grounded in discussions of climate science, providing clear explanations of why technological solutions like "clean coal" are doomed to fail, why scenarios of "runaway climate change" are often overblown, and what the latest climate science really tells us about the years ahead.

Indeed, readers might be surprised to find just how optimistic Mann is in his outlook. While doomsday scenarios abound in the broader public discourse, *The New Climate War* seeks to motivate, rather than depress, the public to push for political change, suggesting that we might be on the precipice of a turning point in the climate fight. Not only have carbon emissions leveled off in recent years, the result of advances in renewable energy, but Mann also sees an opening in the U.S. political horizon, with an uptick in extreme weather, the coronavirus pandemic, and a new wave of youth activism together creating a “perfect storm” for climate policy. Above all, Mann stresses the need for both urgency and agency in the climate fight, arguing that it’s not too late to meaningfully address climate

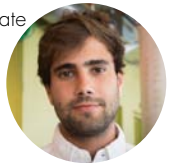
Mann stresses the need for both urgency and agency in the climate fight, arguing that it’s not too late to meaningfully address climate change if we act collectively and work for systemic change.

change if we act collectively and work for systemic change.

While Mann largely leaves it to the reader to decide how to best advocate for climate policy—a missed op-

portunity that could have made the book a particularly useful tool of climate organizing—Mann’s restoration of individual agency, coupled with highly approachable explanations of climate science, makes the book invaluable for science educators and students alike looking to be involved in the fight against climate change. Readers will come away from *The New Climate War* with a clear understanding of the climate landscape, and a sense that, in a turbulent political environment, the fight against climate change and the fossil fuel industry is one that we can, and must, win.

Oliver Lazarus is a PhD candidate in history of science at Harvard University. His work focuses on intersections of animal and economic history, and how these interactions have shaped development processes and relationships with the natural world. olazarus@g.harvard.edu



WHAT WE'RE UP AGAINST

Op-Docs that Flummox



“Ark of the Apocalypse,” a 12-minute-long film by Jeremy Seifert posted on the “op-docs” (i.e., opinion documentaries) section of *The New York Times* website on January 5, 2021, focuses on Answers in Genesis’s Ark Encounter attraction in northern Kentucky. But the film’s message evidently was obscure. Writing at the Friendly

Atheist blog (January 6, 2021), Hemant Mehta [commented](#), “Ultimately, it functions as an unintentional advertisement for the Ark precisely because there’s nothing critical about it in the film.” But in a post at The Panda’s Thumb blog (January 7, 2021), Matt Young [quoted](#) viewers who regarded the film as revealing the ab-

surdity of the Ark Encounter project, debunking the claims that it would invigorate the local economy, or even as crudely satirizing the views of Answers in Genesis. Significantly, perhaps, Answers in Genesis remained silent about “Ark of the Apocalypse” on its website.

—GLENN BRANCH

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