

# reports

OF THE NATIONAL CENTER FOR SCIENCE EDUCATION | SPRING 2017 | VOLUME 37 | NO 2



FIGHTING FOR TRUTH IN A WORLD OF ALTERNATIVE FACTS p. 3

MEET THE TEACHER ADVISORY BOARD p. 10

EXPANDING ACROSS THE COUNTRY p. 12

DINNER PARTY 101: EMOTIONAL CONNECTIONS p. 13

BOOK REVIEW: *THE MADHOUSE EFFECT* p. 14

## EDITOR

Stephanie Keep  
National Center for Science Education  
1904 Franklin Street, Suite 600  
Oakland CA 94612-2922  
phone: (510) 601-7203  
e-mail: [editor@ncse.com](mailto:editor@ncse.com)

## BOOK REVIEW EDITOR

Glenn Branch

## PUBLISHER

Ann Reid

## VOL 37, NR 2, SPRING 2017

ISSN 1064-2358 ©2017 by the  
National Center for Science  
Education, Inc, a not-for-profit 501(c)(3)  
organization under US law. *Reports  
of the National Center for Science  
Education (RNCSE)* is published by NCSE  
to promote the understanding of  
evolutionary and climate science.  
NCSE is a nonprofit, tax-exempt  
corporation affiliated with the  
American Association for the  
Advancement of Science and an  
Associated Group of the National  
Science Teachers Association.

## OFFICERS & DIRECTORS

Francisco J. Ayala, President  
Lorne Trotter, VP/Treasurer  
Robert M. West, Secretary  
Barbara Forrest, Director  
Michael Haas, Director  
Richard B. Katskee, Director  
Kenneth R. Miller, Director  
Barry Polisky, Director  
Benjamin D. Santer, Director

Views expressed are those of their  
authors and do not necessarily  
reflect the views of NCSE.

RNCSE is published 4 times a year.  
Address editorial correspondence  
to [editor@ncse.com](mailto:editor@ncse.com)

Write to the publisher regarding  
address changes, missing issues,  
purchases of back issues, reprint  
rights, and related issues.  
[publisher@ncse.com](mailto:publisher@ncse.com)

## IMAGE CREDITS

Cover Image: [iStock.com/leonello](https://www.iStock.com/leonello)  
Back cover graphic and dinosaur  
illustration on p.15 by Tim Bradley  
[www.timothyjbradley.com](http://www.timothyjbradley.com)

# Dear NCSE members,

If you have time to read only one article in this issue of *RNCSE*, please let it be Stephanie Keep's interview of Ben Santer, a prominent climate scientist who serves on NCSE's board of directors ("Fighting for Truth in a World of Alternative Facts," p. 3). I promise that you will be inspired by his courage, resolve, and optimism. I was especially touched by how Santer responded to the insidious notion that climate scientists are in it for the money. He didn't just call it out for its frankly hilarious falsity. He explained, People do science for "the joy of understanding. They do it for those 'aha!' moments that you might be lucky enough to have a couple of times in your career—those moments when you hold a tiny piece of the puzzle in your hands, a piece that nobody else in the world has." This struck such a chord with me, reminding me of many mornings I spent in a darkroom developing the previous day's X-rays and seeing, for the first time any human ever had, a small piece of the genetic sequence of the 1918 influenza virus. That was incredibly exciting, and it was a great privilege—a word that Santer uses to describe his career as a scientist.



Looking at the flu back in 1998.  
Photo: Eric Haase

As I write this letter in early spring, scientists are mobilizing to organize a national March for Science on April 22, 2017 (as well as satellite marches elsewhere). Some scientists fear that such a march will make science look political or diminish scientists' credibility. We at NCSE disagree. In fact, NCSE was one of the first organizations to endorse the march and sign on as a partner. Why? Well, even though he wasn't talking about the March for Science, Ben Santer explained it marvelously in his interview: "There is no point in doing science, in devoting your entire career to advancing understanding, if you are unwilling to speak out forcefully and publicly when that understanding is incorrectly dismissed as worthless."

Most people in the United States, whether Democratic, Republican, Green, Libertarian, or independent, respect and value science. They want their children to get great science educations because they know that will lead to better job prospects, improved medicine and agriculture, cleaner air and water—and the list could be continued. And they want regulations and policy to be based on evidence, not special interests. So on April 22, we'll be out there with the March for Science, reminding everyone that science is important, useful, and—yes—inspiring.

Thanks, as always, for your support,

Ann Reid is the  
executive director of NCSE.  
[reid@ncse.com](mailto:reid@ncse.com)



# Fighting for TRUTH in a World of Alternative Facts:

## An Interview with Ben Santer

Toward the end of 2016, I read an [article](#) in the *Los Angeles Times* entitled “Can a Federal Government Scientist in California Convince Trump that Climate Change is Real?” I read it with sparks of hope—and immense pride, since the subject of the piece, Ben Santer, is a member of NCSE’s board of directors. Six weeks later, preparing to interview Santer, I expected to discover that his flinty resolve had eroded at least a little. I was wrong. Not only was the optimism still there—it was contagious. Can a federal government scientist in California convince Trump that climate change is real? I don’t know—but Santer convinced me that it’s not time to give up hope. The following transcript has been edited for space and clarity.

**Stephanie Keep:** You were the lead author of the 1995 IPCC report chapter entitled “Detection of Climate Change and Attribution of Causes.” When you submitted it, did you have any idea about the impact it’d have?

**Ben Santer:** No. I had no idea. I remember at the end of the three-day plenary meeting in Madrid, some of us went out

to have something to eat since we had been on stage for eight hours without food. Steve Schneider was sitting next to me and at one point during the course of our meal he turned to me and said, “This sentence [‘The balance of evidence suggests a discernible human influence on global climate’] will change the world.” I had no clue what he meant.

But the politicization started quickly because the consortium of energy interests did not like that finding, cautious though it was. It was the handwriting on the wall; it indicated that the scientific community—not just in the US, but the *international* scientific community—had seen the evidence and was saying, “Mission Control, there is a problem. Humans are affecting global cli-



Santer in his office at Lawrence Livermore.  
Photo: George Kitrinos

mate.” And they didn’t like that message. Any science that might cause them to modify their business model was anathema to them. So, shoot the messenger. And that’s what started back there in 1995.

In my case, that’s where the “alternative facts” really started as well. You had the energy interests claiming that I had engaged in “scientific cleansing”—that I had singlehandedly purged all discussion of uncertainty from chapter 8, even though twenty percent of the chapter was specifically devoted to the discussion of scientific uncertainties. It was a lie. It was a bald-faced lie. The notion that shadowy conspirators had engaged in political tampering was just completely ridiculous, but, again, it was not about advancing understanding of the science; it was about shooting the messenger.

**SK:** Since then you have devoted a lot of energy into **disproving** the notion that satellite data show no significant warming of the planet. Senator Ted Cruz has made this claim repeatedly; he even made it the subject of a congressional hearing in December 2015. In response to this claim, you did the research—and he is unequivocally wrong. And yet people still talk about “satellite data” as if they were Exhibit A in the case against global warming. What do we do about this?

**BS:** You keep on holding the powerful accountable, and not letting them get away with this alternate view of reality. There is no point in doing science, in devoting your entire career to advancing understanding, if you are unwilling to speak out forcefully and publicly when that understanding is incorrectly dismissed as worthless. Why even bother if you’re not going to defend what you’ve done? I’m not saying it’s easy—it’s not. These incorrect claims get out there in a very public way. The process of rebutting them and of setting the record straight is much slower and receives much less attention.



**SK:** Climate science is one of those areas of research—along with vaccine safety, evolution, and GMOs—that have become politically charged. Some scientists in these fields worry that they'll lose their credibility if they speak up to defend their work. Do you ever have those concerns?

**BS:** No, I don't. When I talk to the public, I talk about what's in my scientific wheelhouse. I talk about what I study—I fingerprint the climate system to investigate the nature and causes of climate change. I don't go beyond the bounds of my expertise or make extravagant claims that are unsupported by the data. The "fingerprint" evidence is powerful enough "as is," without amplifying it in any shape or form.

**SK:** We know from the research, though, that the scientific facts aren't enough if you want to change minds.

**BS:** No, they're not. So in addition to presenting the evidence, I also tell people that I'm a climber and a mountaineer. I show them images—pictures that I have taken since my late teens—from beautiful and fragile high-alpine environments around the world. I show them the Himalayas, the Alps, the Cascades, and the Juneau icefield in Alaska. And I tell them that I have witnessed, over one human lifetime, profound changes in the glaciers I have visited. I give people the message that I have a life outside of science, that there are things that I'm passionate about, and that I care about. I initiate a dialogue about values. I try to tell people that all of us have some investment in the future, and I ask them, what kind of world do you want to leave behind?

We all have an equal voice, and an equal vote, in determining the kind of world we leave behind. Donald Trump owns golf courses, and hotels, and casinos, but he doesn't own the atmosphere, the climate system, or the water. We all do. The environment is a collective good—the commons—and we all have some say in what happens to those collective goods.

**SK:** Okay, since you brought him up ... Trump has said, "nobody really knows" how large the human effect on climate is relative to the natural effect—but you know, don't you?

**BS:** That's what I've been looking at for the last twenty-five years! Many of my colleagues around the world have done that, too. The claim "nobody really knows" is untrue. We do really know something about human and natural effects on climate and the relative sizes of each. That understanding has been captured in literally hundreds and hundreds of scientific papers. This work has been subjected to extraordinary review and has formed the scientific backbone of assessment reports published by the National Academy and the IPCC. Bottom line: "nobody really knows" is false.

**SK:** Is this a unique problem to the US? Or does this denial and politicization of science happen elsewhere?

**BS:** Other countries also have folks who, for whatever reason, are arguing against the science. But in the U.S., we have such arguments at the highest levels of government—and that is unusual. That's not the sort of leadership we want. "Leaders embracing ignorance with open arms" is not a title you covet.

**SK:** No, it's really not. Why'd it happen?

**BS:** Well, dark money is part of it. If you're getting millions and millions of dollars from fossil fuel companies and relying on that money to get elected and re-elected, then how can you possibly be objective when it comes to the issue of human-caused climate change?

**SK:** It's so ironic given the narrative out there that climate scientists are in it for the money.

**BS:** It is, and nothing could be further from the truth. I think that that is pure projection. There are folks whose currency is money and power, but in science, your currency is whether you got the science right. That's what matters, and that's how you're judged. How well did you do with the science? Did you get it right? People do not go into scientific research to get rich quick or to alter world systems of government. They do it for the joy of understanding. They do it for those "aha!" moments that you might be lucky enough to have a couple of times in your career—those moments when you hold a tiny piece of the puzzle in your hands, a piece that nobody else in the world has. That's why you do it. It's a real challenge to get this across—to

*Santer climbing Taku B on the Juneau Icefield in Alaska. Photo: Kurt Kleman*

explain that most scientists are in it for the joy of understanding, and not for anything else.

**SK:** You work at Lawrence Livermore National Laboratory, which is run by the federal Department of Energy, now headed by Rick Perry, who once said he wanted to get rid of that agency. What is the feeling around the office these days?

**BS:** Well, I'm concerned, and a number of younger colleagues, in particular, have existential concerns. I'm in my sixties, and I have other options if things don't work out here, but many of my colleagues do not. They embarked on this journey because they care about this stuff, and now they see a political environment that appears to be antithetical to science and they're wondering if they made the right career choice. Their justifiable worries are what motivated me to write my personal "statement of purpose."

**SK:** You said in that [statement of purpose](#), "This is not the time for despair—it's time for leaving the sidelines and entering the public arena." It seems that you feel an obligation to speak up.

**BS:** Again, my feeling is—use it or lose it. If you don't use your voice, there are going to be people who try and take it away.

**SK:** Do you still feel that there is some room for optimism?

**BS:** I think so. Even though it's been a very difficult time, it offers teachable moments. There is extraordinary interest in "how do we know it's us?" Just a couple of weeks ago, for example, I was asked to give a presentation to the board of directors of a major power company. Many in the audience were skeptical about what I do, but they still wanted to understand "Well, what is the evidence?" and "What do satellite data really tell us about the size and significance of warming?" I'm seeing a real appetite for understanding the science. This appetite is there in a way that I have not seen before. That makes me cautiously optimistic.

**SK:** Do you think that the increased interest is because the traditional climate naysayers are the dogs that have caught the car?

**BS:** I think so. In 1995, at the time of the IPCC's "discernible human influence" finding, it was a simple thing for the naysayers to double down and to deny the science. It was easy to demonize the scientists. It was easy to say: "No problem folks, let's just move along, nothing to see here."

Doubling down on denial is more difficult now, twenty-

one years later. We see signs of human fingerprints everywhere we look in the climate system. Not just in surface temperature, but also in rainfall, in sea level, in Arctic sea ice, in the statistical behavior of extreme events: in pretty much anything you name. There is only so long you can get away with denying reality. With every passing year, the wiggle room is diminishing for the deniers.

**SK:** There have been some high-profile people in the news lately affirming—or reaffirming—their commitment to climate action. Bill Gates is heading up a new \$1 billion-venture for climate research, and your governor [Jerry Brown] said at this winter's AGU meeting, "if Trump turns off the satellites, California will launch its own damn satellite." Is reliance on private and state funding going to be the model going forward for climate research?

**BS:** My hope is that the federal government will continue to lead. But if we politicize the science, if we cut the funding for the science, if we demonize the science and the scientists, we will not be leaders. Can the philanthropic community and some individual states take up the slack? I don't know. I certainly hope that it doesn't come to that. I hope this administration recognizes that we can't ignore facts, ignore science, and make decisions based on poor information, misinformation, and disinformation. That would be a recipe for disaster.

**SK:** Speaking of disasters ... if we pull out of Paris, what happens?

**BS:** That would be a tragedy. As we said in an [open letter](#) on behalf of 376 National Academy members, it would send the wrong message to the rest of the world. Pulling the U.S. out of the Paris Climate Agreement would embolden other countries to pull out. It would become less likely that they would give serious attention to their responsibilities to reduce emissions of greenhouse gases. It would make it much more difficult to bend the arc of emissions, and to begin to take a serious bite out of the problem of human-caused climate change. That would be catastrophic.

We know that climate risk will amplify over the twenty-first century. It will amplify a lot more if we do nothing to reduce emissions of greenhouse gases now, immediately. So an administration that denies the science, that says to the rest of the world, "we don't care about this problem, and you shouldn't either," increases the climate risk for our kids and grandkids, and for all other future citizens of this planet. That is unacceptable to me.

In my opinion, it's pretty clear that the U.S. will lose if we pull out of Paris. We will be irrelevant. Countries like China will assume the leadership position that we

once had. The U.S. faces a choice. Do we want to be a leader or a follower? Do we want to be relevant, and actively participate in solving global problems, or do we want to be an asterisk—a footnote in history?

**SK:** What's so enraging is that most of us don't want to be the asterisk! But we're not in the positions of power. There is this small group at the top and they are dragging us all down with them.

**BS:** They are not dragging me down without a fight.

**SK:** Unfortunately, you're used to fighting this battle. In *Merchants of Doubt*, Naomi Oreskes and Erik Conway wrote that no scientist has been "more brutally—or more unfairly—attacked than Ben Santer." Do you wear this badge proudly? Indifferently? Defiantly?

**BS:** I'm glad you asked that question. When journalists contact me, a common theme goes something like this: "Oh, you must be so sad or so depressed—all these bad

things have been happening to you—Congressional investigations, calls for your dismissal, threatening e-mails—gee, it must really be tough to be Ben Santer." But all of that bad stuff is background noise. The real signal is the privilege—the extraordinary privilege—of being able to work with brilliant women and men all around the world, people who give so generously of their time, of their passion, of their energy.

Even though the political situation is difficult, it's a real comfort to know that I can still build—I can add a brick or two to the foundations of scientific understanding. Many of the people on the other side never create—they only destroy. What a privilege to be a creator of understanding, and not a destroyer!

**Stephanie Keep** is the editor of *Reports of the NCSE* and director of special projects. [keep@ncse.com](mailto:keep@ncse.com)



## news from the membership



### Zack Kopplin

received the David Norr Youth Activist Award from Americans United

for Separation of Church and State, according to the December 2016 issue of the organization's magazine, *Church and State*. "Kopplin, who thanked AU for the 'incredible honor,' noted that he began opposing creationism in his home state of Louisiana in 2010 when he was a 17-year-old high school student. The state, he pointed out, had passed a law allowing public schools to 'supplement' teaching about evolution with other materials." The law, despite the efforts of Kopplin and other activists, remains on the books. Kopplin received NCSE's Friend of Darwin award in 2012.

NCSE is pleased to congratulate **Bill Nye** ("The Science Guy") for receiving the National NASA Space Grant Distinguished Service

Award for 2016. The award "was established to recognize individuals whose life and career have had a long[er] lasting impact in a science, engineering or education field that is related to aeronautic, aviation, or space endeavors," according to the National Council of Space Grant Directors. The host of the popular science education television programs *Bill Nye the Science Guy* and *The Eyes of Nye*, the chief executive officer of the Planetary Society (the world's largest space interest organization), and a member of NCSE's Advisory Council, Nye is also the author (with Corey S. Powell) of *Undeniable: Evolution and the Science of Creation* (2014)



*Nye with NCSE staff in 2014. (l-r) Front row: Steve Newton, Minda Berbeco, Josh Rosenau; second row: Glenn Branch, Ann Reid, Bill Nye, Eugenie C. Scott*

Photo: Lindsay Miller

and *Unstoppable: Harnessing Science to Change the World* (2015).

**Jason R. Wiles** received both the Evolution Education Award for 2016 from the National Association of Biology Teachers and the Excellence in Teaching Award for 2016 from the Association of College and University Biology Educators. The NABT award, sponsored by BEACON and BSCS, "recognizes innovative classroom teachers and their efforts to promote the accurate understanding of biological evolution with the larger community," while the ACUBE award "is offered annually to honor faculty who both practice and promote effective, innovative teaching in the biology classroom." A longtime member of NCSE and a contributor to *Reports of the NCSE* (for example, his "Is Evolution Arkansas's Hidden Curriculum?" published in 2005), Wiles is Associate Professor of Biology at Syracuse University.

—GLENN BRANCH

## Discovery Center and Creation Emporium

In early 2001, Tommy Walden, a substitute teacher in the public schools of Abilene, Texas, quit his job after being scolded for showing students a video featuring “intelligent design.” The next month, he and his wife Carolyn, who together worked as “traveling creation evangelists and educators,” attended a two-day symposium entitled “How to Build a Creation Museum” at Joe Taylor’s Mt. Blanco Fossil Museum in Crosbyton, Texas (see my column in *RNCSE* 2016;36[3]:5). By June 2001, the 600-square-meter (6,500-square-foot) non-profit Discovery Center and Creation Emporium opened for visitors.

The Discovery Center “exists primarily to provide scientific and historic evidence for the truthfulness of God’s word, especially as it relates to the creation/evolution issue” and “to expose the myth of evolution as anti-science and atheistic in nature.” The museum, “[o]ne of Abilene’s Top-Rated Family Attractions,” provides “scientific and historic evidence for the truth of creation as opposed to the atheistic evolutionary view of origins.”

The Discovery Center and Creation Emporium includes two theaters that host special events, tours, classes, and Discovery Bible Church. The museum also produces a daily radio program called “Discovery Minute,” broadcast locally and over the internet, which “explores the wonders of creation from science history and the Bible.” The museum’s exhibits include Carl Baugh’s “Creation in Symphony” video; the Alvis Delk Print—supposedly a human footprint from the Cretaceous—from the Paluxy



Photo: Randy Moore

*The Discovery Center claims that biblical giants were angel-human hybrids that originated when women had sex with fallen angels. Shown here are museum co-founder Tommy Walden (left) and Randy Moore.*

River in Glen Rose, Texas; and displays claiming that Adam was a historical person and that Charles Darwin’s ideas are responsible for racism, Hitler, and abortion. The Genesis Park showcases live exotic animals such as doves, parrots, and iguanas; an astronomy display including a testimonial from *Apollo 16* astronaut Charles Duke; a 1:75 scale model of Noah’s Ark; and two human-size interactive robots that can tell you, among other things, how to get to heaven from Abilene. Although the museum’s website promotes creation occurring in “literal 24 hour days,” the age of Earth is not emphasized in the museum, nor is Grand Canyon as a product of Noah’s flood. However, the museum does include an exhibit about the *Titanic* (“the world’s second-most-famous boat”), including artifacts gathered by Abilene oil tycoon Jack Grimm, who searched for both the *Titanic* and Noah’s Ark.

The museum’s extensive “Noah and the Giants” exhibit includes

a 4.25-meter-long (14-foot-long) bed and a 3-meter-tall (10-foot-tall) “lawn chair” supposedly used by giants. Related exhibits tell visitors that these giants are mentioned repeatedly in the Bible, “are a serious problem for evolution,” and were produced by “evil fallen angels” who came to Earth and had sex with women, thereby creating a “genetic mixture of fallen angelic DNA with that of humans” that produced “wicked hybrid monstrosities” (the “Nephilim”). These angel-human hybrids, which soon ruled the world, helped to convince God to drown all but eight people on Earth. Another exhibit notes that scientists’ manipulations of human and animal genomes could produce more giants and are “something to think about.”

At the end of the tour, visitors can buy creationism-based toys, DVDs, and books such as *The Genesis Flood*, *Darwin’s Deadly Legacy*, *The Evolution of a Creationist*, and *Not By Chance*. Also for sale are “No Foolin’ T’s creation apparel” denouncing evolution as “a fairytale for adults.”

The Discovery Center and Creation Emporium ([evidences.org](http://evidences.org); telephone (325) 673-5050) is located at 810 Butternut Street in Abilene, Texas. The wheelchair-accessible museum is open Tuesday through Saturday 1:00–5:00 P.M. Admission is free.

**Randy Moore** is author of *A Field Guide to the Scopes Trial* (Rhea County Historical and Genealogical Society, 2016) and co-author (with William McComas) of *Images of America: The Scopes Monkey Trial* (Arcadia Press, 2016). He is the H. T. Morse–Alumni Professor of Biology at the University of Minnesota, Twin Cities. [RMoore@umn.edu](mailto:RMoore@umn.edu)



# UPDATES

ncse.com/updates

Do you want to let us know about threats to effective science education near you? Or do you have any cause for celebration to share? E-mail any member of staff or [info@ncse.com](mailto:info@ncse.com).

## KANSAS

In November 2016, the Supreme Court declined to review *COPE et al. v. Kansas State Board of Education et al.*, bringing the case to a decisive end. At issue was Kansas's adoption of the Next Generation Science Standards, which, according to the plaintiffs-appellants, "establish[ed] and endorse[d] a non-theistic religious worldview" in violation of the Constitution. Originally filed in 2013, the case was dismissed by the district court on the grounds that the plaintiffs lacked standing; the dismissal was consistently upheld on appeal.

## NEW HAMPSHIRE

The New Hampshire state board of education adopted the Next Generation Science Standards in November 2016, making the state the nineteenth to do so. Arkansas, California, Connecticut, Delaware, Hawaii, Illinois, Iowa, Kansas, Kentucky, Maryland, Michigan, Nevada, New Jersey, Oregon, Rhode Island, Vermont, Washington, West Virginia, and the District of Columbia have also adopted the standards. Although there was controversy over evolution and/or climate change in a number of states, the adoption in New Hampshire seems to have been uncontroversial.

## NEW YORK, CHEEKTOWAGA

Joell Silver, a high school biology teacher who sued the Cheektowaga Central School District for directing her to remove religious items from her classroom, lost her appeal to the Second Circuit Court of Appeals in November 2016 after losing at trial in 2014. The district's directive was issued after a student complained about the display as well as about Silver's referring to Adam and Eve while discussing the human rib cage and about a guest speaker who cited Bible passages.

## OKLAHOMA

Senate Bill 393, styled the Oklahoma Science Education Act, would, if enacted, in effect encourage science teachers with idiosyncratic opinions to teach anything they pleased—proponents of creationism and climate change denial are the usual intended beneficiaries of such bills—and prevent responsible educational authorities from intervening. No scientific topics are specifically mentioned, but the bill's sole sponsor, Josh Brecheen (R–District 6), introduced similar legislation that directly targeted evolution in previous legislative sessions. The bill is with the Senate Education Committee.

## SOUTH DAKOTA

South Dakota's Senate Bill 55, which would empower science denial in the classroom, was introduced, passed the Senate Education Committee on a 4–3 vote, and passed the Senate on a 23–12 vote in January 2017, despite consistent opposition from the state's educational and scientific communities; it is at press time with the House Education Committee. Although no specific scientific topics are mentioned, the sponsors are targeting evolution and climate change. NCSE is coordinating opposition within the state and nationally.

## WISCONSIN

Wisconsin's Department of Natural Resources removed references to the role of human activity in causing climate change from its website in late December 2016. The changes elicited protests from scientists at the state's public universities and local environmentalists. Science education was affected as well: the *Milwaukee Journal Sentinel* noted, "The DNR also has recently removed a teaching guide on climate change from its website, and according to the agency, it is turning it over to the University of Wisconsin-Stevens Point."

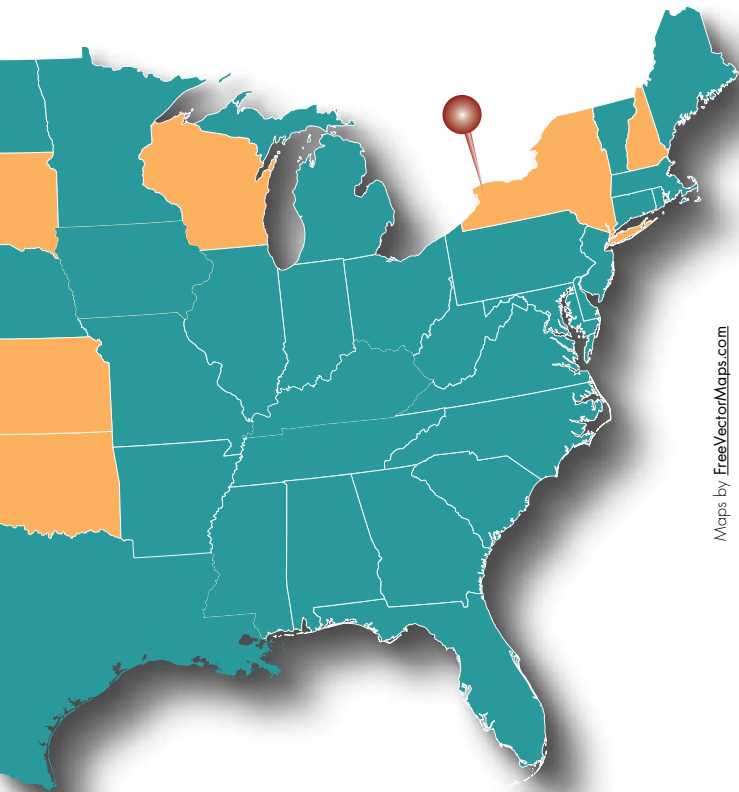
## ERRATUM

The map in the printed version of *RNCSE 2017*;37(1):8–9 incorrectly highlighted Nevada instead of Arizona. Thanks to all the readers who drew the error to our attention, and apologies to all our friends in the American Southwest.



## NATIONAL

A draft of the Western Interstate Commission for Higher Education's Interstate Passport Initiative—aimed at standardizing curriculum objectives across a number of institutions in the western states—recommended showing the 2014 debate about evolution between Bill Nye and Ken Ham to college students. After scientists, including Michael Baltzley of Western Oregon University (who broke the story in a letter to *Science*), and organizations, including NCSE and the Federation of American Societies for Experimental Biology, protested, the reference to the debate was removed.



Maps by FreeVectorMaps.com

## NATIONAL

House Resolution 44, introduced in the United States House of Representatives on January 11, 2017, would, if passed, express the House's support of designating February 12, 2017, as Darwin Day, and its recognition of Charles Darwin as "a worthy symbol of scientific advancement." H. Res. 44 is the sixth such resolution introduced in the House of Representatives (and the eighth introduced in Congress) since 2011; none of its predecessors was passed. The lead sponsor of the bill is Jim Himes (D-Connecticut).

## IRELAND

A replacement chapter for a sixth-grade geography textbook used in Irish schools was issued in August 2016 after concerns were raised about the presence of climate change denial in it. *Unlocking Geography*, published by Folens, features a debate between a fictional pair of scientists, one of whom claims, "Humans are not to blame because we have very little control over nature," as well as quotations from climate change denial blogs. The replacement chapter was vetted by scientists and the environmental group An Taisce.



## TURKEY

A draft of a new national curriculum in Turkey omits evolution, according to soL international. A unit entitled "The Origin of Life and Evolution" will be replaced with a unit entitled "Living Beings and the Environment." "[T]he Minister of National Education, İsmet Yılmaz[,] said that the draft is open for feedback ... and the Evolution Theory is not an exception," soL International reported, adding, "Yılmaz claimed that 'whether it is scientific, merely a hypothesis, or just theoretical, all these are debatable.'"



## COMINGS AND GOINGS AT NCSE



NCSE bids farewell to **Josh Rosenau**, who joined NCSE as a Programs and Policy Director in 2007.

Among his many accomplishments and contributions in his decade at NCSE were orchestrating a series of webinars for science education activists, testifying before the Texas state board of education in 2011 and 2013, establishing the teacher scholarships on NCSE's Grand Canyon excursions, and developing and analyzing the NCSE/Penn State survey of climate change education in the United States. A gifted writer, Rosenau was

a driving force behind the creation of NCSE's blog and published articles on evolution and climate education in venues ranging from the *Washington Post* to *Trends in Microbiology*. All of us at NCSE wish him the best in his new endeavors.



NCSE is pleased to welcome aboard **Brian Pinney**, our new Regional Community Organizer.

Pinney earned his Ph.D. in Science Education from the University of Iowa, focusing on science classroom interactions that promote critical

thinking development in elementary and middle school students. With NCSE, he will head up our outreach efforts in Des Moines and Ames, both in Iowa, and will lead our western expansion this summer. His passion for evolution education stems from his background teaching biology to undergraduate majors, nonmajors, and pre-service teachers at the University of Iowa. Through these experiences, it became clear to Pinney that additional work was necessary to promote evolution education and remove barriers to the successful teaching of this essential topic.

—ANN REID

## *Meet the Teacher Advisory Board*

NCSE's teacher network, NCSEteach, was created to support educators on the front lines of teaching climate change and evolution. Since we are not teachers ourselves, we felt it critical to recruit a Teacher Advisory Board. Members of the board have been extremely helpful in guiding the implementation of NCSEteach and were the original advocates of the Scientist in the Classroom program. We are excited to feature some of our Advisory Board members here and acknowledge all of their efforts to improve our teacher network.



**David Amidon**

*grade 8 life science and living environment at LaFayette Junior/Senior High School, LaFayette, New York*

"I work in New York, a state that has had climate change and evolution clearly stated in their curriculum for my entire teaching career. That is not the case for many teachers across the country. NCSEteach offers valuable support and guidance to educators promoting these concepts in less than favorable conditions. I hope my thoughts and advice have helped hone programs and make NCSEteach a more useful resource."



**Reagan Boeset**

*middle grades STEM at Clear Creek Amana Middle School, Tiffin, Iowa*

"I am on the Teacher Advisory Board because I love to be able to hear and learn from my peers in the field and stay up to date for my students. Scientific literacy is of the utmost importance to stress, model, and practice. NCSEteach is an incredible resource for teachers to use for professional and personal development."



**Robin Bulleri**

*high school and AP biology at Carrboro High School, Carrboro, North Carolina*

"In these rapidly changing times, it is of utmost importance that students understand how science impacts their lives. When teachers are unsure of how to approach controversial topics in their science classes, I direct them to NCSEteach. The resources and advocacy empowers us to teach the science of evolution and climate change in schools all over the country."



**Kristy Butler**

*high school biology and research at Central High School, Grand Rapids, Michigan*

"I wanted to be a part of the Teacher Advisory Board because NCSE shares my belief that all students should have access to quality science education. Learning to use science as a verb is the key to our students becoming scientifically literate, able to take knowledge and apply it critically and responsibly."



**Edward Clark**

*high school and AP physics, integrated science, and astronomy at Beechwood High School, Fort Mitchell, Kentucky*

"Covering socially controversial subjects can be a daunting task, and often teachers feel as if they are out on a limb without support. NCSE and NCSEteach assist teachers with lesson plans and connect their classrooms to scientists working in the field. NCSE's dedication and commitment to monitoring the forces that would silence the science are laudable. I am very proud to be associated with this essential organization."



**Brandon Haught**

*high school environmental science and biology at University High School, Orange City, Florida*

"Even before I started teaching, I was an advocate for science literacy. I drum into my students' heads how what they learn in my class has immediate real world applications. I support NCSEteach because helping passionate teachers spark the science fire in students is vital to the kids' future and our own. And in today's world of 'alternative facts' the stakes are even higher. Teachers need to be comfortable helping students practice reality-based critical thinking. NCSEteach helps make that happen."



**Eileen Hynes**

*director of Thematic Studies at the Lake and Park School, Seattle, Washington*

"Teachers are always busy and have more to do than there are hours in the day. Students look to teachers to help them find

answers and NCSEteach is a reliable resource. Since the fall of 2015, I have worked with a scientist who comes in to work with our students, meets us at the university, and sends me additional ideas and lessons to explore with my classes. This is a real gift! Serving on the Teacher Advisory Board is a small way I can give back."



**Maggie Moore**

grade 9 and honors biology at Hononegah High School, Rockton, Illinois

"It is becoming increasingly important that teachers educate students about the facts of evolution and climate change. NCSE provides tools and support for teachers, so that truth can be communicated to the next generation."



**Philip Stein**

anthropology at Los Angeles Pierce College, Woodland Hills, California

"I have taught anthropology for over fifty years and continue to teach online in retirement. In spite of the fact that we are living in

a technological advanced society, many of our citizens are sadly misinformed about the nature of science even though critical thinking is more important than ever. I have found over the years that NCSE is a valuable resource."



**James Walker**

middle school and high school science and college physics and mathematics (retired), Massillon, Ohio

"I joined the Teacher Advisory Board because I want to help NCSE grow in visibility among teachers. The organization supported me when I had to initiate legal actions in 1989 against my northeast Ohio school district's officials over academic freedom issues related to the teaching of evolutionary theory. Now that climate change is on the front burner and we are in the era of 'alternative facts,' I feel that it's more important than ever for classroom teachers to know that NCSE has their backs."

**Claire Adrian-Tucci** is a program coordinator at NCSE who works with NCSEteach and the Science Booster Club project. [adrian-tucci@ncse.com](mailto:adrian-tucci@ncse.com)



**Random Samples** with Amanda Glaze

NCSE is only as good as its members. Luckily for us, our members include countless extraordinary individuals, such as Amanda "The Pot Stirrer" Glaze. (To understand her nickname, listen to the Science Friday episode for April 20, 2015, and watch the associated video: you won't be sorry.) Glaze's research centers on the intersections of science and society, specifically the acceptance and rejection of evolution in the southeastern United States and the impact of conflicts between religion and evolution on science literacy. Let's pick her brain, shall we?



Photo: Jaymon Glaze

*First, quick word associations. What's your immediate reaction to the following phrases?*

- **NCSE**  
My heroes! (No, really!)
- **Just a theory**  
You keep using that word. I do not think it means what you think it means. (As Inigo Montoya said in *The Princess Bride*.)
- **Pot-stirrer**  
Me!
- **Education**  
Empowerment

*Next, short answer. In 25 words or less...You get one sixty-minute lecture to cover evolution—what do*

*you spend your time on?* Scientific ways of knowing and culturally responsive conversations about evolutionary theories. You can't change the world in sixty minutes, but you can plant the seed.

*What's the most problematic misconception about evolution and why?* That evolution equals atheism, a point that is devastating to science literacy and prevents all other conversations.

*You have five minutes to try and convert an evolution-doubter to an evolution-acceptor—what would you say or what evidence would you present?* I don't think you can

"convert" people, let alone in five minutes, but you can change their thinking enough to allow them to head down that path themselves. So I'd listen first, then talk about how scientific ways of knowing are different from others, to encourage them to question and explore.

*Finally, Cephalopoda, Xenarthra, or other?* Cephalopoda rules! (I have the squid hat to prove it but no, we aren't using that as my picture.)  
*Editor's note: I convinced her otherwise.*

Learn more about Glaze at [www.amandalglaze.com](http://www.amandalglaze.com) and feel free to drop her a line at [aglaze@georgiasouthern.edu](mailto:aglaze@georgiasouthern.edu).

—STEPHANIE KEEP



## news from the science booster clubs

# Expanding Across the Country

In the last issue of *RNCSE* (2017;37[1]:12–13), we issued a call for action. We needed people to help us get out into communities to teach climate change and evolution to the public. Volunteers all over the country responded, enabling the Science Booster Club program to officially go national on January 24, 2017. We received requests from people in over twenty states. After interviews and initial training, we found the teams and leaders most likely to succeed. We are proud to announce that there are now active Science Booster Clubs in California, Georgia, Indiana, Iowa, Kentucky, Maryland, Nebraska, Oklahoma, Texas, Virginia, and West Virginia, and interested volunteers in many other states.

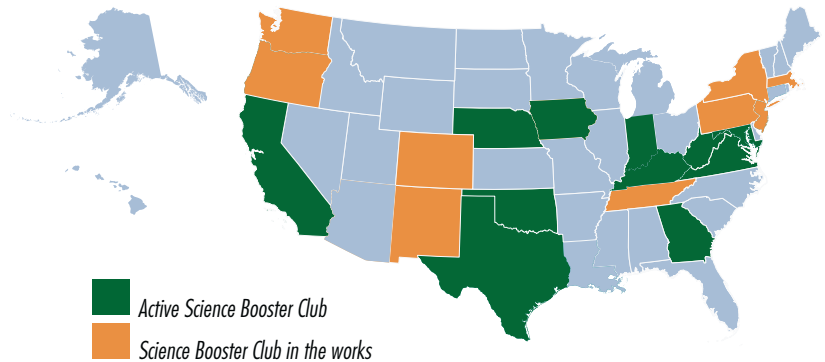
### Planning for Unity

With clubs forming across the country, how will we maintain a consistent identity and level of quality in our outreach efforts? In short, how will we keep the clubs unified? Our solution is to provide club leaders with all the materials and information they need to present the activities that we have developed and extensively field-tested in Iowa in the form of a kit. We will also provide leaders with ongoing training and support in our no-conflict approach to public education. In the first wave, we have sent out kits for our popular and easy ocean acidification activity. The kits contain enough materials to engage 350 people per kit, meaning that we'll educate around 5,000 community members on climate change for just about ten cents a head. An equally low-cost evolution-teaching kit will follow in the next few months. Here I am with the first kits, ready to go out to the post office!



*On the way to the post office with a car full of science!*

Assembling these kits in my home, which is overwhelmingly full of science gear now that I'm over eighteen months into this project, has made me a little emotional—and not just out of frustration over my steadily diminishing floor space. I am so grateful that through my



work with NCSE, I have been able to positively affect so many people. What a wonderful network we are building! Look at all these sweet giant tubes I'm cramming full of science gear! And who would have thought back in May 2015 that we'd be ready to go national in less than two years? It is just amazing.

### Planning for Diversity

I know the materials we've developed work well in Iowa, but it would not surprise me if we needed to make some adjustments for audiences in other locations. In the Science Booster Club program we work hard to create a warm and welcoming environment, because we want people to see themselves as capable of doing science. One of the primary goals of the SBCs is to make science something that our audience of community members can identify with. As we branch into new geographic regions, it will be crucial to take community characteristics into account. For example, as we get into rural Texas, we will really benefit by developing materials in Spanish, a project for which we are beginning to lay the groundwork. And in every new community, we need to work actively to recruit volunteers from all of the diverse ethnic and cultural groups that live there.

Some people may think that such efforts are unnecessary because science is (or at least should be) color-blind. While in theory science is accessible to everybody, the reality is quite different. This has been documented in countless research studies. We know, for example, that black, Latino, and Native American students often report that while in school they experience difficulties in inclusion and many subtle forms of prejudice. Research has

demonstrated that members of these minority groups have disproportionately low rates of participation in STEM fields. Students report that they find it more difficult to proceed in STEM without role models, and studies have shown that access to role models improves student retention and eventual career choice.

To bring more talented Americans into the STEM fields, we must make a sincere effort to develop connections to groups and communities that have historically been less than fully included in the scientific community.

### **New Challenges: New Stories**

This year, we plan to act on our intentions. Clubs are getting started in the South and in Texas. We will be working with the leaders to identify needs in these areas, and then help them find ways to reach across divides, model inclusion, and prioritize representation. Learning to do this will be a dynamic process. We don't pretend to have the answers already, and we know that our new leaders are working in areas with very different demographics, levels of resources, and access to social supports. However, we know that prioritizing diversity from the start, right as we get off the ground, is necessary if we are going to achieve our goals in the long term.

Over the course of 2017, we are going to learn a lot about what clubs need to launch successfully. I am really looking forward to hearing stories from all over the country about the experiences our volunteers have teaching Americans about climate change and evolution. I am sure that we will face many challenges, some that we can't even anticipate. None of us in this first wave of the expansion is in what you might think of as "easy" territory—liberal areas with great educational systems and abundant economic opportunities. Will we face more challenges teaching about climate change in West Virginia or in Texas? Personally, I think we might run into more drama around Washington DC than we might have anticipated, considering how high tensions are running over national politics.

But if we stay friendly, open, and thoughtful, we will use those challenges to learn and build, as we develop a network of citizens passionate about science education in their communities. We reached over 54,000 people last year. This year, I wonder how high our numbers will go. Can we multiply by ten again? Let's give it a shot!

**Emily Schoernig** is the NCSE Director of Community Organizing and Research. [schoernig@ncse.com](mailto:schoernig@ncse.com)



# DINNER PARTY 101:

## Emotional Connections



© Paula Spence

We've all had that experience where, even before someone opens their mouth, you can tell they're going to try to get your goat. Maybe it's your creationist uncle, who early in every visit proclaims the need to save your soul, or your colleague who, for reasons completely unrelated to her self-interest, defends the coal industry in the break room whenever you're within earshot. These people know what they're doing. They're choosing to engage in a confrontation with you, and you can tell it in all sorts of subtle ways from their body language.

When you know someone's gunning for you, the natural tendency is to get ready to fight back. After all, you can tell that this person is looking for a confrontation, and it's tempting to oblige. But I would like to suggest that you try a new tactic, which in my experience will disarm most opponents. Before you engage in any counterargument—before you present any evidence about fossils or carbon emissions, even before you pull up any graphs on your smartphone!—make an emotional connection.

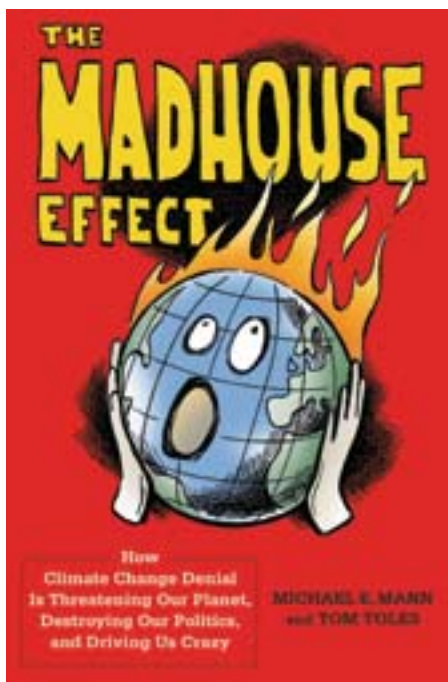
Is your conversational partner one of those people who distrusts the scientific establishment? Try acknowledging that; empathize a little. The scientific establishment has done some pretty terrible things—Tuskegee, anyone? Is their opposition to the conclusions and recommendations of climate scientists based on economic fears? Try acknowledging that many aspects of our economy, like current tax policies, are massively unfair to most Americans.

When I am aware of my emotional responses, and work to fight my natural human tendency to respond to negativity and conflict with more fuel for the fire, I find that I am more able to connect with my fellow Americans. People are often totally unprepared to have their statements of science denial met with empathy and emotional warmth. When they feel heard, when their pain is acknowledged, people are almost always way more open to actually listening to you. And, when I am able to connect with people in this way, I find that I get to hear such interesting stories.

This—making connections, not engaging in debate—is the way to change the minds of "skeptics." Once a connection is made, we can use that connection to bring about real dialog, and real change.

— *EMILY SCHOERNIG*

# THE RNCSE REVIEW



## The Madhouse Effect: How Climate Change Denial Is Threatening Our Planet, Destroying Our Politics, and Driving Us Crazy

author: **Michael E. Mann and Tom Toles**

publisher: **Columbia University Press, 2016**

reviewed by: **Ann Reid**

Regular RNCSE readers know that NCSE's national survey of middle and high school teachers found that when asked what percentage of climate scientists agrees that human activities are primarily responsible for climate change, fewer than half chose the correct response of greater than 80% (in fact the percentage is upward of 97%). In other words, most teachers falsely believe that up to 20% of scientists dispute the human role in climate change. What might explain this startling result?

For one powerful answer, you need look no farther than a new book from climate scientist Michael Mann and Pulitzer Prize-winning cartoonist Tom Toles, *The Madhouse Effect: How Climate Change Denial Is Threatening Our Planet, Destroying Our Politics, and Driving Us Crazy*. The prose is concise, and of course

the cartoons are even pithier, so in just 150 pages, Mann and Toles are able to explain how a toxic brew of corporations with economic interests to protect, politicians supported by those corporations, and a media seduced by false balance has enjoyed remarkable success in sowing doubt about the weight of climate change evidence—and the motives of climate scientists. *The Madhouse Effect* brightly illuminates the essential absurdity of where we are, and how we got here.

From NCSE's point of view, one of the most important contributions of *The Madhouse Effect* is its acknowledgment that it is not only wrong, but also counterproductive, to assume that anyone who doesn't "get it" on climate change is stupid or ignorant. The authors demonstrate that there is a reason people are confused about climate change and describe exactly who benefits from that confusion. When you combine the orchestrated campaign to cast doubt on climate change with the very human tendency to shy away from bad news, Mann and Toles argue, it is not surprising that many people find ways to reject the

science and embrace a view of the world that feels less alarming and accusatory.

*The Madhouse Effect* begins with clear explanations of enough of the basic science to orient the reader, using helpful analogies as in the following passage:

We of course can't say that climate change "caused" a particular heat wave, flood, or storm. There is always the chance that the heat wave, flood, or storm would have happened anyway. But climate change is almost certainly making these events more frequent. There is an increased occurrence of these events because of climate change, just as there is an increased incidence of lung cancer among smokers and an increased number of home runs by steroid-using baseball players. (p. 26)

But as Mann and Toles point out, and as anyone who has ever tried to change the mind of a climate change denier, an anti-vaxxer, or a creationist will agree, even the clearest explication of the science



© 2017, Tim Bradley

is unlikely to change minds. Indeed, maddeningly, there is pretty good evidence that the more science you bring to bear, the more entrenched and defensive your science-rejecting audience will become. And that is where *The Madhouse Effect* is especially effective. In a chapter entitled “Why Should I Give a Damn?” Mann and Toles describe the psychological hoops that people jump through to avoid coming to terms with a problem that is big and scary and potentially expensive and difficult to solve. In “The War on Climate Science” and “Hypocrisy, Thy Name is Climate Change Denial,” they describe the concerted (and ongoing) effort that has gone into trashing scientists and sowing confusion in order to block or delay even the most preliminary discussion of how our

society might begin to take action. Finally, they point out how crazy (albeit comforting) it would be to pin our hopes on one or another of the various geoengineering schemes that promise to solve climate change without making any difficult changes in the way we generate and use energy.

**The Madhouse Effect brightly illuminates the essential absurdity of where we are, and how we got here.**

Returning to those science teachers I mentioned earlier, I think that we should not be surprised that so many of them are unaware of the overwhelming weight of the scientific evidence for climate change, and we certainly should not condemn them for it. Instead, maybe we should give them (and any parents who are uneasy about how climate change is being taught to their children) this book so that they can get on with the important task of explaining the straightforward science of climate change to the next generation without compromise.



**Ann Reid** is NCSE's executive director. [reid@ncse.com](mailto:reid@ncse.com)

**WHAT WE'RE UP AGAINST**  
**A Bumpy Four Years**



Testifying before the Senate Health, Education, Labor, and Pensions Committee on January 17, 2017, Betsy DeVos, the nominee for Secretary of Education, was asked about her support of organizations that promote climate change denial (in particular the Acton Institute for the Study of Religion and Liberty)

and creationism (in particular the Thomas More Law Center, which defended the Dover Area School District in *Kitzmiller v. Dover*). Her questioner, Senator Sheldon

Whitehouse (D-RI), asked DeVos point-blank whether a DeVos-led Department of Education would side with students or with the purveyors of junk science. She evaded answering—but in so doing, she conspicuously used the “critical thinking” catchphrase beloved by creationists and climate change deniers alike. On February 7, 2017, the Senate voted 51–50 to confirm DeVos as Secretary of Education, with the deciding vote cast, unprecedentedly, by Vice President Mike Pence in his capacity of President of the Senate. As Bette Davis’s Margo Channing said in *All About Eve*, “Fasten your seatbelts. It’s going to be a bumpy night”—or a bumpy four years.

—GLENN BRANCH

**CHANGE SERVICE REQUESTED**



day in, **day out**  
year in, **year out**

When  
science education  
is under attack,



**ncse**

is  
**there.**

*every student, every teacher, every classroom*

[NCSE.com/donate](http://NCSE.com/donate)

Or call the NCSE office during business hours  
(9 AM – 5 PM Pacific, Monday through Friday)  
at 510-601-7203