

# reports

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photo: Elaine Adrian-Tucci

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# Dear NCSE members,

As I write, Houston is still in the emergency phase of reacting to the massive, epic, historic—pick your favorite adjectival cliché, but unquestionably devastating—floods caused by Hurricane Harvey. Many things contributed to the scope of the disaster, but climate change was certainly an important exacerbating factor. As Michael E. Mann (a member of NCSE's Advisory Council and a recipient of NCSE's Friend of the Planet award) explained in an [op-ed published in the Guardian](#) during the crisis, the magnitude of the storm surge, the volume of rain, and the extended stalling of the hurricane over the Houston area were due to higher sea levels, warmer waters, and weaker prevailing winds in the Gulf of Mexico, and these in turn can be attributed to climate change.

Climate change is real; it's serious; and it's already having a dramatic impact. As Houston recovers and rebuilds, we can only hope that its citizens will insist that local, state, and federal officials base all of their planning decisions on the best available predictions of future climate conditions. The students and citizens of Houston should be given as many opportunities as possible to learn about climate science, so that they can participate in making informed choices about their city's future. For our part, NCSE will be actively looking for partners to help Houston teachers cover climate change confidently and accurately. Conveniently, our new Director of Teacher Support, Brad Hoge, came to NCSE from Houston, and is well-connected with prospective partners there—learn more about him, and his vision for NCSEteach, on page 10.

Also as I write, science teachers all over America are starting their 2017–2018 school year. They have welcomed students of all backgrounds, from all kinds of communities. Many of those students enter class with a plethora of misconceptions about evolution and climate change, and the best teachers know that correcting those misconceptions will take patience and respect in addition to a skillful deployment of evidence. NCSE can show no less.

Our goal has always been ensuring that what's taught in science class reflects the best current scientific understanding. We believe that the vast majority of people—people of all faiths and of none; Republicans, Democrats, and independents—share that goal. And we think that we can attain that goal by concentrating on that agreement, avoiding the temptations to berate or despair.

NCSE is the only national organization working to make sure that teachers have the expertise and support they need to teach evolution and climate change accurately, honestly, and confidently, even in communities where it is challenging to do so. We can't do it without you. Thanks so much for your continued support.

With gratitude and respect,



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Maurine Neiman and graduate student Rob Todd engage with the public on evolution at the 2016 Iowa State Fair. Photo: Emily Schoerning

# BOOSTED BY BOOSTER CLUBS:

## An Interview with Maurine Neiman

For the last three years, NCSE's Science Booster Clubs (SBCs) have been a source of support, inspiration, and encouragement to science educators and aficionados across Iowa. Emily Schoerning and her band of merry interns (one of whom is now NCSE staff) and volunteers have taken Ann Reid's germ of an idea and run with it, expanding first across Iowa and now into nine states plus the District of Columbia. From offering free science summer camp experiences for underserved children (see page 12) to providing casual opportunities for tens of thousands of community members to learn about evolution and climate science, SBC programs are making themselves known. We have been buoyed by the enthusiastic responses our programs and their no-conflict approach to public engagement have received, and even more excited by preliminary data out of Iowa that suggests our programs are having a positive impact on community scientific literacy.

One standout on the teams working with us on these programs is Maurine Neiman, Associate Professor of Biology at the University of Iowa. I got a chance to ask Neiman about her work with the SBCs, and to my delight, she reported that the benefits are being felt not just by the public, but by her lab as well. The following interview has been edited for clarity.

**Stephanie Keep:** How did you get involved with the Science Booster Club project?

**Maurine Neiman:** I have a pretty solid history of community engagement here at the University of Iowa, in large part through my leadership of the [Iowa City Darwin Day](#) organization. Every year, we organize educational and social

activities in and around Iowa City, Iowa, on or near Charles Darwin's birthday, February 12. When Emily Schoerning began asking around for Iowa City-based people who might be a good partner for the brand-new SBC project, my name was suggested. I'm glad that it was!

**SK:** You have encouraged your graduate students to work with the Iowa SBCs, and from what I understand, the program would not have been as successful without them. Clearly, the SBCs have benefited from their participation, but you've told us that you feel your students have benefited, too.

**MN:** Absolutely. They have benefited substantially in three major ways: they have received concrete and translatable training in community engagement and curriculum development; they have gained a justifiable feeling that their efforts are contributing to the solution of major planet-level problems; and they have received funding for their graduate education.

**SK:** Let's take these benefits one at a time. Many professors wouldn't regard community engagement and curriculum development training as valuable. Can you tell me why you see things differently?

**MN:** The common public perception—often held by scientists themselves—that academic scientists are somehow separate from society is incredibly harmful. In particular, this perspective contributes to the assumption that those engaged in academic pursuits are elitists who don't care about regular people. This fuels some of the anti-intellectualism that is so dangerous in an era of rising temperatures and oceans. All of



Graduate student Kyle McElroy, whose work has been supported directly by NCSE and through partnership grants, teaches SBC campers about parasite evolution. Photo: Emily Schoering

us, academics or not, are part of communities. As a scientist and as a citizen, I want to play a role in making our communities a better place for ourselves and for the generations to come. I want my undergraduate and graduate students to feel the same way, and I am careful to select students who have at least a passing interest in community engagement. Yes, there are certainly career benefits too; the students involved in the SBC program receive hands-on training and experience in a variety of very useful skills and concepts. While these benefits are important, I view them as secondary to the value of being a community-engaged academic.

**SK: This is so refreshing to hear. I felt I had to leave academia to pursue community engagement and outreach. You're correct, of course, that people can (and should) engage the community from within academia—but I didn't know it was possible at the time.**

**Your second listed benefit has to do with being part of the solution to a planet-level problem. I assume that you mean climate change.**

**MN:** Yes. The SBC student interns are contributing to the solution by bringing accessible and engaging means of learning about the urgent challenges facing all of us today—challenges that many Americans do not want to think hard about or even acknowledge. The most serious of these problems is climate change, and by addressing science illiteracy, we give our community the tools that they need to understand the challenge that climate change poses. We cannot, as a society, take meaningful steps toward mitigating and adapting to climate change unless we understand the problem.

**SK: Indeed—it's hard to get people to understand the urgency of climate change if they aren't convinced that climate change is real. That's a big part of the reason that NCSE wants to ensure climate science is taught appropriately in schools—avoiding the topic isn't helping anyone,**

**and we need the next generation to be climate-savvy so that they can contribute solutions.**

**Okay, benefit number three is financial. Through a partnership with the University of Iowa, NCSE is able to provide financial support to one graduate student per semester, and a generous donation from Steve and Kathie Jenkins supported a student over the summer of 2017. Has that been helpful?**

**MN:** It has. As you know, educating a graduate student requires money both for their tuition and for the stipends that the students need to pay their cost of living while in school. Historically, this funding came from state-level support of public institutions, a funding source that has nearly dried up for many large state universities (including the University of Iowa) in the last decade or so. I have led efforts to acquire funding at the departmental, college, and university levels, as well as via a supplement to an existing grant from the National Science Foundation. NCSE has also been a steady contributor. My collaborators and I are continuing to expand these efforts to acquire funding, working with University of Iowa officials and applying for new grants.

**SK: How about for you, personally? How has partnering with SBCs benefited you, if at all?**

**MN:** It's one of those rare and wonderful situations, where my contributions, though motivated by a desire to promote science literacy in general, have proved to result in substantial professional benefits as well. Broadly speaking, these benefits come in two flavors: support for my graduate students, and positive media and professional attention. I view the former as more important, generating direct positive consequences for my students through access to funding and via training and career-building opportunities. That said, the positive attention [from the media](#) and [my colleagues](#) helps to pave the way for the continued growth and expansion of the SBC project. Being able to highlight, for example, our recent [T. H. Huxley award from the Society for the Study of Evolution](#) is a real strength when it comes to grant applications and with respect to convincing other members of our community that investment in this program will rapidly reap dividends.

**SK: Ah yes! Congratulations on that!**

**MN:** Thank you! I got the news from Laura Bankers, a very recently graduated Ph.D. student from my lab. While the Huxley Award was to a group of us, the application had to be submitted by an individual, who was Bankers. Upon receiving the e-mail that said we had gotten the award, she texted to me "WE WON THE HUXLEY AWARD!" I was so happy. It's of course really exciting to win any meaningful

award, but this was even more special because my students got recognized in a way that they deserved and that would translate into real professional benefits.

**SK:** You mentioned that you've had colleagues seek you out to talk about outreach, and that got me wondering about how your peers, in general, have reacted to your work with the SBCs.

**MN:** My peers think that the SBC project sounds like a great way to make a real difference, and I've even been able to recruit some colleagues from other institutions to get involved. The professional community has also been very enthusiastic about the SBC project, as evidenced by the Huxley award I mentioned, as well as by very positive reviews of the description of the SBC project that I provide in statements about the broader impacts of my lab's work for National Science Foundation grants.

**SK:** Do you think other researchers might see the appeal of participating with SBCs given the need to discuss the broader impact of their work with funders like the NSF?

**MN:** Definitely. Broader Impact Statements have only been a required part of NSF grants for fifteen years or so, recently enough that I remember their introduction. I initially resented this addition to the already onerous task of grantwriting, but I now am of the sincere belief that these Broader Impacts are a necessary, important, and very satisfying part of the scientific process. I hope that other researchers come to see that participation with SBCs is a fantastic way to meet the requirement.

**SK:** Have you heard any reservations from your peers or the community about your participation? Are there any concerns that your attention is being diverted from your "real" job as a professor, or that your students are being distracted from their "real" job as researchers?

**MN:** None whatsoever! In fact, I hear the opposite, especially with respect to graduate student involvement. I think that my peers see this facet of the program as especially creative and exciting, providing a new and very career-relevant mechanism for graduate student funding and training.

**SK:** I'm guessing I know the answer to this, but I'll ask anyway: What would you say to other professors who are considering getting involved in the SBC project?

**MN:** Do it! Let me and other project leaders know how we can help you get started.

**SK:** For a last question: In your own words, what is the mission of the SBC project?

**MN:** To help make the world a better place by improving public comfort with and understanding of critically important scientific issues.

**SK:** Coming soon to an SBC recruitment flier near you!

**MN:** You can definitely quote me on that.

**Stephanie Keep** is the editor of *Reports of the NCSE* and Director of Special Projects. [keep@ncse.com](mailto:keep@ncse.com)



## WHAT WE'RE UP AGAINST Creationism at NEA's Annual Meeting

Among the internal interest groups in the National Education Association (NEA) is the Creation Science Educators' Caucus. Despite the grandeur of its name, it consists of a single NEA member, albeit one aided by volunteers and outside creationist organizations. The caucus takes advantage of its official status to distribute young-earth creationist materials to teachers attending the NEA's annual meeting. (I myself acquired a bagload for NCSE's archives when I attended the meeting in Washington DC in 2016.) The caucus was established years

ago, and NCSE routinely hears from teachers objecting to its official status within NEA and its distribution of creationist material at NEA's meetings. But perhaps not for much longer: in 2017, the NEA adopted a resolution to review and evaluate exhibitors' materials for compliance with the organization's rules before its 2018 meeting. Three groups in particular were identified by the resolution as of particular concern, including the Creation Science Educators' Caucus. Here's hoping that there's no opportunity to acquire any new creationist materials at next year's meeting.

—GLENN BRANCH



Photo: Nina Heilmberg

# RAFTING THE GRAND CANYON WITH NCSE IN 2017

“While I was in the Canyon, I took a lot of time to talk to the brilliant people on my trip and to learn from them. When I wasn’t visiting, I was writing down stories, ideas, and other phenomena that I can share with my students. This fall, when I go back to school, I am excited to put what I learned to use, making the science a little more engaging for my students.”

—Marie Storey, 2017 NCSE Grand Canyon Teacher-Scholar

*One of the many rapids facing scientists in the contentious struggle over the Grand Canyon.*

In July 2017, three teacher scholarship winners joined a score of NCSE supporters to raft through the Grand Canyon on the Colorado River. Teachers Marie Storey, Robyn Witty, and Nate Chisholm joined me on NCSE’s unique “two-model” rafting trip during which the creationist arguments about the canyon’s formation are contrasted with the scientific understanding. We visited locations used by young-earth creationists to argue that Grand Canyon records the events of Noah’s Flood, but in addition to explaining what creationists claim, we of course offered the scientific explanations of how these features and rock formations came about.

Beginning with the 2015 trip, NCSE has raised money to pay the expenses of one or more teachers. The idea for the teacher scholarship originated with former NCSE staffer Josh Rosenau, who envisioned teachers using this experience to enrich their students’ educations. Our hope is that, learning of

the teachers’ experiences, their students will come to further share their teachers’ passion for science.

This year’s trip coincided with a legal case (quickly settled) brought by young-earth creationist Andrew Snelling against the National Park Service over its refusal to grant Snelling a permit to collect canyon rocks. The ongoing struggle over the interpretation of Grand Canyon is something NCSE has been involved with for a long time. Science supporters everywhere hope to keep science in our national parks. With NCSE teacher scholarship winners sharing their experiences in Grand Canyon, we hope to enlist many students among the supporters of science.

**Steven Newton** is Programs and Policy Director at NCSE; he also teaches geology at the College of Marin. [newton@ncse.com](mailto:newton@ncse.com)



## news from the membership



NCSE is pleased to congratulate **Bruce Alberts** on receiving the 2016 Lasker-Koshland Award for Special Achievement in Medical Science. According to a press release from the Albert and Mary Lasker Foundation, which confers the award, Alberts was honored “[f]or fundamental discoveries in DNA replication and protein biochemistry; for visionary leadership in directing national and international scientific organizations to better people’s lives; and for passionate dedication to improving education in science and mathematics.” Alberts is Chancellor’s Leadership Chair in Biochemistry and Biophysics for Science and Education at the University of California, San Francisco. A former president of the National Academy of Sciences and a former editor-in-chief of the journal *Science*,

Alberts is also a member of NCSE’s Advisory Council and a recipient of NCSE’s Friend of Darwin award.

**Michael F. Antolin** of Colorado State University, **Jay N. Marx** of the LIGO Laboratory at the California Institute of Technology, **Karen R. Rosenberg** of the University of Delaware, **James J. Smith** of Michigan State University, and **Curtis John Struck** of Iowa State University were all elected as Fellows of the American Association for the Advancement of Science. Congratulations to all. (And let the NCSE office know if we overlooked your name on AAAS’s list!)

NCSE is pleased to congratulate **Sean B. Carroll**, a member of NCSE’s Advisory

Council and a recipient of NCSE’s Friend of Darwin award, on winning the Lewis Thomas Prize for Writing about Science. Carroll’s books include *Endless Forms Most Beautiful* (2005), *Remarkable Creatures* (2009), and his latest, *The Serengeti Rules: The Quest to Discover How Life Works and Why It Matters* (2016). According to a press release from the Rockefeller University, which awards the prize, “Carroll’s work as a science communicator embodies the prize’s original intent to honor those who inspire others.” Carroll is vice president for science education at the Howard Hughes Medical Institute and professor of molecular biology and genetics at the University of Wisconsin, Madison.

—GLENN BRANCH

## Clarence Darrow Returns to Dayton

In July 1925, famed criminal defense attorney Clarence Darrow helped to defend John Scopes at the famous “Monkey Trial” in Dayton, Tennessee. Darrow’s presence was protested by several of Dayton’s citizens (as well as some members of the ACLU), but the trial and his questioning of William Jennings Bryan became legend. Bryan, who was often viewed as a martyr after he died in Dayton five days after the trial, remains popular in Dayton, where he is commemorated by Bryan College and a statue installed in 2005 on the courthouse lawn (see my book, *A Field Guide to the Scopes Trial* [2016] for more information). Darrow, on the other hand, was not commemorated by anything in Dayton—that is, until this year.

On July 14, 2017, the statue of Bryan was joined by one of Darrow made by Philadelphia sculptor Zenos Frudakis. Darrow is presented in a classic pose, with his left hand pulling on his suspenders, and his right hand “making a point.” On the base of the Darrow statue is a bronze relief showing both Darrow and Bryan sitting together at a table, and Darrow questioning Bryan during the trial.

Whereas the statue of Bryan was donated to the county by Bryan College, the statue of Darrow was paid for with private donations from individuals and organizations such as the American Humanist Association and the Freedom From Religion Foundation. The statue and its placement were approved by the Rhea County Historical and Genealogical Association, whose president Ralph Green noted that the trial “would not have been the same thing without either of them.” On the evening before the unveiling, a banquet at the Chatta-



*The statue of Clarence Darrow, by sculptor Zenos Frudakis, sits on the lawn of the Rhea County Courthouse in Dayton, Tennessee. Nearby is a statue of Darrow’s foe from the Scopes trial, William Jennings Bryan. Photo: Randy Moore*

nooga Hotel celebrated the upcoming dedication.

Just as the real Darrow faced protesters back in 1925, his effigy faced opposition from some current-day residents. For example, Rhea County Commissioner Bill Hollin said he could “see no reason to celebrate the man who lost the trial [i.e., Darrow] and whose opponent [Bryan] contributed so much to Dayton.” Much of the opposition to Darrow’s statue was led by conservative Christian political activist and preacher June Griffin. Griffin, who organized a three-hour “God, Family, and Country” rally at the courthouse on July 1, likened placing the statue of Darrow at the Rhea County Courthouse with “putting Hitler over in front of the Holocaust Museum. [Darrow] was an enemy of the country ...” Griffin, who has fought to post the Ten Commandments in Tennessee’s county courthouses, claimed that the controversy surrounding the statue was about “good versus evil,” and announced that “God is not pleased

with this.” Among other claims, Griffin ridiculed evolution as “a joke for any thinking person” and warned, “I’ve heard talk of ‘well, there’s always spray paint.’” Griffin ended one of her talks by urging citizens to “rise up,” adding that “if worse comes to worst, I will challenge them to meet us in their uniforms at King’s Mountain, just like John Sevier did, and we’ll settle it over there.” (Sevier was a leader in the American Revolutionary War who led patriots to battle against loyalist militias; he was later elected the first governor of Tennessee in 1796.)

Before the dedication ceremony began, the Freedom From Religion Foundation demanded that local officials take down a “Read Your Bible” sign that had been posted on the courthouse. (Such signs were common throughout Dayton during Scopes’s trial, and the one shown in the photograph here had been posted earlier in the week as Dayton prepared the courthouse for the Scopes Trial Play and Festival.) Once the sign was removed, an hour-long dedication and unveiling ceremony took place, featuring comments by Dan Barker and Annie Laurie Gaylor (co-presidents of the Freedom From Religion Foundation), Darrow scholar Andrew Kersten, actor John de Lancie, and the statue’s sculptor Zenos Frudakis. There was a heavy police presence at the ceremony, but there were no protests. Approximately two hundred people attended, Griffin not among them.

**Randy Moore** is the H. T. Morse–Alumni Professor of Biology at the University of Minnesota, Twin Cities. His most recent book is *A Field Guide to the Scopes Trial* (Rhea County Historical and Genealogical Society, 2016). [Rmoore@umn.edu](mailto:Rmoore@umn.edu)



# UPDATES

ncse.com/updates

## FLORIDA

Florida's House Bill 989, aimed at making it easier for Floridians to object to the use of specific instructional materials in the public schools, was signed into law by Governor Rick Scott on June 26, 2017. Climate change and evolution were clearly among the targets of the bill, whose supporters submitted affidavits that complained, "I have witnessed students being taught evolution as fact ... rather than theory ... I have witnessed children being taught that Global Warming is a reality."

## IDAHO

The Idaho House of Representatives voted 56–9 to adopt Senate Concurrent Resolution 121 on March 24, 2017, finalizing the legislature's decision to delete five passages—those discussing climate change and human impact on the environment—from a proposed new set of state science standards. The House Education Committee originally voted in February 2017 to remove the five standards, on the grounds that they failed to present "both sides of the debate"; the Senate Education Committee and the Senate followed suit.

## IDAHO, continued

On May 19, 2017, the state department of education released a revised version of the standards. They acknowledge human responsibility for recent climate change, but appear to soften or qualify the acknowledgment. The state board of education reviewed the standards in August 2017 and is expected to make a final decision in the following month; if approved, the standards return to the legislature for its review in 2018.

## OKLAHOMA

Oklahoma's Senate Bill 393, which would have empowered science denial in the classroom, failed to receive a vote on the floor of the House of Representatives on April 27, 2017, the last day on which it could do so, and is therefore blocked—for now. Since it was not voted down, it is technically still alive and it may be considered again in 2018. The bill previously passed the Senate and the House General Government and Oversight and Accountability Committee.

Are there 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).

## TEXAS

Texas's House Bill 1485, which ostensibly would have provided Texas science teachers with the academic freedom to teach "the scientific strengths and scientific weaknesses of existing scientific theories" covered in the state science standards, died in committee in May 2017, when a deadline for bills to pass committee expired. Before dying, the bill was heard in the House Public Education Committee. HB 1485 specifically identified "climate change, biological evolution, the chemical origins of life, and human cloning" as controversial.

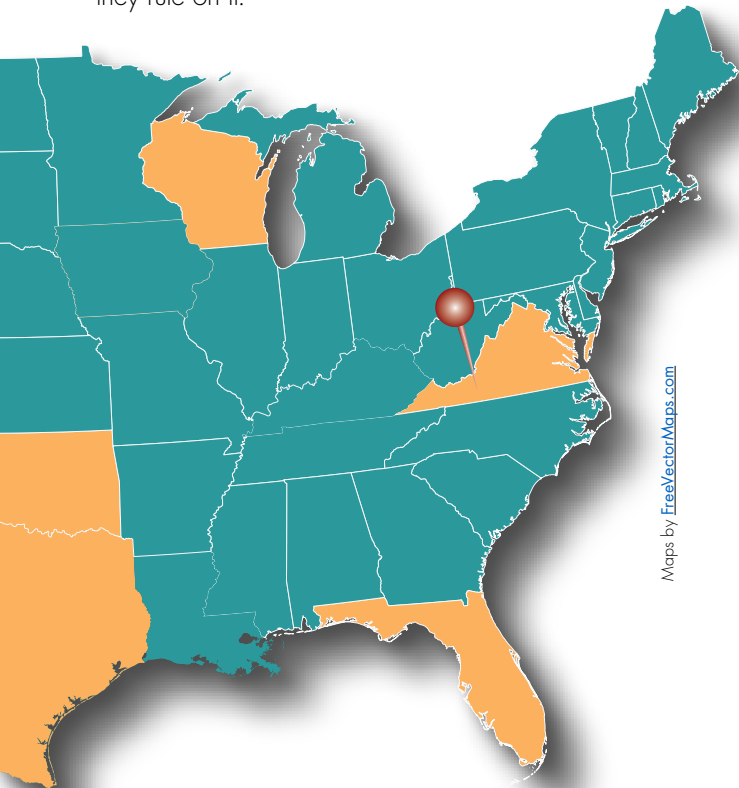
## TEXAS

The Texas state board of education voted, at its April 21, 2017, meeting, to adopt a panel's recommendations for streamlining the state science standards, which included removing the "all sides of evidence" standards—the successor to the notorious "strengths and weaknesses" standard. Three additional problematic standards, reflecting creationist ideas about the fossil record, the origin of DNA, and the complexity of cells, were replaced with what the panel regarded as innocuous versions. NCSE hailed the vote as a victory.



## VIRGINIA, CHRISTIANSBURG

In February 2017, the Christiansburg, Virginia, Parks and Recreation Department canceled a planned excursion for senior citizens to Answers in Genesis's creationist attractions in Kentucky. The decision was made in part because of a lack of interest and in part because of a complaint filed by the Freedom From Religion Foundation alleging a breach of the Constitution. A professor at Virginia Tech opined that the case law was unclear: "we don't know what a court would rule until they rule on it."



## WISCONSIN

A provision of Wisconsin's Assembly Bill 299—dubbed the Campus Free Speech Act—would require the state's public universities to be neutral on "public policy controversies," which critics allege might include evolution and climate change. The concern was seemingly validated when the lead sponsor of the bill, Rep. Jesse Kremer (R-District 59), suggested that it might protect college students who feel intimidated from expressing their opinions about the age of Earth in geology classes. Both AB 299 and a counterpart bill, Senate Bill 250, are in committee.

## SERBIA

A controversial petition challenging the teaching of evolution and calling for the teaching of creationism in the schools and universities of Serbia is apparently going to be without effect. The petition was countered by a letter from the Serbian Biological Society and allied organizations describing evolution as "the backbone of modern biology." Subsequently, in May 2017, the Serbian state news agency reported that the minister of education, science, and technological development said that the ministry will not comply with the petition.



## TURKEY

A version of Turkey's national curriculum in which evolution is absent was adopted in June 2017. A previous unit entitled "The Origin of Life and Evolution" was replaced with a unit entitled "Living Beings and the Environment," ostensibly on the grounds that evolution and the origin of life are too difficult for ninth-grade students and too "controversial." Turkish academics have protested the decision, and teachers unions have vowed both to continue to teach evolution and to challenge the new curriculum in court.



Artwork by Roy Troll © 2017 [www.trollart.com](http://www.trollart.com)

## *Reaching Out to Teachers with Respect, Admiration, ... and Poetry*

Hello, everyone! I'm the new Director of Teacher Support for NCSE. That means that our teacher-facing programs, under the umbrella of NCSEteach, are now my responsibility. While I'm new to NCSE, I'm not new to science education. I have a vision for NCSEteach, and I'd like to describe a few of the ways we plan to enhance and expand the resources we offer to science educators.

But before I get too far into that, I want to give you a little background about myself—which is, in and of itself, a bit of a challenge. Not because I am especially shy or humble, but because the path that brought me to NCSE meandered like a river. It's hard to decide where to start, or to know just how many of the oxbow lakes I've left behind to include.

I have worked in both formal and informal science education environments, teaching science and mathematics to students in every age group, from preschool children to graduate students, in both public and private schools. I have also taught methods and content courses for pre-service teachers, and designed and conducted professional development programs for in-service teachers. Additionally, I have worked with colleagues in all areas of the STEM learning community, including school districts, industry, government agencies, academic institutions, and non-profit enterprises. Throughout, I have formed many productive relationships, participated in many successful collaborations, and stimulated and supported numerous productive efforts.

Okay, so how does this relate to my role as Director of Teacher Support for NCSE? Well, I hope that it shows that I have the background to recognize the challenges teachers face, and that I understand the importance of listening. I have learned that educators must navigate challenges arising from disparate and often unforeseen directions. They need to have the discipline to maintain the integrity of their teaching while balancing the demands of their subjects, their students, and their communities. Teaching

requires empathy for a diverse range of student backgrounds and needs. It also requires sincerity, authenticity, and honesty.

NCSE has a unique approach toward equipping teachers with the scientific, pedagogical, and cultural wherewithal to teach socially—but not scientifically—controversial topics such as evolution and climate change. We know that in addition to mastering content and understanding how to present it effectively, teachers must consider their communities' norms to teach successfully. Teaching evolution in a community where most people are evangelical Christians is different from teaching it in a more religiously diverse community; teaching climate change in coal country is different than teaching it in eco-friendly San Francisco.

We know that plenty of teachers in diverse areas are already presenting evolution and climate change successfully—accurately, honestly, and completely—without raising the hackles of their communities, even where resistance to evolution and/or climate change is present. We want to empower those teachers and help them become models. That's why one of the new projects for NCSEteach is a pilot study to develop Teacher Ambassadors: master teachers with substantial expertise on teaching evolution and climate change effectively. The plan is to amplify, augment, and spread our message by recruiting these experts, getting them talking among themselves (with the aid of on-line tools), and then helping them to share their expertise, especially with new and pre-service teachers. And since behind every great teacher is a great administrator, we also plan to recruit science coordinators, principals, and others interested in helping teachers in their classrooms to the program.

Our current thinking is that we will combine face-to-face training and workshops with webinars and other on-line tools and resources. Some of the topics will be general—how to frame the issues, how to engage in respectful



dialog, how to respond to conflict—while others will focus on specific content areas, with contributions from experts in science and in science education.

As NCSE’s Executive Director Ann Reid told me in my first few days on the job, for years NCSE has been putting out brush fires—dealing with actual ongoing direct threats to the integrity of science education. As important as it is to put out the brush fires, she said, it’s also important to clear the brush, to forestall the conflagrations from occurring in the first place. I am delighted to be working as the newest sickle in NCSE’s toolshed and hope, as the Teacher Ambassador project gets off the ground in the coming months, to be clearing a lot of brush in the near future.

From my experience, I know what it’s like to adapt to changing currents and how to keep myself focused on long-range goals when the view of what lies ahead is obscured by the next bend. What I bring to NCSE is not only the product of my experiences, but also insights gleaned from the channels I have navigated, which includes one last meander I want to mention, if you will indulge me. In addition to having worked as a teacher and scientist, I am also a poet. While I am capable of keeping my roles as scientist and poet separate, both motivate my work supporting teachers. Teaching is both art and science. As a reflection on this perspective, I offer a parody of Eden Phillpotts’s poem “The Learned,” which portrays scientists and teachers, at least academic ones, as self-important oafs. With all due respect, I would argue that our motivations are not quite so self-promotional as the original poem suggests.

### **The Learned**

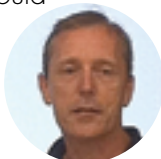
*The grey beards wag, the bald heads nod,  
And gather thick as bees,  
To talk electrons, gases, God,  
Old nebulae, new fleas.  
Each specialist, each dry-as-dust  
And professorial oaf,  
Holds up his little crumb of crust  
And cries, “Behold the loaf!”*

### **The Life of a Scientist**

*In quiet solitude and wrinkled clothes,  
each seeks a grain of truth,  
a missing link, an unknown toad,  
new nebulae, primordial ooze.  
Each specialist inspired by the unknown  
curiosity, not glory,  
holds up his small discovery  
and hopes to contribute to the story.*

I look forward to sharing news from NCSEteach as it develops, updating you on the successes of our teachers and projects, and thanking you at every opportunity—since none of our work supporting teachers would be possible without your financial support of NCSE.

**Brad Hoge** is NCSE’s Director of Teacher Support.  
hoge@ncse.com



# DINNER PARTY 101:

## Talking about Teachers



© Paula Spence

When I consider topics worth debating over dinner, the American education system rises right to the top of the list. We know that students in other countries frequently outperform ours in math and science, as shown by the Programme for International Student Assessment (PISA) tests. Almost everyone can agree that things need to change, but it seems fair to say there is little national agreement on what exactly we should do.

Unfortunately and unfairly, there are people who blame American students’ underperformance on American science teachers. If we want teachers to do a great job teaching evolution and climate change, crucial topics for understanding our world, we need to make sure they have the necessary tools. The majority of states now have standards that mandate the teaching of climate change and evolution. These standards establish crucial frameworks, but teachers need more than orders from on high to implement quality lessons in their classrooms.

But they may not receive it, owing to the Every Student Succeeds Act (ESSA) of 2015, which will dramatically change the STEM funding landscape, moving many funding decisions from the federal to the state and district level. Most of the money available for science education is contained in the block grant program under Title IV of ESSA: in, that is, the same pot as other important programs, such as health services. This will further increase competition for limited funds, as districts are forced to make tough decisions. In other words: it is going to get harder for many teachers to get the basic supplies and equipment that they need.

As members of NCSE, you care about how teachers are handling evolution and climate change in your local schools. Instead of confining your discussions to the dinner table, consider reaching out to teachers in your district and asking how you can help. They’ll more than likely appreciate the interest and support, and we’d love to hear what you learn.

— EMILY SCHOERNING



## news from the science booster clubs

### *Summer: A Time for Science!*

“My mom is really proud of you for teaching us about the scientific method and how to think like scientists.” I was not anticipating this level of praise from a fourth grader, but receiving it was a wonderful moment that highlighted why summer is my favorite time of year at NCSE. That’s when the Science Booster Clubs host their summer camps!

Our camps provide fun activities about evolution, climate change, and the scientific method. And by giving the campers a chance to interact with scientists, they help to improve student understanding of the diversity of scientific careers and, perhaps, even to inspire a few students to become scientists themselves.

In the summer of 2017, NCSE conducted Science Booster Club summer camps in Iowa and Maryland. Even though the camps were hundreds of miles apart, we used the same core SBC value of building on grassroots support to make our camps a reality.

#### **Iowa**

This year, we partnered with the Johnson County Community Centers and Iowa City Parks and Recreation to provide a three-day camp. Integrated DNA Technologies generously served as a financial sponsor for the camp for the second year in a row, allowing us to provide the experience for no cost—even meals and snacks were included. The campers all

came from a local Section 8 (federally subsidized) housing complex. This is a community where informal science opportunities are especially limited. NCSE’s Emily Schoerning notes, “We absolutely could not have served this year’s students by reaching out to individual families. To reach underserved kids, we needed to connect with their community through existing grassroots community institutions like the Johnson County Community Center.”

Once we had a (literal) busful of excited middle-school-aged campers, the next task was to give the kids a taste of just how much fun science can be. The first stop: Integrated DNA Technologies. Campers were able to tour the facility, an impressively large industrial lab in their own community. This gave our campers the valuable chance to see different types of scientists and technicians at work on many diverse projects. After the tour, the students got to extract DNA from strawberries with IDT staff. Understanding that DNA is the heritable material found in living things—even the living things we eat!—is crucial background information for discussing evolution. This was a great chance for the campers to see that DNA is a real thing, not an abstract concept.

The following day, campers went on laboratory tours at the University of Iowa Biology Department. Graduate students served as tour guides, providing another great opportunity for our campers to engage with real scientists. These tours provided campers with an understanding of how scientists

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### *Encounters with Creationists*

Science Booster Clubs across the country have engaged the public at county fairs and community festivals throughout the summer. As we’ve expanded into states like Tennessee and Virginia, and into the western half of Iowa, we’re increasingly working with socially, religiously, and politically conservative populations. Unsurprisingly, this means we’re meeting more creationists at public events. I’m pleased to report that our no-conflict approach has served us and the public well, helping to turn potentially contentious encounters into positive, engaging experiences in which everyone comes away having learned something.

For example, Brian Pinney met a creationist home-schooling mother at an event in Des Moines, Iowa, where he was presenting a couple of our newest genetics and evolution activities. The woman circled our booth a few times, observing how others were enjoying themselves, before deciding to let her family join in. While her children were learning, she spoke with Pinney for quite a long time about her reluctance to approach, and the challenge of providing a quality science education at home.

Interestingly, although she strongly identified as a creationist, her self-designed curriculum covered evolution. In her view, understanding evolution was an important part of becoming scientifically and culturally literate, and she did not want her children’s future educational opportunities to be limited. Her concern in participating in the SBC activity was not that her



*Iowa City campers removing strawberry DNA from test tubes.*

*Photo: Kyle McElroy*

conduct their research and employ scientific methods, as well as some insight into the fact that evolution isn't a set of fixed facts, but the topic of extensive ongoing scientific research.

We're proud that we were able to give our campers in Iowa a fun evolution experience, and that we were able to provide it to a really diverse audience. The scientific community needs better representation of marginalized and minority groups. By giving kids early educational and career-modeling experiences, we are doing our part to support diversity in the next generation of scientists.

## Maryland

The D.C. Science Booster Club hosted three short camps in Maryland. We partnered with the Rockville Science Center to provide four weeks of their summerlong programming for kids at nature centers and schools in the area. So unlike in Iowa, where we used field trips to bring the campers to the science, here we needed to bring the science to the kids.

Our first camp at the Croydon Creek Nature Center hosted fifteen students for three days. We discussed the methods that scientists use in their work. (This is how I wound up with a fourth grader's mom being so proud of me.) Being at a nature center was fabulous. The many hiking trails provided

children would be spiritually harmed in some way by learning about evolution, but that they would be emotionally harmed—treated with contempt or made to feel inferior either by the SBC leaders or the others participating. In the end, she and her children enjoyed the experience, and she appreciated the chance to provide her kids with an educational opportunity that didn't come packaged with judgment or negativity.

Similarly, our volunteer leader Robert Marken Jr. met a creationist family at a Fourth of July community event near Orange, Virginia. Marken and the family's grandmother had an extensive and civil discussion. The woman volunteered that she did not believe in evolution, but that she thought it was important for her grandchildren to be exposed to different viewpoints. She cared deeply about their education, and

immersive opportunities to practice observation skills. Outdoor explorations give an invaluable boost to understanding evolution in the natural world, keeping it vivid and real rather than pale and abstract. Like their Iowa City counterparts, Maryland campers extracted DNA from strawberries, coming to understand that DNA is a real thing present in the plants and animals we interact with every day. These types of hands-on activities, along with learning about the historical research of Darwin and Wallace, contributed to students' gaining a rich understanding of evolution.

We then hosted two two-week sessions of "the science of life" at the Bullis School. Here we were able to collaborate with the Towson Center for STEM Excellence and to use their kit "Mystery of the Crooked Cell." In the activity, the campers were "disease detectives" using gel electrophoresis to distinguish normal hemoglobin from sickle cell hemoglobin. It was really exciting to watch these students learn how to use micropipettes (a staple of most wetlab environments), and to make the connection between DNA and evolution. These hands-on experiences helped to illuminate the evolution of the sickle cell gene, as students came to understand the genetic outcomes of selective pressures in malaria-endemic regions.

## 2017: Double the Impact!

The Iowa City and D.C. Science Booster Clubs were able to provide summer camp activities to over a hundred kids. This was made possible by the logistical and monetary support of our grassroots partners. Our camps reached more than twice as many kids as in 2016! Here's hoping that our reach in the summer of 2018 will be even bigger.

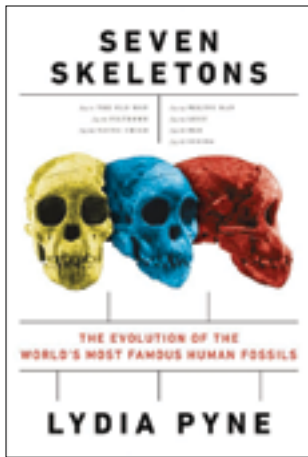
**Claire Adrian-Tucci** is the manager of the NCSE Science Booster Club Program and Regional SBC Organizer. [adrian-tucci@ncse.com](mailto:adrian-tucci@ncse.com)



wanted them to be able to learn about science and see scientific evidence for themselves. Again, this family had been cautious about engaging with us, but our open, friendly, positive approach allowed them to access information about evolution.

These are just a couple of examples of children and adults who have not only gotten a chance to learn about evolution from the SBC program, but perhaps more importantly, who have had unexpectedly positive encounters with SBC leaders representing the scientific community. There are a lot of people out there who want to learn about evolution and climate change, but aren't sure it is socially safe to do so. With the SBC program, we are learning how to make a space where everyone can experience the excitement and joy of science.

—EMILY SCHOERNING



# THE RNCSE REVIEW

## Seven Skeletons: The Evolution of the World's Most Famous Human Fossils

*author:* **Lydia Pyne**  
*publisher:* **Viking, 2016**  
*reviewed by:* **Amanda Glaze**

**T**he Old Man, Piltdown, Taung Child, Peking Man, Lucy, Flo, Sediba. What is it about these relics of human evolution that have enabled them to capture our imaginations, interest, or even ire? What elevates one fossil to international acclaim while so many others are relegated to boxes on shelves in museums? How is it that some stories of our origins win our hearts while others fail even to attract our attention?

In *Seven Skeletons*, Lydia Pyne explores each of those questions in a beautifully crafted narrative of some of the best-known fossils in human evolution. In doing so, she tells the story not only of seven individual fossils but also of the birth, development, and change of an entire field of research. She demonstrates that great science is done on a wide range of levels, from the professional to the amateur. (A particularly compelling example of the latter was the nine-year-old son of a scientist who, on a walk with his dog, stumbled on the find of a lifetime: *Australopithecus sediba*.) Throughout the book, Pyne cleverly punctuates the science she presents with cultural references and connections that provide not only humor but also context for the celebrity of the fossils. With each chapter focused on the rich history surrounding the discovery and “afterlife” of a single fossil, *Seven Skeletons* sheds

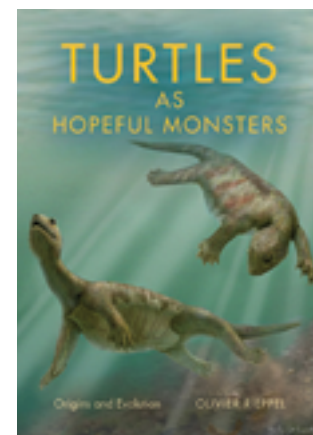
light upon the struggles, conflicts, and celebrations that accompany scientific discovery and our need for deeper connections to our human (and hominin) predecessors.

Throughout her narrative, Pyne beautifully captures the fragility and ambiguity of fame, whether of the living or the long-passed. She illustrates how a mixture of chance, necessity, and a thousand individual choices result in some fossils getting a name and others merely a museum accession number. She explores how and why the named fossils become a beloved (or notorious) part of public scientific discourse, while the unnamed—though contributing to our broad scientific understanding—remain virtually unknown. It becomes clear that the impacts of science, history, and culture can be more influential than the fossils themselves. And that, of course, explains the choice of fossils included in the text. As Pyne notes, the seven subjects of her book are far from the only hominin fossils that support and form the human evolutionary tree. But they have proved to have a life beyond bone, becoming imbued with a cultural relevance and historical power that makes them head and shoulders (as it were) above their counterparts.

I highly recommend *Seven Skeletons* to everyone who has ever looked at a fossil and wondered about its story. It will

also be of particular interest to anyone wanting to learn about the changing face of paleoanthropology and how we have come to understand the evolution of our species.

**Amanda Glaze** is Assistant Professor of Teaching and Learning at Georgia Southern University and coeditor of *Evolution Education in the American South* (Palgrave, 2017). [aglaze@georgiasouthern.edu](mailto:aglaze@georgiasouthern.edu)



## Turtles as Hopeful Monsters: Origins and Evolution

*author:* **Olivier Rieppel**  
*publisher:* **Indiana University Press, 2017**  
*reviewed by:* **Kevin Padian**

**I**n his new book, Olivier Rieppel uses the turtle, with its exquisitely unique *Bauplan* (body plan) and its intriguing early fossil record, to explore how major morphological innovations arise. Since the 1980s, evo-devo (evolutionary developmental biology) has provided great insight into how major morphological features change, of course, but the turtle presents a particular challenge, thanks to a series of ambiguous if wonderful fossils,

tantalizing developmental sequences, and problematic family trees of both molecular and morphological characters (with and without fossils).

The book explores not only the evolutionary history of turtles but also the history of evolutionary thinking about turtles, which is fraught with controversy. As the title suggests, Rieppel is particularly interested in the ideas of Richard Goldschmidt, who coined the term “hopeful monster,” and his approximate contemporary Otto Schindewolf. They did not accept that an accumulation of small mutations, naturally selected, would result in the evolution of major body

plans and the almost cyclical histories of major groups of animals. Instead, they thought that microevolution and macroevolution involved different processes. Unusual mutations that affected changes early in development would create relatively abrupt changes in morphology, some of which would be adaptive.

For their trouble, Goldschmidt and Schindewolf were excoriated by Ernst Mayr and the lions of the Modern Synthesis as heretics, and indeed, decades of genetic and populational research found little or no support for their claims. It isn't clear to what extent Rieppel really

wants to resurrect their ideas and to what extent he only wants to acknowledge their influence and pay homage to their inspiration. Be that as it may, this beautifully written book presents not only science, but also history and personalities. Moreover, it serves as a reminder that the philosophy and genesis of scientific fields are as important as their methods and materials. It is an education in itself.

**Kevin Padian** is Professor of Integrative Biology and Curator in the Museum of Paleontology, University of California, Berkeley. He is a past president of NCSE's board of directors. [kpadian@berkeley.edu](mailto:kpadian@berkeley.edu)



## Random Samples

with Lisa White



Photo: Josephine Wu, UC Berkeley

**For years, anyone—especially teachers—seeking reliable on-line information on evolution or the processes of science has turned to the University of California Museum of Paleontology's (UCMP) marvelous and comprehensive websites Understanding Evolution (<http://evolution.berkeley.edu>) and Understanding Science (<http://undsci.berkeley.edu/>). The sites were the brainchildren of longtime NCSE member Judy Scotchmoor, who retired in 2012, the same year in which she received NCSE's Friend of Darwin award. Scotchmoor's successor, Lisa White, has not only maintained the excellence of these two invaluable resources but is also overseeing the development of a third. Under the direction of Jessica Bean, UCMP is developing Understanding Global Change, to launch in 2018. Additionally, White is a leading advocate for increasing access to science, technology, engineering, and mathematics education for underrepresented groups. All this, and her office is located behind a cast of a *Tyrannosaurus rex*. Let's pick her brain!**

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

- **NCSE:** Advocates!
- **Informal Education:** Critical!
- **Engagement:** Ongoing!

*Next, short answer. In 25 words or less... Diatoms or dinosaurs, and why?*

Diatoms! Microscopic diatoms are not large or charismatic fossils, but so many fascinating revelations about Earth history come from studying diatoms and other microfossils preserved in deep marine sediments.

*What's the best way to increase minority representation and participation in STEM?*

There is certainly no magic formula, but access to authentic experiences in science, particularly in field and laboratory settings, does wonders to expose and excite young people about science.

*Describe the last time a teacher taught you something.*

This past summer I was part of an International Ocean Discovery Program “School of Rock,” a seventeen-day voyage with eighteen teachers on the JOIDES Resolution research vessel. I was a co-instructor and, throughout the expedition, I learned from my fellow instructors the value of always revisiting models and challenging ideas about Earth history.

*Finally, I happen to know you once got to touch a real live sloth. Tell me the truth: was it the most amazing experience ever?*

Yes, it was! During promotion of the NOVA special *Making North America*, other PBS programs were promoting their respective series. Sloths from a PBS Nature series made their debut at the promotional event and I was fortunate enough to touch one!

*Editor's note: I will never ever stop being jealous. Ever.*  
—STEPHANIE KEEP

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