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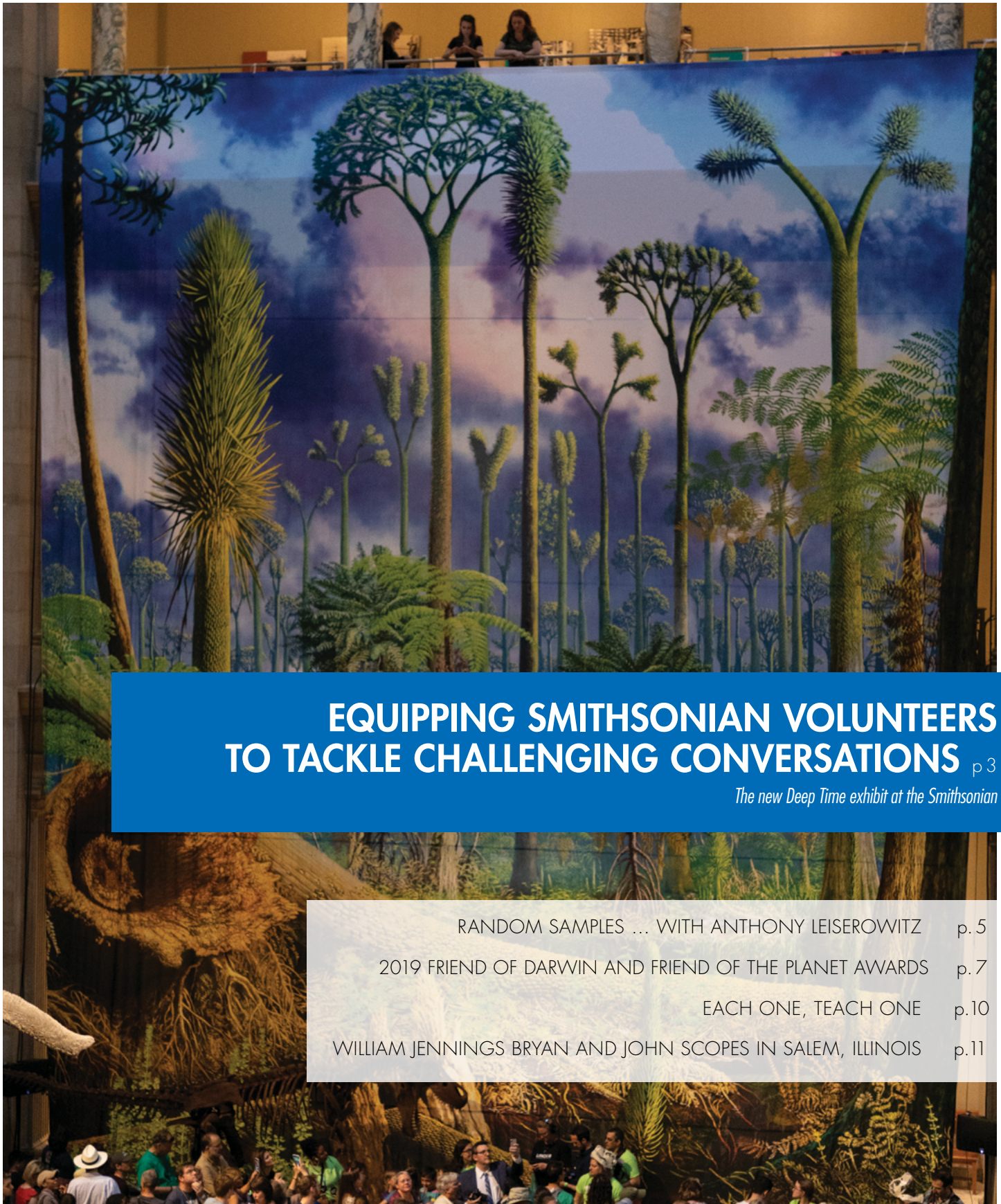

Photo Courtesy of the Smithsonian National Museum of Natural History

EQUIPPING SMITHSONIAN VOLUNTEERS TO TACKLE CHALLENGING CONVERSATIONS p 3

The new Deep Time exhibit at the Smithsonian

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Dear NCSE members,

Not long ago, as I was waiting to disembark from the back of a crowded airplane, I got into a conversation with a flight attendant, who had already gathered that I travel a lot. She asked what I did that required so much travel and I told her that we work with teachers all over the country to help them teach evolution and climate change. "Oh my gosh," she burst out, "I don't know how you can stand to deal with the ignorant people who deny climate change!"

I get this response a lot. The sentiment behind it is heartfelt but, I think, misguided. It seems that many people think that all of us here at NCSE are busy interacting with red-faced, screaming, climate change deniers and creationists, trying our best to set them straight. Not only is that *not* what we do, what we do depends on a totally different set of principles. We recognize that the primary problem is not ignorance. Furthermore, our target audience is not primarily the red-faced screamers. The problem, instead, is misconceptions, and the target audience is the people who've been confused, misled, or just turned off by the red-faced screamers.

I don't want to pretend that we're the only people who have figured out that empathy and persuasion are important ways to reach people who have, at best, just tuned out of what seems like a contentious and unpleasant topic, or, at worst, are victims of a concerted effort to deceive and confuse. We have found many partners who are interested in giving people an opportunity to engage with science in a non-condescending, non-antagonistic way. In this issue, we highlight our multiple collaborations with one such organization: the Smithsonian National Museum of Natural History. (A hidden connection: I served along with Anthony Leiserowitz, interviewed on page 5, on the advisory committee for the museum's new Deep Time exhibit, which opened in June 2019.)

I know that you as NCSE members care deeply about science and want everyone to understand what scientists know and how we know it. When people who reject important, well-established, extensively researched areas of science are splashed all over the front pages, it seems like we must constantly be waging a battle against those most extreme voices. But there is another task to be accomplished—that of giving as many people as possible the tools to see through the deceptive tactics and misrepresentations of those red-faced screamers. We are fortunate to have partners like the Smithsonian and many other science museums in this quieter but equally important duty.

I hope you'll enjoy reading about how NCSE and the Smithsonian continue to work with and learn from each other.

As always, thank you for your support of NCSE.

Ann Reid is the executive director of NCSE.
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Equipping Smithsonian Volunteers to Tackle Challenging Conversations


Interpreting the Deep Time exhibit

Photos Courtesy of the Smithsonian National Museum of Natural History

Let's try an exercise. Close your eyes and imagine your worst-case scenario describing evolution or climate change. It could involve an interaction with a student while teaching, a community member while doing public engagement, or even a family member while sitting at the dinner table. As you're putting yourself mentally in this situation, what is your visceral reaction? Are your palms sweating, are you getting flushed, or has your pulse started to race? Have you forgotten everything about science that you are sure you knew five minutes ago, or has your mind cleared, ready to overcome whatever challenges await?

NCSE has been partnering with the Smithsonian to provide training for several years on our no-conflict approach.

I always start with this exercise when I lead workshops on difficult conversations involving evolution and climate change, as I did this summer for 100 volunteer docents at the Smithsonian National Museum of Natural History. NCSE has been partnering with the Smithsonian to provide training for several years on our no-conflict approach.

With the opening of the new Deep Time exhibit, which tackles both evolution and anthropogenic climate change in a hands-on fashion, I wanted to make sure the Smithsonian's volunteers had the tools to handle even the most challenging interactions. The opening exercise accomplishes two things. First, while the potential for negative interactions is a looming specter that makes volunteers hesitant to do evolution and climate change outreach, allowing them to describe a worst-case scenario helps them understand that their abstract fears entail problems that are actually solvable. Second, it's important to recognize that we are not objective observers in our interactions with visitors. Recognizing our own tendencies during these interactions is an important part of preparing a confident response as it helps volunteers recognize the complex human emotions that they share with the visitors.

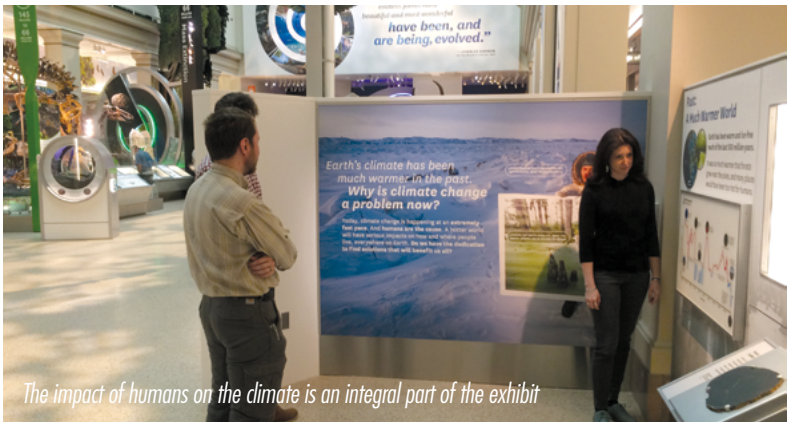
The Smithsonian volunteers knew that the Deep Time exhibit was likely to present many opportunities for these conversations. The exhibit represents a departure from the traditional walk-through-time museum display, as it connects both humans and anthropogenic climate change throughout deep time. This is true even for eras well before humans: the section on the Carboniferous invites visitors to think about coal and natural resources. Throughout, the exhibit explains changing, complex environmental systems by focusing on the role of humans in that process. The messaging is clear: while ecosystems have changed throughout time, humans are changing their environment at an unprecedented rate. The exhibit does not shy away from the negative consequences, but ultimately ends on a positive note, encouraging collective action on climate change and emphasizing human unity.

While effective and accurate communication of science is a crucial element, it is not enough to reach the most skeptical populations.

Shared humanity is also a recurring theme of the training I do with volunteers. One of the most rewarding exercises occurs midway through the workshop, where we engage in an empathy exercise to dissect five types of difficult conversations about evolution and climate change. (If you want to try this out for yourself check out our new feature, Case Studies in Empathy, on page 13.) When presented with the speakers in these scenarios and asked to explain what's going on in the speakers' minds, most volunteers make a rookie mistake: they focus on what their response should be, rather than taking the time to understand the values and fears of the person they're speaking with. Often, this takes the form of focusing on communicating the science. While effective and accurate communication of science is a crucial element, it is not enough to reach the most skeptical populations. By taking time to assign real human emotions to the visitors, volunteers can better empathize and use this newfound understanding to decide the best way to share their evidence.

The exhibits' videos presentthe human effect on climate with accuracy

For the Smithsonian volunteers, thinking about these issues had a significant emotional impact. One of our scenarios involves an elderly couple more interested in learning about the volunteer than the climate change science; the couple concludes their interaction by stating there are "both sides to every story." Our workshop participants were able to empathize with the couple and how difficult it can be to visit a science museum without kids. Volunteers mentioned that even when they visited science museums by themselves, they felt awkward and often forgotten. They then reasoned that by asking questions about the volunteers, these difficult visitors were trying to forge a human connection in a way they felt was more appropriate than doing the activity. Furthermore, their insistence on "both sides" could be a statement more about seeking recognition and a valuing of their wisdom than an attempt to be argumentative. Not only did this exercise provoke a more empathetic response to this type of climate change conversation, it also allowed us to have a broader conversation about increasing the comfort and participation of a diverse range of groups in museum education.



The impact of humans on the climate is an integral part of the exhibit

People from all over the world visit the Smithsonian, bringing a diversity of backgrounds and experiences that make this training crucial. However, traveling to DC and spending time at a science museum still presents cost and time barriers: many people, especially those far from urban centers, can't avail themselves of the opportunities for accurate evolution and climate change information afforded by the Smithsonian. Therefore, I was excited to be invited back to the Smithsonian to share this workshop with a group of Smithsonian affiliates, many working in rural areas across the country. Their worst-case scenarios were often not imaginary: one had almost lost her job over a Darwin Day event, and others were worried about the possibility of losing funding over using the words "anthropogenic climate change." All expressed, however, their appreciation of NCSE's work and this training in helping them reach those populations hesitant about science.

People from all over the world visit the Smithsonian, bringing a diversity of backgrounds and experiences that make this training crucial.

Kate Carter is NCSE's Director of Community Science Education. carter@ncse.com

Photo courtesy Anthony Leiserowitz

RanDom Samples with Anthony Leiserowitz

Anthony Leiserowitz is Director of the Yale Program on Climate Change Communication and a Senior Research Scientist at the Yale School of Forestry and Environmental Studies. He is an expert on public climate change beliefs, attitudes, policy preferences, and behavior, and the psychological, cultural, and political factors that influence them. He conducts research at the global, national, and local scales, including many studies of the American public. He also conducted the first global study of public values, attitudes, and behaviors regarding sustainable development and has published more than 200 scientific articles, chapters, and reports. He has served as a consultant to the John F. Kennedy School of Government at Harvard University, the United Nations Development Program, the Gallup World Poll, and the World Economic Forum. He is a recipient of a Mitofsky Innovator Award from the American Association of Public Opinion Research. He is also the host of Climate Connections, a daily radio program broadcast on more than 500 stations and frequencies nationwide.

We spoke with Leiserowitz recently about his work at the Yale Program on Climate Change Communication—a recipient of NCSE's Friend of the Planet Award—and as one of a group of advisors to the Smithsonian National Museum of Natural History's recently unveiled Deep Time exhibit. The exhibit focuses on the evolution of life, with an emphasis on how organisms have interacted with each other over time, and how they've interacted with Earth and its climate.

Paul Oh: The namesake donor of the Deep Time exhibit was the late David H. Koch, who funded not only scientific exhibitions at institutions like the Smithsonian and the American Museum of Natural History but also organizations promoting climate change denial. Did you find that problematic?

Anthony Leiserowitz: My first priority—and I think this was true for all the scientific advisors—was making sure there was a tall, wide, and impermeable firewall between the source of the funding and the exhibit's content. I think everybody involved was deeply, and rightfully, concerned about that and didn't want to be associated with something that tried to downplay climate change or the human impact on the planet. The leadership of the Smithsonian made it clear that wasn't going to be the case. That was step one: we all needed to be confident that this exhibit was going to follow the science.

PO: What were you hoping to see?

AL: One thing I encouraged the museum to do was to try to help visitors engage with the exhibit on a more individual and personalized level and not tell the story of the Anthropocene solely through data and scientific abstractions. One of the most powerful means to engage people is by sharing the personal stories of people experiencing the impacts of global environmental change and, even more importantly, people that are taking action within their own lives to make a difference.

I also encouraged the museum to include diverse voices. More than just scientists, they should represent a variety of people from different walks of life, especially because the Smithsonian attracts so many visitors from all over the US and around the world. My sense is from the video stories embedded in the exhibit that the museum did manage to include a lot of personal narratives and diversity even within the confines and constraints of a single exhibit.

I also encouraged the Smithsonian not to focus solely on a narrative of doom and gloom. Of course it's important that visitors understand what humans have done and are continuing to do to the planet. At the same time, it's vitally important for visitors to understand that we can solve these problems, that we have the capacity right now to address these issues. Moreover, that we get to choose. Human beings are the authors of our own history and we have a lot of unwritten pages in the book of human history ahead of us. We have the opportunity to create the future we actually want to live in.

PO: Let's turn to your work as Director of the Yale Program on Climate Change Communication. What surprises you most about the data you've collected over time?

AL: Right now, one of the most important things we're seeing is around the 2020 election. We've been tracking the importance of climate change as a voting issue for Americans as a whole, but more specifically within each political party. And what we've seen is that climate change is moving up the ranks of the most important national issues for voters. For years, climate change has been at the bottom of most issue priority rankings. What we've found in our most recent study is that global warming

news from the **membership**

NCSE is pleased to congratulate **Naomi Oreskes,** professor of the history of science at Harvard University and a member of NCSE's board of directors, on her election to the American Philosophical Society in May 2019. The oldest learned society in the United States, the APS was founded in 1743 by Benjamin Franklin for the purpose of "promoting useful knowledge."

Photo: George Katrinos

NCSE is proud to congratulate **Ben Santer,** a member of NCSE's board of directors and a climate scientist at Lawrence Livermore National Laboratory, on winning the 2019 Sigma Xi William Procter Prize for Scientific Achievement, bestowed "to a scientist who has made an outstanding contribution to scientific research and has demonstrated an ability to communicate the significance of this research to scientists in other disciplines." The prize recognizes the importance of Santer's work on natural and human "fingerprints" in observed climate records. "His early research contributed to the historic 1995 conclusion of the Intergovernmental Panel on Climate Change: 'the balance of evidence suggests a discernible human influence on global climate.'" Also recognized were his efforts to communicate climate science to a wide range of audiences. Santer will deliver a lecture at Sigma Xi's annual meeting and student research conference in Madison, Wisconsin, November 14–17, 2019, where he will also receive a bronze statue, a commemorative certificate, a $5000 award, and a $5000 award to aid the research of a younger colleague. Previous recipients of the Procter Prize include Margaret Mead, Lynn Margulis, Jane Goodall, Murray Gell-Mann, and E. O. Wilson.

In a blog post for *Scientific American* (April 10, 2019), **David Westmoreland,** professor of biology at the United States Air Force Academy, discussed his approach to teaching evolution to the unusual audience of "a hundred saffron-clad Tibetan monks" taking a two-week crash course on evolutionary theory. "I have learned to deliver information in a conversational way, to use facial expressions as deliberately as speech, and to follow my gut instincts in unexpected directions," he concluded. "Most importantly, I learned that it is critical to humanize myself before expecting anyone to invest trust in what I am saying."

—GLENN BRANCH

is now number 17 among registered voters—not a top-tier issue, but higher than in years past. Among conservative Republicans, global warming is 29th out of 29 issues. Among moderate Republicans, it's 23rd. So better, but still a bottom-tier issue. Among moderate and conservative Democrats, however, it's 8th. And among liberal Democrats, it's 3rd. And protecting the environment is number 2. So for the first time in American history, global warming and the environment are among the top three issues for the progressive base of one of our major political parties. Every single one of the candidates running for the Democratic presidential nomination has said climate change is an important issue and that they'll make it a priority in their administration. And I don't think that's a coincidence. Climate change is now an issue that primary voters in one party care deeply about. I think that's fascinating and really important. But the data also demonstrate that this country is still very polarized on this issue.

PO: NCSE deeply appreciates the data you've collected and—importantly—made freely available and easy to use. How do you see your work and NCSE's complementing each other?

AL: Fundamentally, NCSE helps the public better understand science to inform decision making. And that's what we do and are continually trying to figure out: what do Americans understand, or not understand, about climate change? What do they need to know and how best can you engage them? What are the critical understandings they need to make informed decisions? What are the barriers—emotional barriers, political barriers, ideological barriers—getting in the way of people being able to hear, understand, and engage with what scientists and scientific institutions are trying to tell them? Facts do not speak for themselves; people are different and they interpret information in different ways. Evolution, climate change, vaccines: each issue demonstrates that reality on a daily basis. Unfortunately, not everyone just hears the facts about climate change and suddenly says, "I've got it." We live in a rich and complex political, social, and cultural landscape, and our work—the work of both organizations—reflects this.

—PAUL OH

2019 Friend of Darwin and Friend of the Planet Awards


Jim Krupa

NCSE is pleased to announce the winners of the Friend of Darwin award for 2019: **Jim Krupa**, Professor of Biology at the University of Kentucky; **Joe Thornton**, Professor of Human Genetics at the University of Chicago; and **Lacey Wieser**, the former director of K–12 Science and STEM in the Arizona Department of Education who resigned in 2018 in protest of then Superintendent of Public Instruction Diane Douglas's attempt to undermine the treatment of evolution in the state's science standards.


Joe Thornton


Lacey Wieser

"Jim Krupa is a biology instructor *par excellence,* teaching literally tens of thousands of students over the last two decades—with evolution always front and center," commented NCSE's executive director Ann Reid. "Evolution, in particular the evolution of genes and the proteins they code for, is also front and center in Joe Thornton's important and influential research. And Lacey Wieser felt so strongly about evolution education that she continued to advocate for its place in Arizona's science standards even after her resignation."

NCSE is also pleased to announce the winners of the Friend of the Planet award for 2019: Climate Parents,


Lisa Hoyos

a national movement mobilizing for clean energy and climate solutions, directed by **Lisa Hoyos**; **Heidi Cullen**, the former chief scientist of Climate Central and now the Director of Communications and Strategic Initiatives and the Director of the Information and Technology Dissemination Division at the Monterey Bay Aquarium Research Institute; and the Paleontological Research Institution, directed by **Warren D. Allmon**.


Warren D. Allmon

"Heidi Cullen is a tenacious and effective specialist in climate change communication," Reid explained, "while the Paleontological Research Institution—already a leader in informal evolution education—deserves special praise for The *Teacher-Friendly Guide to Climate Change* (2017), the single best available resource for teachers on climate change." She added, "And Climate Parents has been a valuable and effective partner of NCSE's in working against assaults on climate education, especially in Arizona, New Mexico, and South Dakota."


Heidi Cullen

The Friend of Darwin and Friend of the Planet awards are presented annually to a select few whose efforts to support NCSE and advance its goal of defending the teaching of evolution and climate science have been truly outstanding. Previous recipients of the Friend of Darwin award include Niles Eldredge, Susan Epperson, Edward J. Larson, and the plaintiffs in *Kitzmiller v. Dover.* Previous recipients of the Friend of the Planet Award include Kerry Emanuel, Katharine Hayhoe, and the Yale Program on Climate Change Communication.

UPDATES

ncse.com/updates

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

CONNECTICUT

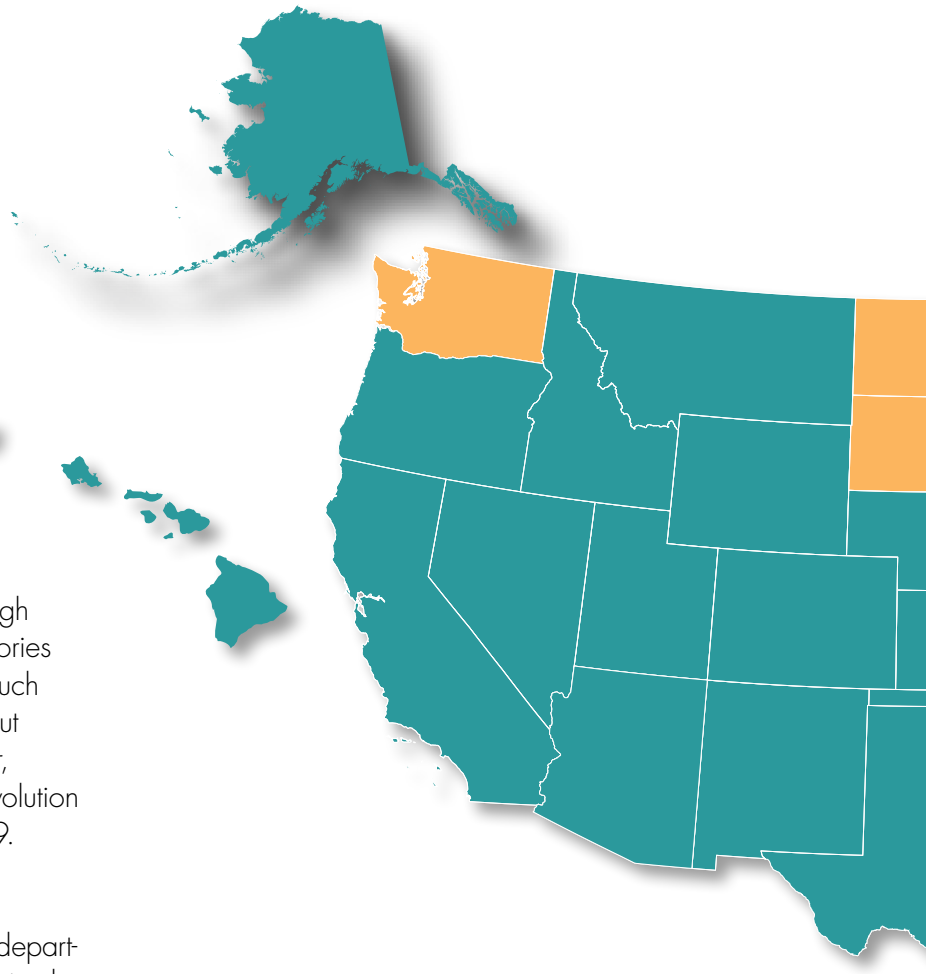
Connecticut's House Bill 5955 would have "eliminate[d] climate change materials" from the Next Generation Science Standards as used in Connecticut, describing climate change as "a controversial area of information," while House Bill 5922 would have rescinded Connecticut's adoption of the NGSS altogether. Both bills were sponsored by John E. Piscopo (R–District 76), who has a record of introducing legislation and working with organizations, including the Heartland Institute, that dispute anthropogenic climate change; both died in committee in March 2019.

FLORIDA

Florida's Senate Bill 330 would have required "[c]ontroversial theories and concepts" discussed in science standards "[to] be taught in a factual, objective, and balanced manner." Although there was no indication in the bill about which "theories and concepts" are deemed to be "controversial," much less any guidance about adjudicating disputes about which are and which are not, the bill's sole sponsor, Dennis Baxley (R–District 12), has a history of antievolution advocacy. SB 330 died in committee in May 2019.

IOWA

Iowa's House File 61 would have required the state department of education not to "adopt, approve, or require implementation of the [N]ext [G]eneration [S]cience [S]tandards by school districts and accredited nonpublic schools." Iowa adopted the NGSS in 2015. In a 2016 interview, the bill's sponsor, Skyler Wheeler (R–District 4), declared, "I also oppose NGSS as it pushes climate change … NGSS also pushes evolution even more." The bill died in committee in March 2019.

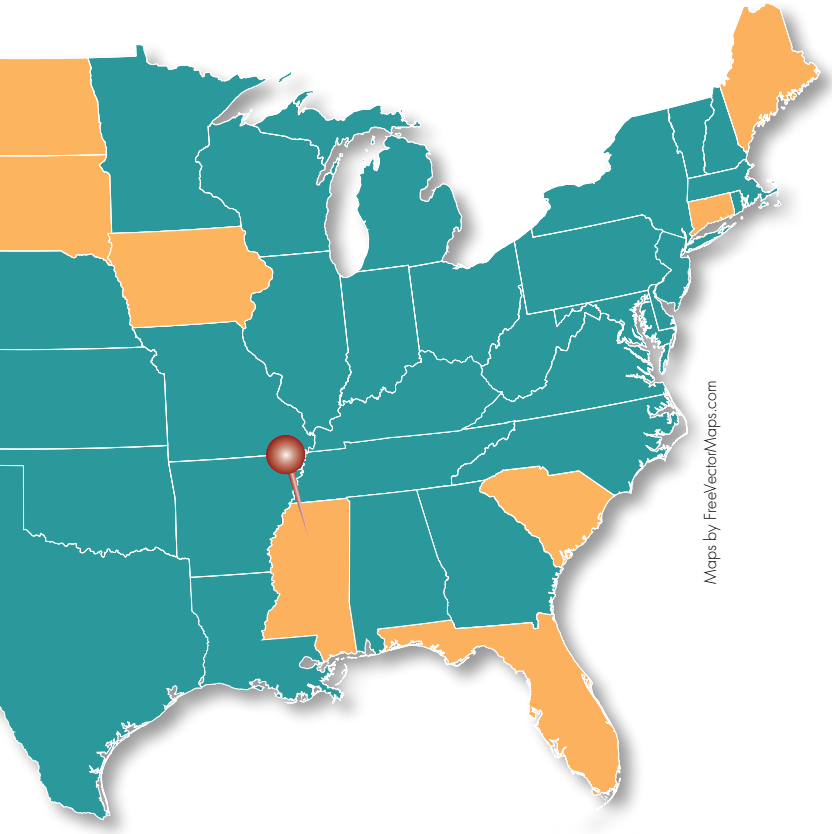


LOUISIANA, BOSSIER PARISH

A settlement was reached on January 22, 2019, in *Does v. Bossier Parish School Board*, a case before the United States District Court for the Western District of Louisiana. The school system was accused of promoting religious beliefs, including by tolerating teachers "reportedly … praising creationism in class and attempting to discredit the scientific theory of evolution." Americans United for Separation of Church and State, representing the anonymous plaintiffs, described the settlement as "a huge win."

MAINE

Legislative Document 589 (House Paper 433), prefiled in the Maine House of Representatives, would have required the state board of education to adopt a code of ethics to prevent public school teachers in the state from engaging in "political or ideological indoctrination." Teachers would have been prohibited from taking a stand on any topic that is mentioned in the platform of any political party—which includes evolution and climate change. The bill was defeated in committee in February 2019.



NORTH DAKOTA

House Bill 1538, ostensibly intended to promote "the freedom to teach students the strengths and weaknesses of scientific theories and controversies" while prohibiting state and local administrators from exercising supervisory responsibility over teachers, was introduced on January 14, 2019, and then withdrawn by its chief sponsor, Jeff A. Hoverson (R–District 3), on January 24, 2019. No scientific topics were specifically identified as controversial, although evolution and global warming have often been cited, wrongly, as controversial in similar bills elsewhere.

SOUTH CAROLINA

House Bill 3826 would have allowed public school districts to offer elective courses on religion—and to "require the teaching of various theories concerning the origin of life, including creation science[,] as part of the course content." The bill, which would also have required display of the motto "In God We Trust" in classrooms, was sponsored by Dwight A. Loftis (R–District 19) and James Mikell "Mike" Burns (R–District 17). It died in committee in April 2019.

SOUTH DAKOTA

House Bill 1113 and House Concurrent Resolution 1002 would have required and urged, respectively, the adoption of a code of ethics for public school teachers to prevent them from engaging in "political or ideological indoctrination." The proposed code would have prevented teacher from taking a stand on any topic that is mentioned in the platform of any political party—which includes evolution and climate change. HB 1113 died in committee; HCR 1002 was withdrawn by its chief sponsor.

SOUTH DAKOTA

House Bill 1270 would have allowed the misrepresentation of science in the public school classroom, using the familiar "strengths and weaknesses" language. Although no specific scientific topics were mentioned, the language of the bill matched the language in bills explicitly aimed at disputing evolution and/or climate change, including South Dakota's SB 114 in 2015. The bill passed the House Education Committee on a 8–6 vote but was then decisively defeated on the floor of the House in February 2019.

WASHINGTON

A pair of identical bills in the Washington state legislature, House Bill 1496 and Senate Bill 5576, were aimed at "establishing a comprehensive initiative to increase learning opportunities and improve educational outcomes in climate science literacy." Both bills would have placed a new emphasis on sustainability in required areas of instructions and provided grants to provide teacher training in the Next Generation Science standards, "including climate change standards" in particular. Both bills died in committee in April 2019.

EACH ONE, TEACH ONE

Photo: Mary Morrow

Mary Morrow describes herself as a "PD junkie."

"I attend about every professional development workshop I can," Morrow, an NCSE Teacher Ambassador, recounted recently as she discussed her role organizing and facilitating a two-day professional learning opportunity focused on NCSE's five climate change lessons. A 31-year veteran of the Lincoln, Nebraska, Public Schools, Morrow brought 20 teachers from the region together to the University of Nebraska State Museum in the summer of 2019 to meet, learn, and connect with local scientists.

As a PD junkie, Morrow understands first-hand what teachers are looking for from these kinds of experiences: not only ready-to-go classroom-tested activities but also an opportunity to go through the activities carefully and thoroughly—and to have a little fun along the way.

Morrow kicked off the event by showing a video featuring NCSE's Executive Director Ann Reid in which she discusses the fact that many high school teachers acknowledge lacking confidence in teaching climate change or avoiding teaching the topic altogether. "Well, that was me however many years ago," Morrow explained. She, too, avoided teaching about a topic that was and continues to be socially contentious. "That was at a time when there was a lot of climate denial. And I was a little shy about teaching it, because I didn't have the background or the data. As a teacher, I wanted to understand the evidence to answer students when they queried me about what was going on."

Morrow guessed—correctly, as it turned out—that many of the teachers attending her workshop were in the same boat she found herself in years ago.

Over the course of the two days, Morrow had the teachers delve into each of the five lessons to understand the science and pedagogy behind them, as well as consider ways to modify the lessons to meet their individual needs as teachers. She also focused on the misconception-based aspect of each of the lessons, which she explained is crucial in helping the teachers, and by extension their students, become critical consumers of science, particularly climate change science.

Along with planning the workshop content, Morrow also solicited participants by spreading the news about the workshop through her various contacts including at the Nebraska Department of Education. And she secured the venue through a researcher she knows at the museum, David Harwood, who studies ice cores and is one of the scientists who helped Morrow better understand the current climate crisis. The museum has opened a new exhibit called "Cherish Nebraska" that's focused on climate change impact in the state, and was very receptive to hosting a teacher workshop on climate change. Holding the workshop there had numerous benefits, Morrow said. It was a comfortable, attractive setting. And Morrow was able to schedule several guest speakers from the university, one of whom treated the teachers to an evolution demonstration about the various species of horses in Nebraska over time, which they found utterly fascinating and informative. Another, Clint Rowe, spoke about climate modeling. Perhaps most importantly, hosting at the university allowed the teachers to connect with these scientists and see how open those in the scientific community are to working with educators.

Morrow discovered years ago that scientists welcome working with teachers and she's found their input to be invaluable. "One thing that always concerns me is that you can design a really neat activity, but it won't be usable if the science isn't right," Morrow said. Asking an expert to review materials for scientific accuracy has been incredibly helpful to her over the years.

Morrow is on the leading edge of NCSE Teacher Ambassador work in the coming year. The Teacher Ambassadors are all attempting, as Morrow did, to plan, find the resources for, and lead professional development activities that will help their colleagues become more confident and skilled at teaching about climate change, evolution, and the nature of science. The work will happen in areas of the country, like Nebraska, where there's a demonstrated need.

Based on the response of her participants, Morrow deemed the two-day workshop a success. "There were a number of teachers saying, 'I'm going to use this in my environmental science class, I'm going to use that in the fall, I'm going to use this in the spring.' I think it's empowering for these teachers that they start the school year with something ready to use, provided by NCSE." Another sign of success: Morrow has already been contacted by some of the participant teachers' districts and asked to provide additional resources.

And this is just the beginning. Morrow is presenting on the NCSE work in November 2019 at the Nebraska Association of Teachers of Science conference, and she's contemplating how to schedule professional development workshops in the more rural western part of the state, where there is widespread misunderstanding of climate science.

"It's all about spreading the word," Morrow explained. "Each one, teach one."

Paul Oh is NCSE's Director of Communication. oh@ncse.com

William Jennings Bryan and John Scopes in Salem, Illinois

Photos: Rndyy Moore

Anti-evolution crusader William Jennings Bryan was born in this house in Salem, Illinois, on March 19, 1860.

William Jennings Bryan (1860–1925) was the most famous of John Scopes's prosecutors at Dayton, Tennessee, in 1925. Bryan was born in Salem, Illinois, on March 19, 1860, in the house at 408 South Broadway (above). This three-bedroom house, which was built in 1852 for his father, Judge Silas Lillard Bryan (1822–1880), and mother, Mariah Elizabeth Jennings (1834–1896), is now the William Jennings Bryan Birthplace Museum. The museum includes, among other things, photos, newspaper clippings, awards, books (e.g., *The Menace of Darwinism*), the office chair that Bryan used as Secretary of State, the uniform worn by Bryan in 1898 in the Spanish-American War, life masks of Bryan and his wife Mary (created by Gutzon Borglum, the sculptor of the memorials at Mt. Rushmore), memorabilia from Bryan's three campaigns for president, trophies from the National Dry Federation for Bryan's promotion of prohibition, and a cast of Bryan's fist (also created by Borglum).

When he was six years old, Bryan moved to a 13-room, two-story home at the 600-acre Silas Brown Estate near today's Bryan Memorial Park in Salem. In the 1940s, the house burned down. The house built in 1991 at the site incorporated bricks from Bryan's home in its driveway.

Bryan attended Salem Academy at 531 North College, which was later destroyed by a tornado and never rebuilt. Bryan was a member of the Cumberland Presbyterian Church (now First United Presbyterian Church) at 201 East McMackin. Later in his life, Bryan gave the church its ornate, inlaid podium. Later in his life, Bryan returned often to Salem to give speeches, several of which were heard by John Scopes, who graduated from high school there. The Marion County Courthouse in Salem's town square houses a mural by local artist June Goldsborough, dedicated in 1995, depicting Bryan's early years.

On North Broadway, across from Bryan Memorial Park, stands a large, bronze statue of Bryan. On the base is inscribed a sentence from Bryan's famous 1896 "Cross of Gold" Speech: "You shall not press down upon the brow of labor this crown of thorns. You shall not crucify mankind upon a cross of gold." This statue, which was created by Borglum, was dedicated in West Potomac Park in Washington DC, by President Franklin D. Roosevelt on May 3, 1934. Bryan's statue was later moved to clear the way for a new approach to Theodore Roosevelt Bridge, which opened in 1964. After lying in a vacant lot owned by the National Park Service for several years, the 1225-kg, 2.4-m (2,700-pound, 8'-high) statue and its 13290-kg (29,300-pound) marble base was moved by Salemites in 1961 to Salem, where it now stands. (John Scopes was invited to the dedication, but he got sick on the way to Salem and did not attend.) The transfer of Bryan's statue to Salem was the first time a Washington Park Service statue had ever left the capital.

When John Scopes's family moved to Salem in 1917, they attended Cumberland Presbyterian Church and lived in Badollet House at 310 North Washington. The two-story Italianate house, which had been built in 1854 for Howard and Tabitha (née Pace) Badollet, had been a stop on the Underground Railroad system; it was also the first brick home in Salem. The house was restored in the 1990s and was a bed and breakfast until 2018, but it is now a private residence. When Scopes graduated from Salem High School on May 16, 1919, Bryan was the commencement speaker. At that service, which was held at Salem's Methodist Episcopal Church (today's Grace United Methodist Church at 116 East Schwartz), Scopes and three of his classmates interrupted Bryan's talk with "boyish frivolity" and laughter, which both Scopes and Bryan remembered when they met in Dayton six years later. Bryan's birthplace, Badollet House, and Salem's Methodist Episcopal Church are all on the National Register of Historic Places.

In 1917, John Scopes and his family moved into Salem's Badollet House.

WJBD radio, which began broadcasting in 1972, is at 310 West McMackin. The first three of the station's call-letters (i.e., "WJB") honor Bryan. The "Commoner" part of the *Salem Times-Commoner* newspaper headquartered at 120 South Broadway honors Bryan, who was often called "The Commoner" or "The Great Commoner" and whose political newspaper titled *The Commoner* was published in Lincoln, Nebraska, from 1901 to 1923.

When Bryan's wealthy friend and supporter Philo Bennett of New Haven, Connecticut, died in 1903, his estate included $1,500 for a library to be built where Bryan was born. Bryan matched Bennett's contribution and the Bryan-Bennett Library opened in 1909. (To fit the library onto the corner lot, Bryan's house was moved 2.4 m [8'] south.) The library's first books were bought with money donated by Bryan. The library moved in 1986 to Main Street, and in 2008 to its current location at 315 South Maple.

Randy Moore is the H. T. Morse Distinguished Professor of Biology at the University of Minnesota, Twin Cities. His most recent book is *Galápagos Revealed: Finding the Places that Most People Miss* (Fairfax, VA: Galapagos Conservancy, 2019). For more on Bryan and Scopes, see Moore's *A Field Guide to the Scopes Trial* (Dayton, TN: Rhea County Historical and Genealogical Society, 2016.) Rmoore@umn.edu

MEET THE NEW COHORT OF GRADUATE STUDENT OUTREACH FELLOWS

Thanks to the generous support of the Carver Foundation and the University of Iowa Graduate Challenge Grant, NCSE has been able to take on a second cohort of Graduate Student Outreach Fellows starting in August 2019. This cohort, which includes University of Iowa graduate students in biology, anthropology, and geography, united by their research in evolution and their shared passion for engaging the public, follows on the heels of our successful first cohort of graduate student fellows (see *RNCSE* 2019 Spring; 39:2).

During their first meeting of this year-long fellowship, the new fellows participated in a roundtable discussion about the growing importance of effective science communication. In addition to discussing the nature of science, they also flaunted their artistic skills as they painted a patchwork mural. (Read excerpts of the conversation below, along with a photograph of the completed mural.) You can find out more information about the Outreach Fellowship program, including how you can apply, by e-mailing Emma Doctors at doctors@ncse.com.

Christie Vogler is a Ph.D. candidate in the anthropology department at the University of Iowa with an emphasis on archaeology. Her research employs middle-range theory and small-artifact distribution analysis to examine the occupational roles of Roman women during the 1st–3rd century CE. She is also a former educator with the Iowa Children's Museum where she helped develop STEM programming for elementary school-aged children,

Joe Jalinsky is a Ph.D. candidate in biology at the University of Iowa. His research focuses on the genomic and phenotypic changes that occur when species transition from sexual to asexual reproduction. He has been involved with science outreach for over five years.

Rachel Larson has a M.S. in biology from California State University Northridge and is currently a Ph.D. student in biology at the University of Iowa. She studies wildlife in urban and suburban areas. Her master's work examined coyote diet across the gradient of urbanization in Los Angeles, California. She hopes to continue similar research in her dissertation, understanding which landscape and habitat features attract wildlife to cities in the Midwest.

As a master's student, **Briante Najev** studied the snail communities of the Lower Rio Grande Valley and the effects of human disturbance and urbanization on these communities. Her research also compared snail and vegetative community compositions in the last remaining Tamaulipan thorn forest in the lower Rio Grande Valley of the US. She is interested in continuing her education in ecology by studying the biological invasion and phenotypic plasticity of Potamopyrgus Antipodarum, the New Zealand mud snail.

Kate Carter: What was the first thing that you remember that got you interested in science?

Christie Vogler: I received the question "What do you want to be when you grow up?" a lot. The first thing that came to my mind was to be a vet since I loved animals. That quickly turned into an interest in being a zoologist, then an anthropologist when I started taking college courses. The interest in archeology came from doing excavations in my backyard with my brother when I was little. We found these lava rocks, and learned later that there was an

Photo: Kate Carter

Case Studies in Empathy

With this issue we are debuting a new feature, Case Studies in Empathy. Practice your empathy skills as we unpack potential reasons behind climate change and evolution hesitance and resistance and discuss best practices for engagement.

Scenario: Mei, 19
Imagine you are leading a hominin skull activity at a local science festival. Mei approaches your table and seems interested in doing the activity. She knows some of the vocabulary (for example, she uses "encephalization" correctly) but is very eager to learn even more about evolution. She eventually says that she grew up believing in creationism, but her first-year biological anthropology class is making her consider evolution.

What Might Be Going On
College lets you explore worldviews that may be different than what is the norm in your hometown milieu, which can lead to lots of questioning of values and beliefs. Students struggling with these issues often have difficulty separating beliefs from the people that hold them. Helping students realize that they can explore science without having to reject their families is important to help reduce their initial resistance to evolution.

Since this scenario takes place during public outreach, you might also consider that Mei has chosen a relatively safe place, unlike her classroom or her home, to imagine what it's like to be a scientist. If this interaction goes poorly for her, she doesn't have to interact with you again. Mei probably wants a really positive encounter, as she has not only approached you but also shared lots of background to help guide your interaction.

What Should You Do?
Fundamentally, Mei is looking for validation: she wants to be reassured that it's okay for her to accept evolution while still being a part of her loving family. She has taken a brave step and shared an essential part of herself in an environment where she's unsure how that action will be received. Engaging her with the knowledge she already has is a great start, but what she's really after is your response to her background. Disparaging her family or making her feel caught in between two disparate choices might cause her to feel more nervous pursuing evolution. You can share your experiences with your own creationist family members, if relevant, or at least acknowledge that it might be a difficult internal struggle for her. Help her understand that this is a common occurrence and that she doesn't necessarily have to make a choice between science and her family. Since she has shown so much interest in evolution, you might want to end by helping her take the next step. Is there a public lecture or local museum exhibit she might enjoy? Guiding her towards other places where she can try out the scientist identity without conflict may help her gain confidence in her knowledge and abilities. You might be able to guide a future scientist!

old blacksmith shop in our backyard. I learned that I loved digging things up, and I haven't stopped since.

KC: What are your favorite memories of moments of discovery?

Joe Jalinsky: One of my favorite discovery moments was during an exhibit where there were caterpillars that were munching on leaves. There was a directional microphone on a caterpillar. There's so much of the natural world that we don't readily experience that's happening all around us. That was my realization that there's so much that we can't perceive.

KC: How would you sum up your understanding of science today?

Rachel Larson: Science is the process of discovery. A child's interpretation of things is one hundred percent genuine, unfiltered and not riddled with preconceived notions.

Christie Vogler: What's cool about archaeology is that you never truly know the answer because you can't talk to the people of the past about what happened … In anthropology we try to bring in the human element. The idea that science begins where magic and religion ends. Science is a way of explaining the world in a way where magic and religion used to. Humans always shape knowledge in new and different ways, and science is the newest way of explaining the world.

Briante Nagev: I just got out of a class about scholarly integrity. We had to go through situations where one of our lab mates falsified data on their newest experiment, and role play. You had many options of how to go forward.

KC: How do we help frame people's observations and understanding in a scientific way?

Rachel Larson: You don't have to be a traditional scientist in a lab coat to engage in science. You can be discovering something about the organisms that live in your backyard or you notice a strange chemical reaction that occurs while you're in the kitchen—that's science still.

Joe Jalinsky: There is a lot of room for creativity with the scientific method—there isn't just one way to do science. Depending upon your personality, etc., there's room to discover in your own way. Your own way of designing your experiment as an example. Science is fun for me because there are different ways to complete the same task.

KC: What do you think is a barrier, in the Iowa City community, to understanding science or engaging with science?

Joe Jalinsky: It's a misconception that in science you have to be a genius to do science. You can still do good work if you're not a genius.

Briante Nagev: If we give them moments of success, they can learn from them. That is a positive engagement in science.

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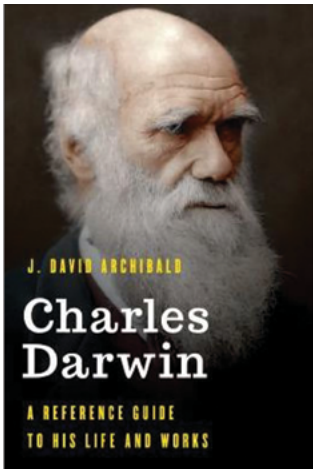

Charles Darwin: A Reference Guide to His Life and Works

author: **J. David Archibald**

publisher: **Rowman & Littlefield**

reviewed by: **Adam M. Goldstein**

J. David Archibald's *Charles Darwin: A Reference Guide to his Life and Works* is a welcome addition to the literature on Charles Darwin and evolutionary biology. Working scientists, historians and philosophers of science, and researchers in allied fields with an interest in Darwin will want to add it to their collections, as will enthusiasts; and it will serve K–12 teachers admirably as a source for clarifying vocabulary and concepts students are likely to encounter in lessons on Darwin and early ideas in evolutionary biology, or in their own efforts to learn about the subject.

Archibald is well-placed to write about Darwin. A paleontologist, he is an emeritus faculty member in San Diego State University's Biology Department, in the Evolution concentration; he is also curator of terrestrial mammals in SDSU's Museum of Biodiversity. Highlights of his work include an extensive list of publications detailing fossil discoveries on numerous paleontological expeditions. Nonetheless, he has the temperament of a scholar. The result is that the *Reference Guide*'s prose is eminently readable, in the utilitarian spirit of scientific writing, while its treatment of the subject reflects a humanist's interest in history, bibliography, and the conceptual foundations of the subject.

The front matter of the book includes a map of Darwin's voyage on the *Beagle*, a genealogy of Darwin's family, and a chronology. The chronology, especially detailed, invites browsing, and at the same time, is eminently useful for confirming details about a particular date. It lists dates of important events in Darwin's life, such as his marriage, and traces the course of his lifelong illness. It also provides dates of important events in his scientific career, including visits with colleagues, his attendance at scientific meetings, and milestones in his scientific work, for instance, providing a month-by-month account of his progress in 1857 on his "big book" on evolution, of which the *Origin* was an "abstract."

The bulk of the book is comprised of the entries, organized alphabetically. Archibald covers such a range of topics, but writes so concisely about each, that the *Reference Guide* is far more efficient than Internet searching, especially given the considerable authority Archibald brings to the subject. A lengthy index further enhances the usefulness of the entries. The entries describe concepts, people, places, events, scientific works and documents, and organisms. Archibald maintains his tight focus throughout on Darwin, his influences, and the scientific research in the generation immediately following Darwin: readers looking for information about the state of evolutionary biology today are advised to look elsewhere. Notable exceptions are the entry on the Modern Synthesis and the several entries on present-day archives of Darwin's work, such as the Darwin Manuscripts Project and the Darwin Correspondence Project. The entries are extensively cross-referenced: in addition to an ample number of "see also" entries, words in an entry that form the subject of another are set in boldface. Only a few entries extend beyond one page in length, making for a quick read. Despite this, Archibald captures subtleties. For instance, in "Finches, Darwin's," he

… the *Reference Guide* is far more efficient than Internet searching, especially given the considerable authority Archibald brings to the subject.

mentions the conclusions about finch diversity reached by Darwin's contemporary John Gould, noting that "Darwin did not keep good locality data for these specimens," and adding that "genomic research now shows that they are not finches but belong among the tanagers." Thus Archibald avoids the mistake made by a large majority of sources on Darwin's finches, which misrepresent the importance of the finches in Darwin's argument for evolution, or at the very least, mislead by omission.

An extensive list of bibliographic references concludes the *Reference Guide*. Archibald lists all of Darwin's scientific publications and their translations, as well as contemporary reviews of Darwin's work. This is especially useful for non-specialists faced with the task of differentiating among the many editions of the *Origin* or unaware of the timeline of his later, lesser-known works. Archibald also lists scholarly works and works for the general reader about various topics in Darwin's evolutionary biology, similarly useful for illuminating Darwin and the 19th-century context of his work.

The primary shortcoming of the book is the lack of drawings and photographs, limited to portraits and photos of buildings or books. For this, readers are advised to use the book as their guide in Internet searches for relevant images or other multimedia sources. Otherwise, however, for ease of use, comprehensiveness, and accuracy, the *Reference Guide* is strongly recommended as the go-to resource for understanding Darwin's life and work.

Artwork © Roy Troll 2018 www.trollart.com

Adam M. Goldstein is a teacher, historian and philosopher of science, and librarian. From 2005 to 2014 he was Associate Editor for the Darwin Manuscripts Project at the American Museum of Natural History. z_californianus@shiftingbalance.org

WHAT WE'RE UP AGAINST
Convergence of the Climate Cranks

In a press release dated April 5, 2019, the Heartland Institute announced that Anthony Watts joined its staff as "senior fellow for environment and climate." Watts was described as "a TV and radio meteorologist for more than 40 years and founder of the award-winning climate website Watts Up With That," while the Heartland Institute described itself as "a leading think tank promoting scientific research showing that human activity is not causing a climate crisis." Unmentioned was the fact that both Watts and the Heartland Institute are notorious for avidly disseminating misinformation about climate change, in the case of the Heartland Institute repeatedly to teachers across the country. Reacting to the announcement on Twitter, Michael E. Mann of Penn State University (now a member of NCSE's board of directors) joked, "It has happened. The climate denial singularity!" and explained, "All truth and light is sucked into an infinitely dense morass of antiscience & pseudoscience."


Anthony Watts
Photo: the Heartland Institute

—GLENN BRANCH

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