# Interview with Glenn Branch

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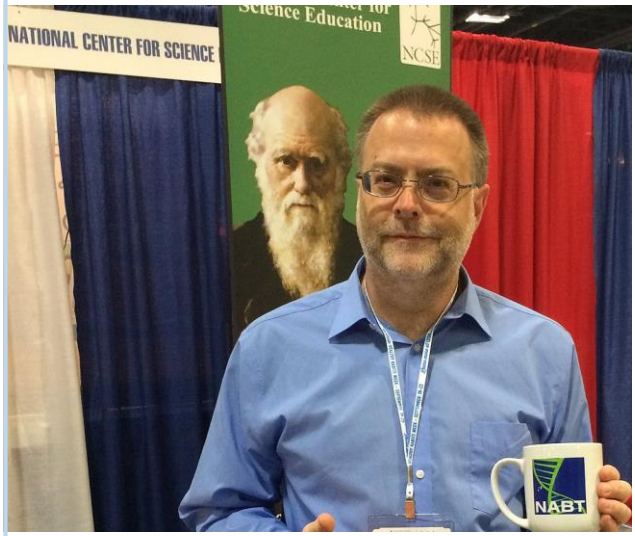


*Photograph: Bob Melton*

*Glenn Branch is the deputy director of the National Center for Science Education, where his work involves organizing resistance to attempts to undermine the teaching of socially but not scientifically controversial topics, such as evolution and climate change. He received the Evolution Education Award for 2020 from the National Association of Biology Teachers. He has written extensively about evolution and climate education, and threats to them, for scholarly journals, reference works, and popular magazines: his "The latest face of creationism," written with Eugenie C. Scott, was translated as "Manobras mais recentes do criacionismo," Scientific American Brasil 2009; 81: 82–89. With Scott, he edited Not In Our Classrooms: Why Intelligent Design is Wrong For Our Schools (2006). Branch is currently also coordinating NCSE's survey research program, which recently produced a major publication: Eric Plutzer, Glenn Branch, and Ann Reid, "Teaching evolution in U.S. public schools: A continuing challenge," Evolution: Education and Outreach 2020; 13(14).*

**1. Tell us a little about the role of the National Center for Science Education, the non-governmental organization (NGO) in the USA where you work. What is its scope?**

NCSE was founded in the early 1980s, to serve as a national resource for grassroots organizations resisting the attempts to impose creation science—then the trendy form of creationism—in the public school system. NCSE continues to help people facing challenges to evolution education, at the state, district, and school level. In 2012, NCSE added climate change, like evolution a socially controversial topic in the United States, to its portfolio. Additional projects currently under way include conducting research on evolution and climate change education; preparing and disseminating model lesson plans on evolution, climate change, and the nature of science; and aiding informal science education, especially in so-called science deserts, to develop relevant exhibits and activities. NCSE mainly focuses on the United States, but we sometimes, when the need arises, collaborate with people abroad, including in Canada, the United Kingdom, and Brazil.

**2. You have been very active against the teaching of the latest incarnation of creationism, intelligent design, in science classes. Tell us a little about the victories and difficulties of this battle.**

The main victory was in 2005—exactly fifteen years and three days ago, as I write—in a legal case called Kitzmiller v. Dover. In October 2004, the school board in Dover, Pennsylvania, voted to adopt a policy requiring students in the schools to "be made aware of gaps/problems in Darwin's theory and of other theories of evolution including, but not limited to, intelligent design." (I should explain that in the United States, decisions about curriculum and instruction in primary and secondary education are largely in the hands of local, rather than state or federal, government.) Eleven concerned parents filed suit in federal court.

The basic issue before the court was whether the policy endorsed a religious view, in violation of the U.S. Constitution. The trial thus centered on questions such as: Are intelligent design and the idea that there are "gaps/problems" in evolution religious views? What was the board's primary purpose in adopting the policy? And because the board's defense was that the policy was intended to promote science education, there was a further question: Is intelligent design science? NCSE helped to prepare the legal team representing the parents, as well as their expert witnesses (including three members of NCSE's board of directors), to answer these questions.

The judge presiding over the case concluded that it was "abundantly clear" that the policy was unconstitutional, adding, "In making this determination, we have addressed the seminal question of whether [intelligent design] is science. We have concluded that it is not, and moreover that [intelligent design] cannot uncouple itself from its creationist, and thus religious, antecedents." The intelligent design movement never really recovered from the blow. In the wake of Kitzmiller v. Dover, attacks on evolution in public education have increasingly eschewed calling for creationism to be taught, instead favoring the strategy of belittling evolution.

**3. Your organization has faced a similar issue in relation to climate change. Tell us a little more about this form of scientific denialism. In your opinion, why does it persist despite all the contrary evidence?**

Climate change deniers vary. Some deny any recent change in global climate at all; some acknowledge that it's real, but deny that human activity is responsible; some acknowledge that it's real and that it's us, but deny that it will have significant effects on the world and our society; and some acknowledge that it's real, it's us, and it's bad, but deny that action can be taken to reduce, mitigate, and adapt to its impact. When NCSE first became involved with climate change, the first two forms of denial seemed to be the most prevalent; owing in part to the increasingly visible disruptions caused by climate change, denialism seems to be shifting toward the less extreme forms.

As with evolution denial, climate change denial seems to be motivated by ideological, rather than scientific, concerns. Religious views appear only to play a minor role in climate change denial, however. Rather, political and economic views—sometimes dubbed "free-market fundamentalism"—are the drivers. International cooperation and government regulation are generally acknowledged to be necessary for a successful response to climate change; these provoke fears, among climate change deniers, of a one-world government and a massive redistribution of wealth, which are then transmuted into denial of the underlying science.

**4. Brazil and the United States are currently experiencing the growth of science denial movements. Give us some explanations why two countries so different in several aspects are confronted with this phenomenon in a similar way.**

Well, not all science denial movements are growing. Judging from public opinion surveys in the United States, both evolution denial and climate change denial seem to have waned somewhat over the last couple of decades, although their levels remain high in comparison to those in much of the rest of the developed world. (According to a recent multinational survey by the Pew Research Center, by the way, Brazilians were more likely than Americans to accept anthropogenic climate change but less likely to accept evolution.) And, for a lot of science denial movements, public opinion survey data over time simply isn't

available, so it's hard to know whether they are really growing or merely increasing in visibility.

And I believe that it's unhelpful to think that there's a single phenomenon — a war on science or a conspiracy against science, as various recent authors have described it — here. There are ways in which different forms of science denial are similar, of course. By definition, they all involve denying principles of science that are widely accepted by the scientific community on the basis of overwhelming evidence, and they tend to converge on the same rhetoric for doing so. But different science denial movements vary so much in their motivations, doctrines, tactics, strategies, and audiences that it's hard to arrive at informative generalizations about science denial as a whole. The title of a well-known paper from 1995 hints at the problem: "Why Creationists Don't Go to Psychic Fairs."

It would be fair, though, to conclude that a number of science denial movements have been disproportionately influential in the United States, primarily as the result of developments in national politics. In broad strokes, the Republican party in particular embraced evolution denial when it engulfed evangelical Christianity in the 1960s and climate change denial when it was captured by the fossil fuel industry in the 1990s. The attitudes toward science in general engendered by these embraces, coupled with a populist and anti-elitist strategy appealing to the increasingly rural and less educated base of the party, now makes the party hospitable to a wide (but not unlimited) variety of forms of science denial. I'm not as familiar with Brazilian politics, but my impression is that similar factors are at play there as well.

**5. Give us suggestions, from your experience in the USA, for confronting the growth of scientific denial in Brazil, which includes everything from an anti-vaccination movement to leaders who propagate the absurd flat earth theory.**

That's a difficult task, because a lot depends on the circumstances: what form of science denial is involved, who is propounding it and in what context, and who is going to be confronting it and in what context. Given that resources are always going to be limited, it's not likely to be worth anyone's while to confront a form of science denial that is vanishingly rare or basically harmless.

When the faulty claim is common and harmful, it's worth confronting, of course, but the confrontation can take different forms. Sometimes a detailed refutation of the faulty claims, ideally exposing the bad reasoning and motives behind the faulty claim, will be necessary. But sometimes it will be more effective to emphasize a different rhetorical frame.

In either case, the person doing the confronting should be credible to the audience, both in terms of actual relevant expertise and in terms of being regarded as trustworthy by that audience. For example, Katharine Hayhoe, a climate scientist who is an evangelical Christian, is, unsurprisingly, especially effective in communicating about climate science with fellow evangelical Christians.

A handy document summarizing the current state of the science of misinformation and its debunking is The Debunking Handbook 2020, freely available online at https://www.climatechangecommunication.org/debunking-handbook-2020/ in English, German, Italian, and Turkish editions — and a version in Brazilian Portuguese is under preparation as I write!

**6. There has never been so much scientific knowledge produced as there is today. How do you think we can bring this kind of knowledge to the population and stop the dissemination of and belief in fake news?**

There are two questions there, and there isn't a simple answer to either of them, but I'll say a little about both.

To get scientific researchers to communicate with the public more often and more effectively, it's probably not enough to appeal to their public spirit: incentives and resources are necessary. NCSE has been experimenting in a small way with helping to fund graduate students to do outreach in informal science education environments, especially to underserved communities. In this model, just as graduate students are funded to do research or to teach, they can also be trained in, and funded to do, outreach. It's too early to say yet whether this will ultimately be a successful model, but we can imagine a future in which university science departments recognize outreach as well as research and teaching as a primary area of activity, and recruit, support, and fund their personnel accordingly.

By the same token, to get the mainstream media to communicate science to the public in a more responsible and effective way, incentives and resources are necessary. It's hard to know whether, and if so how, the scientific community can provide the incentives here, but it can provide the resources. The American Association for the Advancement of Science's SciLine service, for example, prepares scientists to communicate effectively with journalists and supplies journalists with qualified scientists as sources for their stories. NCSE hasn't organized anything along these lines itself, but there are programs that do so, one of which invited me a few years ago to speak to a conference of journalists about how to cover controversies over evolution education better.

Of course, the public itself can be better prepared to cope with fake news. Science education can, and should, incorporate instruction aimed at equipping students to be critical consumers of science news. After all, most adults will be getting their information about science not directly from the peer-reviewed scientific research literature but indirectly, from the media and the like. So, in the model lesson plans on evolution, climate change, and the nature of science that NCSE is currently developing and disseminating,

in addition to the scientific content and skills you might expect, there's also a strong emphasis on "inoculating" students against fake science that they might encounter: equipping them to identify the misconceptions and detect the fallacies deployed to make them seem plausible.

**7. You won an award as a student for your good academic writing and are now a member of the editorial board of several academic publications. Give some tips to our undergraduate readers who intend to engage in research and publishing in high-level journals.**

I can't improve on the advice of the first-century Roman orator Quintilian: "We should not speak so that it is possible for the audience to understand us, but so that it is impossible for them to misunderstand us." The same goes for writing.

Writing well is a practical skill, so it takes a lot of practice. Writing and rewriting and rewriting again, ideally in light of feedback from careful and thoughtful readers, is essential. Reading widely — and thinking not only about what the authors say but how they say it—is helpful. And it doesn't hurt to consult a style guide, ideally one informed by linguistic evidence and not mere prejudice: Steven Pinker's The Sense of Style (2014) is quite good.

Of course, those writing in a second language in which they may not be entirely fluent face further challenges. Making friends with a native speaker willing to help with idioms and the like would be a good idea!

**8. You also work with science education, supporting teachers and the general population in the USA. From your point of view, which topics deserve academic research in the coming decades?**

I have a narrow perspective here, because my work centers on science education in the public schools of the United States with regard to a handful of topics: evolution, climate change, and what's called, in American educational circles, "nature of science"— basically a smattering of history and philosophy of science. So naturally I would like to see research aimed at improving both curriculum and instruction in these areas. Just as important, though, is work to try to ensure that such research informs policy and practice. What's the point of conducting science education research if it never reaches the classroom?

**9. What are the main educational problems, especially in relation to science education, that you see today?**

Again, owing to my narrow perspective, I'm interested primarily in educational problems for evolution, climate change, and nature of science. With regard to these topics, the main problem is simply that they are not presented as frequently, accurately, and thoroughly as they should be. A number of causes are responsible, including underfunding of public education in general, inadequate preparation of pre-service and inadequate support of in-service teachers, ideological resistance from local communities, and the long-term systemic neglect of the earth sciences, systems thinking, and the nature of science in American science education. So clearly a solution to the main problem is not going to be simple! But there are certainly encouraging signs. For example, in "Teaching evolution in U.S. public schools: A continuing challenge," Evolution: Education and Outreach 2020; 13(14), my colleagues and I reported on survey results that showed clear improvements in the presentation of evolution in U.S. public high school biology classes between 2007 and 2019, which were partly due to the influence of a new set of science education standards with both a richer scientific content and a better pedagogical approach.

**10. Explain to us why it is so important to make as much effort as your organization does to defend the teaching of evolution theory in schools.**

The central importance of evolution to the study of biology is a powerful reason to ensure that students have the chance to learn about at least the rudiments of evolution. As Theodosius Dobzhansky, one of the architects of the modern evolutionary synthesis, famously wrote, "Nothing in biology makes sense except in the light of evolution."

In part, students ought to understand evolution for its own sake, as one of the greatest triumphs of modern science. As Stephen Jay Gould memorably wrote, "Evolution is not a peripheral subject but the central organizing principle of all biological science. No one who has not read the Bible or the Bard [Shakespeare] can be considered educated in Western traditions; so no one ignorant of evolution can understand science."

But understanding evolution is also practically important. In a world in which the biological sciences are, and are sure to continue to be, increasingly important — for example, in fields such as agriculture, biotechnology, climate change, genomics, and medicine — students should also understand evolution in order to be informed consumers, workers, and citizens.