



## PROFILES IN SCIENCE ENGAGEMENT WITH FAITH COMMUNITIES

# Liz BARNES

*Dr. Liz Barnes is an Assistant Professor at Middle Tennessee State University studying biology education. We spoke with her about understanding and addressing tensions related to religious identity and evolution, particularly in biology classrooms. (Above photo courtesy L. Barnes)*

### **What led you to think about religion, faith, and spirituality as being relevant to biology education?**

I grew up in a secular household. I've never identified as religious, but when I started taking biology classes, I did very much identify as a science person. Like a lot of people with this high science identity, I had this idea that science and religion had to be in conflict, and that religion often tried to encroach on science, and that it was something that we should be trying to push out of science.

During that time, I became really interested in studying evolution education, because I thought evolution was just the coolest thing. The idea that all life on earth comes from a single common ancestor that lived billions of years ago is so beautiful, but I found out that about 40% of the United States didn't believe that<sup>1</sup>. And I discovered that one of the main factors for predicting that was somebody's religious background.

So, I started studying how to increase acceptance of evolution so other people can see how awesome evolution is, and I almost immediately realized how many misconceptions I had about the relationship between science and religion. I hadn't realized that science is a process that's fundamentally agnostic; it's not something that either supports or denies the existence of a God or religion. And there are many ways that people can reconcile their religious beliefs and evolution.

A key moment for me was when I was taking an upper-level class led by an instructor who was a militant atheist. In the first week of class, they were lecturing about how "creationists don't believe in science," and how to "solve the problem of creationism." And when the lecture was over, I felt like, "Yeah, we need to squash creationism, and religion doesn't belong in science!" But there were three girls sitting next to me, and one of them looked over and said, "I don't know if I can stay in this class..." and I didn't see her again.

At that moment, I realized, even though these messages were jiving with my own identity, they weren't jiving with other people's identities, and the more I learned, the more I realized how important this was. Because 65% of the United States identifies as Christian<sup>2</sup>, and in a recent study of ours, 54% of students in undergrad biology courses identify as Christian<sup>3</sup>, and yet among scientists—some of whom are teaching evolution—only about 25% identify as Christian<sup>4</sup>. So, I started talking with other scientists who teach evolution about how to be culturally competent with religious individuals. We're never going to see the needle move on acceptance of evolution if we continue to push this narrative of science and religion having to be in conflict.

#### **What about when evolution and religion are in conflict?**

There are some religious beliefs that are in conflict with evolution. If someone believes that the Earth was created in seven 24-hour days by God and that species were created separately from one another, then that is in conflict with scientific understanding, but that doesn't represent a majority of religious individuals.

Usually when you hear people talk about the history of science and religion, they tend to cherry-pick two times in Western history where they believe there was a huge conflict—Galileo's ideas about the structure of the solar system, and Darwin's ideas

about evolution. They don't talk a lot about the vast majority of human history, whether in Europe, or in the Middle East, or Asia, or Africa, or in the civilizations of the Americas, when spirituality and science—even if it wasn't always called that—have been side by side and almost complemented one another. I like to point out that Thomas Henry Huxley, who was considered Darwin's bulldog for advocating for evolution, is the one that coined the term "agnosticism" in order to describe what science is.

Science doesn't care whether you're religious or not; it doesn't say anything about the existence of God or not. I try to get secular scientists to examine how they are injecting their own lack of religious beliefs into their instruction, and examine how they are assuming that their anti-theism, or atheism, or secularism, is more scientific than somebody's religious beliefs.

A big underlying theme in all my research is that the perception of conflict between religion and science is much greater than the reality of conflict between religion and science, and it is time that we started to correct that misperception—especially if we want to increase positive attitudes towards science.

#### **What are some evidence-based practices that evolution instructors should follow?**

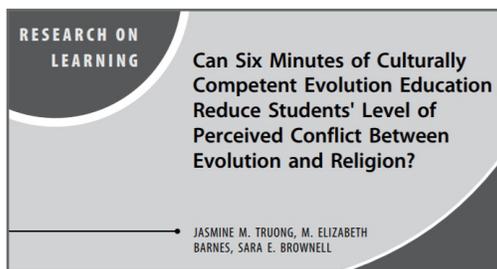
As far as positive practices for educators, providing examples of scientists who are religious and accept evolution seems to be effective, providing role models to break down the stereotype of atheist scientists, and showing the possibility of theistic evolution. One of the biggest misconceptions that students have when they come into the classroom is that you either have to be an atheist that accepts evolution, or you're a religious person that rejects evolution—but there are all sorts of views in between. A lot of students in the United States are just familiar with the seven-day creation story in Genesis and they don't know that there's an option of seeing theistic evolution where God was somehow responsible.

Another helpful practice is teaching about the nature of science, that science is agnostic and not atheistic. Science is really good at answering questions about the natural world using natural explanations, which differs from religion, philosophy, and ethics, which a lot of people see as useful for answering questions about the purpose of life, or the existence of God, or how we ought to live. This is useful not just for highlighting compatibility between religion and evolution; often people think that

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Paper in *American Biology Teacher*, <https://doi.org/10.1525/abt.2018.80.2.106>.

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science can give us our ethical values, and that is not what science can do. If we want to realize a certain ethical value we have, then science can tell us how, but science can never tell us what that value should be.

All of the underlying principles, all those practices, is to highlight potential compatibility. Yes, sometimes religion and evolution are in conflict, but let's talk about the ways that they're compatible.

#### **Are there things that evolution instructors should avoid?**

A lot of instructors have the misconception that if they don't address religion at all, they're not creating any conflict with religion and evolution. But what we know from our interviews with students is that they come into the classroom with ideas about religion and evolution, often the narrative that religion and evolution have to be in conflict. When the instructor doesn't address that at all, those misconceptions don't go away. And oftentimes, because science is seen as such a secular discipline, students will assume that the instructor is anti-religion, or that the instructor thinks evolution and religion have to be in conflict.

Another thing that instructors should do is examine how your own beliefs are influencing the way that you're teaching, and how you might be conflating your own anti-religious or non-religious beliefs with what the science actually says or can say. Many people think that science is supposed to be acultural and unbiased, but I think that we're now starting to realize that everything that's human is cultural and has cultural biases in it. This has a lot of implications for diversity in STEM, because when you don't recognize those biases, what you default to is "white male atheist," that's what's "acultural." But what we know about people who aren't white and male in the sciences is that they tend to be more religious. If we're consistently telling religious individuals that they don't belong in science, then you're inadvertently telling some Black students, Hispanic students, women students, that they don't belong in science.

Also, don't automatically assume that somebody's religious beliefs are in conflict with evolution. Sometimes students don't have very concrete religious beliefs about evolution yet. They haven't sat down and thought about, "What is the exact belief that I have about the creation of the universe and how does that fit in with evolution?" If

an instructor comes out and makes a broad statement about religion and evolution being in conflict, even if the student didn't previously have any specific beliefs that conflicted with evolution, they will leave the classroom thinking that they do.

#### **What is a constructive approach to engaging with religion and spirituality in classroom contexts?**

The number one thing is having respect for your students—regardless of where they're coming from, regardless of whether they have religious beliefs or not, even if they have religious beliefs that are in conflict with evolution. You have to maintain a relationship of respect, because building that trusting relationship with the student is what's going to help them examine some of their prior beliefs, and maybe change them to be more in line with the scientific evidence. But if you come out the gate with "religion and science are at war," and "religious people aren't as smart scientifically," you shut down the students that have that identity, and they won't trust you enough to examine, and potentially change, those beliefs.

When I interview instructors, I'll say, "Have you ever been challenged in your class about evolution, or have you had people ask questions about religion and evolution?" And they say, "No, nobody ever asked me that, so I just assume that people are okay," when often, it's just that they're not comfortable enough to say anything.

#### **How do these principles look when actually put into practice in the classroom or lab?**

We have a paper out called "Can Six Minutes of Culturally Competent Evolution Education Reduce Students' Perceived Conflict?" When I start teaching the parts of evolution that tend to be in conflict with religion, at the beginning of the lecture, I say, "There may be some of you in the room who are not sure about whether macroevolution is something that you accept or that you think that there's real evidence for. You may have a perceived conflict between your religious beliefs and evolution. That's okay. I'm here to teach you what we know about science currently. I respect you whether or not you are struggling with how this fits in with your religious beliefs, and I hope that you can come to me with questions, and that you feel like this is an environment where you don't have to hide that identity, and we can have open conversations about it."

I think instructors are often afraid to say something like that because they don't want to open up the floodgates, but that's never happened to me. What I do get is students writing on class feedback surveys, "Thank you so much for saying that. When I started learning about this, I got some anxiety, but you saying that it's okay really put my fears at ease."

Instructors also worry about giving students permission to reject evolution. What's ironic about that, though, is that our data show that when you tell students that they don't have to accept evolution, they end up accepting evolution more. But when you have this attitude, "This is the data, evolution is real, and you have to believe it to be a biologist," students accept evolution less.

This has a lot to do with a principle in educational psychology called autonomy. People have to feel like they have autonomy over their decisions and beliefs. If they feel like their autonomy is being taken away, then they're going to resist. Even though it makes biologists uncomfortable to feel like they're giving students permission to not accept evolution, that permission is actually what's going to lead to more acceptance.

Also, it seems to be the case that people don't change in just one semester; it's something that happens gradually over time. They need to be getting these messages throughout their entire undergraduate curriculum so that they can slowly make these belief changes.

### **What are some insights from people who are teaching either as religious scientists or in religious contexts?**

I value our religious scientist communicators so much. They are in the minority in the science realm, but they're the ones that are going to be the most effective boundary-spanners to the religious American public. And yet, they're in an environment where they might feel like their religious identity isn't valid. But it really is important, because we know that people are going to listen to others that share their identity. Rather than discouraging religious scientists from being open about their religious identity, we should be saying, "Go tell the world! Go tell the world that you're a Christian [for example], that you accept evolution, that science and religion don't have to be in conflict, that you can be a scientist and be Christian."

We did a study where we interviewed 33 evolution instructors who were also Christian. We asked them if they used the practices to reduce conflict between students' religious beliefs and evolution. And almost all of them were using almost all of the practices we had been studying to reduce conflict, which was in stark contrast to the instructors at public universities we interviewed that were mostly secular. The secular instructors were overwhelmingly avoiding talking about religion at all, but among these Christian instructors, it was they themselves that were the religious scientist role model, and talking about the nature of science. When we asked them, "Why do you take this approach?" they often talked about their own experiences struggling through this perceived conflict between religion and evolution and how they wouldn't have had to struggle that much if they'd had a mentor or instructor that helped them the way that they're trying to help their students now.

### **How could these approaches apply in broader contexts, like scientists engaging with the general public, or about less contentious topics?**

Always start with your shared values. Whatever the topic is, if you can find agreement on a shared value, then that is the best place to start. There's an automatic human tendency to shut down when somebody is telling you that you're wrong. If you come at it with conflict and pushback, then you're not going to get very far with people. But, if you can figure out where you both agree and then work your way up, then that is a much more effective strategy.

Also, when you're having a conversation with somebody about a contentious issue in science, if you start to feel your own defensiveness or resentment, stop and evaluate why you feel that way. Don't move on with the conversation when you're feeling that way, because that's probably not going to be productive.

Last, don't try to change somebody's mind in one five-minute conversation, or even one 20-minute conversation. Start with those shared values, make baby steps over several iterations of conversations with somebody, and work on building your relationship with them. It's about building a trusting, respecting relationship where both of you feel like you have shared values that you're working towards. ~

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