OpenTheo

Can We Be Scientific and Spiritual? | Michael Hecht & Praveen Sethupathy

September 30, 2021

The Veritas Forum

Dr. Michael Hecht, Professor of Chemistry, Princeton University, and Dr. Praveen Sethupathy, Associate Professor of Biomedical Sciences, Cornell University, discuss what science and spirituality might have to offer each other in our current time. Hosted by the Veritas Forum at Princeton University • Please like, share, subscribe to, and review this podcast. Thank you.

Transcript

Welcome to the Veritas Forum. This is the Veritaas Forum Podcast. A place where ideas and beliefs converge.

What I'm really going to be watching is which one has the resources in their worldview to be tolerant, respectful, and humble toward the people they disagree with. How do we know whether the lives that we're living are meaningful? If energy, light, gravity, and consciousness are in history, don't be surprised if you're going to get an element of this in God. Today, we hear from Dr. Michael Hecht, Professor of Chemistry at Princeton University, and Dr. Praveen Sethupathy, Associate Professor of Biomedical Sciences at Cornell University, as they discuss what science and spirituality might have to offer each other in our current time.

A talk titled "Can Science and Spirituality Coexist?" hosted by Princeton University and moderated by Princeton student, John Tracey. Yeah, the first question that I wanted to ask both of you is just, "Can you share a bit of your story about how you've delved in in your life experiences with the question of tonight? Are science and faith compatible? How have you lived out?" Being a scientist, we're also exploring religious faiths. So thanks again, John, for the very kind introduction, and it's really wonderful to have the chance to meet all of you and to get to know Michael and to be a part of this forum, thanks to all who are taking time to attend tonight.

Science and religion definitely are compatible, and they always have been, even when I

grew up as a Hindu and today, as a, to me, science is a set of tools that we use to explore the natural world, to discover around us. And religion, fundamentally, is the opportunity to worship the one who gave us those tools. And so when thought of in that fundamental way, I have never really ever seen or felt tension.

That being said, of course, the practice of science and, you know, scientism that might result from that, and the practice of religion and particular beliefs that may exist within specific traditions can sometimes appear to be in conflict. And I think that's sort of fundamentally what people are really thinking about when they talk about conflict between science and religion. But I've actually found in my experience that there are a lot of shared values between science, my experience in science, and my experience as a Christian.

And one of those shared values is a sense of awe and joy in discovery. I mean, I think that, you know, it's really fundamental to my scientific, to the scientific enterprise that it doesn't detract from my humanity, it encourages it, right? It persuades me almost on a daily basis to open my eyes to the kind of overabundance, even that would might even say, prodigal amount of created things all around us, right? The sheer vastness of the created order, the diversity and complexity of created things. It's just awe inspiring and I get to be in that space on a regular basis.

It's not so different from in the religious space in the song, How Great Thou Art, I sing, Oh, Lord, my God, when I in awesome wonder consider all the works thy hands have made. And so there are these really beautiful, wonderful and natural touch points between my experience as a person of faith and as a scientist, where I find that there are shared values that are often overlooked. Michael, what's been your experience? I think we share a lot in common.

Let me take a different way of describing it. You know, in anticipation of this meeting, I think one of the emails that we'd exchanged during the week was along the lines of how is your work in science shaped your belief system. And I thought for the last few days about how I might answer that.

And then this morning, I got an email and I thought about how I might answer both as somebody who grew up Jewish and somebody who thinks a lot about Buddhism. But then this morning, I got this email coincidentally and I'll just read it. And it was from Tricycle, which is a Buddhist magazine, just out of the blue in this email, I'll just read one line.

It said, one of the things that many West, again, the topic here is how science affects shape your belief system. And the email came in. One of the things that many Westerners find appealing about Buddhism is that it doesn't require that we buy into a belief system.

Okay, so in some ways that seemed like I'm undermining the question about how

science shapes a belief system. But in fact, I think there's this real, you know, and there are many angles I could take on this, but the one I want to do now just based on that email I got this morning is that in the Buddhist tradition, there's the concept of taking nothing on belief, but instead to do to pursue one's life and one's practice through inquiry, experience and observation. And I thought about that and I thought, well, yes, that's a tradition that very much dovetails with science in that in science, what we're always doing experiments, observation, inquiry.

And you know, in my science lab, we might be doing that for things in the test tube. Whereas in this tradition that I was just speaking of a moment ago in the Buddhist tradition, the inquiry and the experiments are on the nature of mind, the nature of consciousness, the interconnectivity of all things. Okay.

But at the same time, I think that doesn't in all in any way mean, and I want to breathe for being here, this doesn't in any way mean that it's not consistent with some form of spirituality. And I'll pick up on some things that you were saying. And that is that if that tradition, the Buddhist tradition is observation, inquiry, experimentation in a sense, then it is that very type of experimentation, whether it's observation of the mind or observation of the interconnectedness of the world, or the observation of experiments in laboratory that lead, that enhance our awareness through through observation through inquiry, our awareness becomes enhanced.

And you know, in some traditions they call that enlightenment, they call it awakening, whatever it is, I'll just use the word awareness, get it simple. And I think that enhancement of awareness leads us to an awareness of that which is bigger than us. And that awareness of the world around us, whether it's through some sort of meditation or contemplative practice, or whether it's through some spectroscopy experiment or or whatever you want to do that enhanced awareness leads us to a sense of innocent transcendence, where I'll use the word transcendence as a consciousness of that which is bigger than us.

And so these, these observations, this constant inquiry forces us to acknowledge that something is bigger than us. And I think most people spiritually going to people, you know, if they look at a beautiful sunset, they'll look at something in nature, it leads to a sense of that which is bigger than me, it's transcendent, it's spiritual. As scientists, we have the added advantage that we can look deeper and we can be in fact more amazed by it.

And I'll, you know, I'll pick up on your wording. It's the awe or it's the wow factor. And so as we observe and inquire and look and understand, we are over and over again, hit with wow.

And wow is to me is kind of a central thing to what I consider spirituality. Michael, can I pick up on this? This is really, really interesting response and it makes it reminds me

about this book called the Enlightened Gene that was written by Ari Eisen at Emory University. He's a professor of pedagogy, I believe, at Emory.

I'm not sure if he's still there. But when I read that book, I was really impressed by the time that he took, the book is really about how he and a Buddhist monk actually worked together into that to bring science, modern day science, the study of cell biology and molecular biology, to Buddhist monks, Tibetan Buddhist monks, and actually did lab practicals with these monks and the kinds of questions they asked were just qualitatively different day after day than the kinds of questions he was used to Western students at Emory University asking when faced with the same kind of information. And one of the first things he learned, he said, is that in the process of inquiry, the monks were beginning to allow the new information that they were gathering to start to inform their faith.

So one of the things that particular group of monks believed is non-violence against all sentient beings. Well, how do we define sentience? If we define it simply as beings that are able to sense and be aware and respond accordingly, Ari Eisen started telling them about bacteria and how bacteria growing in a dish can actually sense their environment. And in response to that environment, change their shape, change their location, etc.

Is that sentient or not? These were questions that the monks had never had to face before in their religious studies. And rather than shying away from them, they actually found it sort of at first a little bit disquieting, but then actually really inspiring because it it challenged with their faith, but in a way that was really helpful and meaningful for them as they engaged what they believed even more. Well, that's fascinating.

I mean, I think, particularly in the Tibetan tradition, the Dalai Lama has really encouraged this inquiry, and they've had these so-called Mind and Life Institute meetings where scientists come to DarmSala where he lives. And they've done this for 20 or 30 years. It was founded originally by a bunch of scientists.

And they've explored science from, you know, with the Buddhists and the scientists talking together and top people. And some of the most interesting ones were about quantum mechanics and about causality. And the Dalai Lama's perspective on this has always been similar to the one I alluded to earlier that he doesn't, you know, we don't take anything on faith.

We have to do the experiment. And so, you know, they would do, so he was very much a huge fan of science and very much fan of doing the inquiry and seeing what happens. And so they've done a large range of experiments where they study meditators in, you know, by brain scanning.

And he said at the outset, well, if the brain scan shows nothing happens, then nothing happens. You know, it's inquiry. It's not, it's not a fundamental, some, it's not a

fundamental belief.

This is how it must be. But rather, it's perhaps a faith or a belief that has a foundation of inquiry to it. So, yeah.

Right. Right. And I believe that the sort of opposite is true as well.

Religion and our experiences in faith-based worldviews can inform science as well. Perhaps not so much in the empirical methods that are used to gather data and things like that. But sometimes in our interpretation of the observations that we make, and what I mean by that is as follows, Carl Sagan is arguably one of the most famous scientists to come out of Cornell University.

So, we often fond of using him as an example, but a famous, famous astrophysicist. And he has this quote that is often mentioned. He said, "Who are we humans?" Right.

We find that we live on an insignificant planet of a hundred-star lost in a galaxy tucked away in some forgotten corner of a universe in which there are far more galaxies than people. Right. And what I often really enjoy thinking about when I see that quote is surprisingly, I actually find that there isn't a whole lot in the Bible that actually is contrary to that.

Right. When it comes to the stuff that we're made of and our position in the universe, we find that there's a lot that is contrary to it, which actually leads me to then think that the value we have isn't intrinsic to us as much as it is given unto us by our creator. Belief is that he values us.

Our value comes from the value he's imbued onto us. And so, as a person of faith, I can look at Carl Sagan's statement and say, "It's absolutely true, but I don't actually find those observations threatening as a religious person. I actually find it even more inspiring because it elevates God even further that such a quote-unquote insignificant species on an insignificant planet could have value to him, that he would want to relate with us as more about him than it does about anything else to me.

And that leads me to a place of awe and worship and humility. I want to pick up on one of the things you said about the value that God puts onto us. And this is a story.

And so, the story is years ago, I did a sabbatical at the Weitzmann Institute in Israel. And the person who's lab, I did the sabbatical and was a man in a friam cutseer. Very interesting guy.

He was the previous president of Israel. Why am I doing doing a sabbatical lab of the president of Israel? Well, Israel has a prime minister who's the political head of state and president who's more the ceremonial head of state. And a friam was a renowned biochemist.

He was, I think, the first Israeli elected to the US National Academy of Sciences. And then at some point, they made him the president of Israel. And then after that, it was over, he came back to the Weitzmann Institute and reopened his lab.

And I was fascinated by him for many reasons. He's a wonderfully human being. He's no longer alive, but a wonderful person.

So I went to the sabbatical in his lab. We got to know each other fairly well. And the sabbatical was over.

But then a year or two later, I was back in Israel at the Weitzmann Institute. And I was visiting a friend there and I basically over to a friam's house. And it was the day before Passover.

And a friam was sitting there in front of his computer, preparing his Passover seder that he was going to present to his extended family, including his grandkids and so on. And so I came over and I walked in. We hadn't seen each other in a while.

And he was immersed in this. He looks at me and he says, so I'm preparing the seder. And I'm thinking about God.

I'm thinking about religious issues. And he says, so why did God create humans? And then humans do all these horrible things. We have this beautiful natural world and humans mess things up all the time.

They go to war. They tell each other. They pollute the environment.

Why do they why why do God create these humans? And he pondered her for a while. And he said, I think what it is is that God had created this universe. And you know, it says in Genesis, and it was good on the last day and it was very good.

But then God had this feeling that, well, who's going to appreciate it? And the sentient beings that are the chemotactic bacteria, I'm not sure that they can appreciate it. They can do chemotaxis to get their nutrients. But to what extent do they appreciate it? And so by this logic that Afrayan was sharing with me, he was saying, well, you know, perhaps God created humans, because God had a need for some creature to appreciate the magnitude of what had been created.

And so perhaps is the value that God puts on humans. And maybe that circles all the way back to what you started with the concept of all. And maybe the experience of all that we experience perhaps there is a deity, a God that is somehow enjoys the awe, or it's looked it in some ways.

That's a kickback, John, because we could go back and forth, I think, for a while. Yeah, I was going to say that's a great story, Michael. And it leads into the next question that I

wanted to ask, which was in your story, you asked why did God create humans, given so many problems and justices in the world? It seems like both science and religion propose solutions, frameworks for addressing social issues like injustice, disease, hunger.

How should we reconcile these two different frameworks, especially in light of all of the injustices that we see in the world today? So you want what do you specifically, what should we, what do you want to reconcile at this moment? I mean, there are many ways of going after this. I'm kind of profiting, do you want to you want to start with that? Since I just-- Yeah, the way that I read that question or hear it is, you know, are there shared values, again, in the scientific enterprise and religion, as we deal with the kills and injustices in the day? To me, it really boils down the call to action. Science isn't about being passive.

It's about taking action to explore. It's about taking action to discover new things, to expand boundaries. And it's the same way with my faith tradition, and I think many others as well, you know, in faith without works is dead.

And so I think what that begs us to think about is that just sitting in our seats saying that we have faith, there's an emptiness to that. There's a call to action. There's a call to actually without that faith.

In new ways that might be scary, it might have to mean to the unknown. It might have to be engaging with ideas and concepts in peoples that are unfamiliar to us. But I think that is what faith calls us to do, is to get into those spaces and be agents of healing, or as scripture would say, ministers of reconciliation.

And I think science is the same way, is that it's looking to figure out answers. It's looking to make new discoveries in the hope, particularly it pertains to the biomedical sciences, in the hope of the hope of bridging gaps in the hope of bringing joy where there is pain. And so I think that's where the science and religion connect to me, as I think about the ills of the world.

So let me ask you a question. I mean, you were saying, paraphrasing, I'm not sure if I'm quoting it, but that faith without action is somewhat empty. Or I understand action.

Can I ask you in that context to define what you mean by faith? Yeah. Don't ask me as good. I'm not sure I can.

Yeah, the way that what I meant by it, as I, even in terms of what I articulated, faith is in the belief in the existence of God, in the existence of a personal God, the belief that we are made by God, and that we have a calling from God. Right? So, you know, faith is that there is a superhuman power deity, and that he wishes to relate with us, and that we have the capability to relate with him. But just believing that is insufficient to really experience the fullness of what God wants from us.

If there's a calling to, well, what does that mean? How is that actually going to shape how you behave and interact with the world around you? That lived out faith. When you say, well, what does this faith mean to me? How does that inform who I am? It's in the action that comes out of that where it's really alive. It's just fascinating.

I think we come to similar points. When I think about that, I think about, you know, I think at the level of action and the ethics of good action and good deeds and what we call in Hebrew Tikkun Olam, which is Hebrew for repairing the world in the sense that the creation is not finished, that it is upon humans to do Tikkun Olam, to repair the world, to keep, you know, and so I'm, you know, the idea of Tikkun Olam and fixing the world and doing good deeds is certainly very central and very important. I think for me, I'm not driven by faith in the way that you describe it, but perhaps I'm driven by the awareness I was describing before and that awareness that brings me to a sense of the interconnectivity of all things and that interconnectivity, which again comes from this observation and awareness and once that interconnectivity is in the forefront, how can we not be active? How can we not do the right thing? How can we not try and Tikkun Olam? How can we not try to build a better world? So I guess for me in that sense, I can come to the same end point from a perspective that is spiritual but less focused on a deity.

Yeah, no, I think it reminds me of Rich Mullins. I don't know how many will be familiar with Rich Mullins. He was a musician, a lyricist in the 90s and he has a song where he says, you know, faith without works, it's about as useless as a screen door on a submarine.

And those words I'm recalling now as I'm listening to you, Michael, because there's a sense in which I think although we're coming at it slightly differently, I think both of us are also kind of saying that if you really see everything for what it is, how can you not act? Right? And so if you aren't acting or not feeling compelled to act, are you really seeing it? Yeah, I mean, for me, I think the spirituality is one of, as I said earlier, it's one of transcendence, the awareness that something is much bigger than I am and the awareness that everything is interconnected and that form of spirituality leads me to a desire to action and a desire to better the world. Yeah. So, Praveen, Michael, I'm sure one question that has been on many people's minds for the past year is in the course of the coronavirus pandemic.

Many religious communities have reacted negatively or skeptically to some scientific recommendations like masking vaccines, limits on church capacity. Do you have thoughts on this conflict that's been seen in our society for the past year? Yeah, that's a good question, John. I do have a lot of thoughts on it because it is something that I've been engaging quite a bit in the past few months in particular.

I think it's really important to understand when you see enmity between two different

groups, it usually did not come overnight. It's been percolating for a while. I mean, the same is true when you see the animosity and even sometimes vitriol between scientific communities and lay communities, particularly religious ones.

They're certainly not mutually exclusive communities, but for the moment, we'll talk about it that way. There are a lot of reasons for why mistrust and stone over the years. And I think both camps have a lot to do with why they're not really speaking to each other anymore as much as they are speaking at each other.

And I think neither one seems that there is value in the positions and ideas and concepts of the other. And so it really becomes an us versus them kind of tribalism mentality that creates these echo chambers where you really aren't going to go beyond your groupthink mentality because you just don't think there's value in that. I know a lot of colleagues who just feel, "Why would I go talk to that religious community? I don't think they have anything to offer me." And I know a lot of people of faith in the evangelical community who think, "I don't trust these scientists who maybe they had perceived that they have an agenda to marginalize their faith." And so once you start to put people in those kinds of camps, it becomes extraordinarily difficult to see value in one another and that you have something to learn and gain from each other.

And so when a pandemic like this rolls around, we see the consequences of that mistrust. And so when I talk with people, I mean, it's sometimes maddening and really deeply saddening and frustrating to me when scientists who have been working 24/7, around the clock for the development of these vaccines and related antivirals to be able to help our communities are not trusted. Even cynical motivations are attributed to them.

And I know many of these people and it does feel very sad to me. But at the same time, I keep reminding myself that they didn't just wake up deciding to be angry at Anthony Vauci. There are decades, centuries long mistrust and a growing chasm between these communities that they're just a part of.

So helping to break that down requires building trust. So we often think about what's the most eloquent way to frame something or phrase something. But trust matters a lot more than information.

And so building relationships, building trust has really been the most successful method that I've come across in being able to, you know, begin to help people to be able to see, you know, how vaccines could be helpful for them or how some of the things that they've been hearing in their echo chambers may not actually hold water. I think it's really difficult to get people to appreciate these things if they see you as an outsider, if they see you as someone who doesn't share values and beliefs that they do. And so building trust, I think, is extraordinarily important.

But it's tough because it's the long game. Building trust doesn't happen overnight. It happens over the course of the long haul.

So I'll leave it. There are other things I could say that I'd like to hear from Michael. No, I'm glad you said all that.

Yeah, just to pick up on a couple of things you said, trust matters more than information. That's certainly true. I think we delude ourselves, particularly those of us who have talked to places like Cornell and Princeton, we delude ourselves to think that much of what we do is motivated by our intellect.

But in fact, much of what we do is motivated by our emotions. And trust is an emotional thing. And the information is not going to matter if there's no trust.

And I think we do have to acknowledge that these are very emotional issues for people. And I think the other thing you mentioned, tribalism, which is the in-group, it's the out-group. And it's a very emotional thing.

It's hardwired in us. I mean, we evolved as we grew up as tribal creatures. So it's very hard to do that.

Two things I do want to say a little bit in a different area about religion and science with the coronavirus. In the course that I teach, I teach a graduate course, which is mostly undergraduates, but I teach an advanced course on proteins. And this year we did a section on the coronavirus.

And so that caused me to dig into a pretty deep teacher. We did a ton of papers. And I'll get back to the term we used before.

I was in awe as I looked into it and started to understand it better. I was in awe of what the virus does, what our immune systems do. It was spectacular.

And so, I mean, it's also going to kill us, but it's spectacular what's going on. And that feeling of awe was both as a scientist, or as we said before, as a scientist who's going beyond the self and going into a more spiritual plane. Another thing I want to say in terms of going beyond the self is I had a conversation with somebody on.

So in my regular world, and I'm sure it's true for you, Praveen as well, in the academic science world, we don't come across a whole lot of people who are opposing vaccines. That's not the world we move in. But we move in other worlds as well.

And I was talking to somebody online who didn't want to get the vaccine. And I sort of couldn't help myself. And maybe it was a snarky thing to say.

But I said, "I have to learn how to come out, which is a fundamental religious text from the Old Testament, which loved my neighbor as I self." And it goes into the New

Testament as well. And so it was somewhat mystifying to me that this is a fundamental core principle in most religions of loved by neighbor as I self and the vaccine. People sometimes see it as, "Well, I'm an independent entity.

I don't want to be told what to do." And that is a lot of the reason why people don't get vaccinated. It's a hyper focus on the self. And I've talked to people like this who said, "I don't want somebody to tell me what to do." Right? And so they're very focused on the self.

Again, this is a Buddhist concept which deals with non-self or the transient nature of self. But I find that many people who I've talked to who don't want to be vaccinated, they don't want to be vaccinated because they're really bothered by somebody else telling them what to do. And they want to have control over their own body.

And my response to that is, "It isn't about you. It's about loved by neighbor as I self." You're not, if you want to not get vaccinated because you don't want to take care of yourself, "Okay, I don't agree with that, but I can accept that." But in terms of the interconnectedness of us all and in terms of love with our neighbor as I self, that's why we should be vaccinated. Michael, this is really interesting that you say this because I think it actually does in a way come back to the whole in-group, out-group sort of mentality that you mentioned.

There's a woman, a lovely, wonderful woman that I was talking to recently by phone. She had reached out because she was vaccine hesitant and was in a community that was really discouraging her from thinking about it. But she wanted the best information out there.

She was trying her hardest to be informed and make a good decision. We talked about all her questions. We prayed together.

We cried together. There were things going on in her life. At the end of the conversation, I actually brought up this point.

I hadn't intended to leave it for the end, but it just sort of happened organically. And I told her the same thing at the end of the day. This is just a wonderful way to live out what Christ told us to love our neighbor as ourselves.

She told me later that she'd been told that before, and she felt preached at. She felt condescended to. But it came up at the end of a conversation where a whole lot of trust building had happened.

It just came across very differently to her. Suddenly, it took on a different meaning. It had a different flavor.

It reminded me all over again how much of this is the kind of relationship building that

we're doing or not doing in the midst of conveying information. That's why I said my comment to the person online was snarky. I think it was snarky because it didn't have the build up that you have.

When you had that build up with that woman and you made the comment about love that never as I self, then it was accepted. Whereas when I said it just in an email, it may have come across as a little bit judgmental. But one of them- and I think I just got lucky, Michael.

I didn't mean to say that. I think I was lucky in the way that the timing of that scene. There's no conflict there.

We agree. As you mentioned the introduction, John, I spent six months at the center of theological inquiry, which is not part of the Princeton University. It's across the street.

I have very little background in theology, but I got to know some of the philosophers and theologians when I was there. One of them was telling me about this concept of parochial altruism. This ties into what we were saying before about the in-group and the out-group and tribalism.

We all understand altruism. We all understand the concept of taking care of others. As you and I both have evolution in genetics backgrounds, we also understand that there is a tendency to take care of that, which is genetically close.

I take care of my kids really, really passionately. I take care of my first cousins, somewhat less passionately, my second cousins, yet less passionately, and so on. Depending on how homologous your DNA is, having a level of altruism that correlates with that.

He was describing this as the term as parochial altruism, that when it's altruistic to the in-group and not to that, which is far away. I think this is a core issue in our society now, is that everybody wants to take care of their own families, but then you look across society and you wonder to what you see it. You see people who are very much opposing to, they don't want to take care of the people who are outside of their group.

Again, I think this goes back to this concept of altruism. How broadly do we want to define it? It also, to me, goes back to the idea of the interconnectedness of all things. It also goes back to the idea of sentient beings.

We are related to those bacteria that do chemotaxis, but I don't feel that my level of relatedness to them is preventing me from autoclaving 10 to the 12th of them after an experiment. It reminds me of a verse in Wook, actually. If you do good to those who are good to you, what credit is that to you? Then it goes on to actually issue a calling to think bigger than that.

That's something that comes viscerally. It comes naturally. The calling placed on is to look outside that parochial altruism.

This isn't doing good to those who do good to you, it's not a biological connectedness that you were speaking of, Michael, but it reminded me of how we have a tendency perhaps to just define our in groups and then show our goodness and our kindness just within opposed to looking outward beyond that. Michael, before we open the floor for students, questions and responses, I wanted to give you the chance if there's anything you'd like to add or a burning question, I'd like to know about the other. Let's go for me to jump in.

I think we covered a lot of the things that I was thinking about in the lead up to this. I'm glad that both of us stumbled upon this idea of awe and the wow factor as really things that are central to the overlap between science and religion. I'll describe one other small story and that is I'm heading out to Sedona tomorrow, which is a beautiful area of Red Rock Canyon in Arizona, a place that I find a spiritually uplifting place.

I remember last time I was hiking there feeling a sense of awe for what I was seeing for the scenery. John, you're a geoscience person. Well, that area in Arizona is part of the Colorado Plateau and it was formed by a spectacular series of geological events over the course of a long time.

I was walking along, I was thinking about how the area formed and I was just stopped in my tracks because my level of awe for what I was seeing was magnified so much more by my understanding and by the depth of understanding what had happened there, not just that which is, but that which formed it, not just the thing, but the process, not just the noun, but the verb as well. I think as scientists, that's sort of a treat that we have and that perhaps it can foster enhanced levels of spirituality or transcendence is that we can understand the beauty or the magnificence of what's around us at ever increasing levels of understanding of detail and of awareness. I'll just quickly add to that a concrete example because sometimes we speak in the abstract and I wonder if people think, well, give me an example of exactly how you experienced this awe and how they intersected and so for me that would be, it's pretty amazing when you think about the human genome, for example, at least 10% of the genome represents sequences from viruses that have integrated into our DNA over time.

And so in a way, even at the genetic level, each of us is like one-tenth virus. And the amazing thing about it is that viral DNA is thought to have actually shaped some aspects of our biology in ways that we just take for granted. And a really curious example is the growing evidence for the fact that pieces of viral DNA may have been co-opted to contribute to the development of the human placenta.

I find it so fascinating. And PBS, when they got wind of this, they put a piece together called the viruses that made us human, which I thought was interesting. But to me, this

doesn't take away from God's authorship of our lives.

Instead, I'd say that it actually adds this wonderfully surprising, unexpected color to what Psalm 139 says that God knit us together in our mother's wounds. I mean, who is to say that God can't use viruses to accomplish this? I just find the feeling that goes to their being conflict. I love this.

You have to give me, John, you have to give me another mention of this. So when Darwin came along in his day and presented his theories of evolution and presented the idea that all life on Earth arose from common ancestry, traditional religious people, perhaps fundamentalist religious people, we're very upset. And I look at it nowadays, and I think, well, we could take the literal reading of Genesis and the days of creation.

One could take that. I mean, I don't, but one could take the literal reading of Genesis. And to me, that kind of falls flat.

If there's a God, evolution is so much more impressive than the six days of creation story. The six days of creation, it was a one-off, it happened, it was like a card trick done. Whereas evolution is sort of an ongoing creation that continues to create magnificence.

And to me, the Darwinian process is perhaps God's greatest creation. And invites us, I think, to contribute to that creativity, right? And that actually goes into the realm of your work and your expertise, Michael. Yeah, we didn't even get to that.

But right, so once, you know, one's sort of aware of the magnificence of life around us, to what extent is it possible to fabricate? And I don't want to use the word create, so that's a big word. You know, to what extent is it possible to fabricate new molecules, new genes, new proteins that never arose in life on Earth, but nonetheless have the capacity to sustain life? Are we playing God there? Or is it perhaps partners in creation with God? And those are, I mean, we're not going to answer that, but those are the kinds of questions that are provoked by that kind of work. Well, we can certainly get into that in the student questions.

So at this point, I'd like to welcome back Kathleen and Sylvana. We'll not be moving into a time of Q and R where, and we call it question and response because although committed to seeking truth, we recognize that our search must be marked with humility. So we'll be taking questions from the suggests the suggests tab and just a quick reminder to everyone in the audience, you can ask your questions and upvote them again in the suggests tab.

The first question for tonight is how can one begin or stop having faith in a religion when it is inherently non-falsifiable? How does one decide what religion to believe in and can these questions be approached with a scientific mindset? I can dive into, oh Michael, do you want to go? Very briefly, I think for me in this whole setting, I don't describe it as

religion. I describe it as spirituality. I describe it as an awareness, an wide-eyed, wide-open, eyes-wide open awareness of something that is bigger than us.

To me, that's what spirituality is. So I can answer that much more easily than if I was talking about religion. So then I'll hand it off to you.

You have the harder answer. Two things that come to mind, that question, it's a wonderful question and thank you to the university. The first is that this is actually one thing that I found to be somewhat more tangible in my exploration of Christianity.

So I came to Christ and to Christianity during my college years, which was also at Cornell, kind of comeback full circle. But it was during a time when I was actually exploring many different faith traditions. I grew up as a Hindu, a very orthodox Hindu, and I started with Hinduism.

I tried to study Buddhism. It was extraordinarily challenging and Judaism and Islam and Christianity with the help of imams and priests and so on in as much as is possible. And in that journey, one of the things that I did find about Christianity is that there are claims that are made that are falsifiable, historical claims.

And even things that happened in history, people can have different takes, right? So it is challenging. But there are things that one can do in terms of analyzing the text, in terms of looking for historical and archaeological, etc. evidence.

And Paul, in fact, says that the historicity of the faith is troll to everything. If it can be shown that Christ did not resurrect, then he said, we are to be pitied among all people, because we're just living alive. And so there was a seriousness with which the early practitioners of the faith took the historical claims that were being made.

And so I felt in the study of the religion that I had to explore that as well. And we don't have the time here to get into all the things that that I explored. And I didn't necessarily get answers to all of my questions, but I did find it quite satisfying more so than I had anticipated.

The second thing I'll say is there are different ways in which to know things. Epistemology is a really important subject. And I think this question touches on it.

My wife, my love for my wife, right? Is it falsifiable? Can I prove that my wife loves me or that I love her in a way that I could just write QED at the end of it? I don't think so. I'm not aware of the scientific tools for me to be able to do that. At the end of the day, what I would be doing is relaying a set of stories about my experience with my wife, my journey with my wife.

And then you need to get to decide whether that was compelling or not, right? Whether that felt strong enough to you that it seemed like love and maybe not that she wanted

me for the money that I don't have, right? So I think that's a lot of the way it is when it comes to faith traditions too, right? There are signs you can look to. There are things you can probe. There are, you know, you can look to see whether the claims are consistent with your life experiences.

There is a lot that you can do, but at the end of the day, you do have to take a leap of faith in the same way that I had to take a leap of faith that, you know, I would like to propose to my wife and live with her forever because I believe she loves me too, right? There's a sense in which I could never actually prove it in any mathematical scientific sense. And in fact, the reality is most of what we do in the lab isn't really proving anything. It's actually building an explanatory model, right, that fits the data far better than anything else does.

And that's actually what I realized I was doing when I was on my science, my spiritual journey as well. All right. Thank you both.

I will read the next question. So somebody watching the forum has asked, "Going back to the main topic of the talk, you have presented science as a tool to investigate the natural world. However, many religions tend to come to predictions about the natural world that are at odds with scientific conclusions.

How do you approach coexistence in those cases?" I'm going to answer that a little bit. I think, I mean, I guess goes back to the main topic was "Arts are science and well, the original title was our science and religion compatible or can they coexist?" I would change it to spirituality. But I think it depends on the approach to religion and the approach to science.

And I think on both sides, it's a question of how authoritarian and dogmatic they are versus how open-minded and aware they are. And I think both scientists and people of religion can be dogmatic and authoritarian. And then there's conflict.

And at the same time, I think both scientists and people of religion can be open-minded. And it sort of goes back to what we're talking about before about inquiry and the search for awareness. And so if we're, it ties into a lot of things we said before, also about people who are anti-vax and people who are, it goes back to if people are wedded to some level of dogma in an authoritarian way, such that they cannot see and inquire and observe and achieve greater awareness, then we have a problem.

And whether it's coming from either side, from the science or the religion side. On the other hand, if we have people whose approach to their science or religion is open-minded and can take in new things, then we have the capacity to build greater awareness and greater appreciation for that which is around us, which ultimately leads to, I think, an enhanced level of spirituality. So it's not the science or the religion.

It's the dogmatism or dogmatic approach versus the inquiring mind. Both, as we said earlier, both the scientists and the people of religion, if they have open minds, they will constantly be bombarded by awe and wow, the scientists and the religious people. On the other hand, if they have closed minds, the scientists will be stuck in picky-une levels of data and the religious people will be stuck in reinterpreting that same quote for the end of time.

So I think it's a matter of just the wow factor, the open eyes, and the willingness to inquire and be inspired by that inquiry, both as a scientist and as a religious person. I have to say, I think Michael's response is really beautiful on that. I agree wholeheartedly.

I mentioned earlier about shared values between science and faith. Well, I really believe that humility and curiosity are actually shared values, but if we don't appreciate those two as shared values, that's where the problem comes in. And I think that's another way of saying what Michael said, where if we are entrenched, we dig our heels in and we become overly daunting.

Science or religion, that's where the problems occur. But the willingness to have a strong foundation, I'm not suggesting that people be a read blowing in the wind with no foundation at all. But to have a foundation and then inquisitiveness and curiosity to enhance that foundation as a value for life, that's where you find really the beauty of the connection.

Thank you. I will ask the next question. Since 2011, studies have shown that placebos are still effective when participants are told that they are taking a placebo.

Would it be possible to have a church slash synagogue, mosque, or temple that explicitly states that the religious experience is a placebo? This would allow practitioners to gain the benefits of religion slash spirituality while not needing to contradict science. What are your thoughts? I mean, I'm fascinated by the we're I think many of us are fascinated by the placebo effect. I think part of what happens there is it is in the way our in the way our minds have evolved.

There is in some ways there is the raw data that comes in, right? You see behind me, you see the colored brown, but in your minds, you've probably already made a story in your mind about where I'm sitting and what's going on here. And is that a closet well that is all your eyes really see as brown. But the mind has a need to create a story to unify things.

And I think that was an evolutionarily selected trait because the mind that just saw the brown photons or the mind that saw brown photons in the distance, the brown photons, that mind got eaten by a bear. Whereas the mind that said, oh, it's a bear and ran, that mind survived. So I think that the tendency to build a story around the sensations that we take in, that's a selected trait.

Okay, that being said, that's the placebo effect is that we, somebody gives you a sugar pill. It's just a placebo. We construct a story in our minds that something has been done and I'm going to feel better.

And so we make up the story. And as we said earlier, sometimes emotions are much more powerful than actual cognitive, you know, actual data. And so in that sense, you know, the placebo here is basically our minds trying to build a story out of it.

But that was just sort of the start of it. I don't know, maybe you want to, if we now take the placebo is just a building, is it just a church? I don't know, what do you think, Vivian, how do you want to? Actually, the fascinating question, all my years doing science and faith talks, I don't think I've ever heard that one. And that's a really, really interesting question.

I have to think about it some more instinctively, though, what comes to mind is that I actually would not reject the notion that there is probably some positive effect, you know, to the idea of spirituality or a connection with something bigger than you, even as a placebo effect, right? I think that it probably can have a positive impact in a way that you relate with the people around you, etc. I do, based on my own experience, and this isn't sort of based on, you know, sociology or data that has been collected from a survey or anything like that, but based on my own experience, I do feel like that would hit a wall. I think that while stories are important to us, what is real is important to us too.

And I think this is why we've been grappling with what is truth? Like, this is just so foundational to our existence. We want good stories, but at the same time, it feels like we don't want to live a lie either, right? And so there is something in us that really seeks out the truth. And I feel as though the placebo effect, especially if we knew that we were being given a placebo, I think at some point, it would hit a wall.

And when push came to shove, for the lack of a better way to say it, right, that it would fail us, right? And that we would still end up feeling empty in the sense that we hadn't made progress. And I think for us, it's really about the journey. It's about the journey of finding something.

It's about the journey of finding something real. I think this is why we want to be in relationship, right? We want to like really be known. How many people really know us? Like really know us.

We want to be known. And we want to know someone else in a real and true and fundamental way. So I don't think at the end of the day, we can escape this desire that we have for truth.

One last comment. At the same time, I certainly know many people who are orthodox Jews and almost everything in their lives is set by a way of doing things, laws and

traditions. And yet if you talk to them about whether they believe in God, they're not sure.

And so I think what that says is there's a tremendous value for humans of having a tradition. And I think having a tradition enhances the connection that we feel to our tribe, to other people, to it enhances our feeling of connection. And so that has value in its own right.

And people do it, even when they're not so sure about whether there is a God. That's interesting. I don't have any as we as you said, this is not Q&A.

This is Q&R. Thank you. I will be reading two questions from the audience because they're related.

So here goes the first. How do you reconcile our modern understanding of physics and intelligent design? If there is a creator somewhere out there who wanted to create something capable of appreciating humans, how would this have happened? Did a creator intelligently design the laws of physics such that the creation of intelligent life was probable? That's the first one. And then the second one, which is related is a majority of cultures have creation myths, while some creation accounts can, to some degree, coexist with widely accepted theories regarding the evolution of the universe and the origin of life.

There often exist the presence of the supernatural in these explanations that goes against pure reason. Do you see a conflict between your traditions view and the scientific consensus? And if so, how do you maneuver this? There's a lot there. It was overwhelmed.

I'm glad you're here. I'll dive right in and see if I can address at least some of the questions there. As a biologist, as a biomedical scientist, as a person who actually teaches evolutionary genetics and biology in some of my classes, I will answer the first question somewhat simply by saying that it is my belief.

The explanatory models that I have that best seem to explain the data I'm interacting with is that God created the world through evolutionary processes. So I would still view him as the author of evolution. And so what I mean by this is not the Stephen Jay Gould kind of idea of here's kind of natural processes, and then here's the kind of circle of supernatural things.

And then, you know, the two don't have to meet, right? Let's just keep them in their separate areas. That doesn't work for me as a person of faith. And I believe God is the author of both of those things.

Finding how something works naturally doesn't give me any less awe than believing in a supernatural explanation for something such as the resurrection of Christ, which is also

awe-inspiring. Both are authored by God. And so I find both of them to be thrilling, right? And to be under the purview of God.

One is just something that we have the tools to be able to explore, and that's science, right? The other we have to use different kinds of tools, not scientific tools, right? And this is the spiritual part of us, then connecting with something bigger than what we are that Michael has been talking about as well. I think one thing that people have trouble with when with that kind of answer is that inherent to evolutionary process is randomness. And I think that it's really difficult for people sometimes to see how God fits into a picture that, you know, or authors a process that has randomness or stochasticity at its core.

But I think what people miss is that, you know, apparently random processes lead to ordered predictable outcomes all the time. And it's all around us, right? It's actually pervasive, right? And a really wonderful example of this, if I may, is the formation of each of our human bodies in our mother's womb. It's said that, you know, our cells play dice on root to becoming a fully formed heart cell or lung cell or liver cell.

But despite this underlying randomness, it's a human body that emerges every time, right? And there was an article in Nature quite a while ago now that provided a really poetic answer to this. And they said, if cells play dice, various geometric and temporal constraints on the cells can weight the dice, thus disrupting perfect randomness to convert noise into orchestrated sounds, right? And so the idea is that randomness doesn't have to imply lack of order or purpose, at least the way scientists usually refer to it. And it's because even apparently random processes are constrained by the parameters of the system in which they operate.

And these constraints help shape the final outcome, right? So it's a lot of the way that we think about randomness in an evolutionary process context as well. Really famous geneticist and biologist recently said, the theoretical space of all the different things that could be, right? It's just far, far, far more expansive than what actually is, right? And that's in large part because things are not as random as they seem, right? Said by a scientist with, as far as I know, no particular persuasion as far as faith is concerned, right? So I'll leave it at that and pass it on to Michael. Who said that? You got me curious.

Avib Regev. Yeah. I, again, no answers, just responses.

I think about that. You said before that that which we see that exists on Earth is a very minute fraction of what could be. That which is much smaller than that which could be.

This is something I think about a lot in terms of my own work. To what, you know, the number of possible gene sequences is beyond comprehension, right? The combinatorial diversity is beyond comprehension or the number of possible proteins. I went described it this way.

This you made every possible protein sequence and you made just one molecule, just one molecule of every possible protein and you put them in a box. The box would be bigger than a mole of universes, okay? Which is just a staggering book. And yet over the course of evolution, what arose are whether it's E. coli or whether it's you, okay? These living systems that are spectacular, right? I mean, any living system is spectacular.

And yet these living systems are sustained by a very, very, very small number of genes and proteins. And so if you say you start out with a collection that is so big it's beyond comprehension and you end up with a collection that's tiny and what that tiny thing does is spectacular. It lives.

And you have to say, well, somehow these sequences are really special, whatever special means. And so maybe special is another way of thinking about the wow factor, right? Those sequences that arose, they wow us. No, they don't just wow us, they make us alive, right? But they're so rare and they're really special.

So then you have to, all right, so that's life as we know it. Then you have to wonder, suppose you started making entirely novel sequences. Those you started making genes and proteins that never before existed on Earth.

How hard would it be to come up with some that are actually life-sustaining? And I don't know the answer to that. I mean, we do that in my lab and we're just dabbling in it. But in a big way, I don't know.

How hard is it? How special is life, right? How special is it? Magnificent. But how special is it relative to what could happen? Are there alternatives to life as we know it? They're never. I hope Michael and I touched on the question somewhere in there, Kathleen.

That's true, we did, but we had fun. Another question that an audience member asked is, they say that they read a case for a creator by Lee Strobel and a chapter on evidence for a spiritual world can be found in neuroscience. It left the audience member questioning.

If proof for God can be found in neuroscience, do you think, and if either of you don't think you know enough, it's fine too. Do you think that the soul or spirit could be disproven by neuroscience? This is really a fascinating question and it's very fresh in my mind because just yesterday, I hosted Bill Newsom for a virtual conversation here at Cornell. And Bill Newsom is one of the leading figures in systems neuroscience and cognitive neuroscience in the world and has done a lot of work studying non-human primates and simple decision making and what's going on in the brain when that happens.

And he's based out of Stanford University and was the co-chair of the brain initiative if any of you are aware of that. And he had fascinating response to a very similar question. He was much better suited to answer it than me, so I'll try to, maybe you can live

vicariously through me to access Bill Newsom.

But one of the things he talked about is that a lot of neuroscience are actually determinists, but that he had never in his life really found that very satisfying in the way that he thought about concepts of free will and things like that. And he shared a little bit about earlier neuroscientists who thought that the interface between the physical mind and this spiritual soul thing, whatever it is, was actually found in certain like structures in the brain, like the pineal gland or other structures in the cortex. That's actually where the magic happened.

Nobody really proposes those kinds of ideas today, but what that conveys is that we've been working hard for a really long time trying to address this question. And so that's sort of a fancy way of saying, I don't think we're ever actually going to address this question, but I don't think that there is some kind of a physical interface. I actually don't know.

This is one of the questions in my spiritual journey that has been the most, remains the most open. I don't know how to think about what a soul or a spirit is. I know that I don't think about it as completely separate from my physical body, though.

It's intertwined with everything that I understand about my biology, but beyond that, I don't really know how to really understand it, other than the fact that it's the part of me that, again, not completely separated from the physical part of me that helps me to connect with a larger vocational calling to live out my faith, as we were talking about before, and to represent him and reflect him and his character in the world. So I think of it more as a calling than I even do like some kind of physical thing that is somewhere around me that I can't locate. It's actually more of a calling placed on my life, and I believe on every human.

Can I ask you a question? Does it persist? I mean, it's sort of connected with the body, but the body does not persist. Does the soul or the spirit persist after the body? I mean, the Christian belief is that we are given a new body, and then that gets into all kinds of, I don't know what that means either. People have been talking about what the new body means for a very long time, and I've heard quite a varied number of opinions on exactly what that means, and where that body exactly will be, and even exactly what heaven is.

So I don't know, but I'm inclined to think yes from everything that I do understand from scripture, but I don't know that I have personal experience or understanding of it beyond a willingness to, at some point, trust certain things that are shared to me through scripture or reveal to me through scripture that I actually don't have a way of probing. So it's sort of like one of those things where I've probed so many things, and they've proven trustworthy for me, that at some point I get to a few other things where I say, I don't know that I have the capacity to probe that right now. And so maybe I'll walk by faith and not by sight on this one.

I think we have time for one more question. Do you want to jump in? Sure. So then our last question for tonight will be, how has the recent pandemic and the public response to it made the coexistence of science and religion either easier or harder? I would love to think that it's made it easier because of the miraculous, I shouldn't use the word moraphas, because of the stupendous things that science has done in the past year.

Whether it's the basic science of understanding what's going on with the virus or the applied science of making us immune, I mean, we'd love to think that that would have enhanced how science is accepted by people of faith. But I'm not sure that's happened, you know, as we've discussed before, there's also been quite a bit of anti science, despite of that. So I'm inspired, but I'm also distressed.

Again, couldn't have said it better myself. I am distressed and inspired, all rolled into one. And I'm really hoping the inspired part of me wins out, because I see the potential.

That sounds really bad to say that there's potential in the tragedy that we're living in right now. But if there's a silver lining to come out of the experience that we're going through right now, when it comes to science and faith, anyway, I think that there's an opportunity. There's a really fresh opportunity or engagement between the scientific community and the religious community.

In a way that I think we haven't really had for a little while. But it's up to the individuals in both of those communities, leaders in both of those communities, to take advantage of that opportunity. And to step in to talk to one another and lead.

And I'm really hoping that that happens. I've seen glimmers of hope. I'm a part of BioLogos, as John mentioned in the beginning, and it's an organization committed to conveying harmony between science and faith.

But during this past year, one of their primary goals has been to have conversations between different, sometimes, warring communities when it comes to the COVID-19 vaccine. And help people to see this as an opportunity to learn from one another. And I hope that sticks because I've seen some of those things do wonders as people have come together.

It's my hope that more of that kind of thing happens because I do agree with Michael that there is an opportunity here. If you like this and you want to hear more, like, share, review, and subscribe to this podcast. And from all of us here at the Veritas Forum, thank you.

(gentle music)