

The Future Is Calling Us to Greatness

with Michael Dowd + 56 Experts



Bringing Climate Science to Evangelicals with Katharine Hayhoe

Big ideas from this session:

- How did a Texas atmospheric scientist become the rock star of the most watched climate show in TV history?
- Effectively countering climate skeptics and converting evangelicals and other conservatives
- AAAS 'What We Know' Campaign / The making of "The Years of Living Dangerously"

Michael: Katharine, welcome to this conversation and thank you for being part of this conversation on The Future is Calling Us to Greatness.

Katharine: Thank you for having me.

Michael: One of the questions that I've been asking, actually the first question I've been asking all of my guests is to simply introduce yourself to the audience. I'm assuming, even though you're now a rock star in this sort of field, I'm assuming not everyone will know who you are and sort of how you got to where you are. If you would, share both a little bit of your trajectory in terms of your story but also what are you best known for in the world.

Katharine: Sure. I'm a climate scientist which means that I study how the world around us affects us, especially at the local scale where we live. We often don't realize how we depend on our climate for the water we drink or that we use to water our lawn or our crops, the food that we grow, the air that we breathe, the energy that we consume.

Today, because of that energy, we are actually changing our climate. Every time we burn coal or gas or oil it releases this invisible but very powerful gas into the atmosphere, carbon dioxide. That acts like an extra blanket that we're wrapping around our planet, trapping heat inside that would otherwise escape to space.

That heat is changing our climate. It is altering the risk of extremes, like heat waves and floods and very strong hurricanes. It's causing our sea level to rise, it's changing the

amount of water we have. All of these things are things that impact us personally in the places where we live.

I would add as a Christian it's even more important because they specifically impact the people who are already living at the edge, whether it's here in North America or on the other side of the world. The people who have the least resources to adapt to this changing climate are the very people who are being most harmed by it.

Michael: Exactly. Say a little bit more about how you became an atmospheric scientist. I know your dad was an inspiration to you. Share a little bit of your story in terms of how you came into science. Also, if you feel comfortable, sharing your own faith journey as well. I'll probably share a little bit of that also since we have some of that in common.

Katharine: I grew up in a Christian home where my dad was a science educator, originally a science teacher then the coordinator for the Board of Education and now a professor of education.

To me, science was first of all the most exciting thing in the world when you're three or four years old. Second of all it was a way to understand what God was thinking when he set up this amazing universe that we live in. Science just came very naturally and it wasn't until I was halfway through my undergraduate degree that I actually realized that science is very hard and not always that fun.

By then it was a little too late. I finished up my degree and then I looked around to see what would be a way that I could make a difference. When you're at that age in your early 20s you're like, "I want my life to matter. How can my life matter?"

At the time I was actually studying astrophysics, which I love, which is one of the most fascinating fields in the world. How we can tell things not just about our galaxy, not just about other distant galaxies, but even about the beginning of the universe, just from the observations that we can make here on our own planet.

Astrophysics was amazing, but in third year university I took a breadth requirement in the geology department on climate change. I had known about climate change growing up in Canada. That's part of our high school curriculum. I knew it was real. I kind of mentally classed it. We have air pollution, water pollution and deforestation, loss of sea, environmental green issues.

It wasn't until I took that class that I realized that climate change is really huge, that it's affecting all of these other issues. The reason we care about climate change isn't because it's on this list of green things to care about. It's because climate change is affecting our lives, our health, our resources, our water, our economy, you name it.

Then I also realized that in studying physics and astronomy I'd actually accidentally developed all the skills you need to do climate science and climate modeling.

From there I began a career in climate science knowing that I wanted to go into an area where I could do science that would be used. Not just science that would be published in an academic journal or published in a book but science that can actually be used to make decisions. We are being impacted today by climate change. Even though the future's uncertain we know one thing for sure. That one thing is that if we fail to account for who climate is changing when we're making our future plans we're going to get the wrong answer.

Michael: Exactly. One of the things when I was looking at your background, you've done research and written on methane and the challenges that that presents. I know just recently in the news we've seen these craters in Siberia and that sort of thing.

Some of the people on the really far end of the doom and gloom, that basically we're just all screwed and that sort of thing, really point to some of the scary stuff around the melting of the permafrost and the methane release. Anything that you can share with us about both what you understand in terms of the science, what's happening there, and what actions we can take or what we can do to help avoid the worst catastrophes that are possible in terms of some of these runaway, positive feedback loops?

Katharine: Yes. Well, we scientists are a very, very staid, conservative bunch. About the worst thing you could possibly call a scientist is an alarmist. In fact, studies have actually shown that at least in climate science over the last 20 years we have systematically underestimated the magnitude of climate change, to the extent where they actually coined a syndrome airing on the side of least drama. Scientists hate drama and we are subconsciously downgrading our estimates of how bad things are because we don't want to be dramatic about it.

All of this is a background to say that nowadays in scientific circles when you see a worried scientist that worries me more than if I saw a worried environmentalist. Environmentalists sometimes make a career out of being worried. Scientists, not so much.

When you see worried scientists, that's a sign that we've got to be sitting up and paying attention to this. In science, one of the things that we are doing is trying to understand how the planet is going to react to this experiment that we are conducting with the only planet we have.

We have never in the history of the planet as a human race dug up so much coal and natural gas and oil and burned it and spewed all that carbon into the atmosphere so quickly. We don't know how sensitive the planet is to what we're doing. That's never happened before. It's like you invented a drug and you immediately give everybody on the planet this drug and

you have no idea what the side effects of this drug are. In fact, you didn't even know there were any side effects when you started taking the drug.

One of the biggest side effects that we're worried about is the fact that we know up in the Arctic in the ground and also in the continental shelf just under the ocean there are enormous reservoirs of methane stored there. Methane is a really important heat-trapping gas. If that methane gets released into the atmosphere one particle of methane is equal to 25 particles of carbon dioxide. It's really, really powerful.

What we're seeing, we've seen for a long time now, is that as the land, the permafrost, is melting up in the Arctic the methane that was trapped in that permafrost is being released into the air. What we're starting to see now that we didn't even think was going to happen a couple years ago is that the methane in the continental shelves is also starting to be released as the ocean water melts.

We're starting to see these explosive releases, like these craters they're discovering in Siberia that you mentioned. We're not sure yet because it's still early days, but they are indicative of basically huge methane buildup underground and then an eruption. Methane is natural gas. That's what it is.

These are the things that keep us scientists up at night. There's no magic threshold of if we burn so much fossil fuels then we're okay but if we burn just a little bit more then we're screwed. It's kind of like there's no magic number of cigarettes you can smoke, if I smoke this many cigarettes in my life I won't get lung cancer but if I smoke one more I will.

The one thing we know for sure is that the further down this pathway we go, the more cigarettes we smoke, the more carbon dioxide we produce, the higher the risk of these types of catastrophic events happening. That's why I and other scientists feel that it's so important to reduce the amount of carbon we're producing.

We can do it through a couple different ways. We can do it by number one just being more efficient with the way that we use our energy, which saves us money as well as reduce air carbon emissions. We can do it by switching from more intensive carbon-based fuels to less intensive. Switching from coal to natural gas helps.

Long-term the way we have to do it is we have to switch from using these old and dirty ways of getting energy to using clean, new ways of getting energy like wind and sun and tides that are never going to run out on us. This is what we have to do as a society long-term.

Michael: I completely agree. In fact, I was just doing a presentation on the same title of this interview series called *The Future is Calling Us to Greatness* at a Catholic spirituality center just three nights ago. One of the things that I talked about in there and I actually have a quote from

Bob Ingliss who's one of my heroes, a Republican from South Carolina. Along with Citizens Climate Lobby and others who are lobbying for a systemic solution rather than a government solution.

Bob Ingliss says it the most concise way I've ever heard anybody say it. He says, "I favor a conservative approach." This is his words. "I favor a conservative approach that marshals the power of the market and doesn't increase the size of government. Here it is in a nutshell. Put all the costs in all the fuels and eliminate all the subsidies and then watch the free market enterprise system solve the climate and energy crisis."

I just find that that's just a brilliant way. That whole notion that we have to integrate true costs because people think of coal as inexpensive. Coal is really expensive when you actually look at what the impacts are in terms of our health and the environment and future generations. That whole sense of intergenerational justice.

You were speaking before about, and this is one of the things I know you've used in your appeals to Christians, especially Evangelicals, this sense of compassion for the poor and the outcast and the disenfranchised and those on the margins. We need to also, as I know you agree, consider and hold in our heart our responsibility, our commitment to a healthy future and the fact that by simply status quo doing nothing or thinking that we can continue and make small tweaks, changing lightbulbs and flying less and driving less and that sort of thing, which is all good, that's going to somehow magically create a world where our grandchildren aren't suffering a literal hell on Earth.

I know a policy recommendation isn't something that you or most climate scientists have any interest in, but I'm wondering if you could say anything at all about some of the systemic shifts such as what Bob Ingliss talks about. Do you see hope of that happening?

One of the things that I said the other night is that if that happens in the next two or three years or if that happens ten years from now, at some point that will happen, at some point we'll put a fair price on carbon pollution and marshal the global market into helping us move in the right direction.

Whether we wait ten years to do that or do it in the next two or three years, just that difference will make the difference between the suffering of billions of humans and animals for thousands of years. Anything that you'd be willing to share in terms of the systemic hope?

Katharine: Absolutely. That's why a large part of my research is devoted to quantifying the impacts that we expect. I feel like science can tell us that we have a problem, the climate's changing. Science can tell us why it's changing. This time for the first time in history it's not a natural cycle, it's not the sun, it's not volcanoes, it's humans.

Michael: Let me jump in. I love the way you've done that. I've seen you do this on a video and I think that you're brilliant in that. Could you pretend that you're talking to a skeptic or somebody who says, "It's just natural cycles, it's the sun." Share how we know scientifically that that's not the case.

Katharine: What I found is that we really have to talk about this stuff. It makes sense to think it is a natural cycle. We can't just assume trust me, it's not a natural cycle, let's move on. People deserve a real answer on that. They deserve to know that climate scientists have been studying natural cycles for more than a century and that there's actually big facts and research to explain why we think it's humans. It's not that we've drunk the Al Gore Kool-Aid or something like that as they often suspect.

What I try to do when I talk to people about climate change, I go through the reasons why we think climate has changed in the past. Natural cycles is number one on the list. We have two kinds of natural cycles actually. We have ones that are inside our Earth's system and we have ones that are outside.

The inside systems are like El Nino. When we have an El Nino it's wetter some places, it's dryer others, it gets warmer some places and cooler in others. What natural cycles do inside the Earth's system is they just move heat around. They move it from east to west, they move it from north to south, they move it from the atmosphere into the ocean or the ocean into the atmosphere.

If our planet were warming due to natural cycle and if that warming was seen in the atmospheric temperature, the air temperature, then heat would have to be coming from somewhere inside the Earth's system. The most likely candidate would be the ocean since the ocean has a huge heat content compared to the air.

We look at the ocean. We say, "Has the ocean's heat content been going down while the atmosphere is getting warmer?" If the answer's yes then it's an actual cycle. The answer, though, is a resounding no because the heat content of the ocean has actually increased 20 times more than that of the atmosphere and the land and ice all put together. That's how we know it's not a natural cycle. The entire planet is warming from the depths of the ocean to the top of the atmosphere.

The other type of natural cycle we see causes the ice ages. This one's really cool because it actually relates to astronomy. There was a Serbian engineer back in World War I who had a lot of free time on his hands at that time and by hand calculated how shifts in the Earth's orbit around the sun actually cause the ice ages. The natural question is aren't we just recovering from the last ice age?

The answer to that is, though, actually no. We are overdue for the next ice age. The next thing on that calendar is not a warming. The next thing on that calendar is actually a cooling. In fact, people have hypothesized that we're actually postponing the next ice age because of what we've done. That's a good thing because another ice age would be just as devastating as global warming. What we like is just a stable climate.

Then the last cause people look to is the sun. They say, "Isn't it just more energy from the sun?" That's an easy one because we actually look at the sun's energy and we see that since the 1900s it was going very slowly up just a little bit at a time. Then around about the 1970s it started to go down. Correlation doesn't imply causation as the statisticians always like to tell us, but you have to at least have a correlation to look for causation. If the sun's energy's going down and your temperature's going up, that is not responsible.

I go through these things first and then talk about how we burn coal and gas and oil. That produces carbon dioxide. Carbon dioxide traps heat in the atmosphere. We already have this perfect blanket around this planet that is just absolutely perfect for life. It keeps us at just the right temperature.

What we're doing is we are adding an extra blanket around the planet. Just like you and I would at night if somebody snuck in like my grandma used to and put an extra blanket over us, you wake up sweating like, "I don't need that extra blanket. It was just the perfect temperature." That's what we're doing to our planet. We're putting that extra blanket around the planet that it was never designed to have. That's why we're getting warmer.

Michael: That's great. That's a fabulous overview. Thank you.

Katharine: No problem.

Michael: One of the things that I've appreciated about your work, and your relationship to your husband somewhat parallels, at least there's aspects of it that parallels my relationship to Connie. I am a minister. I pastored three churches over the course of a decade. Connie is a science writer and she's written four acclaimed science books. We've both been passionately concerned for ensuring a healthy future and doing so with religious zeal you could say for quite some time.

We've been living on the road now for 12 and a half years traveling all over North America. We've spoken to about 2,000 groups. This is what we do.

The one little difference is that I'm out in the public more on the issue of science and religion and sustainability. She's more the geek. She works on audio and text and video editing and a lot of the background stuff.

We both have this deep commitment for integrating science, religion and inspiration and sustainability in ways that motivate people to go deeper into their own religious traditions if they're associated with a particular religious tradition. Also with secular people, help them see that there's an inspiration for them as well. Perhaps most importantly to inspire people to work together across ethnic, religious, political and philosophical differences in the service of a just and healthy future for all of us.

I was wondering if you can share anything you'd like to about the unique gifts and challenges about you and your husband's not identical but parallel and intertwined ministry and the your book that you co-authored.

Katharine: As I was saying before, science is good up to a certain point. Science tells us there is a problem, science tells us why we have a problem, science can even explore the implications of different options like if we do X here are the consequences, if we do Y here are the outcomes of that choice. Science can't make the choices for us. That's where our values come in.

That's why I feel like it is so important to connect this issue of climate change as well as the broader issue of sustainability, equitable sharing of resources, things like that, to our values. For those of us that come from a faith tradition that's where our values come from.

Often we feel or we've been told, I should say, that if we're Christians we can't X. If we're Christians we can't be an environmentalist or we can't say that climate change is real or it would be anti-Christian to put in one of those newfangled light bulbs or something like that even if it saves us money.

The reality is, though, as Christians we have everything we need already in our hearts to care about climate change. Caring about climate change is caring about people. We know that we have all the love in our hearts that we've been given by God to love and care for other people. Caring about climate change is just an extension of that love we have for our neighbors literally next door as well as our neighbors around the world who are already feeling the impacts of this issue.

My husband grew up in a very conservative church. He grew up going to a southern Baptist school. He had never met anybody who thought that climate change was real who shared his Christian faith and his values. I had grown up in Canada and in South America, my dad being a science educator. I had actually never met a Christian who didn't think climate change was real. It isn't such a politicized issue up in Canada.

Down in South America where people are already kind of living on the edge there is no debate over the reality of an issue like that. If your farm got washed away in a flood you're not going to sit there and say that wasn't a flood.

We actually met at grad school. We got married. It wasn't until probably about six months in that we realized that we were not on the same page on this issue. I know that sounds ridiculous but we just assumed that no reasonably intelligent person.

Here's the thing. I knew that my husband was a really smart person. He has a PhD in linguistics. At age 27 he was a professor and endowed chair at the University of Notre Dame. He was used to doing data, he was used to doing statistics and experiments. He knew, he understood the scientific process by which we would both determine his area of how people acquire language and my area of climate change.

We sat down together and we went at it. He brought all the arguments and I brought all the data. I dug into a lot of information that I had never looked at before either that I just kind of took for granted.

It wasn't something we got into every day. It was certainly a progressive process. By having faith in each other and having a mutual respect that the other person was not an idiot, that they had really good reasons for thinking what they did, and we both had that perspective, we eventually came to an agreement that this was a real issue.

He would tell you himself that what convinced him was when we went to the NASA website and he downloaded the global temperature data from NASA. He put it into Excel and he plotted it on his own computer and it was clearly going up. He said at that point I have a choice, either NASA who put the man on the moon is involved in this global conspiracy to make up data and create this imaginary issue or else just as we trusted NASA to put people on the moon I'm going to trust NASA that they're right about this, too.

For him, that was the Occam's razor moment that the simplest answer is probably correct. Since then he's gone on to have his own very full career. He's written eight books on practical theology now. He has a Sirius XM call-in show. He travels all around the country talking to people about issues related to faith and doctrine. He has a Facebook group of over 10,000 people.

It's really cool because what he does focused very much on theology. What I do focuses very much on science. Every once in a while, like the other day, he'll put something up like about the Years of Living Dangerously series that we're both in, and then he'll get questions. "Hey, I heard that Greenland was really warm 1,000 years ago. If Greenland was so warm then how can you say that humans are causing global warming today?" Or, "Isn't the world just going to end anyway? If it's going to end why are we going to all this trouble? Isn't it a good thing that the world is ending?"

I think that highlights how so many of the questions we have about this issue are not just scientific but they're about the things that we believe to be true. That's why it's so

important to address people's questions and to address this issue not just with scientific facts but from the perspective of what's in our hearts and what matters to us the most.

Michael: That's great. One of the things that I may do as a result of this conversation is reach out to your husband. One of the other podcast series that I've done for the last couple years is called *Evolving Faith*. Specifically there interviewing religious leaders and pastors and theologians who are sort of on the growing edge of their own faith tradition in terms of integrating science or sort of ecology. I wrote a book called *Thank God for Evolution* so clearly evolutionary theology is something that's important to me.

I think I'd really like to have him share some of his own experience in how he does that. While I occasionally get invited. A little bit of my background. I grew up a Roman Catholic. Had a born again experience in my teenage years and was involved in a Pentecostal Assemblies of God context for about five years. I went to Evangel College, which is affiliated with the Assemblies of God in Springfield, Missouri. Then graduated there with a double major in Biblical studies and philosophy.

Went to Eastern Baptist Theological Seminary and studied with Ron Sider. In fact, I was Ron Sider's assistant for a year. Then ended up pastoring three churches, three United Church of Christ congregations. One in western Massachusetts, one in southeast Ohio and one in Ann Arbor, Michigan.

Throughout that time my theology sort of kept expanding to include things that I hadn't included before. I went from frankly being someone who was just sort of a pretty standard Pentecostal Evangelical. At the time I actually referred to myself proudly as a Fundamentalist. Now perhaps I'm still a Fundamentalist but the emphasis is on the fun rather than all the mental.

Katharine: I like that.

Michael: I consider myself a Christian naturalist or an Evangelical naturalist. I interpret my faith somewhat differently than perhaps you and your husband do, but I find myself speaking to widely divergent audiences. I can do the exact same program in a progressive Evangelical context or a group of Catholics or Protestants or sort of new thought or secular groups of humanists and skeptics and free thinkers and I don't have to change a single slide.

In fact, I did a program a few years ago at the United Nations and then Michael Shermer of *Skeptic Magazine* asked me to do that exact program. It was called *Evolution and the Global Integrity Crisis*. I did that same program at CalTech for a group of 350 humanists and atheists. Exactly a week later I gave that same program at Michael Beckwith's *Agape Spiritual Life Center*, which is sort of a new age mecca. Then a month later at a Catholic church and three weeks after that at an Evangelical church.

Now, Evangelicals, Catholics, Atheists and new agers are radically different populations but I didn't change a single slide. It was the same program. It usually takes a courageous Evangelical to invite me in, though.

Because you have such credibility and such a heart and you and your husband have such a passion and respect in that community I wanted to ask a question. Many people are aware that perhaps the largest group of people that seem to be on the resistant side and so often susceptible to denialist propaganda are the conservative Evangelicals and Fundamentalists.

Yet, I have the belief as I suspect you may share, that it's only a matter of time before Evangelicals actually lead the way. I really believe that there can be a way of thinking about Evangelical theology and even mythic understandings such as the second coming of Christ that motivate and inspire Evangelicals to be really on the leading edge.

I'm wondering, A, if that makes any sense to you. B, when you speak in Evangelical settings or maybe let me back up. What change or changes or what shifts are growing within the Evangelical message or the Evangelical theological world do you think would need to be different or perhaps are evolving or shifting? Do you see the possibility in the next two, three, five, ten years where Evangelicals really could be on the growing edge, where they're actually leading culture on this topic?

Katharine: Great question. First of all, I completely agree with you that I think Evangelicals should be on the leading edge. One of my favorite scholars whose work has really given me a new perspective on this issue is a French historian at Georgetown University, **Jefferson Hull**.

He's the slavery movement and climate change. In essence we replaced our need for slave labor with using fossil fuels instead through machinery. What he's done, though, is he's gone further. He's looked at the arguments people were using back then to preserve slavery. It's not so bad, we need it, it will destroy the economy if we give it up. The exact same arguments are being used today to retain climate change.

What really inspires me is the fact that back then Evangelicals were on the leading edge of standing up and saying, "I don't care what it costs the economy. This is wrong and we have to stop." That's why I have complete faith in our community that we can be leaders because the same argument applies today.

As Christians, our concern is not what it costs the economy. Our concern is that it is wrong and it has to stop. Then you'd say why are we in the situation where when you poll Americans specifically and you ask them whether they think climate change is real, whether it's been caused by humans, and then you parse that out by religious affiliation, Evangelicals end up at the very bottom of the heap.

Here's the thing, though. When you control for political affiliation, much of that bias goes away. I believe that what's been happening is increasingly over the past 20, 30, 40 decades we have been confusing our faith with our politics. Partly due to a vacuum in leadership in the Evangelical church. Catholics have a Pope, Anglicans and Episcopalians have Archbishops. The more hierarchical your church, the more main line your church, the more structured your leadership. Leadership has time to investigate these issues and put together position papers and teaching resources and things like that.

Evangelical churches are much more loosely organized. We, by default, often rely on conservative media and conservative politics to give us our opinions on issues that we just don't have time to dig into ourselves. We say they share our values on X, Y and Z so why not share our values on climate change, too? It's kind of a cognitive miser approach is what it's called in social science. We don't have the time to devote to investigating each issue for ourselves.

I think that there has been this vacuum of consistent interdecadal leadership on social issues in the Evangelical church. That vacuum has been filled by conservative media and politicians who do not have our best interests at heart and are not working from a base of Christian values, even though they may mouth them.

The result is that we as a community have really been led astray by unreliable information and we've really become a target for these disinformation campaigns because they are couched in conservative and sometimes even very religious sounding language.

Michael: That's great. I just deeply applaud both your work but also your husband's and the work that you do together. Frankly, I don't think there's anything more important than engaging with the deep religious sensibilities of the American people and recognizing that that's diverse, that's a multifaceted thing, it's not a monolithic thing.

Doing so in a way that is respectful and honoring of the tradition and where people are at and where they're at. Doing so also in a way that inspires them to evolve or to grow or to come to a new holding of the faith so that it is able to integrate. Let me back up. I see evidence as modern day divine revelation.

One of the things that I've been doing I just want to bounce this off you and see what you feel about this. As I was saying, anybody who's working with religious communities in a way that are helping them move beyond places where perhaps their parents or their grandparents were I think is doing holy work, doing God's work at this time.

Actually about three and a half years ago I interviewed 38 of the world's most prominent theologians and scientists and ministers who fully embrace an ecological evolutionary world view. Some of the top Catholics, the top Protestants, the top Evangelicals and so on.

In all 38 interviews I was trying to find is there something that we can say with confidence that we can speak with one voice about? We're all over the map theologically, metaphysically, spiritually and we have different traditions and different language. Is there anything that we can say confidently that we share that is a core common?

I sort of narrowed it down to three things. Once I did that I kept testing it with all the various people that I spoke with. There seems to be three sort of core things of agreement. One was that we all had deep time eyes. We all had an evolutionary understanding of reality that went back millions and millions of years and also forward millions and millions of years. We all had deep time eyes.

We all had a global heart and a global commitment. That is our commitment wasn't just to our own soul salvation or our religious group or even our nation's state. Our commitment in a very real sense included the larger body of life of which we're all a part of and the health of that.

Then the third thing was that we all valued evidence in some very real sense, divine revelation, divine communication. Some felt comfortable, like I do, calling it modern day scripture. Others didn't feel quite comfortable with that language. Nonetheless, we all valued evidence, scientific, historical and cross-cultural evidence as in some very real sense divine communication or revelation.

Those three things: deep time eyes, a global heart and a valuing of evidence as divine communication was something that all 38 of us agreed with no matter where we were at. I find that really good news.

I wanted to just ask you what you think of this idea of evidence as modern day divine revelation. I see you doing that, although you may not use that kind of language. It may be a bit of a stretch for some in Evangelical circles. How do you see it? I guess this is the question. How do you see the interplay between ancient revelation that we find in the Bible, for example, or that has been embodied in some of the creeds within the tradition and science and the findings of science?

In my world every scientific discovery is a revelation of God. I sometimes say facts are God's native tongue, that God is speaking through evidence. I'm just wondering what you think about that and what you see as the relationship between ancient scripture and evidential scripture, or if you even feel comfortable using that kind of language.

Katharine: For me, I wouldn't distinguish so much between the age of the revelation as I would between the method of delivery. I would reference the book of Romans where Paul talks about how God is revealed through nature.

Growing up in a Christian home with a father who was both a scientist as well as a teacher in our church I very much grew up with the idea that God is revealed through nature to the extent that we can almost consider creation as a second book.

That is a big part of I think why I do science. It's interesting because I think it's something that's implicit in science that we as scientists don't often think about. We implicitly assume that the universe is understandable, that it's logical and rational, that there are rules that govern its behavior that can be understood and captured and used to predict situations that we have not encountered. Where does this understandability come from and where does this order and rationality come from?

By studying the universe, by studying this planet, by studying the physical world I do feel like I'm studying what God was thinking when he set it up. When we study the Earth and we see it telling us that it is getting warmer, that climate is changing, that what we are doing to the planet is causing enormous upheavals in both natural systems as well as human society, I believe that there is truth to this because it is God's creation that is giving us that message. I think that that last point you cited is one that we definitely have in common across all areas of science.

Then issue number two that you said, this global perspective, is also one I think we all share because the reason why we care about this issue of climate change is because it is affecting people everywhere. I may have my air conditioning, I may have ample water where I live, I may feel able to get food up until the day the apocalypse comes but our neighbors are not so fortunate. As Christians that is our whole preoccupation is to express the love of Christ to others. That's why we're here.

Issue number one, though, is an interesting one. That is regarding the age and the time frame that we look at. I've found it very helpful to share with people how to agree that climate is changing and that humans are responsible we don't need to agree that the planet or even the universe is any more than 300 years old. This whole problem began with the industrial revolution.

In fact, the younger we think the Earth is the stronger the evidence for humans being responsible. If you just look at the last 6,000 years there are no major natural cycles over the last 6,000 years. You cannot allocate natural cycles unless you're willing to go old Earth.

Michael: I love it, I love it.

Katharine: That's where I think we have even more points of agreement. Creation, the age of the universe and evolution often comes up when I'm talking about things like climate change. What I say is that these are issues that are really important to talk about and to discuss and to

hopefully come to a resolution on one day. I mean, I'm talking as a community, not as an individual. Obviously as individuals many of us already have.

The problem with climate change is we do not have the luxury of time. If we wait another five or ten years, as you yourself just said, there will be more people suffering, there will be more species going extinct, there will be more losses, more harm, more damages, more deaths with every year that we wait.

That is why we cannot afford to wait and we have to identify as many points of agreement as we can in order to say, yes, it's a real issue and, yes, we need to move forward with it even if we come from different parts of the political spectrum, even if we disagree on many other scientific issues, even if we disagree on issues of faith.

We're all humans, we all live on this planet. When it comes to the bottom line that is the only value we need to agree that this is important and we have to address it.

Michael: I agree, amen. One of the things you mentioned a word and because it's such I don't even want to say important. It has been at least for the last 150 years and is currently for many people, many Evangelicals, a core concept or core understanding, this notion of the apocalypse.

Let me back up. When I was a Biblical literalist or Fundamentalist I believed at that time in 1981 which is when I came to Christ in a really personal, committed way. I read the Bible straight through three times and I believed that we would not see the year 2000. I believed that Jesus was coming back and of course the way I interpreted that at that time was that a six-foot, 180-pound man would come back magically on the clouds and all us who have the right beliefs would be raptured up and that sort of thing.

I now hold a very different understanding of the second coming of Christ than I did then. I still find that core theological concept inspiring but I now interpret it in a very different way. For me now the second coming of Christ is not the unnatural return of a supernatural superhero to clean up the mess we've made but the undeniable return of the awareness that God is right here, right now, present incarnate in time, nature and mystery, that is incarnate in reality as much as God is incarnate in Christ.

We are called to be Christians, truly Christians, little Christs. We are called to be saviors of the future. We are called to embody that, not to passively wait for the second coming of Christ but to actually participate in the return of the Lord to use religious language, this being a salvific influence. I think the church can potentially play a hugely salvific role as it takes this on. That's sort of my theology.

I'm wondering, you must have people within the Evangelical community who say this is good news, the fact that things are going to hell in a hand basket just shows that the end times are coming. How do you deal with that? How do you respond to people for whom the worse things get they interpret that through the lens of this is great because what we've been waiting for for 2,000 years is finally going to happen?

Katharine: I know exactly what you're talking about. I grew up in the 1970s so my parents had a full bookshelf of Hal Lindsey and the original *Left Behind* novel. We've grown up in a culture of the world is going to end any day. My parents even said to me, "We never expected you to go to university. We thought the world would be over before that." Here I am. That was very much the mindset interestingly back in the '70s, that we were not long for this world.

Here's the thing. Whether you believe that we are waiting for a specific event or whether you believe, as you do, that we are progressively moving towards a greater realization, I think that the Bible very clearly calls us to have the same attitude. In Thessalonians there was a group of people who had that 1970s attitude, that Christ is returning any day now so I'm just going to kick back, I'm just going to wait for that event to come, fold my hands and we'll be good.

Paul wrote to those people and he wrote to them very strongly saying, "Get a job, care for others, take care of the poor and the people who need help. Support your family. Don't sponge off of others."

We are given a very clear mandate that no matter what we think is going to happen in the future we are called to actively live and love people in the present. Whatever we think is going to happen in 10, 100 or 1,000 years, today I think that our actions should look almost identical regardless of our opinion of the future. That is to be caring for people who we see around us right here rather than looking backwards or forwards.

Michael: I agree, obviously. I love the way that you just language that. One of the things that I've found challenging to hear when I learned about it was that I think at the last Gallup poll that I'd seen it was something like 41% of Americans, mostly Evangelical Christians, believe that these are the end times anyway so why bother concerning ourselves with what the world's going to be like 100 years or 1,000 years from now.

There are two things that I've experienced in the last three years that have made a humongous difference for me on this topic specifically. One of them is Brian Paisley who does Canadian television had a Canadian series, I think it was a four or five part series called *Apocalypse When?* Then within actually prior to me watching that because I met Brian and he gave me a copy of the DVDs.

I read John Michael Greer, who's one of my favorite writers. He writes *The Archdruid Report*, his blog. He writes on peak oil and sustainability and this sort of thing. He wrote a book called *Apocalypse Not*, the subtitle is *Everything You Know About Nostradamus, 2012 and the Rapture is Wrong*. Both of them, both John Michael Greer's book *Apocalypse Not* and Brian Paisley's video series called *Apocalypse When*, it's interesting, independently neither one of them had ever heard of each other.

Both of them chronicled the 3,200 year history of end times thinking and some of the tragedies and the suffering that has resulted from both secular and religious people believing that this is the end of the world within the next couple decades. I'm always recommending those two things for people who just think that we shouldn't be responsible for the future because X, Y or Z.

Katharine: Well, actually to that I would add something very important. This May I was a lead author on the US National Climate Assessment, which basically assesses the state of climate, says here's what's happening and here's why we care.

Their number one key message of that assessment, which was put together by over 100 authors from all around the country and exhaustively peer reviewed, all science, no theology, the number one conclusion was that climate change is no longer a distant issue, it is here now. It is not about tomorrow, next year or 100 years from now, it is not about the next generation anymore. We are feeling the impact today.

We can put a dollar sign on the amount it's costing us. People are suffering today from it. We are losing an average of five billion dollars a year in global food production because of climate change since the 1980s every year.

The whole issue of is it this future issue, no it's not, it's here today. Again, regardless of what we think is going to happen in the future it doesn't matter because climate change is now.

Michael: Yes, beautifully said, thank you. I know you have a young son. I have a granddaughter that's almost four years now. This whole theme that the future is calling us to greatness, I actually keep a picture of my granddaughter often by my computer that reminds me. She is the embodiment of the future calling me to greatness.

One of the questions that I've been asking my guests in this series is what wakes you up on a day-by-day, week-by-week basis? What inspires you to be in action in the face of some really scary stuff?

Katharine: What wakes me up is usually being hit over the head by a pillow pet. What inspires me to get up is I'm late for school and breakfast. Leaving that aside, there's no doubt

about it, studying climate change is not exactly an encouraging thing. There are definitely times where I am very depressed and discouraged.

Some of the biggest challenges come through the opposition I experience. When you open up your emails in the morning and there's just email after email saying you're an idiot, get a job at McDonald's, go die, you're just like, "Why am I doing what I'm doing?"

When you read books like *The Climate Coverup* by Jim Hoggan who's a PR specialist who just details in chapter after chapter all the sophisticated ways that are being used today to deceive us on this issue, on all the advertising techniques and PR techniques honed over decades that are now being applied to the issue of climate science to tell people it's not real, there's nothing we need to do about it. These are the things that discourage me.

What encourages me is when I talk to people, when I go out and I talk to local farmers in a small, tiny, conservative town where everybody goes to church and nobody thinks climate change is real. They all show up when I speak at the local civic center. Afterwards they say things like, "I've always been told this wasn't a real issue but here's somebody who shares my faith, who explained to me why it matters to me here today, why it's affecting things like the drought that we have here that's destroyed my crops, I agree this is an important issue and I want to know what to do about it now."

That's what encourages me. When I go into work with a city and the city of Dallas, for example, says, "We have actually just upped the lead certification on our buildings, not just because of wanting to be green but it's because it saves us money." People are moving into the urban core because we're being so much greener and friendlier and we love it, too.

I see all these things happening around us. No matter how discouraging it gets at the national level or the international level, here bottom line, even in Texas, people care about this issue, people are moving forward about this issue and we're seeing change.

We smashed the records in the spring where we got over a third of our electricity from wind here in Texas in the spring. When you see things like that happening, like I said in Texas, what else can we see anywhere else in the world?

I envision this amazing future where we shingle our houses in solar panels and our kids' backpacks charge their iPad as they walk to school. All of our energy comes from clean sources that God gave us that don't pollute our air or our water or use up the resources that we need. Everybody has enough food to eat and everybody's healthier because we have less contaminants in our environment from the dirty energy we're using.

I see a world that is much better than the world we live in today. I think that by tackling climate change we're actually moving closer to that world.

Michael: Yes, amen. Winding down now there's a question that my wife has asked me specifically to ask my guests. It's off the wall. I purposely don't tell you about it ahead of time but it's been really fun to hear the responses. That is that if you could have dinner or a glass of wine or a cup of coffee or whatever, if you could have a one-on-one conversation or perhaps a dinner party with three people from any time in human history, so either a dinner party where there's all four of you together having a conversation over a meal or one-on-one over a meal or a glass of wine or a cup of coffee or whatever, any three people in human history. Who would those three people be and why would you choose them?

Katharine: Oh man, that's an awesome question. You want the answer off the top of my head?

Michael: Exactly, exactly.

Katharine: Just out of curiosity has anyone ever had a prepared answer to this question?

Michael: Nope.

Katharine: Okay. There was that whole *Dinner With a Stranger* book.

Michael: Right. This I purposely have not let anybody know ahead of time and the responses have been really interesting, all over the place. The most common one is, "Gosh, I have to give that more thought."

Katharine: Exactly. I'm going to try to come up with some ideas off the top of my head. Number one is I would pick William Wilberforce. I would just want to hear about his life experience, how he got through the things that he did and how he achieved what he did. He was a Christian who was at the forefront of getting rid of slavery.

I just really admire the fact that he combined his faith and his Christian values with social action in a situation that, as we discussed, is very similar today. The opposition he got is incredibly similar to the opposition that we are getting today on climate change. I would just want to sit down with him and say, "How did you do it?"

Then as a Christian obviously I don't know how you could not want to sit down with Jesus and just say, "What's the deal? Why is this happening? Where do we go from here? Any suggestions?"

Also just as encouragement to say this is why we're doing what we're doing. Life is not easy. Doing what I'm doing is not easy. Being an astrophysicist would have been honestly a lot more fun most days and a lot easier. Remind me again why are we here? Why do we have

this mandate to love other people? Why is it so important? From the perspective of astrophysics, how exactly did you begin the universe again? I would like to know that one.

Then, let's see, who else? I think it would be really inspiring to sit down with, there's many of them, any number of women who have managed to overcome all the barriers that often gender, socio-economic status, race, things like that throw in our way. There's a unique component to being a women who is trying to lead on issues.

There are some ways in which men really have the advantage. One of the ways is as a woman it's hard if you're not moderated in your language and your approach. People are quick to label you with many five letter words and four letter words if you don't conform to stereotypes. I would like to sit down with somebody who really bucked the stereotypes in a big way during their life but did so gracefully and with integrity and being true to who they were and to their faith at the same time.

Michael: Yes, beautiful. That was wonderful. Katharine, this has been such a wonderful conversation. Again, as I said before, I just deeply honor the work that you're doing and the work that your husband's doing. In fact, please mention to him that I'll be sending him an email inviting him to have a conversation for my separate Evolving Faith podcast series.

Katharine: Absolutely.

Michael: Any last things you'd like to say on this theme of the past is rooting for us and the future is calling us to greatness?

Katharine: I think that's definitely the case. I think that it's a mistake to castigate ourselves for what we've done. You could say the whole reason we're in the situation now is because of the industrial revolution. We need to repent from the evils that have led us to this terrible sin we've committed.

When we dug that coal or gas out of the ground and burned it to power our factories, to improve our welfare, to develop new medications, new technologies, new ways of doing things that have led to better lives for many people around the world, we didn't know it would lead to climate change. There are many good things we achieved through doing that.

I would say that looking backwards and beating ourselves up over the things we have done is not the way to move forward. The way to move forward is to say, "Thank you for all the benefits that the industrial revolution brought us. Thank you for the fact that we're at a place that we have the technology that we do today and let us use that as a source of encouragement to say how different the future can be from what we've experienced in the past."

Michael: Amen, amen. Well, God bless you, Katharine and your work. Thank you for taking the time to have this conversation. If people want to go more deeply into your work specifically where would be the best place to send them?

Katharine: Great question. I have channels on YouTube and Vimeo where people can catch up on other videos. There's a great series called *The Years of Living Dangerously* that aired on Showtime this year. I think it's coming out on iTunes on September 7th. That's a great place to see some of the work I do but also some of the amazing work that other people do around the world looking at how climate change is affecting us in a very real way.

I would also encourage people to take a look at the US National Climate Assessment. I know that kind of sounds a little intimidating, it's got long words. It isn't a scientific report written for scientists. It's a scientific report written just for people. They have a great website and what it does is it tells us if I live in California, if I live in Iowa, if I live in Atlanta why should I care about climate change.

The assessment answers that and it has a great frequently asked questions section which I wrote a lot of that just lays out very clear terms how do we know climate change is real, why do we think it's humans that are causing it, what do we expect in the future and what can we do about this problem.

I would also encourage people to check out the book I wrote with my husband, *The Climate for Change - Global Warming Facts for Faith-Based Decisions*.

Lastly the number one question I get these days is what can I do. We want to do something about this problem. I would say two things. I would say number one go online and find a carbon calculator. It's a calculator where you enter where you live, how many people live in your house, how far you drive to work, how far you travel every year. I'm sure you've used one yourself.

What it does is it helps us figure out how much carbon we're producing now. Then if it's a good carbon calculator it's going to give a whole bunch of different suggestions of ways that we can reduce it. I kind of look at it like losing weight. If you're going to lose weight the first thing to do is to weigh yourself, right? If we don't weigh ourselves how do we know what goal we're going to set and if we even got there?

In the same way, let's weigh our carbon footprint and then look at different ways. For one person it might be eating less meat. For another person it might be carpooling. Another person might be changing the light bulbs because actually changing light bulbs is very effective. If everybody in the US changed one light bulb it would be like taking a million cars off the road.

There's no one magic every size fits all, but there is a carbon calculator to tell us what to do. That's number one.

Number two I would say is look up the organization, which you know about, called Citizens Climate Lobby, and join your local chapter. Citizens Climate Lobby is the best organization I have found, and that's why I agreed to serve on their Board, that empowers the average citizen to talk to our elected officials. It's not just in the US. It's in Canada and it's in all kinds of countries around the world because so many countries are blessed with a democracy with elected officials.

Join them and learn how you can make a difference, how you can talk to somebody, how you can write an op-ed, how you can even just sign a letter saying, "I care about this issue and I wish you would, too."

Michael: That's great. I'm so glad that you mentioned both the carbon footprint and how you can calculate that and the steps you can take. Also especially Citizens Climate Lobby because at some point in the next two to eight years we will, in fact, put a fair price on carbon pollution and we will marshal the power of the market to help us move in the right direction.

What I often tell my evening audiences when I do programs, I have a slide on Citizens Climate Lobby and I say, "You want to be able to look some young person in the eyes two, three, four, five years from now and say I helped make that happen." It'll be one of the best moments of your life in terms of joy.

Katharine, thank you so much. Just blessings on your continued work. This has been really wonderful. Thank you.

Katharine: Thank you for what you are doing, too.

Michael: Thanks, take care. Bye-bye.