

# The Future Is Calling Us to Greatness

with Michael Dowd + 56 Experts



## The Sacred Side of Science

with Nancy Ellen Abrams & Joel Primack

Big ideas from this session:

- The View from the Center of the Universe: Discovering Our Extraordinary Place in the Cosmos
- Their Yale Terry lectures and the making of *The New Universe* and the Human Future
- Big history, cosmic evolution, and how a shared cosmology could transform the world

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Michael: Joe and Nancy, I have been looking forward to this for a long time. It is such a delight to have you as part of this conversation series, *The Future is Calling Us to Greatness*.

Nancy: Thank you for having us.

Joel: We are glad to be here.

Michael: One of the things that I have been asking everybody to do at the start is that I don't want to assume that everybody watching or listening to this will know of your work and be familiar with your particular contribution.

Since each of you just bring so much, Joel, why don't you start and if you could just give us a sense of who you are, what you are passionate about, what you are known for and that sort of thing. Don't be bashful. Help the viewers in this series really get who you each are.

Joel: I am a physicist. I have worked especially on the universe for the last 30 or so years. This has been a remarkable period in astronomy. We now know that the universe is mostly composed of two invisible things that we call dark matter and dark energy and I helped to develop the theory of how both of these things work.

I have done some of the biggest simulations, both of the universe and the galaxies, and I am helping to lead the biggest project in the history of Hubble Space Telescope, which is giving us wonderful new insights in how galaxies form.

In addition to my scientific work, which also has earlier included helping to develop what we call the standard model of particle physics, I've also for a long time create new institutions that improve the way our society deals with science and technology. I created the forum on Physics and Society of the American Physical Society, with help from some colleagues. I've named it, I've chaired it.

I've created the Congressional Science and Technology Fellowship program which brings 50 scientists to work on the staff of Congress for individual representatives or senators or for congressional committees for a year each. I created the program on Science and Human Rights in the American Association for the Advancement of Science and I also chaired the committee on science, ethics and religion for the American Association for the Advancement of Science.

I've done various other things. I am a founder of the Union of Concerned Scientists, for example and with Nancy, I led a delegation to Moscow back in 1988 that convinced the Soviet Union to stop putting nuclear reactors in orbit. So, those are a few of the things that I've done beyond my scientific work.

Most recently, Nancy and I have written two popular books about modern cosmology, a study of the whole universe and how it can change the way we think about everything else and Nancy has just finished a remarkable new book, *Re-Envisioning the Idea of God*.

Michael: Nancy, why don't you just jump in there?

Nancy: I am a motley collection of different professions. I started out in history and philosophy of science, and then I became a lawyer, and then I worked in Congress in their science advisory office, which was called the Office of Technology Assessment, it doesn't exist anymore today.

When I watched Joel develop this new theory of the universe, we have been together for 37 years and most of that time he has been working on this, and it is a completely new approach to the entire universe. It is just as big as the Copernican revolution, it's just that people don't realize it yet but I have been watching this happen.

I wanted to know what it means for the rest of us, so we taught a course. We taught a course at the University of California Santa Cruz for ten years where we tried to figure out how to present this new picture, how to make sense of it for people who have no science background, and then that turned into our first book, *The View from the Center of the Universe*.

Then we were invited by Yale to give the Terry Lectures and that turned into our second book, *The Universe and the Human Future*. Now, basically I think of myself as a writer rather than a lawyer or anything but I am also a political activist too in my way.

I have a new book which will come out in March of 2015 called *A God that Could Be Real* and this is re-thinking of god based on modern cosmology, what we actually know about how the universe operates.

Michael: Fabulous. As the two of you know and I want everybody watching and listening this to know as well, Connie and I count the two of you as just our dearest and nearest colleagues. We love your work, we love the two of you, and we love what you are committed to. We just align completely with the way you take our best science, best cosmology and find evermore inspiring ways to articulate it that can bring us together and that can help us cooperate across a wide swath of differences, and inspire us in the way that the traditional cosmologies have, the great myths have.

This is grounded in science. In fact, Connie, as you know, took I think something like 50 or 60 of our favorite quotes from *The View from the Center of the Universe*, we have that up on our website and we have shared your Terry lectures and your second book with countless people as well.

I keep looking forward to reading your new book on god, so I am hoping that I can do that soon.

Nancy: We had a bit of an argument about that a few months ago, as I recall.

Michael: That was a little longer than a few months ago, but yes. We come at the whole question of god talk from different angles but I think that you have a platform, you have a voice. You will be appealing to people for whom I don't reach, so I see them as very complimentary but it's like your current thinking, I really don't know that well, so it's not like I can critique it.

This series in particular is really focused around the whole notion that to have a sacred relationship to time is among other things, not only the deep time, the big picture but also to live our lives in the present with a sense that the past is rooting for us and the future is calling us to greatness.

We are living in perilous times. We are living in challenging times, pregnant with possibility but also really scary stuff and so I just wanted to invite either or both of you to speak to this theme that how do you hold your place in the universe and this cosmologic orientation that orients you and lets you know who you are and where you are in space and time.

How does that inspire you to do the work that you do and how do you see that potentially inspiring greater numbers of us as we move into the future?

Joel: I'll start and give you a sort of big cosmic perspective on time and then bring it to more specifically to the particular thing that makes this time so special for humanity.

One of the errors that people make who don't really know much about the universe and maybe take the bible literally is to imagine that we are at the end of time or near the end of time, that time only began perhaps 6,000 years ago with humans on the sixth day of creation and without very much more time to go.

That picture is just wrong. We now have very reliable ways of dating the solar system and the whole universe and the universe has been around for almost 14 billion years. Earth and the other planets, and the sun were created about 4.6 billion years ago and the universe will continue to exist for as far into the future as we can imagine.

Our galaxy will be about as bright a thousand billion years from now as it is today and that's a trillion years. So, we are near the beginning if anything, but because of our uncertainties as we go back into the very distant past and as we try to think about the distant future, we should understand that we work outward from the present.

We have the greatest knowledge about the present and then as we go further away from the present in either direction of time, we know less and less.

Now, another aspect with this present-centered thinking is to appreciate that we live in the middle of time in at least four different senses. The universe was expanding very rapidly after the Big Bang and it slowed down because gravity causes things to attract each other and about 5 billion years ago that process reversed and the negative gravity that's associated with space itself, we call it dark energy or the cosmological constant has caused the universe to expand faster and faster.

So we are near the changeover in the universe from slowing down its expansion to speeding up its expansion, and that process it looks like will continue for some time into the future, but we don't know that for sure. We are still trying to understand the nature of the dark energy.

Now, the solar system is also roughly in the middle of the available time. As I said, it began a little over four billion years ago and it's going to continue for a period about as long as that and then the sun will swell into a red giant and inner planets will be basically wrecked, including earth, but this is many billions of years in the future.

Sooner than that, the sun is going to become so hot that it's going to make life on earth very difficult. This is not a problem that we are worried about in the near term, we are talking about hundreds of millions of years. Keep in mind that human type creatures have only been on earth for about a million years or so. So we are talking about the very distant future.

In fact, if our distant descendants continued to develop space engineering technologies, we could actually solve this problem by moving the earth steadily further away from the sun. This kind of very large scale planetary engineering may be possible in plenty of time for us to take care of that problem that the sun is, like all stars of its type, getting steadily warmer.

We have a very urgent short term problem though and this is the fourth way that our time is very special and that is that since the beginning of the industrial revolution, about 1800, humanity has been increasing our consumption of material on earth and our increasing production of waste products of various types which has been doubling for about 30 years.

For example, if you took the amount of carbon dioxide we put into the atmosphere, starting about 1800 with the industrial revolution, burning coal first to clear out mines then to run factories, locomotives and steam ships, and ultimately to power the entire modern humanity.

The increase in fossil fuel use and the increasing production of carbon dioxide basically double every 30 years. Now, if we were to continue on that path, that would be three more doublings this century, three more 30 year periods and that's factor of eight.

Now, we are already putting carbon dioxide in the atmosphere so fast that it's greatly increasing the total amount of carbon dioxide in the atmosphere. We have increased it from below 300 parts per million, which is what it was before the industrial revolution, to just over 400 parts per million. We've increased the total amount in the atmosphere by more than a third and the rate that we are increasing it is now growing very rapidly.

The consequence has been steady increase in global temperature with new records for hottest year ever being set basically every year or two.

Michael: And ocean acidification and other things related to it.

Joel: Exactly and actually, each of these is really just an example of the general industrial revolution and this very rapid increase in humanity's ability to process vast amounts of the material on the earth's surface.

The problem is that we are now having global impacts and the impacts are becoming increasingly severe. The key thing to keep in mind is the 30-year timescale. That's the timescale over which we need to make changes.

Now, the fact is that over the last couple of decades, renewable energy, solar power, wind power in particular, have become much cheaper. There has been a drastic decrease especially in the price of solar electricity and the result is that in the last couple of years, China, India, Germany and a number of other companies have actually put more new energy in the form of solar and wind than all other forms.

United States is near that. So this is a very helpful time. What it means is that without even raising the price of carbon to reflect what we call externalities, already despite the high subsidies the governments continue to give fossil fuels and the relatively lower and more uncertain subsidies for renewables and energy conservation.

Renewables and energy conservation are already winning. So, I don't think that we have to be fanciful to imagine that economics plus a certain amount of just concern for the future can lead humanity to make drastic changes in the way we deal with energy and other aspects of the environment on a relatively short timescale.

The biggest single problem that I see in the entire world is the Republican Party in the United States. They are against science, they are against truth and they are vetted to fossil fuels, and that has to change but I also think it's very optimistic that it shouldn't be that hard for such a change to occur.

I don't know if it's going to require another crisis or whether just people increasingly realize the evil of the people who are opposing this necessary change and it could be that in a period of five or ten years, everybody is going to say, how could we ever have been so stupid? How could we ever think well of these companies that are actually damaging the entire earth?

Once that kind of mind change occurs, then that could make it much easier to make the transition that humanity is going to have to make and another one of the things that people need to realize is that as we become more and more concerned with personal development to the extent that people in rich countries are mostly reasonably well off, we don't need to consume vast amounts of stuff.

What we need is to have a healthy planet that we can bequeath to our children and grandchildren and that's not impossible. There is no law of physics that says we have to fail. It's largely a question of thinking right and then voting right.

Nancy: Let me jump in here because everything Joel says I completely agree with but even if people realize what the problems are and what we've been doing wrong, it doesn't help them to figure out how to think about what we should be doing.

There really needs to be a vision that is positive and that includes everybody, every human being on earth and this is really the big opportunity that I see from cosmology, from this new picture of the universe not just cosmology. It's the whole scientific picture but it is coherent.

One of the things that we have been trying to do is to try to phrase new picture as a vision, as a way that people can find a new identity really and I think that this is really going to be very important.

You can't really see a great future, a big important future if you don't see that there has been a big important past. So, I think that helping people to understand how ancient we are, how it took the whole 14 billion year history of the universe to produce us.

At first, the basic atoms had to come into existence and there had to be galaxies formed out of dark matter, and then the dark matter pulled together these atoms and then they condensed into stars and then the stars created all the heavy atoms and there is a tremendous amount of history that's built into us.

If we could start understanding that we are this entire history, that every one of us holds it, then we could start seeing ourselves on a cosmic timescale and that is important because people talk about aliens but we don't know if they are aliens.

We could be the first. We could be the beginning of intelligence in the entire visible universe, we just don't know but I think that the best thing we can do is to assume that we are and act as if we are, live up to that standard. How can we possibly go wrong living up to that standard?

Michael: Amen. Just this morning, I preached at a Unitarian Universalist Church, a couple of services in Cleveland and one of the main points that I made was that we are a lot older, bigger, and more related than most of us have any idea.

I did this whole thing in big history and we are the universe becoming conscious of itself and all that, and it's like when we get that, then we can be inspired to be of service to a grand future, not just to get humans to do less bad but to actually see this as a time of transformation that future generations, a thousand years from now, 500 years from now, 200 years from now can look back and see that this was one of the grandest shifts not just in human consciousness but in human social structure.

I agree with you Joel that right now the Republican Party is so largely bought by big oil and coal but I think that the whole idea of deregulated capitalism as our way of doing economics has to shift. This whole globalization, and right now, as I mentioned before I turned the recorder on, Connie and I are in the middle of listening to Naomi Klein's new book, *This Changes Everything*, which we both love it so far.

This holding the past and there is a quote of yours, I forget, something about without a big picture we are a very small people and I think that what I found most useful, rather than scaring the bejeebies out of people is giving a sense of the grand past and that here we are in the present moment and we could potentially co-create something truly amazing, which doesn't mean it's not going to have suffering, doesn't mean it's not going to have difficulties, doesn't mean that earth won't come to some of the new stabilized climate.

There was one question. Joel, you say the fourth way that we are at the center and I think you got to the third one and we were describing our time but I didn't quite understand how that places us in the middle or the center. Is that the timeframe in terms of...?

Joel: The four that I had in mind are first of all, cosmological, they switch over in the universe from slowing down its expansion to speeding up. The middle of the entire lifetime of our solar system, between the creation of the sun and when the sun turns into a red giant and ultimately into a planetary nebula and shedding off the outer parts, and a white dwarf star which is kind of a dead star.

Then from the point of view of earth itself, earth developed in oxygen rich atmosphere, thanks to microorganisms only a little over half a billion years ago and that's when large creatures, animals and plants started to develop, multicellular creatures with organs and in about half a billion years, unless our descendants figure out how to move the earth further from the sun in a slow but steady way, the earth will become too hot.

The third thing is that we are living in the middle of the great period of earth, the period from when earth got –

Nancy: For creatures like us.

Joel: Right. Earth would, after it becomes too hot, only be suitable for microorganisms again and then finally, there is this great transition. This is number four that we humans have to make, the transition beyond exponential growth in our use of resources and the generation of waste.

There is no reason that we can't prosper during that transition and after that transition because once a society becomes sufficiently rich, it mainly depends on service and on

recycling and reusing materials. It's not necessary to keep generating new sources of materials and new sorts of waste. That's been our big problem.

Of course, that will require a fair amount of reorganization in society and no one knows what's going to be optimal but it's clear that there is going to be major changes and these changes are probably going to require a new way of thinking about everything.

The big challenge for our time, and our time is the crucial time, we can't have, earth is not going to allow three more episodes of doubling. This century is the last century that we will see that kind of increase on human impact on earth and the big issue is how it's going to change, whether we are going to have an awful overshoot where there is a huge die-off, which happens with the algae when they over-populate a pond, and then they can kill all the other organisms. Are we smarter than algae?

That's in some sense the big question.

Michael: The jury is out on that one, for sure. I am curious, what wakes you each up on a day by day basis? You are so involved in all the right things, from my vantage point. How do you stay inspired? What aspects – and you just articulated some of them of course but what do you find inspires you most to be of service, to be in action, to do the work that you are doing?

Nancy: Let me come back to this idea of the vision because a vision is inspirational by definition and I feel incredibly privileged to be able to work on the vision.

When I was on the staff of Congress, I was always working on the problems. I was always fighting this and fighting that, and it was really very depressing. I moved out to California and I got away from that. Let me tell you, it's really better to focus on the positive because you can't win by fighting all of the negative things that are happening. There will always be more negative things, especially because they have so much money, they can just create any number of negative things. Focus on the positive.

So now, what I've done in my new book, what I've tried to do here is to create a coherent big picture that we can have that not only describes what's going on on earth but who are we, what are we as human beings, how do we fit in? Really, in my opinion, there can't be a really complete big picture without an understanding of god.

I know that a lot of my friends and you are – I am not sure where you exactly stand in this, but we will work this out, Michael but a lot of my scientist friends don't like the word god, especially the religious naturalists who really do want some kind of a spiritual understanding of the world but they don't like that word, but I think that it's arguably the most powerful concept in our minds and we are going to need all the help we can get to get through this transition that Joel was talking about.

I think we could probably use that concept in a positive way. Right now, I think it's being used in a very negative way by millions and millions of people who are using it either to fight with people who don't see it the same way they do or are using it to hold back from understanding the real science and what's really at stake on our planet. They would rather hide inside these old pictures.

My goal really has been to figure out how can we think about god in a way that is not only completely consistent with science but that really enlarges us as human beings, that gives us a whole new way of approaching the world and also unites us?

So that's what my new book is about, *The God That Could Be Real* and it's been very inspiring to me to work on this and I find that almost everybody I talk to about it really wants to read it because they need that. Everyone realizes that we can't just write off the idea of god because that's going to write off billions of people on this planet who have every right to use that concept.

Michael: I am with you a hundred percent. You and I may not use the word in identically the same way, I suspect we don't but I have been freely – in fact I have even started articulating why I think it's important for religious people of various stripes to when they use the word god that we are not pointing to some supernatural being who is on this side but against those people over there, or whatever, but we are talking about an I – thou relationship to what's inescapably real, whether we believe in it or not.

I am radically in favor of redeeming the word god and using it in a way that's totally accurate scientifically and I look forward to learning from you way to do that I have not thought through yet. Whenever I can read a draft of your book or do I have to wait until it's out on the bookshelves?

Nancy: No, the galley will be arriving very soon.

Michael: Great. Here is a question that Connie has specifically asked that I ask folk and that's if you were to have, and you have an interesting twist on it and feel free to interject that but if you could have dinner with any three people in human history, a dinner party where it's the two of you and these three people, or just one on one.

It's the two of you having a glass of wine, a beer or whatever with any three people in history, who would those three people be and why would you choose them?

Nancy: I have to put Shakespeare at the top of my list, because here is a guy who wrote absolutely brilliant, funny, deep stuff and we don't know anything about him. We know nothing about his life. I would love to have a conversation with him.

I am going to choose English speaking people because unless we have one of those little fish that go in your ear from the Douglas Adams novel, I wouldn't be able to talk to Plato or anybody like that. So, George Bernard Shaw. I would love to have a chat with him.

Here is a guy who was an absolutely brilliant writer and socially incredibly daring and original activist. I'd like to talk to him and John Lennon, I would love to talk to John Lennon. I am thinking about women, it's not that easy. My favorite novelist is Edith Wharton and I think I would really enjoy talking to her too, so maybe I can get a fourth person in there so that I can have a female at the table with me.

Michael: All right, and Joel, who would you like to invite?

Joel: I would certainly like to participate in Nancy's dinner party but I thought of Einstein because I would so much like to see his reaction to our new understanding based on of course his ideas of how the universe works.

The thing that he didn't anticipate was that there was so much of this extra invisible stuff but he did partly anticipate at least the dark energy, but nobody really anticipated the idea that most of the matter and some other kind of stuff it's not even made of atoms and we are quite sure of that now.

So, I also would really like to talk to two other very great scientists who were also very interesting human beings. Galileo and Benjamin Franklin, and of course Ben Franklin combines as I've tried to in a much smaller way in my own life, politics and science. He was probably the greatest scientist of the period in which he lived.

He is regarded in the United States as an important inventor and of course he was. He invented bifocals and the Franklin stove and –

Nancy: Daylight Savings Time.

Michael: Really? He was behind Daylight Savings Time.

Joel: Actually, it was candles and also of course, lightning rods and many other things, but he was a very great scientist. He is the first one who understood the Gulf Stream. He had an estimate of the size of atoms, a century before anybody else, from measuring just how far oil could spread out on the surface and realizing that it was an atom thick.

He was the most important person developing the concepts of electricity for the period in which he was active. He was the one who realized that charges come positive and negative. He is the one who introduced that concept, for example.

Of course, he also was the great eminence at the constitutional convention in the United States and he helped to design the whole structure of the American system of government which is of course the first republic. So it's a new system of government and it's got its problems but arguably it's been remarkably successful over the long term.

Of course, Galileo was the inventor of modern science. So these would be wonderful people to have dinner with.

Michael: Any combination of the people that you all mentioned, Connie and I would love to be there.

Nancy: We would invite you too, Michael, sure. Can I say though what I think would be a more interesting question?

Michael: Yes, please because when we talked the other day on the phone you mentioned that and I felt, wow, please. Yes.

Nancy: I did and I think it's really important. I would love to have this entertaining dinner with Shakespeare and so forth but what I have been asking people and really, no one knows how to answer this question is if a flying saucer landed in front of you and aliens came out and they said, "Take me to your leader," who would you take them to?

Michael: That's a great question.

Nancy: Because who is it, who would we trust to talk to the aliens? To me, that is a really profound question because it says so much more than any of our political leaders could possibly be.

Michael: I think it's a great one. One of the people that Connie and I have been reading most and probably our favorite author these days is John Michael Greer. He was actually the person that I interviewed in these series. He writes a blog that comes out once a week called *The Arch Druid Report* and I think I've read eight of his books in the last year and a half.

He is not necessarily my leader but he is certainly someone, as the two of you are that I would. I would not want an alien to visit this planet without meeting the two of you and without meeting John Michael Greer.

Nancy: I don't feel confident to meet the aliens at all but it would be really interesting. I don't know his books, thank you.

Michael: Just to begin winding down, if you were to speak to a young person who is just full of despair at this point, they are looking to the future and it's just scary as hell, what would you say to a young person that would be helpful and then somebody who is in their retiring years, over 60 let's say, what would you say to someone who is an aging boomer that would be encouraging and supportive?

Nancy: The first thing I would say is to read this wonderful book by Theodore Roszak, called *The Making of Elder Culture*. This is the guy who wrote *The Making of the Counter-Culture*, when we were kids in the 60s and it's really a fascinating book.

It basically says, "You guys, you aging boomers, you had wonderful ideals in the 60s but you were very young. You had no money, you had no jobs. You didn't have families yet. Life hit and you had to disperse and basically do what you had to do, but now you are retired, you have money and you still have those ideals. Now is the time to realize them."

That elders, instead of being just written off as finished could really be the core of a whole new way of approaching the future and could also be the allies of the very young, and I really like this idea of the elders and the very young together, and the middle ages, you have to just deal with hassles of life, so one, I would say read the book.

For the young people, it is so easy to scare young people by just telling them all the terrible things that are happening, but what about all the great things that are happening? So, are you interviewing Paul Hawking for this series?

Michael: Not so far.

Nancy: Interview Paul Hawking. His book, *Blessed Unrest* is the most optimistic book. Here is a guy who has actually gone around the world. He has found something like a million different social justice movements, environmental movements and stuff, and he has basically analyzed them and said, "This is a coherent movement, the parts just don't know about each other."

Michael: I agree. I actually reached out to him to be part of this series but the email address that I had for him no longer is good and I wasn't able to get through to him.

Nancy: Okay but the young people can still read his book. The other thing is it is very important for young people to realize that their allies are the other young people around the world, not the older people in their house or their country or their city that the real unity has to be in their age cohort around the world.

Forget about the religions and the political biases and all the crap that you are being handed down from generations before, because that clearly has left us in this terrible

situation. If you look at what the millennials are doing, the blogging that they are doing, the values that they show, it's so much more positive than what older people are doing.

My advice to the young people is don't worry about all of this stuff that you are being told this is possible, we have to make money, capitalism is the only system. Look at what people your age are interested in and unify on that level.

Michael: That is so true for my youngest daughter. She is 24 and she identifies more with other 20 some-things worldwide than she does with Americans, Christians or any other smaller group. It's a very different set of values and priorities and commitment.

Nancy: It's a wonderful development.

Michael: Yes, that's great.

Joel: Also, this expansion of human loyalty to ultimately the entire human race and all life and earth is an essential thing. We have to expand our thinking that way in addition to expanding in time we have to expand in that other sense.

That's I think really important advice to everybody and of course, part of it is people have to understand more. It's not just cosmology. We've had this tremendous breakthrough in biology and the breakthroughs in biology are at several different levels.

Of course there is the genetic revolution. We now know humans are more closely related to all other humans on earth than almost any other species is related to other members of the species. Humans went through at least one and maybe several bottlenecks when there were only a relatively small number of humans.

This occurred only several tens of thousands of years ago, so we are humans very closely related, but of course we also know that all living organisms share exactly the same genetic code. They read the DNA exactly the same way and inverted into proteins. We share a lot of the same biochemical pathways with mushrooms and yeast, as well as with fancier plants and animals.

So, it's very important for humans to get some of this background and then the other thing that I think is really remarkable about modern biology is the realization that the interesting new developments have occurred by a process where as complexity increases new things can happen.

Of course, the most complex thing that we have ever discovered in the entire universe is the human brain and out of the human brain all of culture has developed. So, there is this basic idea of emergence that we see it in the social insects, the ants and the bees, for

example, where each individual hardly knows anything about what the whole hive or ant hill is doing but collectively, they can do amazing things.

In that same way, collectively, the neurons in our brains can do amazing things and the people on earth can do amazing things working together.

That idea that new things can constantly develop as the situations become more complex and more interactive, that is one of the great insights of science. It started in physics but it's not become essentially the basis of a lot of our understanding of how organisms and societies develop and it also is the underlying idea of Nancy's book.

So, it's in that sense also that her book reflects modern understanding of science, not just cosmology.

Michael: That's great.

Nancy: Let me just say one more thing for the young people.

Michael: Sure.

Nancy: Actually, for anybody who is really depressed about the state of the world. That is that in the universe, on different size scales different physical laws actually control what's going on. You can't imagine that a single physical law is going to control everything from the galaxies down to the bacteria, you can't.

So, using that as a basis for thinking about this, we can be emotionally very upset about say your child is hit by a car. All your adrenaline is running, your emotions are going crazy, that's actually appropriate because that is how we evolved but if you start feeling those same emotions when you hear that the amount of carbon dioxide in the atmosphere has gone about 400 parts per million, that is what I call emotional scale confusion.

That is dangerous because that's not what those emotions evolved to be about. They are not about statistical abstract concepts. We should be aware of those things, we should care. We should feel urgency to deal with these issues but we should not feel like our lives are being destroyed or I am miserable, I can't have children because I can't bring them into the world.

All of those emotions are really inappropriate when it comes to statistical abstractions, which is really what we are talking about when we are talking about the faith of the earth. So, what we have to learn to do is to feel in different ways, at the same time on different subjects.

We can live a perfectly happy, loving life on the small scale and still be fighting the big things on the large scale, and the fact is if we don't have this happy loving life to support our work we are not going to succeed on the big scale.

Michael: That's an interesting way to think about it. I've never thought about that in terms of a scale like that but I naturally do that, but I've never had it articulated the way you just did.

Joel: Actually, this is in the *View from the Center of the Universe*, that idea of emotional scale confusion.

Nancy: But it is really very useful for people who are feeling terribly depressed and I have personal friends who say to me, "I don't want to bring children into the world because it's so messed up," and I am thinking, that thinking is what's messed up. Bring your child into the world, love the child, and be happy with the child but work to solve this problem. Let the child grow up to be a worker to solve these problems.

Michael: Where is that in *The View from the Center of the Universe*? Do you remember what chapter is?

Nancy: I don't remember the chapter but it's there.

Joel: It will be in the index, emotions.

Michael: I'll check it out. It just means that I need to go back and do another reading. Because I have forgotten.

Joel: We call it the Ora Bora's thinking because it's this idea that different things are important, different laws of physics control on different land scales and then by analogy, different sorts of thinking are appropriate on different scales of human interaction.

Michael: So, if people want to go more deeply into your ideas, the titles of your book again, *The View from the Center of the Universe* and *The New Universe and the Human Future* and then your book is...?

Nancy: The new one is called *A God That Could Be Real*.

Michael: Great.

Joel: What Nancy does is she asks the question, not whether god exists but of all the things that exist, is there anything that's worthy of the name god? So it's a different question and it leads to a very different sort of thinking.

Nancy: And we'll have another conversation like this after you've read that.

Michael: I look forward to it because in fact, I want to record that probably as part of my Evolving Faith podcast series where I get more into specifically like how do we even think about god, talk about god in ways that are inspiring and in ways that are accurate scientifically.

Joel: Nancy and I were the keynote speakers at the 60<sup>th</sup> anniversary Star Island Conference of the Institute on Religion in an Age of Science. That was a couple of months ago and I have to say, we were really a hit.

Nancy and I gave the joint talk at the beginning of the first day of the conference. Then Nancy gave her talk about her book at the afternoon of the first day. Then there were two discussions in the evening and then for the next two days, special sessions were organized so that many people could get together with us and talk some more about these ideas.

Michael: I heard a little bit about that because Connie and I spent three days in the [indiscernible 50:00] cabin and he was sharing both Ursula's perspective because IRAS and what they have been about and what the two of you are about is such a natural fit that it would be shocking to me to know that you were not in it.

Joel: Actually, we were invited in previous years but it always conflicted with something. This year, we are able to go and of course it was especially timely because Nancy's book is going to be coming out and they are of course the perfect audience for new ideas that we are trying to promulgate.

Michael: They really are. To this day, when I try to describe what I am, I am a religious naturalist but emergent is the language that I'll settle on that I use probably most often and no, I am not a materialist, I am not a spiritualist. I am an emergentist, and sacred realist, as I sometimes use that language now.

Terry Deacon and Ursula Goodenough's chapter that they wrote for some Oxford University book, *The Sacred Emergence* or something like that, they are still one of my favorite.

Nancy: Yes. I have read about emergence.

Michael: Same here.

Joel: Here is the little secret. Ursula helped Nancy improve her discussion of emergence.

Michael: That is fabulous.

Joel: So the final version of the book has this very nice help from Ursula.

Michael: That's great, except it wasn't a secret, I had learned that already from [indiscernible 51:49]. I said it at the beginning of this interview that Connie and I find the two of you our closest colleagues, right up there is [indiscernible 51:57] and Ursula Goodenough, and Terry Deacon, although he is a little thicker. Reading his book, *Incomplete Nature* was almost like reading *Steps to An Ecology of Mind* but it was really dense reading. Really important but not an easy read.

So, your website or websites?

Nancy: We have a website [New-Universe.org](http://New-Universe.org).

Joel: Which also now is in Spanish. The book came out in Spanish and so we actually recreated the website in Spanish, so it's on Nuevo Universo.

Nancy: El Nuevo Universo. Right. If you go to the English one, right at the top you can just click Spanish and the whole thing will just switch.

Michael: Cool.

Joel: You have a new website on your own.

Nancy: I am developing a website, [NancyEllenAbrams.com](http://NancyEllenAbrams.com) but it's not done yet.

Michael: Is that going to have any of your music, because you didn't mention that you are also a political musician.

Nancy: Yes, it's going to have my music. I will mention that I have a music video. I think you may have seen it on higher brain. Anyone who goes to You Tube and goes to higher brain, especially the full version, which is the best version. They can see my You Tube song which is basically a satire about the evil scientists, ones who claim there is no such thing as global climate change and tobacco is not addictive.

Michael: I listened to the book *Merchants of Doubt*, by Naomi Oreskes.

Joel: Yes. In fact, at the end of the video, it says, "If you want to know all the documentation, just read that book, *Merchants of Death*."

Nancy: Mine is one of the few music videos that has a footnote.

Michael:       Why am I not surprised? This has been great. Let's conclude this. I am going to run and get Connie and we can just catch up. Thank you both so much for being part of this series.

Nancy:         It's been a pleasure. Thank you, Michael.