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Keynote Address: “Scientific Obligations in an Age of Denial”

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While Mindy is getting the talk ready, let me just clear up any rumors that might be circling. If Duane Fagergren tells you my shoes are spray painted, it is absolutely true. This black suit is my only suit and my wife told me I couldn’t wear brown shoes with a black suit, so I spray painted the shoes; and I think they look pretty good.

Let’s just do a quick survey by a show of hands. Who here classifies themselves as scientists? An educator? Policy maker? How about reporters? Any reporters? How about any naysayer, no good, pot-stirring troublemakers? Okay, great.

Autism is a spectrum of neuronal development disorders that appear in the first 3 years of a child’s life. It is characterized by Impaired social interaction and communication and by restricted and repetitive behavior. I have a friend with an autistic child and none of us can believe the devastation at finding out your beautiful child is autistic and that your life is not going to take the trajectory you had planned.

In 1999, Andrew Wakefield and 12 co-authors published a paper on GI disease, the Measles, Mumps, Rubella, or MMR vaccine, and Autism in the British Medical Journal, the *Lancet*. This paper claimed a link, a causal connection, between the childhood MMR vaccine and autism.



The study was flawed and should never have been published in the first place. Ten co-authors retracted their contribution and eventually, the Lancet retracted the manuscript and this is what you see when you do a literature search for the article – **RETRACTED** stamped through the PDF.



Until 1963 measles, which is just one of the viruses against which the MMR protects, infected 4 million Americans annually. Hundreds would die and thousands a year would become disabled by the virus infecting the brain causing measles encephalitis. And still in many parts of the world, where vaccines are not available, several thousands of children a year die from measles.

Subsequent to Andrew Wakefield's flawed study and all of the controversy it caused, in 2001, a National Academy of Sciences review concluded that there was no evidence of causal connection between MMR and autism. Three years later another report by the Institute of Medicine also reported the lack of a causal connection between the MMR vaccine and autism. In fact, to date there is NO evidence that the MMR vaccine or thimerosal used in vaccines is connected to autism.

Still, despite numerous follow up studies refuting the connection between vaccines and autism, people like Jim Carey and Jenny McCarthy shown in this picture, still believe that there is a connection. Children get numerous life-saving vaccines at 18 months of age. Autism is diagnosed after vaccination. End of story. They missed that 8th grade science class we all took and were taught that mere coincidence does not establish causal connection. Jim Carey says in the Huffintgon Post, "I've also heard that no evidence of a link between vaccines and autism has ever been found. That statement is only true for the Centers for Disease Control, the American Association of Pediatrics and the vaccine makers."

You see, it's not that they refute the evidence exists, as you read in this quote, its just that it doesn't matter. Because of thinking like this, vaccination rates in the US and other developing countries are declining. Consequently we are seeing a resurgence of diseases that can easily be prevented. This in itself sucks, but also remember, scientific funds are limited and money spent gathering more data to confirm that here is no connection between vaccines and autism is wasted money that could be used to better understanding the causes of autism. This vaccine / autism argument is an example of denialism, which is very prevalent in our society today.

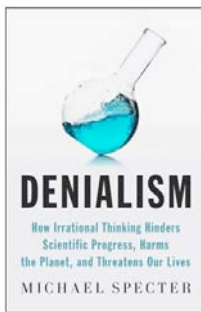
What is denialism? It is when people use rhetorical tactics to give the appearance of an argument, when there actually is no argument. People use it when they have few or no facts to support their viewpoint against overwhelming evidence to the contrary. These are people who don't see the data or don't care about the data, despite the data overwhelmingly supporting the opposite of their position.

Even today there are people who actually believe and argue that the systematic mass killing of European Jews by Nazi Germany is a wild fabrication. There are also people who believe HIV does not cause AIDS. People even believe that Barak Obama is not a natural born American citizen.

Now even I, a scientist of very limited capacity, could do a Google search and actually find a copy of Obama's birth certificate from the State of Hawaii. And when you realize how easy it is for people to deny the fact that our president is a natural born American citizen, a basic requirement for running for the office itself, it's not so difficult to understand why the public at large might have trouble understanding drift cells and the ecological consequences of building a bulk head in front of a feeder bluff.

So if you want to be a denialist instead of skeptic here are a few techniques you might find helpful. These are techniques shared by most denialists regardless of what it is they are trying to deny.

Allege there is a conspiracy. This is a good one. Sure, the data don't support my argument, but the data are fabricated by the government to try and convince us. That was Jim Carey's argument in the MMR / Autism quote I just gave you.



In Michael Specter's book entitled *Denialism*, he theorizes that "our scientific capabilities have brought the world to a point where we expect miracles, but have little faith in those capable of producing them" the scientists themselves.

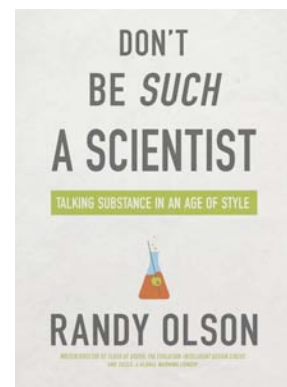
We can try to blame this on scientific literacy or the extreme political right but I'm not sure we'll ever really be able to define the cause of wide-spread denialism, but what I can tell you is that as a collective group, we as scientists are partially to blame and we need to see ourselves as part of the solution. This is not because we are doing what some denialists call "bad science." No, it is because we are stopping when we produce that science. Bam, published in peer-reviewed journal with impact factor of 12. Yes! High five. Done.

But we are not done. It's not tenure time. Our work is not finished. How many peer-reviewed articles do you think your average politician reads annually? Probably none. People get their information from places other than where we put our information and our information is not getting heard or used or believed. This creates sort of a scientific vacuum in a world of information overload where anybody can put up a website and claim to be an expert but we the scientists with the data are not participating.

In his book *Don't be such a Scientist* published by Island Press, Randy Olson gives us a pretty good idea of why we're losing the science outreach and education campaign.

To learn what we are doing wrong you can read his book – and I suggest you do – or you could just look at me – a self-proclaimed scientist. No, better yet, don't listen to me, ask my 13 year old daughter about me and she'd tell you all about my problem in just two words, NOT COOL.

Randy Olson actually uses a few more words than my daughter. He



points out that we are too negative and too literal minded. Who me? Yes, last week a friend gave my 10 year old an encyclopedia of animals of the world for her birthday. I quickly grabbed it, began to read it, and the first thing out of my mouth was that they had mistakenly used a picture of a striped hyena for a spotted hyena. My kids rolled their eyes, my wife hit me and I thought oh my gosh, Randy's right – I'M NEGATIVE AND TOO LITERAL!

He also says that as a group, scientists are poor storytellers and we are even unlikable and can come across as arrogant. You know I told my daughter once that I was invited to give a lecture. I don't know why, maybe I was thinking that might ingratiate me some small inkling of respect. She responded this time with one word; boring! Then followed up by questioning me why anybody would want to hear me lecture to them. She said, "I can't stand it when you lecture to me!"

And really, not many people would pay to see a scientist. There once was a cartoon in the Wizard of Id where the king asked the wizard why athletes made so much more money than scientists and the wizard replied, "Would you pay to see a scientist?" End of story. Who would pay to see a scientist? You guys would, but that's just the problem, we are always talking to ourselves. Well think about what kind of scientist people would pay to see... Steve Irwin.



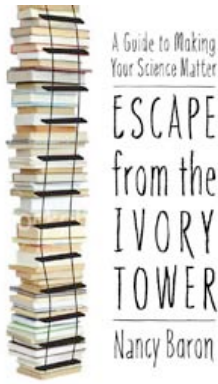
So what was it about Steve Irwin that people liked? He was cool, goofy yes, but cool. He was likeable, funny and he could tell a good story. Now I'm not saying we should all buy some short shorts, move to Australia and open a crocodile zoo. But I am saying we all need to be more engaged and we need to do a better job at it.

At a minimum we need to have a basic ability to communicate our work to the general public. You're the expert and if you're not talking about it, somebody else is and they don't have all the data you have.

We, as scientists, need to be more involved at the science–media, science-management and science–policy interfaces

I'm not the crocodile hunter although I did keep snakes as pets when I was a kid. And the only thing I profess to know about the science–media, science-management and science–policy interfaces is that they are not easy realms to travel in. Most of us were trained as scientists, not reporters, not politicians and not really as communicators.

I have been trying to learn about what we can do better and I'd like to give you a few ideas because as scientists I do feel we have an obligation to do better. Most of what I'm going to say is based on Nancy Baron and Liz Neeley's book *Escape from the Ivory Tower*, also published by Island Press.



Step 1 is to resolve to speak for your science. This is not the same as speaking your opinion. You know what they say about opinions, they're like noses, everybody has one. You are speaking about your data and what you have learned. It is about knowing your data and what your data tell us and what the implications are to the world at large. It's also about not being afraid to go out of our comfort zone. After all, as I tell my kids, you don't want to get too comfortable, fall asleep and miss your life!

Remember – speaking out might not be in your job description. Your Agency might require you to ask for permission before you

conduct an interview. This is an image from a recent article in *Nature* by Emily Waltz giving the Publication and Media Policies for some US Federal Agencies.

The next step is to learn – know the playing field. Learn how to tell a good story, learn how the media operates and learn how politicians operate. Don't expect to call a reporter back 2 days later after you've had time to think about something – they won't be there. Their deadline is long gone and you've just been put to the bottom of their list because you didn't respect that they had a deadline. Don't mail a copy of your publication the governor and expect that she's doing to read it and know what it means. She won't.

Take a class like those offered by COMPASS. Read a book. Also, be honest with yourself. Not everybody is going to be a Carl Sagan. If you don't feel like you can do this, work with a team that has expertise in this.

Just as you do with your science – pursue excellence. But be careful not to get too caught up in what Randy Olson calls being too cerebral. Don't call a reporter up and telling them they got it wrong when they use a lay term instead of the correct scientific term. Don't get mad when the policy enacted doesn't fit with the science. There are a lot more things that go into decisions than just science. Work to try and understand why the decision was made and how science fit into the decision.

And number 4 -Backlash will happen. Yes I like to end on an encouraging note! Seriously, last week I asked Liz Neely what she thought we should tell scientists and she actually told me, "Tell them to expect backlash," but she also said to and reminded you that backlash doesn't mean you failed.

When I say expect it, I mean from the public and from your colleagues. The public might not want to hear what you have learned. Now we are used to getting slammed by our peers, but generally our peers don't attack us personally. The public won't play as nice and will question the validity of your work and attack you personally.

Your colleagues might call you a media hound, question why the media ran your story and not theirs, or accuse you of overstepping the bounds of science. Don't let this stifle you. Do your best to own your science, reach out... and rap about reality. Thank you.