

Climate Change: Are We Losing Faith in Science?

Thank you, Dr. Hull, for the kind words. It's great to be back here...see old friends/ new faces...

I want to thank you all for allowing me to come to speak with you today for this very important event. I also want to thank Dr. Hull, Raudenbush and the rest of the research symposium committee for inviting me. I participated in this event in 2001 and presented my own research and I know how much time and effort goes into the preparation from the students perspective...so I applaud all the participants and look forward to seeing some of the research.

I want to get right to it because I know I don't have much time and there are a few points I want to make before I leave you today. Let me introduce my talk by emphasizing how vital science is to developing an understanding of our world. I say that because I want to talk with you today about something very troubling regarding the status of science and the status of the knowledge that's gained from scientific exploration in this country. The reference to "Climate Change" in my title refers to what I believe is a major problem, that's unfortunately in many ways unique to our country, regarding the climate of scientific understanding and explanation of our world and its phenomena. A climate that ultimately devalues and, in many ways, vilifies science and empirical explanations of natural events. As a country, I believe we're in a state where prestige for science and respect for scientific methodology are in great danger and I'll speak to three examples that emphasize this point. There are several others but today I'll talk briefly about three.

- **Global warming**

- The first is Global warming and the well-funded movement promoting the idea that this is not happening despite widespread consensus among experts in the scientific community that it is happening.
- Those who argue against the reality of global warming often highlight fears...legitimate fears perhaps...that a drastic reduction in emissions will be harmful to the economy. This fear is a major reason why our country has not joined the other 162 countries that have ratified the Kyoto protocol, which would reduce emissions to pre-1990 levels by 2012.
- Aside from the potential economic impact, one of the main arguments dealing with global warming is that "Yeah, the planet is warming but we're not making it worse" with our emissions from industry and our cars. This argument, put forth by fossil fuel lobbyists and politicians who receive funding from these lobbyists, ignores the body of scientific evidence that places some of the blame for global warming on fossil fuel emissions.
- The worldwide scientific consensus is overwhelming on this issue. The Intergovernmental Panel on Climate Change (IPCC) (which is an international scientific body), the National Academy of Sciences, The American Meteorological Society, the American Geophysical Union, and the American Association for the Advancement of Science (AAAS) all have issued statements in recent years concluding that the increase in greenhouse gasses over the last 50 years can be attributed to man-made emissions from industry and our cars
- But yet in this country there seems to be a push against scientific consensus.

- Congressman James Inhofe, the Chairman of the Committee on Environment and Public Works, calls global warming "the greatest hoax ever perpetrated on the American people." The few scientists that Inhofe cites who agree with his position are associated with and funded by the fossil fuel industry. An industry that, as you might imagine, has an interest in downplaying our role in global warming.
 - Inhofe frequently cites the fictional novel "State of Fear" by Michael Crichton (Jurassic Park), in his arguments against man-made global warming. "State of Fear", dismisses global warming as a purely natural occurrence whose proponents possess little concrete evidence of its existence. The book has gotten a lot of attention and actually won Mr. Crichton the annual journalism award from the American Association of Petroleum Geologists. A JOURNALISM award for a fictional novel...from the petroleum industry. Does anybody else see a conflict here? But yet Congressman Inhofe frequently references this as a must-read for those who don't see things his way.
 - In a more frightening example of the disinformation campaign and the movement away from scientific consensus on this topic...in January, James Hansen, NASA's top climate scientist, reported in THE NEW YORK TIMES that his scientific work and opinions were being censored by the government public affairs staff. Hansen said he was censored because his opinions supported the evidence that man-made greenhouse gases were contributing significantly to the increase in global warming.
 - The disinformation campaign about the gravity of global warming is working. In an ABC news poll taken last year, 67% of Americans don't believe that global warming requires immediate action. The scientists do. And 70% believe the area needs more study.
 - In short, there is a well funded disinformation campaign from the fossil fuel industry to mislead the public and influence public policy for its own ends by promoting a false sense of scientific ambiguity on the issue of global warming...and is an example of how our current attitude towards global warming is out of touch with the evidence-based reality supporting our significant role in global warming.
- **Evolution**
 - The ongoing debate about evolution is another good example of the movement against science and rational thought in this country.
 - In the media over the past few years you hear a lot about intelligent design and the idea that it should be taught in our high school classrooms.
 - The idea that there is a movement in this country to introduce non-science into our classrooms should scare us.
 - ID proposes that "certain features of the universe and of living things are best explained by an intelligent cause, not an undirected process such as natural selection."
 - The idea that some things are "too complicated" to be explained by natural selection.
 - This is not science. It cannot be tested in an experiment, you cannot use it to make predictions, and it doesn't generate new hypotheses.

- Instead of proposing new ideas or generating hypotheses of their own, proponents of intelligent design combat evolution and real science by trying to find holes in what they call “just a theory.”
 - The next time you hear someone say that evolution is “just a theory” you can be confident that they don’t know what a theory is. In science, we know that a theory is a well-substantiated explanation of some aspect of the natural world. We know that theories are the end points of science. They are understandings that develop from extensive observation, experimentation, and creative reflection. They incorporate a large body of scientific facts, laws, and tested hypotheses. In this sense, evolution is one of the strongest and most useful scientific theories we have.
 - Evolution is at the core of so many fields...genetics, biochemistry, neurobiology, physiology, ecology, and other biological disciplines.
 - By promoting the “It’s just a theory” rhetoric, the proponents of ID have successfully introduced confusion about the true meaning of theory in science and this has unfortunately helped to legitimize their position in the public discussion.
 - To teach children that there is debate or that there are two theories is incredibly misleading and a true educational injustice...in the scientific community there is no debate about the reality of evolution, period.
 - The weak and un-testable position that some natural processes are “too complex” to be explained by millions of years of evolution and natural selection flies in the face of mounds and mounds of evidence collected over the years since Darwin gave us “Origin of the Species.”
 - Intelligent design cannot be tested and is therefore not science. It explains nothing.
 - We, as researchers, have an obligation to uphold the scientific method as a way for discovery and enlightenment.
 - The very idea of including this pseudoscience as part of high school science curriculum erodes the prestige of science in our culture in an unprecedented way.
 - This is an unfortunate debate in our country. It’s in the news. Judges are ruling on it; school boards are debating it; In some states, legislative action is being pursued to force it’s teaching in our science classes.
- **Potential use of stem cell**
 - Another example of how our current climate is moving in the opposite direction with respect to widespread scientific consensus is in the area of stem cell research.
 - Stem cell research has the potential, the very strong potential, to uncover health and curative discoveries unparalleled in the history of biological research. And in our current culture it is unfairly demonized to the point where our lawmakers are wasting time legislating against it...effectively handcuffing our brightest scientific minds by prohibiting them from conducting this important research.
 - Stem cell research is controversial, especially in this country, because it involves the destruction of a human embryo of 50 – 150 cells. For comparison purposes, there are 100,000 cells in the brain of a fruit fly. But the argument by opponents is that the destruction of the embryo is destruction of potential life,

even though it's not quite potential life yet, as it's not attached to the uterus. In addition, excess embryos, or potential life to opponents of stem cell research, are destroyed daily in fertility clinics across the nation. Yet nothing is said about the destruction of these embryos. Instead of throwing the petrie dishes in the garbage, scientists want to take the embryos and conduct useful research.

- Opponents also argue that the claims made by stem cell researchers are overstated in terms of the cures that can be developed.
 - But when the vast majority of the scientific community is screaming at the top of their lungs about the potential within this line of research, it's hard not to consider the benefits.
 - Research on stem cells has the potential to alleviate the suffering of millions upon millions of living, breathing people with various diseases such as Alzheimer's, Parkinson's disease, and diabetes to name a few.
 - And at some point you have to weigh options between hope for cures and respect for life.
 - The scientific community is almost exclusively behind stem cell research. Researchers are clamoring at the opportunity to conduct research that can unlock the potential wealth of knowledge held within this line of study. However, in science, we never know unless we try. I believe we should be trying.
 - Because of the restrictions on stem cell research in this country, we are losing ground to other countries. When researchers abroad find a cure for juvenile diabetes through stem cell research are you going to deny your child the fruits of that labor? I wouldn't. And I don't think we should continue to prohibit our brightest minds from unlocking the potential cures that can come from research on stem cells.
- The issues I've discussed remain controversial, mostly in this country. However I hold hope that we in this room can continue to uphold our resolve to gain knowledge through our empirical minds and the tenets of the scientific method. Research and the scientific method really speak to the very nature of human experience in the sense that we have an inherent need to know why things are the way they are. Why apple falls to ground; Why sun goes down every day; Why peppermint seems to give us a competitive advantage; We want to know things...and the way we come to know is through the rigorous application of the scientific method
 - For myself, as a clinician, I don't anticipate that I will be conducting much more research.
 - Currently, I'm finishing up my doctoral dissertation. I found that there is less physical bullying in a Montessori school than there is in a traditional public school. Will my findings be replicated in future studies that include more than just 2 schools...I don't know...it doesn't matter...I contributed to the literature and the body of understanding. That's what you're doing today. You're a part of that. And that's what we're here to celebrate.
 - In closing, I strongly urge all of you to take full advantage of resources here at WJU.

- When you look at my CV, a good chunk of it is research that I did upstairs in Dr. Raudenbush's lab and I'm very grateful for that experience because it undoubtedly played a large part in my gaining acceptance to graduate school but more importantly, I'm grateful because it gave me an appreciation for the scientific method and the potential that research holds for gaining understanding of our world. So I applaud your efforts and encourage your persistence in the pursuit of knowledge that can be gained from scientific exploration. Thank you very much.