



Scientist Spotlight with Alan Robock

Q&A with prominent FAS-affiliated scientists and engineers

E-mail interview conducted by Allison Feldman, FAS

Dr. Alan Robock is a Distinguished Professor of climate science in the Department of Environmental Sciences at Rutgers University. He was a professor at the University of Maryland, 1977-1997, and the State Climatologist of Maryland, 1991-1997, before coming to Rutgers. Prof. Robock has published more than 370 articles on his research in the area of climate change, including more than 220 peer-reviewed papers. His areas of expertise include geoengineering, climatic effects of nuclear war, effects of volcanic eruptions on climate, and soil moisture. Robock serves as Editor of *Reviews of Geophysics*, the most highly-cited journal in the Earth Sciences. His honors include being a Fellow of the American Geophysical Union, the American Meteorological Society (AMS), and the American Association for the Advancement of Science, and a recipient of the AMS Jule Charney Award. Robock was a Lead Author of the 2013 Working Group 1 Fifth Assessment Report of the Intergovernmental Panel on Climate Change (awarded the Nobel Peace Prize in 2007). He recently served as a member of the Board of Trustees of the University Corporation for Atmospheric Research, which operates the National Center for Atmospheric Research. He graduated from the University of Wisconsin, Madison, in 1970 with a B.A. in Meteorology, and from the Massachusetts Institute of Technology with an S.M. in 1974 and Ph.D. in 1977, both in Meteorology. Before graduate school, he served as a Peace Corps Volunteer in the Philippines.

1. Why did you get into this field of science? Was there a specific person, event, or “aha moment” that inspired you?

I signed up for Earth Science in 9th grade, but the school counselor told me that it was for the “dumb students,” and since I did well in 8th grade science, I should take Biology, which I did. Sadly, I think that it is still the case that Biology, Chemistry, and Physics are considered “superior” sciences in school, and the House of Representatives recently told the National Science Foundation that Geosciences was not a “real” science.

However, when I got to the University of Wisconsin in Madison, I was able to take Earth Science as a freshman, and a third of the class was Meteorology, taught by Prof. Lyle Horn, the Chair of the Meteorology Department. As I was plotting and analyzing a weather map with the latest hourly observations on the top floor of Science Hall, I plotted a warm front to the east of Madison. I happened to look up and out the window and saw a wedge of clouds on the horizon. I realized this was the warm front I had just plotted. It became clear that I could study a science that was real and that was human scale and had importance for our lives, not something I had to imagine in a test tube or an accelerator. So, I became a Meteorology major.

In graduate school, my Master’s advisor, Norman Phillips, retired, and so I went to the other faculty looking for a Ph.D. topic. I told Edward Lorenz that I was interested in air pollution and that I liked computers. He replied, “Climate would be a good field to get into.” I was lucky to take his advice, and have been studying climate change for my entire career, more than 40 years.

2. What do you believe is the single, greatest challenge that scientists or engineers have in conveying information to the public and political spheres?

The greatest challenge is massive disinformation campaigns funded by those with a financial stake in the status quo. Whether it is global warming, which threatens the short-term profits of fossil fuel companies, or nuclear winter, which threatens the military-industrial complex, those who will lose money in the short-term have much deeper pockets than scientists and also have access to advertising and lobbyists who fool the public and contribute to politicians.

I've attended many "communicating with the public" trainings, but many scientists have already learned to explain their science in a way that non-specialists can understand. That is not the problem. The problem is that there is a constant drumbeat of confusing and opposing information, which is hard to counteract. After all, we have a big handicap – we have to tell the truth.

3. You teach at Rutgers University. Is there a particular piece of advice that you regularly provide to your students (whether in the classroom or in life)?

I tell them to find something they are passionate about, and to do it well. I have had students who are interested in helping to solve the global warming problem, but who are not scientists. I tell them, "Do whatever you do well, be it art or writing or history, and then apply your talents to the particular problem that interests you." If you have the luxury of spending your life doing something you like, you will be much more successful and able to contribute. Many of our problems are multi-disciplinary. But to participate, first you have to be accomplished in a particular discipline.

4. What advice would you give someone about breaking into your field or the scientific and technical worlds in general?

Do well at math. If you are good at math, you can take on science and engineering. Become a scientist if you are curious to figure out how the world works. Become an engineer if you want to build things. Both contribute to society. But always keep in mind the ethical aspects of your work, and how what you create can be used. If it can be used for evil, consider using your talents for a different application.

5. Your research involves many aspects of climate change. If you could say one thing to the "global warming deniers," what would it be?

Global warming can be summed up in 10 words, which I learned from Yale's Anthony Leiserowitz, "It's real. It's us. It's bad. Scientists agree. There's hope." Deniers cherry pick information to confuse the public. To find responses to any of their claims, go to <http://skepticalscience.com>, which will allow you to counter those claims. The one thing I would say to the deniers is, "Become part of the solution, not part of the problem." To people who despair about finding solutions, I recommend my blog, [Human Tipping Points: Why I'm Optimistic About Solutions to Global Warming and Nuclear Winter](#).

6. What do you believe to be the single, greatest threat faced by humans today that requires immediate policy attention?

It is the threat of nuclear weapons. The direct casualties from just three weapons of the size used on Hiroshima, exploding on U.S. cities, perhaps by North Korea or ISIS in the coming decades, would cause more casualties than the U.S. experienced in World War II. Even worse, our recent work shows that a nuclear

war between any two countries, each using only 50 Hiroshima-sized atom bombs (a modest fraction of what India and Pakistan now possess), could produce climate change unprecedented in recorded human history.

Nuclear winter was discovered 30 years ago by American and Russian scientists, working together. We found that the stratospheric smoke originating from fires ignited by nuclear explosions in cities and industrial areas would be so dense that it would block out the Sun, making it cold, dark, and dry at Earth's surface, killing plants and preventing agriculture for at least a year. Unfortunately, we have examples of cities burning, like San Francisco after the 1906 earthquake. There would be winter conditions even in the summer. And our recent work using modern computers and simulation models not only has validated the early work, but shows that the smoke would last for more than a decade.

The scary thing is that this could still happen today. Even the reduced arsenals that will remain in 2017 after the New START treaty (about 4,000 between the U.S. and Russia) threaten the world with nuclear winter. The world as we know it could end any day as a result of an accidental nuclear war between the United States and Russia. With temperatures plunging below freezing, crops would die and massive starvation could kill most of humanity.

We have to solve this problem. By banning nuclear weapons, we will have the “luxury” of only worrying about global warming. For more information, see <http://climate.envsci.rutgers.edu/nuclear/> and my blogs at <http://www.huffingtonpost.com/alan-robock/>.

7. Tell me about your time in the Peace Corps. What did you gain from that experience?

I was in the first draft lottery in the spring of 1970, just as I was graduating from the University of Wisconsin. This scheme was designed so the order of the military draft would be based on a random drawing of your birthday. Although it was later proven that this first lottery was not random, since they put the dates into a big bowl in order and did not mix them well, so those at the end of the year were picked preferentially, it was not changed. I ended up number 8 out of 366. So I knew that as soon as I lost my undergraduate student deferment, I would be forced to join the U.S. Army, go to Vietnam, and kill people. Having been tear gassed three out the four years I was at Madison trying to stop the immoral Vietnam War, there was no way I was going to participate.

I signed up for the Peace Corps before I graduated, as it was an occupational deferment, which meant that they would delay drafting you while you were doing that work. Although they did away with those occupational deferments just before I graduated, I managed to flunk my draft physical, inspired by Alice's Restaurant, and it was too late to change my mind about grad school, so I took the first offer the Peace Corps gave me, which was to go to the Philippines. I ended up (as an expert, with a B.A. in Meteorology) teaching teachers in the fishery vocational schools how to teach Meteorology. Fishery schools were two-year schools after high school, where the students learned fish preservation (girls) or fishing or fish pond management (boys). They all were required to take a course in Meteorology, and I helped them improve the course. I organized a National Workshop on Fishery Meteorology in Manila, and travelled to many of the schools, conducting workshops with the teachers.

For a lot of the time, my work was frustrating, as not all the teachers or principals were interested in what I wanted to provide. But I realized that if it were easy, the problem would have been solved and I would not have been doing that job. Many people, however, were very appreciative of my volunteering to come live there for two years, and at their standard of living.

I learned how lucky I was (and am) to be a middle-class American, one of the richest people in the world. My standard of living improved when I became a graduate student, with a refrigerator and hot water. For the rest of my life, getting rich was never a motivation. I have more than enough.

It was great to experience tropical weather for two years. I survived a direct hit by a typhoon on Manila. There was never a day in two years without some clouds in the sky. But I did get tired of the heat and humidity, and it was great when I got back to the U.S. and experienced autumn, with leaves turning colors and falling temperatures.

I think everyone should take some time in their lives to volunteer. Giving is its own reward. And it makes you appreciate all that you have.

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