OBITUARY

Stephen Henry Schneider (1945–2010)

A voice of reason in climate-change science and policy.

Anyone who ever met Stephen Schneider won't forget the occasion. I first encountered him when I was an undergraduate at Stanford University in 1997. Minutes after I stepped into his office, curious about his work but unsure what to say to a famous climatologist, my nervousness was swept away by a deluge of information. He rapidly delivered a synthesis of climate-change science and the need for action, an amusing deconstruction of the arguments of climate-change deniers and an invitation to take his course, 'Climate modeling and theory'. Later, while making notes to try to capture all I'd learned, I realized I had met a brilliant scientist who possessed a unique talent for both explaining complex issues and encouraging others to care about them.

Schneider, who died on 19 July, was a pioneer in climate-change research. He was one of the first to develop and use numerical models of the climate system to address issues such as the effects of greenhouse gases, aerosols and clouds on Earth's radiation balance. He also made an art of communicating the science; for four decades, he strove to inform the public and policy-makers about the growing and now overwhelming evidence supporting human-caused climate change.

Schneider grew up on Long Island, New York. Early on, his favourite pastimes included roaming the American Museum of Natural History in New York City and gazing at the rings of Saturn through his homemade telescope. He received a Bachelor of Science degree in mechanical engineering in 1966 and a PhD in plasma physics in 1971, both from Columbia University. While at Columbia, several experiences pushed him towards the study of climate change.

In 1968, the university was the stage for violent protests against the institution's affiliation with defence research organizations that supported the Vietnam War. Previously uninvolved in university politics, Schneider became a mediator between students and trustees. He learned to consider differing views and to search for common values on which solutions could be built. Then in 1970, the first Earth Day (originally created by US senator Gaylord Nelson to inspire awareness and appreciation of the environment) impressed on him the importance of climate change as an environmental and societal problem, as well as an emerging field of research.

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A postdoc at NASA's Goddard Institute for Space Studies in New York City in 1971 gave Schneider his start. A year later, he moved to the National Center for Atmospheric Research in Boulder, Colorado, where he remained on the staff until 1996.

In 1971, Schneider drew attention and criticism for a paper he published in *Science* with S. Ichtiaque Rasool. It suggested that the cooling effects of aerosols could dominate the warming effects of greenhouse gases. In this nascent field, findings quickly emerged that showed the effects of aerosols to be regional rather than global, and that warming effects would dominate. Schneider himself was proud that he got the "wrong answer for the right reasons". His conclusions were based on the evidence and modelling tools available at the time. On re-examining the issue in the light of new evidence using new tools, he was the first to correct his earlier calculations in the literature in 1975.

Much of Schneider's interdisciplinary research focused on how to model and better understand Earth's interconnected systems, including human society. He also strove to quantify the risks posed by climate change using probabilistic methods. He founded the interdisciplinary journal *Climatic Change* in 1975, which focuses on research relevant to policy, and served as editor-in-chief until his death. He strongly believed that scientists should provide policy-makers with information about the relative likelihood of possible outcomes and their consequences. In his view, policy-makers could then use this knowledge to make informed decisions about which risks are acceptable — value judgements that extend beyond the answers scientific research can provide. As he described in his 2005 book, *The Patient From Hell*, Schneider applied this kind of 'risk assessment' to his own treatment options when diagnosed with mantle cell lymphoma, a disease he overcame in 2002.

Schneider was deeply committed to public outreach and to training the next generation of scientists. After joining the faculty of Stanford in 1992, he championed graduate and undergraduate environmental programmes and science literacy for all students. He fought tirelessly against misinformation about climate change and what he called "mediarology", the tendency of the media to portray a topic as a two-sided debate, with each side carrying equal weight.

He always separated scientific facts and personal opinions, emphasizing what is well established and where uncertainties remain — and why those uncertainties do not lessen the urgency of societal action. In 1992, he was awarded a MacArthur fellowship for his ability to integrate and convey the results of climate-change research through public and classroom lectures, congressional testimonies, media appearances and his own research. He served as a scientific adviser to all eight US presidential administrations from Nixon to Obama.

Among his many honours, Steve was elected to the National Academy of Sciences in 2002 and was a leading contributor to the Intergovernmental Panel on Climate Change (IPCC). A co-author of all four IPCC Assessment Reports, he was preparing to serve as a coordinating lead author of the chapter on 'Detection and attribution of observed impacts' for the forthcoming fifth report.

Coming of age within a traditional scientific paradigm in which objectivity was considered to be compromised by outreach, Steve demonstrated that scientists can also speak as citizens. His own outreach efforts made him an extensive world traveller, and despite a packed schedule, he always found time to fit in birdwatching forays to add to his 'life list' or to sample wine from a nearby vineyard with his wife and frequent scientific collaborator Terry Root. The importance of living life with purpose and passion is a legacy he leaves to all who knew him.

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