

Princeton University

Honors Faculty Members
Receiving Emeritus Status



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Robert Harry Socolow



Rob Socolow has been on the faculty of the Department of Mechanical and Aerospace Engineering (MAE) since 1971, first as an associate professor and since 1977 as a full professor. He has been a leader in interdisciplinary initiatives on campus in energy and environment, and he has taught undergraduate courses in the School of Engineering and Applied Science and graduate courses in the Woodrow Wilson School of Public and International Affairs (WWS). Following the dictum of one of Rob's mentors, George Reynolds, that a professor's job is to write either the first or the last paper in a field, Rob has written many first papers that have helped reveal the intellectual content of humanity's daunting assignment of assuring that global prosperity is compatible with local and global environmental constraints.

Rob earned his B.A. in physics from Harvard University, *summa cum laude*, in 1959. Awarded the Frederick Sheldon Travel Fellowship from Harvard, he spent 1959-60 witnessing the end of colonial rule in many Asian and African countries and acquiring what he calls a "planetary identity." He received a Ph.D. in theoretical high-energy physics from Harvard in 1964. As a National Science Foundation postdoctoral fellow in Berkeley and Geneva (1964-66) and as an assistant professor of physics at Yale University (1966-71), Rob helped validate the quark model of the sub-nuclear world.

In the summer of 1969, Rob changed fields when he discovered the set of new issues subsumed under the rubric of "environment." With John Harte, also an assistant professor of physics at Yale, he wrote and edited *Patient Earth*, published by Holt in 1971. It was one of the first readers that introduced both the science and the social issues embedded in energy, climate, radiation, water, and land use, asserting by implication that many of the most important problems of modern times lie at the interstices of natural science, technology, social science, and the humanities.

Upon the publication of *Patient Earth*, Princeton asked Rob to help develop its Center for Environmental Studies, which Princeton was then creating. MAE, heady from having played a key role in sending a man to the moon and back and looking for new challenges, welcomed Rob into the department. Over the next three decades, Princeton's center contributed a steady stream of influential research that sought to raise the level of debate on energy efficiency and air quality in buildings (led by Rob, Richard Grot, David Harrje, and Margaret Fels), energy in developing countries (led by Robert Williams, Amulya Reddy, Jose Goldemberg, and Thomas Johansson), and proliferation-resistant nuclear energy (led by Frank von Hippel and Harold Feiveson). Rob ran the center (renamed the Center for Energy and Environmental Studies—CEES—in 1974) from 1977 to 1998. The energy work then moved to the Princeton Environmental Institute (PEI) and the nuclear security work moved to WWS, where both continue to prosper and to demonstrate the value to society of what Murray Gell-Mann (another of Rob's mentors) calls "the rational underground."

In the CEES years, Rob played a central role in bringing the "new thinking" about energy efficiency to Russian scientists. He helped launch the field of industrial ecology, which asks questions about mass flows that are analogous to those posed by energy efficiency. And, with Bob Williams, he was instrumental in stimulating research on carbon dioxide capture and storage, which is industrial ecology for carbon.

In 2000, BP and Ford funded the University-wide Carbon Mitigation Initiative (CMI), which Rob and Stephen Pacala lead and which BP is committed to continue to support through 2020 (Ford exited in 2010). Under CMI, Princeton conducts coordinated research in environmental science, energy technology, geological engineering, and public policy.

Perhaps CMI's most prominent contribution to date is "Stabilization Wedges: Solving the Climate Problem for the Next 50 Years with Current Technologies," published in *Science* in 2004, coauthored by Rob and Stephen Pacala. The article provided new quantitative language for the discussion of climate change mitigation and helped end the fatalism at that time that humanity lacks the

tools to address climate change. More recent papers by Rob and his coauthors include a scheme to move beyond per capita measures of national responsibility in international agreements, climate change as a risk management problem, nuclear power and climate change, constraints on biofuels, and deliberate removal of carbon dioxide from the atmosphere.

On campus, Rob helped launch and develop PEI and the Science, Technology, and Environmental Policy (STEP) Program at WWS. Within PEI, Rob heads the Climate and Energy Challenge, which focuses on enhancing the undergraduate experience, and Princeton Energy and Climate Scholars (PECS), an honor society for graduate students that Rob founded.

Rob is a fellow of the American Physical Society (APS) and a fellow of the American Association for the Advancement of Science. At APS, Rob headed its Panel on Public Affairs and led a study, released in 2011, titled “Direct Air Capture of CO₂ with Chemicals.” He was awarded the 2003 Leo Szilard Lectureship Award by the APS: “For leadership in establishing energy and environmental problems as legitimate research fields for physicists, and for demonstrating that these broadly defined problems can be addressed with the highest scientific standards.”

In recognition of his service to numerous committees of the National Research Council (NRC), Rob was named a Lifetime National Associate of the National Research Council of the National Academies. In recent years, he has been a member of the Grand Challenges for Engineering committee of the National Academy of Engineering and served on two major NRC studies: “America’s Energy Future” and “America’s Climate Choices.”

Among his other commitments, Rob was the editor of *Annual Review of Energy and the Environment* from 1992 to 2002. He helped launch three journals: *Energy and Buildings*, the *Journal of Industrial Ecology*, and *Energy and Environmental Science*. He served on the board of the National Audubon Society and is currently chair of the Science and Security Board of the Bulletin of the Atomic Scientists and a member of the Deutsche Bank Climate Change Advisory Board.

Rob received the 2010 Leadership in the Environment award of the Keystone Center, the 2009 Frank Kreith Energy Award of the American Society of Mechanical Engineers, and the 2005 Axelson Johnson Commemorative Lecture award for “outstanding research in global carbon management and the hydrogen economy,” from the Royal Swedish Academy of Engineering Sciences (IVA) and the Axel Axelson Johnson Endowment.

Upon becoming a professor emeritus, Rob intends to transfer to Princeton’s research staff and to continue to work full time on climate change.