Dr. Mark Jacobson

Professor of Civil and Environmental Engineering and Director, Atmosphere/ Energy Program, Stanford University

Dr. Jacobson's research goals are to understand physical, chemical, and dynamical processes in the atmosphere better in order to address atmospheric problems, such as climate change and urban air pollution, with improved scientific insight and more accurate predictive tools. He also evaluates the atmospheric effects of proposed energy solutions to climate change and air pollution, examines resource availability of renewable energies, and studies optimal methods of combining renewable energy resources. To accomplish this goal, he has developed numerical solvers to simulate gas, aerosol, cloud, radiative, and land/ocean-surface processes. He has also combined solvers into larger models. In 1994, he invented the interactively-coupled airpollution- weather-prediction model for urban/regional-scales. In 2001, he invented the nested global-through-urban scale coupled air-pollution-weather-climate model. Both technologies are now becoming commonplace.

Some topics he has examined include the relative effects of greenhouse gases versus aerosols on global climate, the effects of aerosols on ultraviolet radiation, the effects of aerosol mixing state on atmospheric heating, the effects of black carbon and biomass burning on climate, the effect of hydrogen fuel cells on air pollution and the ozone layer, the effects of aerosols on winds and precipitation, the effects of ethanol and diesel vehicles on air quality, the effects of agriculture on air pollution, and the effects of carbon dioxide on health. His work also encompasses mapping and analysis of winds for wind energy.

Dr. Jacobson has B.S., B.A., and M.S. degrees from Stanford University in Civil Engineering, Economics and Environmental Engineering, respectively. He later earned a Master of Science Degree and Ph.D in Atmospheric Sciences from UCLA.