CLIMATE ENGINEERING

Session co-chairs: David Sholl, Georgia Institute of Technology, and Armin Sorooshian, University of Arizona

The planet's current energy balance is sensitive to the actions of humans in ways that are unprecedented in human history. One clear indicator of anthropogenic activity is the increase of carbon dioxide (CO_2) concentrations from 280 parts per million (ppm) before the Industrial Revolution to approximately 385 ppm currently. Climate engineering is the concept of pro-actively and artificially modifying the earth system in ways that will combat human-induced changes in the planet's radiative balance. Measures that have been considered include modifying the reflectivity of the atmosphere by creation of aerosols, brightening clouds, and large-scale carbon sequestration by targeted changes in ocean chemistry and biology. Each of these methods potentially will lead to side-effects and are characterized by a host of moral issues. This session will explore the issues surrounding the impact of humans on the climate system, methods that may considered to potentially combat such perturbations, and the moral and legal issues raised by climate engineering.

Our first speaker, Eli Kintisch (MIT and Science Magazine), will provide a broad overview of climate engineering and what considerations must be made before such a drastic intervention is contemplated. Dr. Chris Jones (Georgia Institute of Technology) will discuss aspects of removing carbon dioxide from the atmosphere, through mechanical or natural means. Dr. Lynn Russell (Scripps Institute of Oceanography) will describe the role that atmospheric aerosols play in climate engineering and give examples of how recent field projects have attempted to understand the basic science and physics of cloud brightening. Finally, Dr. Ben Kravitz (Stanford University) will discuss methods of climate engineering with an emphasis on the potential effects of simulated volcanic eruptions. Together, these speakers bring together the state-of-the-art in terms of knowledge based on modeling, experimental work, and social science considerations.