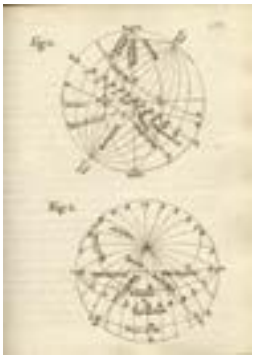
Rebecca Kamen
Hive, 2008
From *Manuscript as Muse*
Acrylic, graphite on mylar
11 x 8 x 2 ¼ inches

Rebecca Kamen
Shell, 2008
From *Manuscript as Muse*
Acrylic, graphite on mylar
14 x 7 x 2 ½ inches



Rebecca Kamen
Matrix 1, 2008
From *Manuscript as Muse*
Acrylic, graphite on mylar
8 x 8 x 3 inches

the intervening decades in a dramatically different way from that report's vivid auguries of doom and disaster.

In our time, the computer models of climate have been elevated some way beyond their deserved status by campaigners agitated by the possible effects of humans' carbon dioxide emissions on climate. In a study published in 2013 by the Heartland Institute, *Global Climate Models and Their Limitations, Climate Change Reconsidered II: Physical Science*, Anthony Lupo and William Kininmonth have presented a detailed and more technical analysis of the many limitations of such models, not least in areas where model output can be compared with observations, and their work provides useful background and reinforcement for the present article.

John Shade
Inverness, Scotland

The policy debate with respect to anthropogenic climate change, addressed by Saltelli and colleagues, typically revolves around the accuracy of models. People who contend that models make accurate predictions argue for specific policies to stem the foreseen damaging effects; those who doubt their accuracy cite a lack of reliable evidence of harm to warrant policy action.

These two alternatives are not exhaustive. One can sidestep the "skepticism" of those who question existing climate models, by framing risk in the most straightforward possible terms, at the global scale. That is, we should ask, what would the correct policy be if we had no reliable models?

Humans have only one planet. This fact radically constrains the kinds of risks that are appropriate to take at a large scale. Even a risk with a very low probability becomes unacceptable when it affects all of us—there is no reversing mistakes of that magnitude.

Without any precise models, we can still reason that polluting or altering the environment significantly could put us in uncharted territory, with no statistical

META This series explores ideas of alteration, transposition, and transcendence. Each sculpture incorporates concepts of mapping time and occurrence. It also reflects Kamen's longstanding fascination with the relationship between scientific and sacred motifs.

Rebecca Kamen
Immortal, 2003
From Meta
Steel wire
25 x 6 x 4 inches

track record and potentially large consequences. It is at the core of both scientific decisionmaking and ancestral wisdom to take seriously the absence of evidence when the consequences of an action can be large. And it is standard textbook decision theory that a policy should depend at least as much on uncertainty concerning the adverse consequences as it does on the known effects.

Further, it has been shown that in any system fraught with opacity, harm is in the dose rather than in the nature of the offending substance: Harm increases nonlinearly to the quantities at stake. Everything fragile has such a property. Although some amount of pollution is inevitable, high quantities of any pollutant rapidly increase the risk of destabilizing the climate, a system that is integral to the biosphere. Ergo, we should reduce carbon dioxide emissions, even regardless of what climate models say.

This leads to the following asymmetry in climate policy. The scale of the effect must be demonstrated to be large enough to have impact. Once this is shown, and it has been, the burden of proof of absence of harm is on those who would deny it.

It is the degree of opacity and uncertainty in a system, as well as asymmetry in effect, rather than specific model predictions, that should drive precautionary measures. Push a complex system too far and it will not come back. The popular belief that uncertainty undermines the case for taking seriously the "climate crisis" that scientists say we face is the opposite of the truth. Properly understood, as driving the case for precaution, uncertainty radically underscores that case, and may even constitute it.

Joseph Norman
Yaneer Bar-Yam
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Good behavior

In "Informing Public Policy with Social and Behavioral Science" (*Issues*, Spring 2015) Brian Baird lays out five recommendations to bridge the gap between academics—specifically in the social and behavioral sciences (SBS)—and policymakers. But there are three important observations he misses that have implications for the type of institutional development that should take place.

First, the strength of SBS is in its theoretical and methodological diversity. Baird recommends a "collaborative, consensus process to identify robust scientific methods and findings that are of potential interest to policymakers." This is not achievable in SBS, however, at least not in the sense laid out by Thomas Kuhn, an influential U.S. physicist, historian, and philosopher of science. Economists, sociologists, psychologists, and researchers in other SBS disciplines appropriately develop and test their own theories, at a variety of different levels of analysis, using a wide range of analytic methods, to address vastly different research questions. This is not because SBS researchers are unaware of one another's research, but rather because of the extraordinarily complex nature of the key units of observation for SBS: individual people and groups thereof (e.g., organizations, communities, jurisdictions), both with innumerable and intangible "moving parts" that are inordinately more difficult to observe (much less predict and explain) than, say, biological or engineering systems.

Second, there is no shortfall of institutional mechanisms for translating and communicating SBS research to policymakers. Most of Baird's recommendations are akin to similar calls for technology transfer from the "hard" academic science and engineering fields to industry. I agree with Baird that one should not presume trickle-down from SBS to policymakers, and that institutional development for translating what SBS academics know to policymakers in a language that the latter can understand and apply is a good