A Call to Action: Marshaling Science for Society

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As the current and past presidents of the American Institute of Biological Sciences (AIBS), we find the assault by politicians and special interest groups on the use of scientific knowledge to guide public policy decision-making alarming and dangerous. The marginalization of scientific information in decision-making has significant negative effects on our public health and safety, our environmental sustainability, and our general well-being. We need not look further than the disruption and deaths that have resulted in many countries, including the United States, from failing to use scientific evidence in making decisions on how to control the COVID-19 pandemic.

AIBS has long stood for the use of science to promote informed decision-making based on the best available evidence. We have helped secure new resources for science and education, defeated antiscience initiatives, and promoted integrity in the use of scientific information to make research funding decisions. Despite these and similar efforts, many politicians in the United States and around the world have continued to spread misinformation to promote goals they consider desirable (Gropp 2018). In the face of this problem, we are obligated to repeat that all policy should be based on sound science and its application to dealing with any policy of consequence, including those that address the existential threats to civilization.

Science does not tell us what specific steps to take to address a particular issue, but it provides information with a measured degree of certainty that should be taken into account when reaching a decision. Unfortunately, debates are often linked to self-interest, and public pronouncements by the parties involved often provide little guidance for distinguishing between alternative positions, because only a subset of information is presented in the argument. Because policy choices often revolve around the issue of causation, sound policy cannot be constructed by suppressing available evidence (Oreskes and Conway 2010).

Policymakers need to understand how science can be used to resolve problems. The scientific process consists of constructing and testing hypotheses. Hypotheses are plausible explanations based on available information obtained by gathering and analyzing appropriate data. This information is itself subject to strong internal checks via (often) anonymous review by specialists before it is deemed reliable. Even then, only after independent verification of the data and after independent methods of investigation have corroborated the conclusions does the science community accept the hypothesis. However, science does not specify any particular action. The International Panel on Climate Change, for example, does not mandate actions but evaluates the likelihood of different outcomes from different actions. Virtually all scientists agree that climate change is a reality, but that agreement does not dictate specific actions. Instead, the conclusions should be employed rationally in decisions based on the likelihood that climate change is occurring. For example, a generation ago, there were debates about acid precipitation contributing to the decline of our pristine lakes. A group of scientists used a variety of approaches, including sophisticated chemical techniques, to trace acid precipitation in the Northeast back to coal- and oil-fired power plants in the Midwest, thereby demonstrating its source with a high degree of certainty. Eventually, the explanation of damage from acid precipitation was accepted and led to the passage of the Clean Air Act Amendments of 1990, which resulted in a reduction in environmental damage through the reduced emissions of sulfur and nitrogen oxides.

At present, we are confronting a global disaster, the COVID-19 pandemic, which is being countered in part by steps based on the evidence produced by epidemiologists, virologists, and researchers in many other fields, which has guided the heroic efforts of medical care professionals worldwide. Unfortunately, those who want the public to believe that there is no problem have slowed our response and limited its effectiveness. Achieving herd immunity, a strategy that requires widespread infections to occur, has surfaced among the membership of President Trump's White

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House Coronavirus Task Force. Most experts in the field disagree with this approach, but there has been no real effort by policymakers to evaluate the evidence and to take the most effective steps possible. Instead, their arguments have been based on achieving specific theoretical outcomes and have largely ignored the source of the problem: spread through person-to-person contact. Consequently, the public has been led to believe that a suggestion is either right or wrong and that they should choose between alternative views on the basis of advice from whomever they trust at the time, rather than on the developing information that is made available.

The AIBS mission is to promote the use of scientific information to inform decision-making at the nexus of life science and society, a mission that is arguably more vital now than it has ever been in the past. For our society to survive in the complex modern world, we must all unite to promote the best science possible, use it to meet the challenges we face, and implore policymakers to listen to and act on the best information that scientists provide. This course of action will enable us to limit the spread of COVID-19; the disastrous disruption of the world's climate; the poisoning of global land, air, and water; and the extinction of a major portion of the biodiversity on which we ultimately depend for our survival.

The progress of science over the centuries has led to our deep understanding of natural phenomena. We must find ways to benefit from that understanding as we move into the future. Let us join together to insist on acting logically and rationally in a world so plagued by self-centered short-term goals and the false information that they all too often generate.

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