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# Meeting Global Challenges

EVERY MAJOR CHALLENGE OF MODERN LIFE, SUCH AS ENSURING ENERGY, HEALTH, WATER, OR FOOD security in a sustainable world with a predicted nine billion inhabitants, has complex science and technology (S&T) components and is global in character, even though its expression often involves national idiosyncrasies. Searching for solutions requires that the scientific community operate in fundamentally new ways. How to deal with these complex global issues is a major focus of this year's annual meeting of the American Association for the Advancement of Science (AAAS), whose theme is *Meeting Global Challenges: Discovery and Innovation.*

Developing effective solutions requires converging approaches, such as the integration of knowledge from the life, physical, social, and economic sciences and engineering. Moreover, the search for solutions needs to draw upon the talents and innovative ideas of scientists, engineers, and societal leaders worldwide to overcome traditional and nationalistic paradigms that have so far been inadequate to meeting these challenges. Unfortunately, neither S&T funders nor performing institutions are well organized, nor are members of the S&T community well trained for working in these ways. That will have to change.

Education and training programs must be developed in what has come to be called "convergence science": the integration of life, physical, and engineering sciences, so that S&T practitioners have a knowledge and experience base to participate in the kinds of integrated scientific efforts that are needed. More opportunities are also needed for scientists to collaborate in international settings and participate in global science projects during their training years, so that international collaboration becomes a more natural part of the scientific culture.

Research-performing and training institutions, such as universities and research institutes, have critical roles to play. Not only is it essential that they develop appropriate training programs and help stimulate multidisciplinary international collaborations, but they also need to reconsider some traditional incentive structures. Performing institutions should encourage and reward scientists and engineers for their work in large multidisciplinary, multinational teams. Institutions should also help provide the resources necessary to nurture these types of collaborations.

Fortunately, there is increasing recognition among some science funders of the need for enhanced mechanisms for funding science in a global, multinational fashion. The Heads of International Research Organizations, an aggregation of health research funders from around the world, meets regularly, with the goal of increasing consistency in policies across countries and facilitating global cooperation to tackle major health issues. The Global Research Council has brought together the heads of 70 basic science funding agencies from diverse countries and is working toward harmonizing policies on topics such as research integrity, peer review, and access to data and publications. AAAS has convened a variety of groups to work on bringing greater coherence and consistency to policies and practices across countries, primarily at the regional level, such as in East Africa and the Asia-Pacific region.

But harmonizing science policies across countries and their funding agencies and taking advantage of collaborative opportunities will not be sufficient. The work products from these multinational, multidisciplinary teams must be rapidly translated into practical solutions. To facilitate that translation, scientists and engineers must engage with business, cultural, and political leaders. Further, the adoption of national policies that address global challenges is dependent on support by an informed citizenry and public debate stimulated by discussions with policy-makers around the world. The international multidisciplinary AAAS Annual Meeting provides forums for such discussions and should produce an array of practical strategies and solutions to bring the full power of science to bear on world challenges.

**– Phillip A. Sharp and Alan I. Leshner**

10.1126/science.1250725







Published by AAAS

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*Science* **343** (6171), 579.
DOI: 10.1126/science.1250725