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# BioScience®

Organisms from Molecules to the Environment  
American Institute of Biological Sciences

## Science and Engineering Unlimited by Borders

Discoveries in the life sciences, along with biology's integration into engineering and the physical and social sciences, make it clear that the 21st century is and will continue to be the "century of biology."

Any institution's welfare and effectiveness depend on its values, and four in particular should characterize AIBS: (1) integration of research and education; (2) broadening participation in our discipline and science in general; (3) fostering science as an international activity; and (4) since AIBS is already the center of a network of member organizations, we should value integrating with the agendas of other societies in the sciences, engineering, and humanities to the benefit of all.

Rather than an emphasis on the parts of biology—our respective subdisciplines, the organisms we study, the systems we strive to understand—biology's future will be enriched by highlighting a common vision that emphasizes questions, concepts, and theories central to a science of life.

Biology research and education today differ from how they were done 10 or even 5 years ago. Today's frontiers are often at disciplinary edges filling the white spaces between our traditional disciplines, at the intersection of biology and computer and information sciences, engineering, geosciences, mathematics, physical sciences, and social sciences. An article in this issue of *BioScience* by James H. Brown and colleagues (p. 19) is a sign of the times: The authors use physics, ecology, and economics to explore their thesis that energy use imposes fundamental constraints on economic growth and development.

These intellectual advances bring the challenge of training students to be open to new ideas and capable of thinking broadly as they develop the depth of knowledge we expect of our best thinkers. The new 21st century biologists increasingly will be what some have called "T-thinkers": students capable of great breadth while also achieving a deep understanding of selected areas.

AIBS is a singular forum for integrating the life sciences. During this year my goal as president is to help us lead a conversation about biology in particular and science in general. The conversation must embrace new ideas in research and education. Individuals and networks of scientists must answer the basic research questions of the century of biology, and embrace a future in which biology and society are ever more entwined. Scientists have an important role to play in clarifying a present that is constantly changing while contributing to sustaining Earth's future.

Biology emerged as a discipline through the synthesis of diverse areas in the life sciences, including anatomy, physiology, and natural history. The "discipline" of biology emerged through the integration of diverse areas with a focus on discoveries for understanding life; today we might describe such an outcome as interdisciplinary or even transdisciplinary. Biology's origins are worth remembering at a moment when the life sciences are in such an exciting time of change, much of which is powered by interactions with other areas of study.

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