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From the Academy

Introduction to Frontiers of Science

Starting in 1989, the National Academy of Sciences (NAS) has organized annual symposia on Frontiers of Science. The goal of these symposia is to bring together some the very best young U.S. scientists to discuss exciting advances and opportunities in their fields in a format that encourages informal collective as well as one-on-one discussions among participants. Speakers are urged to focus their talks on current cutting-edge research in their disciplines to colleagues outside their field and to address questions such as, "What are the major research problems and distinctive tools of your field?" and "What are the current limitations in advancing your field?" "How might insight derived from other fields contribute to overcoming these limitations?" Formulating and answering such questions involves surmounting the barriers imposed by the specialized terminologies and techniques that characterize different branches of science. This poses formidible challenges that these symposia are addressing with success.

The first Frontiers symposium was held at the Academy's Arnold and Mabel Beckman Center in Irvine, California, from March 2 to 4, 1989. It was organized by a committee of young scholars with the support of the National Science Foundation, the Alfred P. Sloan Foundation, and the NAS. The positive response to this meeting prompted the NAS to organize a second such symposium in 1990 and annually thereafter. The symposia, which are held each November, are attended by approximately 80–100 scholars under 45 years of age, by up to a dozen senior colleagues, and by several science writers. Volumes that summarize presentations at the 1989, as well as the 1991 and 1992 symposia, have been published.* Participants include leading researchers from academic, industrial, and federal laboratories in such disciplines as astronomy, astrophysics, atmospheric science, biology, biomedicine, chemistry, computer science, earth sciences, genetics, material sciences, mathematical sciences, neurosciences, pharmacology, and physics.

At each symposium, approximately 25 young scientists report on current research within their disciplines to an academically trained and scientifically diverse audience. They highlight major research challenges, methodologies, and limitations to progress at the frontiers of their respective fields. All attendees participate actively in a general discussion period, during which they learn from—and form collaborative relationships with—other young scientists in different fields.

The success of the Frontiers Symposium series has spawned similar programs, such as the new series on Frontiers of Engineering by the National Academy of Engineering, and the U.S.–German Frontiers of Science, under the auspices of the German–American Academic Council and in coordination with the Alexander von Humboldt Foundation and the Max Planck Society. Discussions are under way about organizing similar international Frontiers of Science symposia with Japan and China. Thus, the Frontiers of Science symposia have become a major instrument in bringing together the best young researchers—the next generation of leaders—in the natural sciences and engineering in the United States and, increasingly, in other countries.

Starting with the report of the November 1996 Frontiers of Science Symposium in this issue, the *Proceedings of the National Academy of Sciences* will publish collected summaries of the papers presented at these symposia.

This collection is the second feature in the "From the Academy" series which is designed to inform *Proceedings* readers about the workings of the National Academy of Sciences. The introductory installment of "From the Academy" was in the March 5 issue on pages 1605–1614.

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*Topics presented at the 1989 symposium are included in *Science at the Frontier*, ed. Addison Greenwood (1989) (National Academy of Sciences/National Academy Press, Washington, DC).

Topics presented in the 1991 and 1992 symposia are included in *A Positron Named Priscilla*: *Scientific Discovery at the Frontier*, eds. Marcia Bartusiak, Barbara Burke, Andrew Chaikin, Addison Greenwood, T. A. Heppenheimer, Michelle Hoffman, David Holzman, Elizabeth J. Maggio, and Anne Simon Moffatt (1994) (National Academy of Sciences/National Academy Press, Washington, DC).