

Introduction to Frontiers of Science

Since 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 of 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 direct their talks on current cutting-edge research in their disciplines to colleagues who are outside their field and to address questions such as, “What are the major research problems and distinctive tools of your field?” “What are the current limitations in advancing your field?” and “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 the different branches of science. This approach poses formidable challenges, which these symposia are addressing with success.

The first Frontiers symposium was held at the Academy’s Arnold and Mabel Beckman Center in Irvine, California, in March of 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 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, a dozen senior colleagues, and several science writers. Participants include leading researchers from academic, industrial, and federal laboratories.

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 series on Frontiers of Engineering by the National Academy of Engineering and the German-American Frontiers of Science, under the auspices of the German-American Academic Council in coordination with the Alexander von Humboldt Foundation and the Max Planck Society. This year, the Academy will cosponsor 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 in other countries.

Summaries of presentations from the 1990 symposium (1), and the 1991 and 1992 symposia (2) have been published by the National Academy Press. Starting with the 1996 Frontiers of Science symposium (3), the collected summaries of the papers presented at these symposia including the German-American Frontiers of Science (4) have been published in the *Proceedings of the National Academy of Sciences*. These symposium papers are included in the “From the Academy” series of articles designed to inform *Proceedings* readers about the work of the National Academy of Sciences.

1. Greenwood, A., ed. (1989) *Science at the Frontier* (Natl. Acad. Sci./Natl. Acad. Press, Washington, DC).
2. Bartusiak, M. F., Burke, B., Chaikin, A., Greenwood, A., Heppenheimer, T. A., Hoffman, M., Holzman, D., Maggio, E. J. & Moffat, A. S., eds. (1994) *A Positron Named Priscilla: Scientific Discovery at the Frontier* (Natl. Acad. Sci./Natl. Acad. Press, Washington, DC).
3. Eighth Annual Symposium on Frontiers of Science (1997) *Proc. Natl. Acad. Sci. USA* **94**, 2773–2795.
4. Third Annual Symposium on German–American Frontiers of Science (1997) *Proc. Natl. Acad. Sci. USA* **94**, 12733–12750.