

PREFACE

This edition of the *AAAS Science and Technology Policy Yearbook* is centered on two of the major trends shaping public policy at the turn of the millennium: globalization and the growth of the knowledge economy. Six of the book's nine parts are devoted to one or both of these topics. As in the past, much of the book's content is drawn from the proceedings of the annual AAAS Colloquium on Science and Technology Policy, held in Washington, DC, in April 1999. Also included are papers from the 1999 AAAS Annual Meeting, talks from a special AAAS-sponsored meeting at MIT on science and secrecy, and excerpts from several significant S&T policy reports issued during the year.

A chapter by former Presidential science advisor, John Gibbons, based on his 1999 William D. Carey Lecture, opens the volume. Gibbons's chapter, entitled "Has the Time of Witches Passed Over?" is a reflection on the politically-charged atmosphere that marked the last four years of his tenure in the White House and a look to the future role of S&T in promoting global sustainability.

Nearly every chapter in Parts 2 and 3 has "global" or "globalization" in its title. These chapters are devoted to technological innovation on a global scale and to global economics in a world where knowledge has become the most important economic resource. Included here are articles by Barry Bosworth, former staff economist for the President's Council of Economic Advisors; Neal Lane, science advisor to President Clinton; Robert Shapiro, Undersecretary of Commerce for Economic Affairs; Frank Loy, Undersecretary for Global Affairs at the Department of State; and Kenneth Flamm, Dean Rusk Chair of International Affairs at the LBJ School of the University of Texas at Austin. These authors examine trade issues; science and technology as elements of foreign policy; and domestic economic and S&T policy issues in global context. In all, what is striking is the complete interpenetration of domestic and international policy elements.

Chapter 5, based on a report by researchers from the Department of Commerce and the University of Colorado at Denver, presents some remarkable statistics on R&D by foreign-owned companies in the United States and U.S. companies' R&D spending abroad. Foreign-owned companies now invest more than \$17 billion a year in R&D in this country, while U.S. firms tripled their R&D spending in other countries between 1986 and 1997. The picture these numbers paint is of an increasingly globalized R&D enterprise where human resources and knowledge flow around the world with little regard for national borders.

A concrete example of international knowledge flow is presented in Chapter 7 by Bernard Robertson, senior vice president for engineering and technology at DaimlerChrysler Corporation, as he describes his own firm's experience in the global marketplace. Lest we be carried away on a tide of economic optimism, however, two authors—Thomas Palley of the AFL-CIO and Dennis Pirages of the University of Maryland—sound cautionary notes about the problems that globalization can cause. These problems rose several notches on the policy agenda after the demonstrations at the World Trade Organization meeting in Seattle in late 1999.

Parts 4 and 5 bring the global knowledge revolution home, in the former section for firms in the private sector and national laboratories, and in the latter one for state and local governments. The chapters in Part 4 focus on knowledge management, considering information and corporate expertise as strategic assets and managing these assets to increase revenues and serve the goals of the organization. Also included here is a report by two faculty members from Rensselaer Polytechnic Institute on how to cultivate breakthrough innovations in mature firms. Part 5 looks at how state and local governments are using science and technology to fuel the knowledge economy for the benefit of their citizens.

Information technology is at the center of the knowledge economy and the six chapters in Part 6 address this topic in detail. Included here are excerpts from the influential 1999 report of the President's Information Technology Advisory Committee as well as articles on e-commerce by Elliot Maxwell, special advisor to the Secretary of Commerce, on the division of labor in IT between government and the private sector, by Irving Wladawsky-Berger, manager of IBM's Internet division, and on e-publishing by Martin Blume, editor-in-chief of *Physical Review*. Also in this section are a chapter on the controversy over the protection of databases as intellectual property and one on the grid of high-speed networks connecting the nation's scientific supercomputers by Larry Smarr, one of the leaders in the development of that grid.

Part 8 looks the knowledge economy from the standpoint of the research universities, including a paper by Charles Vest, president of MIT, and a summary of the widely-discussed report of the National Science and Technology Council on Renewing the Federal Government-University Research Partnership. Bracketing this section, Parts 7 and 9, are papers on a number of other key current issues. The three chapters of Part 7 look at the growing concerns about secrecy in science, both those due to the increasing commercial value of academic research and those

deriving from renewed government attention to spying and information security. And part 9 winds up the book with four very interesting chapters, including a National Academies report on the Government Performance and Results Act, an article by *Jurassic Park* author Michael Crichton on scientists and the media, a AAAS report on stem cell research, and a timely paper by physicist-Congressman Rush Holt (D-NJ) on science education.

As in past years, this *Yearbook* was produced by the staff of the AAAS Directorate for Science and Policy Programs with guidance and support from the Committee on Science, Engineering, and Public Policy (COSEPP). Related AAAS publications include the annual series of *AAAS R&D Reports*, published in the spring, which examine funding trends and policy issues associated with R&D in the President's budget, and their fall counterparts, the *AAAS Reports on Congressional Action on R&D in the Federal Budget*, which present the results of the annual congressional budget process.

Periodic updates on science and technology policy and budget issues are provided on the R&D Budget and Policy Program home page on the directorate's web site and through a newsletter, *Science and Technology in Congress*, published monthly in hardcopy and on the web when Congress is in session. The directorate maintains e-mail lists to inform regular readers when updates have been posted on the web. Information about these and other AAAS science and technology policy publications, programs, meetings, and services can be found on the web at www.aaas.org/spp.

A number of the Colloquium papers included in this volume are based on texts provided by the authors; others have been prepared from transcripts of tape recordings made at the meeting. All have been professionally edited and reviewed by their authors prior to publication. The reader should note that the views and opinions expressed in these papers are those of the authors and do not necessarily represent the views of AAAS.

Many people contributed to this *Yearbook* and we are grateful for their contributions. Most important, of course, are the authors whose works are contained here and whose ideas are the *raison d'être* for the book. We appreciate the efforts of editors, Rebecca Brune and Lydia Paddock, and production manager Kate Ramoth. And, once again, we acknowledge with gratitude the contributions of the members of COSEPP to this book and to the annual Colloquium on S&T Policy.

The web site of the Directorate for Science and Policy Programs, <http://www.aaas.org/spp>, contains up-to-date information about AAAS's S&T policy activities and publications. Information may also be obtained by contacting the Directorate at AAAS, 1200 New York Avenue, NW, Washington, DC 20005 (telephone: 202 326 6600; fax: 202 289 4950; e-mail: science_policy@aaas.org). Comments on this book and suggestions for articles to be included in future editions are welcome. Please address them to the editors at the address above (e-mail: ateich, snelson, cmcenane, or slita@aaas.org).

Albert H. Teich
Stephen D. Nelson
Celia McEnaney
Stephen J. Lita

Washington, DC
February 2000