PREFACE

Science for All Americans, Project 2061's seminal report published in 1989, deals only with learning goals—what students should understand and be able to do after they have left school as a result of their total school experience—but not with how to organize the curriculum to achieve these goals. Now, with the publication of *Designs for Science Literacy*, the curriculum takes center stage.

Why should it have taken so long? One reason was that Project 2061 was crafting an entire set of interrelated tools to enable educators to realize the promise of *Science for All Americans*. But, truth be told, it has also been a struggle to create *Designs*. The struggle was not the usual one of securing funds enough to proceed, but rather a strategic and conceptual one. Was it the job of Project 2061 to create an entire K-12 curriculum that would result in all students achieving the goals set out in *Science for All Americans*? We thought that to be far too ambitious and inconsistent with a healthy diversity of curricula. But if not that, what? Gradually, out of extensive discussions of staff, advisors, and consultants emerged a strong conviction, supported by our advisory body the National Council on Science and Technology Education, that the project should tackle the fundamental challenge of *how* to design entire K-12 curricula that would result in all students becoming science literate.

The education literature was of little help. And so we turned to fields in which there exists a rich literature on design and abundant examples, most particularly (but not exclusively) in architecture and engineering. We soon became aware of a lack of satisfactory language—verbal or visual—for clearly expressing ideas of curriculum structure. And so the project's associate director Andrew Ahlgren and I began to explore possibilities. For at least two years, the walls of my office were covered with an ever-changing array of diagrams and lists, most of them created by Dr. Ahlgren, which invariably caught the attention of staff and visitors, eliciting pointed criticisms and insightful suggestions.

As the concept for *Designs* began to crystallize and draft versions were circulated, two shortcomings were frequently pointed out. One was that the curriculum design

process being presented was too far–reaching to be immediately practical; the other that it was too complicated to carry out. The first problem was addressed by working out how educators could make immediate improvements in curricula, while at the same time putting themselves in a strong position to eventually carry out more comprehensive curriculum reforms. The problem of complexity was dealt with not by aggressively simplifying the design process that had been developed—curricula are by their nature complicated—but by seeing how the principles and tools of computer-aided design, so powerful in other contexts, could be applied to curriculum design.

Designs for Science Literacy, like its forebears, is the result of the commitment, ingenuity, and endurance of the entire Project 2061 staff and the contributions of literally hundreds of educators and scientists. I thank them all, and wish especially to acknowledge the extraordinary work of Andrew Ahlgren, my long-standing collaborator.

Given the demand in our country for quick and easy solutions to complex educational problems, it is encouraging that funding agencies are willing to support Project 2061 long enough for works such as *Designs for Science Literacy* to appear. The American Association for the Advancement of Science and all of us who have had a part in this are deeply grateful.

F. James Rutherford
Director Emeritus, Project 2061

National Council on Science and Technology Education

Chairman

Donald Langenberg, *Chancellor*, University System of Maryland

Raul Alvarado, Jr., *Supplier Diversity Programs*, The Boeing Company
Joan Duea, *Professor of Education*, University of Northern Iowa
Bernard Farges, *Mathematics Teacher*, San Francisco Unified School District
Stuart Feldman, *Department Group Manager*, Internet Applications and Services, Thomas J. Watson Research Center, IBM
Linda Froschauer, *Science Department Chair Person*, Weston Middle School, Weston, Connecticut
Patsy D. Garriott, *Education Initiatives Representative*, Eastman Chemical Company
Fred Johnson, *Assistant Superintendent for Instruction*, Shelby County Board of Education, Tennessee
Roberts T. Jones, *President and Chief Executive Officer*, National Alliance of Business
Sue Matthews, *Science Teacher*, Elberton County School District, Georgia
Gary Nakagiri, *Curriculum Coordinator for Mathematics and Science*, San Mateo County Office of Education, California
Robert Scidmore, *Technology Staff Development Specialist*, Eau Claire School District, Wisconsin
Benjamin Shen, *Reese Flower Professor Emeritus of Astrophysics*, University of Pennsylvania
Claibourne D. Smith, *Vice President (Retired)*, Technical-Professional Development, DuPont Company
Samuel Ward, *Professor and Department Head*, Molecular and Cellular Biology, University of Arizona
Terry Wyatt, *Science Teacher*, Instructional Planning, Toledo Public Schools, Ohio
John Zola, *Teacher, Social Sciences*, The New Vista High School, Boulder, Colorado

Ex-Officio Members

Marcia C. Linn, *Professor and Academic Coordinator*, Mathematics, Science, and Technology Education, University of California, Berkeley
George D. Nelson, *Director*, Project 2061