



National Science Board

SCIENCE AND  
ENGINEERING  
INFRASTRUCTURE  
FOR THE 21<sup>ST</sup> CENTURY:  
*THE ROLE OF THE  
NATIONAL SCIENCE FOUNDATION*

National Science Foundation

February 6, 2003

**NSB**

NSB 02-190

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## PREFACE

Experimental and observational research depends upon the quality of the infrastructure and the tools that are accessible to the researcher. Modern tools provide more coverage, more precision and more accuracy for experiments and observations. Indeed, some modern tools open experimental vistas that are closed to those lacking modern infrastructure and tools.

Fueled by exponential growth in computing power, communication bandwidth, and data storage, the Nation's research infrastructure is increasingly characterized by interconnected, distributed systems of hardware, software, information bases, and expert systems. The new research tools arising from this activity enable scientists and engineers to be more productive and to approach more complex and different frontier tasks than they could in the past. Also, because of their distributed character, these tools are becoming more accessible to increasing numbers of researchers and educators across the Nation, thus putting more ideas to work.

This change has created unprecedented challenges and opportunities for 21<sup>st</sup> century scientists and engineers. Consequently, in September 2000, the National Science Board established the Task Force on Science and Engineering Infrastructure within its Committee on Programs and Plans. The task force was created to assess the current state of U.S. S&E academic research infrastructure, examine its role in enabling S&E advances, and identify requirements for a future infrastructure capability.

This report, *Science and Engineering Infrastructure for the 21<sup>st</sup> Century*, presents the findings and recommendations developed by the task force and approved unanimously by the National Science Board. The report aims to inform the national dialogue on S&E infrastructure and highlight the role of NSF as well as the larger resource and management strategies of interest to Federal policymakers.



On behalf of the National Science Board, I wish to commend Dr. John White, the chair of the task force, and the other task force members – Dr. Anita Jones, Dr. Jane Lubchenco, Dr. Robert Richardson, Dr. Michael Rossmann, and Dr. Mark Wrighton of the National Science Board, and Dr. Mary Clutter, NSF Assistant Director for Biological Sciences. Mr. Paul Herer of the NSF Office of Integrative Activities provided superb and tireless support as the executive secretary to the task force.

The Board is especially grateful for the strong support provided throughout by the Director of the National Science Foundation, Dr. Rita Colwell, and by NSF's Deputy Director, Dr. Joseph Bordogna.

Warren M. Washington  
Chair, National Science Board

## ACKNOWLEDGEMENTS

Several of our colleagues were critical to initiation of the National Science Board's study. These include former National Science Board (NSB) Chair Eamon Kelly, and former Chairman of the NSB Committee on Programs and Plans, John Armstrong, who oversaw the initial phase of this inquiry. Extensive contributions were also made by former members of the Task Force on Science and Engineering Infrastructure (INF): Robert Eisenstein, Vera Rubin, and Warren Washington. Later, Dr. Washington, as NSB Chair, helped to guide this study to its completion.

A number of people assisted the task force as speakers and presenters, including Daniel Atkins, University of Michigan; Robin Staffin, Department of Energy; and William Stamper, National Aeronautics and Space Administration. We also wish to thank Office of Management and Budget staff, Sarah Horrigan and David Radzanowski, and Office of Science and Technology Policy staff, Michael Holland, who encouraged us and helped shape the direction of our inquiry in numerous productive conversations.

We appreciate the unstinting support of National Science Foundation (NSF) staff. In particular, the NSF Assistant Directors and office heads, former and current, worked closely with the task force, frequently submitting written documents, making presentations, and participating in meetings. We would like to thank NSF staff members Stephanie Bianchi, Leslie Christovich, Pamela Green, Stephen Mahaney, and Brett Mervis, all of whom made unique contributions to the report. We also thank the NSB Office staff who guided and supported all aspects of the Board's effort, including Gerard Glaser, Marta Cehelsky, Janice Baker, Catherine Hines, Jean Pomeroy, and Robert Webber.

Finally, we are grateful for the participation of many members of the science and engineering community who provided helpful comments and suggestions when the draft report was released for public comment on the NSF/NSB Web site. (These individuals are listed in Appendix C.)















































































































































