Table of Contents

Preface

Summary Article

Individual Contributions

List of Contributors with Affiliations

Preface

The mathematical sciences have enormous range and diversity. They have demonstrated the consistent ability to renew themselves through synthesis of preceding work and infusion of new ideas, some of which originate through the application of mathematics in other disciplines. This process of rejuvenation and evolution is indispensable for discovery at the frontiers of the mathematical sciences.

The essential role of the mathematical sciences in almost all aspects of the scientific, engineering, and educational enterprise has become increasingly apparent. The mathematical sciences have enabled extraordinary advances in every area of science, engineering and technology, yielding new analytical and experimental tools that address a broad range of scientific and technological challenges previously considered intractable. With this greatly expanded capacity for discovery and its subsequent applications to meet societal needs has come a dramatic demand for new mathematical techniques and capabilities that will ensure the continued growth of our nation's scientific and technological capacity. To enable progress in information technology and the biomedical sciences, participation of the mathematical sciences is indispensable. To respond to this demand, substantial progress in the development of new fields of fundamental mathematics is required. Further, in light of our increasing reliance on science, engineering and technology to sustain economic growth and improve the national quality of life, there is a growing need for improved education and training in mathematics and statistics, both for the scientific and technical workforce and for the population at large.

The Division of Mathematical Sciences at NSF organized a June 26-27, 2000 workshop to outline some of the exciting opportunities. Contributions were submitted prior to the workshop, and formed the basis of the workshop discussions. Together with the summary article "Mathematics—The Science of Patterns and Algorithms," these documents are an outstanding contribution to DMS's planning process which will permit the realization of some of these opportunities.

We are greatly indebted to the contributors for their vision and effort. We are pleased to be able to share this vision and support the mathematical sciences community in the realization of the exciting research and educational opportunities that will present themselves during the next decade.

Philippe Tondeur, Director

Division of Mathematical Sciences
National Science Foundation

NSF 01-20