

Preface

This issue of the *IBM Journal of Research and Development* contains papers honoring the life and career of IBM Fellow Charles H. Bennett on the occasion of his sixtieth birthday. Most of the papers are based on talks presented at a symposium held at the IBM Thomas J. Watson Research Center in Yorktown Heights, New York, on May 8 and 9, 2003. Nearly one hundred participants, some from far distant points on the globe, contributed to the lively discussions and celebrations at that symposium. The papers reflect the active intellectual atmosphere that prevailed at the symposium and show the wide range of Charlie's seminal contributions to several areas of fundamental science. Some of the authors have dug deep into their archives and unearthed photographic and other mementos of their interactions with Charlie, which the reader will find throughout the issue.

The papers are organized roughly around several large themes that reflect his career-long interests. First, there are papers by G. Grinstein, T. Toffoli, and E. Fredkin on the fundamental statistical physics of lattice systems, which are representative of the work that arose from Charlie's famous resolution of the Maxwell demon paradox. The paper by J. A. Smolin recalls the events surrounding the implementation of quantum cryptography. The next set of papers, by N. D. Mermin, A. Peres, B. M. Terhal, R. Jozsa, G. Brassard et al., and W. K. Wootters, give some recollections of the landmark 1993 paper by Bennett et al. on quantum teleportation, and indicate the many new directions of research that teleportation has opened up. The final set of contributions, by M. B. Ruskai, P. W. Shor, and R. Horodecki et al., connect to Charlie's broader interest in the practice and foundations of quantum theory from the perspective of information processing.

Finally, a few acknowledgments: We are very grateful to the family of the late IBM Fellow Rolf Landauer for permission to include in the paper by J. A. Smolin a previously unpublished tribute to Charles Bennett written in December 1997. This issue was in part inspired by the January 1988 issue of the *IBM Journal of Research and Development* (Volume 32, Number 1), containing papers commemorating Rolf Landauer's sixtieth birthday. We would like to close by thanking all the authors of the present issue for helping to create this tribute to Charlie Bennett, and to Charlie himself for his profound contributions to our scientific lives!

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Guest Editors