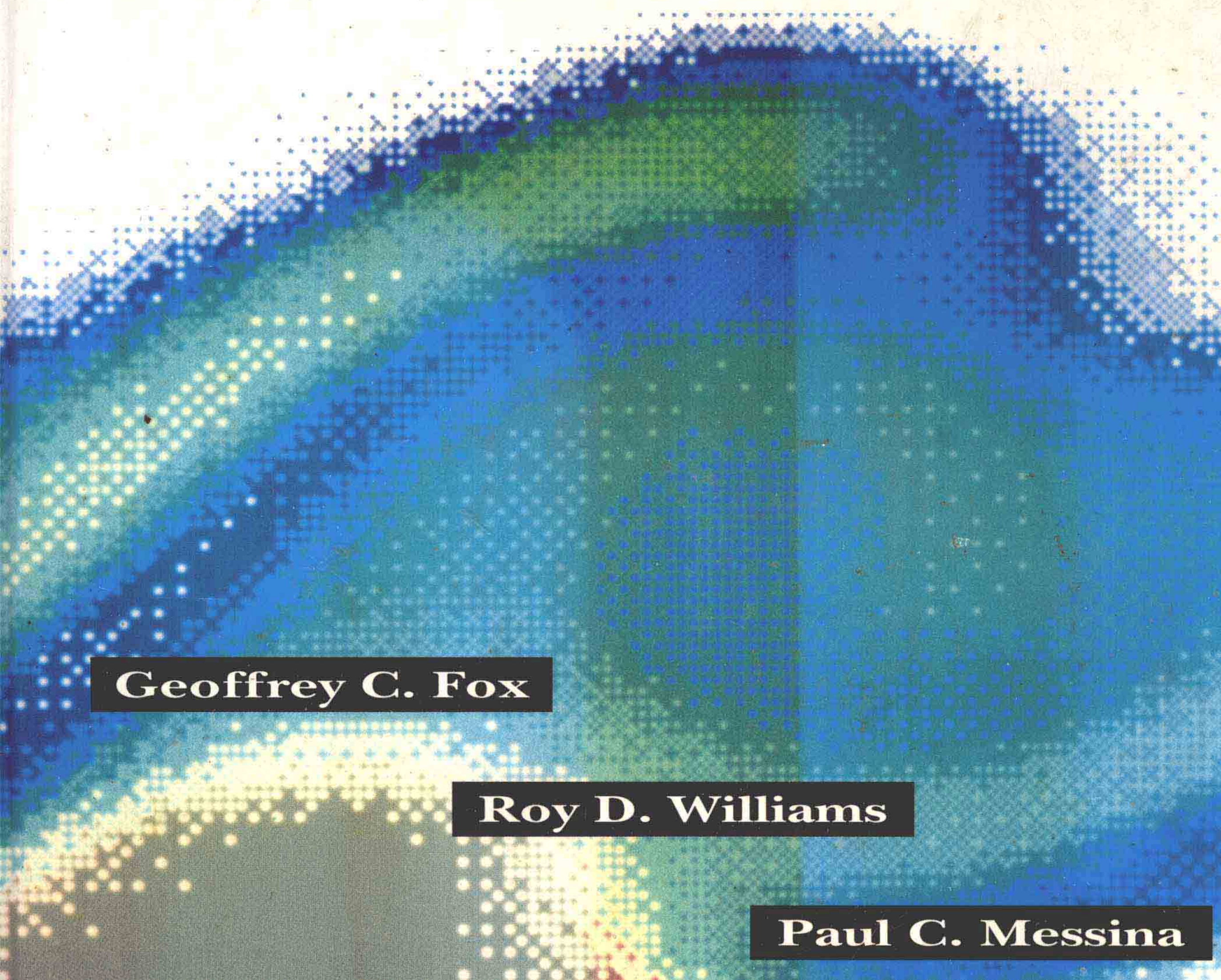
Parallel Computing Works!



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Preface

This book describes a set of application and systems software research projects undertaken by the Caltech Concurrent Computation Program (C^3P) from 1983–1990. This parallel computing activity is organized so that applications with similar algorithmic and software challenges are grouped together. Thus, one can not only learn that parallel computing is effective on a broad range of problems but also why it works, what algorithms are needed, and what features the software should support. The description of the software has been updated through 1993 to reflect the current interests of Geoffrey Fox, now at Syracuse University but still working with many C^3P collaborators through the auspices of the NSF Center for Research in Parallel Computation (CRPC).

Many C^3P members wrote sections of this book. John Apostolakis wrote Section 7.4; Clive Baillie, Sections 4.3, 4.4, 7.2 and 12.6; Vas Bala, Section 13.2; Ted Barnes, Section 7.3; Roberto Battiti, Sections 6.5, 6.7, 6.8 and 9.9; Rob Clayton, Section 18.2; Dave Curkendall, Section 18.3; Hong Ding, Sections 6.3 and 6.4; David Edelsohn, Section 12.8; Jon Flower, Sections 5.2, 5.3, 5.4 and 13.5; Tom Gottschalk, Sections 9.8 and 18.4; Gary Gutt, Section 4.5; Wojtek Furmanski, Chapter 17; Mark Johnson, Section 14.2; Jeff Koller, Sections 13.4 and 15.2; Aron Kuppermann, Section 8.2; Paulette Liewer, Section 9.3; Vince McKoy, Section 8.3; Paul Messina, Chapter 2; Steve Otto, Sections 6.6, 11.4, 12.7, 13.6 and 14.3; Jean Patterson, Section 9.4; Francois Pepin, Section 12.5; Peter Reiher, Section 15.3; John Salmon, Section 12.4; Tony Skjellum, Sections 9.5, 9.6 and Chapter 16; Michael Speight, Section 7.6; Eric Van de Velde, Section 9.7; David Walker, Sections 6.2 and 8.1; Brad Werner, Section 9.2; Roy Williams, Sections 11.1, 12.2, 12.3 and Chapter 10. Geoffrey Fox wrote the remaining text. Appendix B describes many of the key C^3P contributors, with brief biographies.

C^3P's research depended on the support of many sponsors; central support for major projects was given by the Department of Energy and the Electronic Systems Division of the USAF. Other federal sponsors were the Joint Tactical Fusion office, NASA, NSF and the National Security Agency. C^3P's start up was only possible due to two private donations from the Parsons and System Development Foundations. Generous corporate support came from ALCOA, Digital Equipment, General Dynamics, General Motors, Hitachi, Hughes, IBM, INTEL, Lockheed, McDonnell Douglas, MOTOROLA, Nippon Steel, nCUBE, Sandia National Laboratories, and Shell.

Production of this book would have been impossible without the dedicated help of Richard Alonso, Lisa Deyo, Keri Arnold, Blaise Canzian and especially Terri Canzian.

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