# Preface

By a remarkable coincidence, the second edition of this book will appear in the year that marks the 40th anniversary of Flux-Corrected Transport (FCT). The first decade of the 21st century has witnessed a renewed interest in applications of FCT to the equations of fluid dynamics. The first edition of the book has found many readers who used it to improve existing and design new FCT algorithms. Other readers recognized the advantages of FCT and applied it to challenging new problems. A recent comparative study of shock-capturing techniques for unsteady transport equations [16] has made FCT more popular in the finite element community. Being the oldest design tool for nonlinear high-resolution schemes, FCT is still superior to many modern methods when it comes to solving problems with steep gradients.

The revised and expanded second edition summarizes many recent advances in the field of FCT. Chapters 3–8 have been updated to reflect the current state of the art. Moreover, the second edition features three new chapters describing FCT-constrained data transfer in Arbitrary Lagrangian-Eulerian methods, an optimization-based approach to flux correction, and the implementation of an FCT algorithm for high-speed flows on structured overlapping grids. The research presented in the new chapters was done at three U.S. National Laboratories.

The Editors would like to thank all authors for their contributions that make this book the most complete source of information on modern FCT methods. The initiative of the Springer Verlag to publish the second edition is also gratefully acknowledged. Special thanks go to Tobias Schwaibold and Kirsten Theunissen who coordinated the review of the new book proposal and the publication process.

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