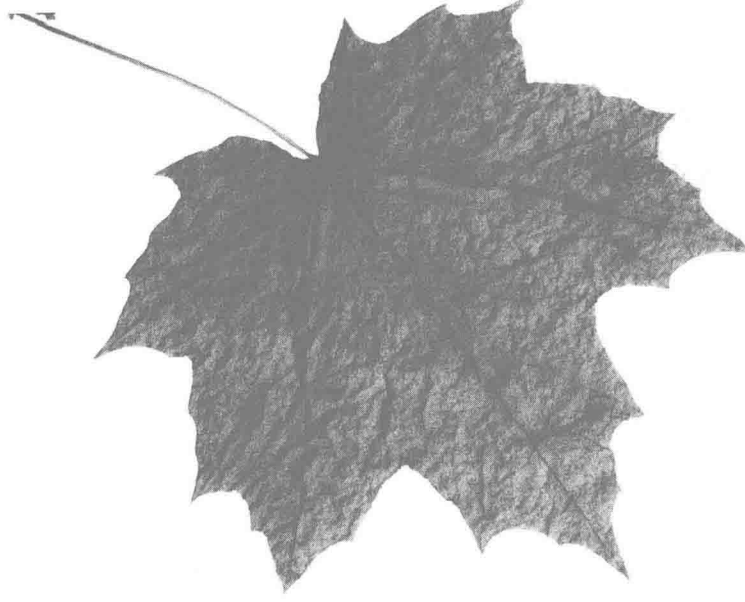


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Brown University

THE COMPUTER IN THE VISUAL ARTS

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THE COMPUTER IN THE
VISUAL ARTS

This book is dedicated to my husband Michael, my parents Dane and Alice Morgan, my brother Dane Morgan III, my mother-in-law Josie Spalter, in memoriam, and to Andries van Dam.

PREFACE

Zither, chess, book, painting, sword.

These symbolize classical skill.

There was once a wanderer who cared nothing for fame. Although he had many chances for position, he continued to search for teachers who could help him master five things: zither, chess, book, painting, and sword.

The zither gave him music, which expressed the soul. Chess cultivated strategy and a response to the actions of another. Books gave him academic education. Painting was the exercise of beauty and sensitivity. Sword was a means for health and defense.

One day a little boy asked the wanderer what he would do if he lost these five things. At first the wanderer was frightened, but he soon realized that his zither could not play itself, the chess board was nothing without players, a book needed a reader, brush and ink could not move of their own accord, and a sword could not be unsheathed without a hand. He realized that his cultivation was not merely for the acquisition of skills. It was a path to the innermost part of his being. *Skills Meditation (#21) from 365 Tao Daily Meditations by Deng Ming-Dao (Copyright © 1992 by Deng Ming-Dao. Reprinted by permission of HarperCollins Publishers, Inc.)*

The Computer in the Visual Arts is the book I wished I had when I began to use a computer to create art work. Although I was able to teach myself various software packages, I had no sense of the general concepts underlying them and knew of few other artists who made the computer their chief medium of expression. When I started to teach the use of computers in the visual arts, I realized even more acutely how hard it was to grasp the field as a whole—its history, the relevant art theory, the breadth of work of current practitioners, and the relationships between different types of software.

I wrote *The Computer in the Visual Arts* to answer my questions and those of countless other artists and designers: Why doesn't my color printout match the image on my screen? What is a spline, and why should I care? Who were the first artists to explore this field? How have other artists used the incredible capabilities of the computer in expressive ways? How does Postmodern theory apply to computer works? What does a "3D" program do?

Since I began to use a computer in my art over a decade ago, computer art and design courses have evolved from isolated electives in art schools to become standard offerings in colleges and universities around the world. At the same time, knowledge of the computer has become a prerequisite for many traditional jobs in design, illustration, and photography, as well as for entirely new types of jobs, such as multimedia and Web development. This book can help practicing artists learn new skills and provides curricular and reference material for a wide range of courses.

The Computer in the Visual Arts differs from program manuals and other books on computer graphics and computer art because it integrates history, theory, art examples, and explanations of the concepts underlying all of the major types of computer graphics software. Features of the book include:

- Hundreds of art works by leaders in the field of computer art.
- An abundance of diagrams and illustrations explaining visual concepts.
- Quotes from personal interviews with dozens of artists and pioneering computer scientists to help illuminate the origins of this dynamic field and suggest future directions.
- Descriptions of all the main program types: digital painting and photoediting, digital design and layout, the building and rendering of 3D worlds, animation, multimedia, and the Web, each presented as part of a larger picture.
- Chapters on input (such as scanning) and output (such as printing) that address the wide range of tools and techniques for working with art software and creating screen-based and hard-copy works.
- A chapter on electronic color that explains the color concepts affecting all types of visual software packages.
- Exercises at the end of each chapter designed for use by individual readers or in a classroom setting. Application-specific versions of the exercises help users get started right away with popular software.
- Annotated suggested readings at the end of each chapter to provide jumping off points for further exploration.
- A supporting Web site at <http://www.awl.com/cseng/spalter>

The Computer in the Visual Arts can be used by the amateur artist at home and by professional visual artists, including fine artists, graphic designers, photographers, videographers, illustrators, architects, industrial designers, animators, and multimedia and Web developers. It is appropriate for artists and designers just beginning to use a computer as well as those who have already embraced it, and for teachers and students in a classroom. It will also be useful for museum and gallery professionals, art critics, and art enthusiasts who wish to better understand the impact of the computer on visual art and design. The content is presented independently of specific computer platforms and software applications. Beyond basic computer proficiency, the only prerequisite is a desire to explore this important and inspiring new medium.

To contact the author please send email to ams@awl.com

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This book could not have been written without the invaluable assistance of numerous colleagues, students, friends, and family, as well as the talented staff at Addison Wesley Longman.

Of all the people who played a role in this project, Andy van Dam contributed the most time and energy, an extraordinary feat given his schedule! His first-hand knowledge of the field of computer graphics, both technical and historical, were important influences, and his passion for the material brought the concepts alive to me. In addition to teaching me most of the technical concepts in these pages, he gave detailed critiques of nearly every draft of the entire text and provided constant support and encouragement as mentor and friend. I am also enormously grateful to Alvy Ray Smith, who responded to an E-mail request for historical information about painting programs by asking to see the rest of the manuscript. He then read several drafts of the text and provided detailed critiques that were a graphics education in and of themselves. It was an honor to have access to his technical insights and many original ideas about the use of the computer in art and design.

I have been honored to have the intellectual and moral support of several influential individuals whose encouragement and belief in me has at times made all the difference. I would like to thank again Andy van Dam and Alvy Ray Smith, as well as Thomas Banchoff, Phil Davis, Carl Gustin, Roger Mandle, William J. Mitchell, and John Sculley.

Many subject-matter experts read sections of the manuscript; their feedback was instrumental in improving its accuracy and depth (any omissions or remaining errors are my own). A big thank-you to David Barkan, William Buxton III, Jonathan Corson-Rikert, Phil Davis, Joseph DeLappe, David Durand, Robert Duvall, David Elliott, Barbara Hoffman, John Hughes, Dane and Alice Morgan, Dane Morgan III, Paul Kahn, David and Tina Reville, Cynthia Beth Rubin, Mark Safire, Scott Sona Snibbe, Morey Stettner and Margie Wachtel, Peter Wegner, Brian Wallace, and William Wooten. Many others contributed imagery and quotations. A special thanks goes to David Reville for his photography, as seen in Figures 1.5, 2.16, 3.1, 3.3–3.6, 3.8, 3.12, 3.22, 9.2, 9.6, 9.7, and 9.14.

I taught my first computer art course in 1992 at the Rhode Island School of Design (RISD) and would like to thank Roger Mayer at Brown University and Christina Bertoni at RISD as well as others at RISD who supported my efforts to establish the joint Brown and RISD course “The Computer and the Visual Arts.” In 1993, I began to work with The Brown University Computer Graphics Group, which has provided a wonderful home base for me over the past five years. I would like to thank all the staff, students, and faculty involved with the Graphics Group who answered my late-night questions and provided support throughout the long writing process. I am also grateful to Eugene Charniak, former Chair of the Computer Science Department, who saw fit to give me, then an adjunct lecturer in a different department, office space and, with the rest of the Computer Science Department at Brown, made me feel so welcome.

The Brown Graphics Group is part of a five-university consortium, the National Science Foundation Science and Technology Center for Computer Graphics and Scientific Visualization. My experiences with people from all five universities (Brown, Caltech, Cornell, the University of North Carolina at Chapel Hill, and the University of Utah) gave me a breadth of understanding and access to ideas that influenced the

structure and choice of topics presented in this book. Images from these labs appear throughout the book, thanks in particular to innumerable folks at Brown and to David Breen (Caltech), Jonathan Corson-Rikert (Cornell), Sam Drake (Utah), and David Harrison (UNC).

One of the most enjoyable parts of writing this book has been the opportunity to meet (whether in person, online, or by phone) the artists featured herein. Many began to use the computer when doing so was considered quite radical, and I am especially indebted to all the pioneers who struggled against enormous odds to tame this new medium. Space precludes listing here all the artists whose work appears in the book, but I would like to thank each of them for letting me reproduce their work and for sharing their motivations and experiences with me. Some spent considerable additional time educating me on various aspects of the field and putting me in touch with their colleagues. In particular, I would like to thank Laurel Paley, Cynthia Beth Rubin, Michael Rees, Kathleen Ruíz, Roman Verostko, James Faure Walker, and curator Brian Wallace.

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Finally, welcome to the world, Amelia!



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