

# Fundamental Research in Geographic Information and Analysis

NCGIA Technical Reports, 1988–1997

University of California,  
Santa Barbara

State University of New York  
at Buffalo

University of Maine

*National Center for Geographic Information and Analysis*

# NCGIA



Funded by the  
National Science Foundation



CD produced with support from  
Environmental Systems Research Institute, Inc.

Copyright © 1988–1997, Regents, University of California

# **Bibliography on Animation of Spatial Data**

A Guide to Literature, Video and Movie Media

Barbara P. Battenfield, Christopher R. Weber, Mark MacLennan, and John D. Elliott

National Center for Geographic Information and Analysis

Department of Geography, State University at Buffalo

Buffalo, N.Y. 14261

Technical Paper 91-22

August 1991

## **PREFACE AND ACKNOWLEDGEMENTS**

This bibliography has been generated as part of the research efforts of NCGIA Research Initiative #7, Visualization of the Quality of Spatial Information, and Research Initiative #10, Spatial and Temporal Reasoning, of the National Center for Geographic Information and Analysis, supported by a grant from the National Science Foundation (SES 88-10917); support by NSF is gratefully acknowledged. Incorporated here are citations from journal articles, monographs, books, and technical reports on research in several disciplines, including cartography, computer science, spatial modeling, and the earth sciences. The common thread is the exploration of methods by which to generate animated visual displays of spatial data.

Animation is an important method of communicating information that lends itself to cartographic display. Cartographers may be delinquent in utilizing this technique. Meteorologists, medical researchers, and physical scientists, employing mini-, mainframe and super-computers, are creating today's most sophisticated animated maps and continue to develop the most sophisticated systems for display of spatial data.

We intend this document to be a tool for the general community, and to provide an overview of research in a topical area that needs to be further explored in its own right. It is clear to us as we complete this literature search that the volume of research that has been reported is being catalogued under categories that are quite diverse. Little if any centralization to the topic we now refer to as Cartographic Animation has penetrated keyword generation to date. We anticipate that this bibliography will reduce the redundancy of research efforts and alert individuals who do not commonly interact within the communality of efforts which strive to promote cartographic animation research. We also intend this bibliography to serve as a starting point for inventory of articles and video materials, rather than a comprehensive inventory.

Special thanks are due to Alan MacEachren and David DiBiase of Penn State University for help locating forthcoming literature, and to Hal Moellering (Ohio state University) and Waldo Tobler (Univeristy of California-Santa Barbara) for providing copies of their animated maps. The selection of articles in Section 1.3 on computer graphics, on graphical design, and on perception, cognition and HCI was based upon encountering citations of these articles in literature on computer and film animation.

## Section 1. LITERATURE

### 1.1 General Overview of Animation

#### 1.1.1 Reference

- Adeli, H. (1985) Animation on Microcomputers. **Civil Engineering for Practicing and Design Engineers**, 4(12), 1029-1042.
- Badler, N. (1982) ed. Special Issue on Character Animation. **IEEE Computer Graphics and Applications**.
- Badler, N. (1983) ed. **Motion Representation and Perception**. New York: Association for Computing Machinery.
- Born, R. (1983) ed. **Designing for Television: The New Tools**. Tequesta, FL: Broadcast Designers' Association.
- Burtnyk, N. and Wein, M. (1971) Computer Generated Key Frame Animation. **Journal of the Society of Motion Picture and Television Engineers**, 80, 149-153.
- Burtnyk, N. and Wein, M. (1976) Computer Animation In: **Encyclopedia of Computer Science and Technology**. New York: Marcel Dekker Inc.
- Cage, John (1969) **Notions**. New York: Something Else Press.
- Campbell, R. (1970) **Photographic Theory for the Motion Picture Cameraman**. San Diego: A. S. Barnes & Co.
- Caruso, D. (1985) Real-Time Animation Turns Data into Images. **Electronics**, 58(33), 20-21.
- Catmull, E. (1978) The Problems of Computer Assisted Animation. **Computer Graphics**, 12(3), 495-9.
- Catmull, E. (1979) New Frontiers in Computer Animation. **American Cinematographer**, 1000-1053.
- Chang, C. (1987) Integration of Computer Animation with Other Special Effects Techniques. **Computer Graphics**, 21(4), 347-8.
- Collins, J. and Tucker, D. (1984) Laser Graphics and Animation. **BYTE**, 9(10), 177-84.
- Crow, F. and C. Csuri (1985) Animation - In the Beginning. **IEEE Computer Graphics and Applications**, 5(9), 7-18.
- Csuri, C. (1978) Computer Animation. **Computer Graphics**, 12, 92-99.
- David, D. ( 1973) **Art in the Future: History / Prophecy of the Collaboration Between Science, Technology, and Art**. New York: Praeger Publishers.

- Felding, R. (1965) **The Technique of Special Effects Cinematography**. New York: Hastings House.
- Finch, C. (1984) **Special Effects**. New York: Van Nostrand Reinhold.
- Glass, B. (1989) Digital Video Interactive. **BYTE**, 14, 283-289.
- Glass, B. (1989) Digital Video Interactive. **BYTE**, 14, 283-289
- Halas, J. (1984) **Graphics in Motion**. New York: Van Nostrand Reinhold.
- Halas, J. and Manvell, R. (1971) **The Technique of Film Animation**. (3d ed.) New York: Hastings House.
- Hanson, D. (1982) **The New Alchemists**. Boston: Little, Brown & Co. Inc.
- Hapgood, F. (1989) The Magic Theater. **OMNI**, 12, 114-118, 146-148.
- Herr, L. and Kuchiki, Y. (1983) eds. **SIGGRAPH '83 Exhibition of Computer Graphics**. Tokyo: Hakuhodo, Inc.
- Hofstadter, D. (1979) **Goedel, Escher, Bach**. New York: Basic Books.
- Kerlow, I. (1983) **Illusion and Technology**. Master's Thesis, Pratt Institute, New York.
- Kranz, S. (1974) **Science and Technology in the Arts**. New York: Van Nostrand Reinhold.
- Krueger, M. W. (1983) **Artificial Reality**. Reading, MA: Addison-Wesley Publishing Co. Inc.
- Leavitt, R. (1976) ed. **Artist and Computer**. New York: Harmony Books.
- Lipton, L. (1982) **Foundations of the Stereoscopic Cinema**. New York: Van Nostrand Reinhold.
- Madsen, R. (1970) **Animated Film**. New York: Interland Press.
- Magenat-Thalmann, N. and Thalmann, D. (1985) An Indexed Bibliography on Computer Animation, **IEEE Computer Graphics & Applications**, 5(7), 76-86.
- Magenat-Thalmann, N. and Thalmann, D. (1985) **Computer Animation**. New York: Springer-Verlag.
- Magenat-Thalmann, N. and Thalmann, D. (1985), **Computer Animation, Theory and Practice**. New York: Springer-Verlag.
- Malina, F. J. (1974) ed. **Kinetic Art Theory and Practice**. New York: Dover.
- Neal, M. (1988) The Birth of a Hologram. **IEEE Computer Graphics and Applications**, 8(4), 4-6.

- Reynolds, C. (1982) Computer Animation with Scripts and Actors. **Computer Graphics**, 16(3), 289-296.
- Robinson, P. (1989) Variations on a Screen. **BYTE**, 14, 251-264.
- Russett, R, and Starr, C. (1976) **Experimental Animation: An Illustrated Anthology**. New York: Van Nostrand Reinhold.
- Speer, R. and Kovacs, W. (1979) **An International Guide to Computer Animated Films**. Computer Graphics for Designers and Artists New York: Van Norstrand/Reinhold.
- Thomas, Frank and Ollie Johnson (1981) **Disney Animation: The Illusion of Life**. New York: Abbeville Press.
- Von An, P. (1984) **Film Design**. New York: Van Nostrand Reinhold.
- Whitney, J. (1980) **Digital Harmony: On the Complimentarity of Music and Visual Art**, New York: McGraw-Hill.
- Youngblood, G. (1968) **Expanded Cinema**. New York: E. P. Dutton Inc.

### 1.1.2 Mechanics

- Ackland, B. and Weste, N. (1980) Real Time Animation Playback on a Frame Store Display System. **Computer Graphics**, 14(3), 182-188.
- Badler, N., O'Rourke, J. and Kaufman, B. (1980) Special Problems in Human Movement Simulation. **Computer Graphics**, 14(3), 189-196.
- Bonifer, M. (1982) **The Art of Tron**. New York: Simon & Schuster Inc.
- Chang, C. (1987) Integration of Computer Animation with Other Special Effects Techniques. **Computer Graphics**, 21(4), 347-8.
- Chuang, R. and Entis, G. (1983) 3-D Shaded Computer Animation - Step by Step. **IEEE Computer Graphics and Applications**, 3(9), 18-25.
- Collins, J. and Tucker, D. (1984) Laser Graphics and Animation. **BYTE**, 9(10), 177-184.
- DeFanti, T. and Sandin, D. (1987) The Usable Intersection of PC Graphics and NTSC Video Recording. **IEEE Computer Graphics and Applications**, 7(10), 50-58.
- Fox, D. and Waite, M. (1982) Computer Animation with Color Registers. **BYTE**, 7(11), 194-214.
- Fox, D. and Waite, M. (1983) **Computer Animation Primer**. New York: McGraw-Hill.

- Gardner, M. (1971) Mathematical Games. **Scientific American**, 239.
- Halas, J. ed.(1974) **Computer Animation**. New York: Hastings House.
- Levitan, E. (1977) **Electronic Imaging Techniques**. New York: Van Nostrand Reinhold.
- Magenat-Thalmann, N. and Thalmann, D. (1986) Special Cinematographic Effects with Virtual Movie Cameras. **IEEE Computer Graphics and Applications**, 6(4), 43-50.
- Magenat-Thalmann, N. and Thalmann, D. (1987) The Direction of Synthetic Actors in the Film *Rendez-vous a Montreal* . **IEEE Computer Graphics and Applications**, 7(12), 9-18.
- Oppenheimer, P. (1986) Real Time Design and Animation of Fractal Plants and Trees. **SIGGRAPH '86**, 20(4), 55-64.
- Parke, F. (1980) Adaption of Scan and Slit-Scan Techniques to Computer Animation, **Computer Graphics**, 14(3), 178-181.
- Platt, S. and Badler, N. (1981) Animating Facial Expressions. **Computer Graphics**, 15(3), 245-251.

## 1.2 The Animation of Spatial Data

### 1.2.1 Cartography, Forestry, Geology, Geomorphology, Planning, Remote Sensing

- Badiozamani, K., Bott, D. L. (1988) UTRA - An Interactive Graphics Underground Mine Planning and Animation System. **Mine Planning and Equipment Selection**, R. K. Singhal (editor), A a Balkema, Rotterdam, 157-165.
- Block, W. A., and Fridley, J. L. (1990) Simulations of Forest Harvesting Using Computer Animation. **Transactions of the ASAE**, 33(3), 967-974.
- Butcher, P.G., M. Mortimer, B.G. Whatley (1987) A 3-Dimensional Computer Animation of a Potential-Energy Surface. **Journal of Chemical Education**, 64(6), 495-496.
- Caldwell Lindgren, Patricia (1991) Television News Maps and Desert Storm. **ACSM Bulletin**, August (133), 30-33.
- Cornwell, Bruce, Robinson, A.H. (1966) Possibilities for Computer Animated Films in Cartography. **Cartographic Journal**, 3, 79-82.
- Davis, B.E. and Williams, R. (1989) The Five Dimensions of GIS, **Proceedings, GIS/LIS '89**, Orlando, FL, 1, 50-58.

- Dewdney, A.K. (1986) A Program for Rotating Hypercubes Induces 4-Dimensional Dementia. **Scientific American**, 254(4), 14.
- DiBiase, D. (1991) Visualization in the Earth Sciences. **Geotimes**, July 1991, 13-15.
- DiBiase, D. A. M. MacEachren, J. Krygier, C. Reeves, and A. Brenner (1991) Animated Cartographic Visualization in Earth System Science, **Proceedings of the International Cartographic Association Conference**, Bournemouth, UK, September, (in press).
- Dunn, R. (1989) A Dynamic Approach to Two-Variable Color Mapping. **The American Statistician**, 43(4), 245-251.
- Fequay, J.W., Thormodsgard, J.M. and Kelly, G.G. (1989) Yosemite National Park: a New Perspective. **Proceedings ASPRS/ACSM 1989**, Baltimore, MD, 2, 80-87.
- Gersmehl, P. J. (1990) Choosing Tools: Nine Metaphors of Four-Dimensional Cartography. **Cartographic Perspectives**, 5, 3-17.
- Halfon, E., and Dejong, D. (1989) A Computer-program to Display Animations within the Computer-graphics Halo Environment. **Ecological Modeling**, 47(1-2), 153-160.
- Hussey, K. J., Hall, J. R. and Mortensen, R. A. (1986) Image Processing Methods in Two and Three Dimensions Used to Animate Remotely Sensed Data. **Proceedings of the International Geophysical and Remote Sensing Symposium (IGARSS'86)**, Zürich, European Space Agency Publication SP-254, 2, 771-776.
- Kalasky, R. S. (1989) Computer Animation for Visualizing Terrain Data. **IEEE Computer Graphics & Applications**, 9(3), 12-13.
- Kelly, A., Mailin, M. and Neilson, G. (1988) Terrain Simulation Using a Model of Stream Erosion. **Computer Graphics**, 22(4), 263-268.
- Kovacic, D. A., C. R. Craig, R. Patterson, W. H. Romme, and D. G. Despain (1990) Fire dynamics in the Yellowstone landscape, 1690 - 1990, **Proceedings, Resource Technology'90**, November 12-15, Washington, D.C., 1-9.
- Kubitz, W.J. and W.J. Poppelbaum (1969) The Tricolor Cartograph: A Display System with Automatic Coloring Capabilities, **Information Display**, 6, 76-79.
- Levy, Michael A., H.N. Pollack, P.W. Pomeroy (1970) Motion Picture of the Seismicity of the Earth, 1961-1967. **Bulletin of the Seismological Society of America**, 60(3), 1015-1016.
- Libicki, C.M., K.W. Bedford (1985) Computer Animation of Storm-Surge Predictions. **Journal of Hydraulic Engineering-ASCE**, 2111(2), 284-299.
- MacEachren, A. M. and DiBiase, D.W. (1991) Animated Maps of Aggregate Data: Conceptual and Practical Problems. **Cartography and Geographic Information Systems**, 18(3), (in press).



- MacEachren, Alan M. and D.W. Dibiase (1990) Automated Maps of Aggregate Data: Conceptual and Practical Problems. forthcoming in **Cartography and GIS**.
- Marshall, Robert, J. Kempf, S. Dyer, C-C Yen (1990) Visualization Methods and Simulation Steering for a 3D Turbulence Model of Lake Erie. **Computer Graphics** 24(2), 89-96.
- Moellering, H. (1980a) The Real Time Animation of Three-Dimensional Maps. **The American Cartographer**, 7(1), 67-85.
- Moellering, H. (1980b) Strategies of Real-time Cartography. **The Cartographic Journal**, 17(1), 12-15.
- Monmonier, M. (1989) Graphics Scripts for the Sequenced Visualization of Geographic Data. **Proceedings GIS/LIS '89** November 26-30, 381-389.
- Monmonier, M. (1990) Strategies for the Visualization of Geographic Time-Series Data. **Cartographica**, 27(1), 30-45.
- Muller, J.P., T. Day, J. Kolbusz, M. Dalton, S. Richards and J. Pearson (1988) Visualization of Topographic Data Using Video Animation. **Digital Image Processing in Remote Sensing**, J.P. Muller ed., Taylor Francis, 21-38.
- Rheingans, Penny and B. Tebbs (1990) A Tool For Dynamic Explorations of Color Mapping. **Computer Graphics**, 24(2), 145-146.
- Ryan, P. D. (1987) The Use of Computer Animation Techniques in the Teaching of Stereographic Projection. **Journal of Structural Geology**, 9(4), 507-509.
- Taylor, D.R.F. (1984) The Cartographic Potential of Telidon. **Cartographica**, 19(3,4), 18-30.
- Thrower, N. J. W. (1961) Animated Cartography in the United States. **International Yearbook of Cartography**, 1, 20-28.
- Thrower, Norman J.W. (1959) Animated Cartography. **Professional Geographer**, 11(6), 9-19.
- Tobler, W.R. (1970) A Computer Movie Simulating Urban Growth in the Detroit Region. **Economic Geography**, 46, 235-240.
- Tufte, E.R. (1990) **Envisioning Information**. Graphics Press, Cheshire, CT.
- Tufte, Edward R. (1983) **The Visual Display of Quantative Information**, Cheshire, CT: Graphics Press.
- Vasconcelos, M.J., D.P. Guertin and M.J. Zwolinski (1990) FIREMAP: Simulation of Fire Behavior - a GIS Supported System. **General Technical Report - US Department of Agriculture, Forest Service**, RM-191, 217-221.
- Verts, W.T. (1989) IBM PC Animation - Crude but Effective. **ASPRS/ACSM Proceedings**, Auto-carto 9, Baltimore, MD (ASPRS/ACSM, Falls Church, VA), 858-866.

- Vetrella, S. and A. Moccia (1988) Computer Simulation of a Spaceborne SAR Impulse Response. **SAR simulation models. EARSeL workshop proceedings, Capri, 1988**, (EARSeL, Boulogne-Billancourt; SP-1.88.47), 38-51.
- Weber, C. (1991) A Cartographic Animation of Average Yearly Surface Temperatures for the 48 Contiguous United States: 1897-1986. **N.C.G.I.A. Technical Paper 91-3**, January.
- Wiggins, L.L. and M.J. Shiffer, (1990) Planning with Hypermedia: Combining Text, Graphics, Sound, and Video. **Journal of the American Planning Association**, 56(2), 226-235.
- Willgoose, G., R. L. Bras and I. Rodriguez-Iturbe (1990) A Model of River Basin Evolution. **Eos**, 71(47), 1806-1807.
- Zin, D. Z. and C. Fairhurst (1988) Application of Animated Graphics in the Analysis of Large-scale Blocky Rock System Around Excavations. **Key Questions in Rock Mechanics: Proceedings of the 29th U.S. Symposium**, P. A. Cundall, R. L. Sterling, and A. M. Starfield (editors), A a Balkema, Rotterdam, 755-758.

### 1.2.2 Meteorology

- Anonymous (1990) Meteorology: Computers Create Video Hurricanes. **USA Today**, 118(2541), 2-3.
- Behling, P.J. (1988) Climatic Evolution - an Animated Approach. **Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology; Fourth International Symposium**, February 1-5, Anaheim, California, American Meteorological Society, 41-43.
- Behling, P.J. (1989) Scientific Visualization of Climatic-change. **Interactive Information and Processing Systems for Meteorology, Oceanography and Hydrology**, American Meteorological Society, Boston, 402-404.
- Behling, P.J. (1990) Supercomputer-based Visualization Systems Used for Analyzing Output Data of a Numerical Weather Prediction Model. **Proceedings, 1990 International Conference on Supercomputing**, June 11-15, Amsterdam, 291-295.
- Chen, P. C. (1990) Application of Scientific Visualization to Meteorological Data-analysis and Animation, **Computer Animation '90**, N. Magnenatthalmann and D. Thanmann (editors), Springer-Verlag, Tokyo, 31-40.
- Chesters, D., and A. J. Krueger (1989) A Video Atlas of TOMS Ozone Data, 1978-1988. **Bulletin of the American Meteorological Society**, 70(12), 1564-1569.
- Grotjahn, Richard, R.M. Chervin (1984) Animated Graphics in Meteorological Research and Presentations. **Bulletin of the American Meteorological Society**, 65, 1201-1208.

- Hibbard, W., L. Uccellini, D. Santek, K. Brill (1989a) Application of the 4-D McIDAS to a Model Diagnostic Study of the President's Day Cyclone, **Bulletin of the American Meteorological Society**, 70(11), 1394-1403.
- Hibbard, William L. (1986) Computer Generated Imagery for 4-D Meteorological Data. **Bulletin of the American Meteorological Society**, 67(11), 1362-1369.
- Libicki, C. M., and K. W. Bedford (1985) Computer Animation of Storm Surge Predictions. **Journal of Hydraulic Engineering - ASCE**, 111(2), 284-299.
- Murty, T.S. (1987) Computer-Animation of Storm-Surge Predictions - Discussion. **Journal of Hydraulic Engineering - ASCE**, 113(7), 933-935.
- Neeman, B.U., P. Alpert (1990) Visualizing Atmospheric Fields on a Personal Computer: Application to Potential Vorticity Analysis. **Bulletin of the American Meteorological Society**, 71(2), 154-160.
- Papathomas, T., Schiavone, J. and Julesz, B. (1987) Stereo Animation for Very Large Data Bases: Case Study- Meteorology. **IEEE Computer Graphics and Applications**, 7(9), 18-27
- Ropelewski, C.F., M.S. Halpert, and J.E. Janowiak (1985) The Analysis and Display of Real-Time Surface Climatic Data. **Monthly Weather Review**, 113(6), 1101-1106.
- Santek, D. A., W. L. Hibbard, K. J. Quinn, T. E. Melka (1989) 4-D Display of Geohydrological Model Results. **Interactive Information and Processing Systems for Meteorology, Oceanography and Hydrology**, American Meteorological Society, Boston, 135-138.
- Schiavone, J. A. (1990) Visualizing Meteorological Data. **Bulletin of the American Meteorological Society**, 71(7), 1012-1020.
- Schiavone, J. A., T. V. Papathomas, and B. Julesz (1989) Visualization of Meteorological Data - A Review of Computer-graphics Applications. **Interactive Information and Processing Systems for Meteorology, Oceanography and Hydrology**, American Meteorological Society, Boston, 285-292.
- Sherretz, L. A., D. W. Fulker (1988) UNIDATA: Enabling Universities to Acquire and Analyze Scientific Data. **Bulletin of the American Meteorological Society**, 69(4), 373-376.
- Smith, Eric A., K.W. Oh, M.R. Smith (1989) A PC-Based Interactive Imaging System Designed for INSAT Data Analysis and Monsoon Studies. **Bulletin of the American Meteorological Society**, 70(9), 1105-1122.
- Smith, W.L. et al. (1988) The Integration of Meteorological Satellite Imagery and Numerical Dynamical Forecast Models, **Philosophical Transactions - Royal Society of London**, A, 324(1579), 317-323.
- Thompson, O.E., and L. Torrence (1988) UVAS - A Videographic Animation System for UNIDATA. **Interactive Information and Processing Systems for Meteorology, Oceanography, and Hydrology; Fourth International**

**Symposium**, February 1-5, Anaheim, California, American Meteorological Society, 369-374.

Tripoli, G.J. and W.R. Cotton (1986) An Intense Quasi-Steady Thunderstorm over Mountainous Terrain .4. 3-Dimensional Numerical Simulation. **Journal of the Atmospheric Sciences**, 43(9), 894-912.

Warnecke, G. (1987) The Visualization of the Ceaseless Atmosphere. **Remote Sensing Applications in Meteorology and Climatology**, R. A. Vaughan (editor), D. Reidel Publishing Company, 245-257.

Warnecke, G., and C. Zisk (1981) The Use of Cinematographic Methods for the Presentation of Atmospheric Motions as Revealed by Remote Sensing Techniques from Satellites. **Remote Sensing in Meteorology, Oceanography, and Hydrology**, A. P. Cracknell (editor), Ellis Horwood Ltd./John Wiley & Sons, 452-473.

Wilhelmson, R., L. Wicker, H. Brooks, and C. Shaw (1989) The Display of Modeled Storms. **Interactive Information and Processing Systems for Meteorology, Oceanography and Hydrology**, American Meteorological Society, Boston, 166-171.

### 1.2.3 Animations in Other Disciplines

Beekman, George (1991) POINT OF VIEW, a Scholastic Software Review. **Macworld**, January, 214.

Danahy, J. W., and R. Wright (1988) Exploring design through 3-dimensional simulations. **Landscape Architecture**, 78(5), 64-71.

Donoho, A. (1988) MacSpin:Dynamic Graphics on a Desktop Computer. **IEEE Computer Graphics and Applications**, 8(4), 51-58

Gurwitz, R., Thorne, R. and VanDam, A. (1980) BUMPS: A Program for Animating Projections. **Computer Graphics**, 14(3), 231-237

Knowlton, Ken. ( 1974) **EXPLOR**. Murray Hill, NJ: Bell Laboratories.

Magnenat-Thalmann, N. and Thalmann, D. (1983) MIRA-3D: A Three Dimensional Graphical Extension of Pascal, **Software Practice and Experience**, 13(9), 797-808.

Magnenat-Thalmann, N. and Thalmann, D. (1983) The Use of High Level 3-D Graphical Type in the MIRA Animation System. **IEEE Computer Graphics and Applications**, 6(4), 9-14.

Magnenat-Thalmann, N. and Thalmann, D. (1987) The Direction of Synthetic Actors in the Film *Rendez-vous a Montreal*, **IEEE Computer Graphics and Applications**, 7(12), 9-18.

- Noma, T. and Kunii, T. (1985) ANIMENGINE: An Engineering Animation System. **IEEE Computer Graphics and Applications**, 5(10), 24-33
- Nouri, Guy, and Eric Podietz. (1982) **Moviemaker**, Reston, VA: Reston Publishing Co.
- Potmesil, M. and Hoffert, E. (1987) FRAMES: Software Tools for Modeling, Rendering, and Animation of 3D Scenes, **Computer Graphics**, 21(4), 85-93.
- Potmesil, M. and Hoffert, E. (1987) FRAMES: Software Tools for Modeling, Rendering, and Animation of 3D Scenes. **Computer Graphics**, 21(4), 85-93
- Schacter, B. (1981) Computer Image Generation for Flight Simulation. **IEEE Computer Graphics and Applications**, 1(4), 29-64
- Sheldon, K. (1987) PreScript, **BYTE**, 12, 197-198.
- Sigel, Efrem, P. Sommer, J. Silverstein, C. McIntyre, B. Downey (1983) **The Future of Videotext**, Knowledge Industry Publications, Inc., White Plains, N.Y.
- Vannier, M., Marsh, J. and Warren, J. (1983) Three Dimensional Computer Graphics for Craniofacial Surgical Planning and Evaluation. **Computer Graphics**, 17(3), 263-273
- Wayner, P. (1988) Modeling Chaos. **BYTE**, 13, 253-258
- White, P. (1980) Behold the Computer Revolution **National Geographic**,
- White, P. (1989) Images for the Computer Age **National Geographic**,
- Yan, J. (1985) Advances in Computer-Generated Imagery for Flight Simulators. **IEEE Computer Graphics and Applications**, 37-50

## 1.3 Graphics, Design, and Animation

### 1.3.1 Computer Graphics and Image Processing

- Amano, Akira (1982) **Computer Graphics**, Tokyo: Sendenkaigi.
- Artwick, Bruce (1983) **Applied Concepts in Microcomputer Graphics**, Englewood Cliff, MJ: Prentice-Hall.
- Asmus, J. (1987) Digital Image Processing in Art Conservation. **Byte**, 12, 151-165.
- Backer, David and Andrew Lippman (1980) Future Interactive Graphics: Personal Video. Massachusetts Institute of Technology, Architecture Machine Group.
- Ballard, Dana H. and Christopher M. Brown (1982) **Computer Vision**, Englewood Cliffs, NJ: Prentice-Hall.

- Barnsley, M., Jacquin, A., Malassenet, F., Reuter, L. and Sloan, A. (1988) Harnessing Chaos for Image Synthesis. **Computer Graphics**, 22(4), 131-140
- Beach, R., Beatty, J., Booth, K., Plebon, D. and Fiume, E. (1982) The Message is the Medium: Multiprocess Structuring of an Interactive Paint Program. **Computer Graphics**, 16(3), 277-287
- Beatty, John C. and Booth Kellog (1982) **Tutorial: Computer Graphics**. 2d ed. Long Beach, CA: IEEE Computer Society.
- Booth, Kellogg S. (1979) **Tutorial: Computer Graphics**, Long Beach, CA: IEEE Computer Society.
- Cakir, A. D., D.J. Hart, and T.F.M.Stewart (1980) **Visual Display Terminal**, Wiley & Sons Inc..
- Cannon, T. M., and B. R. Hunt (1981) Image Processing by Computer. **Scientific American**
- Clark, David R. (1981) ed. **Computers for Imagemaking**, Oxford: Pergamon Press.
- Conrac (1980) **Raster Graphics Handbook**, Covina, CA: Conrac.
- Crow, F. (1977) Shaded Computer Graphics in the Entertainment Industry. **Communications of the ACM**, 20(11), 794-805
- Csuri, C. (1974) Computer Graphics and Art. **Proceedings of the IEEE**, 62(4), 558-570
- Dawson, B. (1987) Introduction to Image Processing Algorithms. **BYTE**, 12, 169-186
- DeFanti, T. and Sandin, D. (1987) The Usable Intersection of PC Graphics and NTSC Video Recording, **IEEE Computer Graphics and Applications**, 7(10), 50-8.
- Deken, Joseph (1983) **Computer Images**, New York: Stewart, Tabori & Chang, Publishers.
- Encarnacao, J. and E. G. Schlechtendahl. (1983) **Computer Aided Design**, New York: Springer-Verlag.
- Foley, James D. and Andries Van Dam (1982) **Fundamentals of Interactive Computer Graphics**, MA: Addison-Wesley Publishing Co. Inc.
- Fu, K. S. and T. L. Kunii (1982) eds. **Picture Engineering**, New York: Springer Verlag.
- Gayeski, Diane and David Williams(1985) **Interactive Media**, Englewood Cliff, NJ: Prentice Hall.
- Gonzalez, Rafael C. and Paul Wintz (1977) **Digital Image Processing**, Reading, MA: Addison-Wesley Publishing Co.
- Graef, G. (1989) Graphic Formats, **BYTE**, 14, 305-310.

- Green, William B.(1983) **Digital Image Processing**, New York: Van Nostrand Reinhold.
- Greenberg, Donald, Aaron Marcus, Allan H. Schmidt, and Vernon Corter (1982) **The Computer Image: Applications of Computer Graphics**, Reading, MA: Addison Wesley Publishing Co. Inc.
- Hall, R. and Greenberg, D. (1983) A Testbed for Realistic Image Synthesis. **IEEE Computer Graphics and Applications**, 3(8), 10-19
- Harmon, Leon and Kenneth Knowlton (1969) Picture Processing by Computer. **Science**
- Harrington, Steven (1983) **Computer Graphics: A Programming Approach**, New York: McGraw-Hill.
- Hoffman, K. and Temple, J. (1990) **Computer Graphics Applications**, Belmont, CA: Wadsworth Publishing Co.
- Jankel, Annabel and Rocky Morton (1984) **Creative Computer Graphics**, Cambridge, England: Cambridge University Press.
- Jarett, Invin M. (1983) **Computer Graphics and Reporting Financial Data**, New York: John Wiley & Sons.
- Joblove, G. H. and D. Greenberg (1978) Color Spaces for Computer Graphics **Computer Graphics**, 20-25.
- Kjy, D. and D Greenberg (1979) Transparency for Computer Synthesized Images. **Computer Graphics**, 158-64.
- Korites, B. Jr.(1981) **Graphic Software for Microcomputers**, Duxbury, MA: Kern Publications.
- Kornfeld, C. (1987) The Image Prism:A Device for Rotating and Mirroring Bitmap Images. **IEEE Computer Graphics and Applications**, 7(5), 21-30.
- Kovalevsky, V. (1989) Finite Topology as Applied to Image Analysis. **Computer Vision, Graphics and Image Processing**, 46, 141-161.
- Kurlander, D. (1988) Graphical Search and Replace. **Computer Graphics**, 22(4), 113-120.
- Kurlow, I. and Rosebush, J. (1986) **Computer Graphics for Designers and Artists**, New York: Van Norstrand Reinhold Co.
- Lange, Jerome C. and Dennis P. Shanahan (1984) **Interactive Computer Graphics Applied to Mechanical Drafting**, New York: John Wiley & Sons Inc.
- Levoy, M. (1988) Display of Surfaces from Volume Data. **IEEE Computer Graphics and Applications**, 8(3), 29-37.
- Liu, Z. and Xiao, J. (1988) Restoration of Blurred TV Picture Caused by Uniform Linear Motion. **Computer Vision, Graphics and Image Processing**, 44, 30-34.

- Machover, C. (1986) PC Graphics: Perspective on a Revolution in Progress. **The S. Klien Computer Graphics Review**, p. 22-32.
- Mamrak, S., O'Connell, C. and Parent, R. (1989) The Automatic Generation of Translation Software for Graphic Objects. **IEEE Computer Graphics and Applications**, 9(6), 34-42.
- Milne, M. (1969) **Computer Graphics in Architecture and Design**, New Haven, CT: Yale School of Art and Architecture.
- Mitchell, D. and Netravali, A. (1988) Reconstruction Filters in Computer Graphics. **Computer Graphics**, 22(4) 221-227
- Moore, M. and Wilhelms, J. (1988) Collision Detection and Response for Computer Animation. **Computer Graphics**, 22(4), 289-297.
- Murch, Gerald M. (1985) Colour Graphics -- Blessing or Ballyhoo? **Computer Graphics Forum**, 4,127-135.
- Neal, M. (1988) The Birth of a Hologram. **IEEE Computer Graphics and Applications** 4-6.
- Nevatia, R. (1982) **Machine Perception**, Englewood Cliffs, NJ: Prentice-Hall.
- Newman, William M., and Robert F. Sproull.(1979) **Principles of Computer Graphics**, New York: McGraw-Hill.
- Nishihara, S. and Ikeda, K. (1982) False Contour Removal by Random Blurring. **Computer Graphics and Image Processing**, 20, 391-397.
- Norton, A. (1982) Generation and Display of Geometric Fractals in 3-D. **Computer Graphics**, 16(3), 61-67.
- Oppenheimer, P. (1986) Real Time Design and Animation of Fractal Plants and Trees. **SIGGRAPH '86**, 20(4), 55-64.
- Pavlidis, T. (1982) **Algorithms for Graphics and Image Processing**, New York: Springer-Verlag.
- Pooch, Udo.(1976) Computer Graphics, Interactive Techniques and Image Processing 1970-75: A Bibliography **IEEE Computer**.
- Porter, T. and Duff, T. (1984) Compositing Digital Images. **Computer Graphics**, 18(3), 253-259.
- Potmesil, M. and Chakravarty, I. (1983) Modeling Motion Blur in Computer Generated Images. **Computer Graphics**, 17(3),389-398.
- Pranke, Herbert (1985) **Computer Graphics-Computer Art**, 2d ed. Berlin: Springer-Verlag.
- Pratt, William K.(1978) **Digital Image Processing**, New York: John Wiley & Sons.



- Reynolds, C. (1987) Flocks, Herds, and Schools: A Distributioned Behavioral Model. **Computer Graphics**, 21(4), 25-33
- Rosenfeld, Azriel, and Avinash C. Kak (1982) **Digital Picture Processing**, 2d ed., Orlando, FL: Academic Press.
- Salomon, Gitta (1990) New Uses for Color, **The Art of Human Computer Interface Design**, Brenda Laurel ed., New York: Addison Wesley Publishing Company Inc., 269-278.
- Schacter, B. (1981) Computer Image Generation for Flight Simulation. **IEEE Computer Graphics and Applications**, 1(4), 29-64.
- Schmandt, C. (1983) Spatial Input/Display Correspondence in a Stereotopic Computer Graphic Work Station. **Computer Graphics**, 17(3), 253-261
- Scott, J. E.(1982) **Introduction to Interactive Computer Graphics**, New York: Wiley & Sons.
- Scott, Joan (1984) **Computergraphia**, HOuston : Gulf Publishing.
- Sheldon, K. (1987) Probing Space By Camera. **BYTE**,12, 143-148.
- Smith, A. (1982) Paint. Technical Memo Number 7, Computer Graphics Lab, NYIT, Oldwestbury, New York.
- Sutherland, Ivan (1966) Computer Inputs and Outputs. **Scientific American**.
- Sutherland, Ivan (1970) Computer Displays. **Scientific American**.
- Ulaby, F., Kouyate, F., Brisco, B. and Williams, T. (1986) Textual Information in SAR Images. **IEEE Transactions on Geoscience and Remote Sensing**, GE-24(2), 235-245
- Van Dam, Andries (1984) Computer Software for Graphics. **Scientific American**.
- Vannier, M., Marsh, J. and Warren, J. (1983) Three Dimensional Computer Graphics for Craniofacial Surgical Planning and Evaluation. **Computer Graphics**,17(3), 263-273.
- Warn, David R. (1983) Lighting Controls for Synthetic Images. **Computer Graphics**, 13-21.
- Wilhelms, M. (1988) Collision Detection and Response for Computer Animation. **Computer Graphics**, 22(4), 289-97.
- Witted, T. (1983) Anti-Aliased Line Drawing Using Brush Extrusion. **Computer Graphics**,17(3), 151-156.
- Yan, J. (1985) Advances in Computer-Generated Imagery for Flight Simulators. **IEEE Computer Graphics and Applications** 37-50.
- Yoshinari, Mayumi (1982) **Computer Graphics/SIG**, Tokyo: Genkoska.

### 1.3.2 Graphic and Cartographic Design

- Muller, W. (1984) ed. **Dictionary of the Graphic Arts Industry**, Amsterdam: Elsevier Scientific Publishing.
- Albers, J (1975) **Interaction of Color**, New Haven, CT: Yale University Press.
- Bertin, Jacques (1983) **Semiology of Graphics**, Madison, WI: University of Wisconsin Press.
- Birren, F. (1970) ed. **The Elements of Color**, New York: Van Nostrand Reinhold.
- Booth, K., Bryden, M., Cowan, W., Morgan, M. and Plante, B. (1987) On the Parameters of Human Visual Performance: An Investigation of the Benefits of Anti-Aliasing. **IEEE CG&A**, 7(9), 34-41
- Buttenfield, B.P. and Mackaness, W.A. (1991) Visualisation, Chapter II.a.4 in **GIS: Principles and Applications**. (Eds. D. MacGuire, M.F. Goodchild, and D. Rhind) London: Longman Publishers Ltd. (forthcoming)
- Cardamone, T. (1981) **Chart and Graph Preparation Skills** New York: Van Nostrand Reinhold.
- Crow, F. (1978) The use of Gray Scales for improved Raster Display. **Computer Graphics**, 12(3), 1-5
- Dennis, Ervin A. and John D. Jenkins (1983) **Comprehensive Graphic Arts**, 2d ed. Indianapolis: The Bobbs-Merrill Company.
- DiBiase, D. W. (1991) Visualization in the Earth Sciences. **Geotimes**, July 1991, 13-15.
- Dreyfuss, H. (1984) **Symbol Source Book**, New York: Van Nostrand Reinhold.
- Dubery, Fred and John W. Illatz (1983) **Perspective and Other Drawing Systems**, London: Herbert Press.
- Frutiger, Adrian. (1980) **Type Sign Symbol**, Zurich: ABC Editions.
- Gerritsen, Fran. (1975) **Theory and Practice of Color**, New York: Van Nostrand Reinhold
- Gottschall, Edward M. (1981) ed. **Graphic Communication**, NJ: Prentice-Hall.
- Heyn, Barbara N., (1981) An Evaluation of Map Color Schemes for Use on CRT's, Master's Thesis, University of South Carolina.
- Huwich, L. M. (1981) **Color Vision**, Sunderland, MA: Sinauer Assoc.
- Imes, Jack. (1984) **Special Visual Effects**, New York: Van Nostrand Reinhold.

- Jones, C. (1989) Cartographic name Placement. **IEEE Computer Graphics and Applications**, 9(5), 36-47
- MacEachren A. M. and Ganter, J. (1990) A Pattern Identification Approach to Cartographic Visualization. **Cartographica**, 27(2), 64-81.
- MacEachren, A. E., Battenfield, B. P., Campbell, J. C. and Monmonier, M. S. (1992) Visualisation. In: Abler, R. A., Olson, J. M. and Marcus, N. G. **Geography's Inner World**. New Brunswick, NJ: Rutgers University Press (forthcoming).
- Marx, Ellen. (1983) **Optical Color and Simultaneity**, New York: Van Nostrand Reinhold.
- Meyer, G. W. and D. P. Greenberg (1980) Perceptual Color Spaces for Computer Graphics. **Computer Graphics**, 254-61.
- Monmonier, M. S. (1982) **Computer Assisted Cartography**. Englewood Cliffs, NJ: Prentice-Hall.
- Moore, Patricia (1980) ed. **Harvard Library of Computer Graphics**, Cambridge, MA: Harvard University Laboratory for Computer Graphics.
- Morris, Joseph (1979) Using Color in Industrial Control Graphics **Control Engineering** .
- Paller, Alan, K. Szoka, and N. Nelson (1981) **Choosing the Right Chart**, San Diego: ISSCO.
- Reichardt, Jasia (1971) **The Computer and Art**, New York: Van Nostrand Reinhold.
- Spear, Mary Eleanor (1969) **Practical Charting Techniques**, New York: McGraw-Hill.
- Truckenbord, J. (1981) Effective Use of Color in Computer Graphics. **Computer Graphics** ,83-90.
- Zapf, Herman (1968) Changes in Letter Forms Due to Technical Developments. **Journal of Typographic Research**, 351-68.

### 1.3.3 Perceptual, Cognitive, and HCI Issues

Apodaca, T.(1989) The RenderMan Interface, **BYTE**, 14, 267-276.

Booth, K., Bryden, M., Cowan, W., Morgan, M. and Plante, B. (1987) On the Parameters of Human Visual Performance: An Investigation of the Benefits of Anti-Aliasing. **IEEE CG&A**, 7(9), 34-41.

Calvert, T., Chapman, J. and Patla, A. (1980) The Integration of Subjective and Objective Data in the Animation of Human Movement. **Computer Graphics**, 14(3), 198-203

Carter, James R. (1988) The Map Viewing Environment: A Significant Factor in Cartographic Design. **The American Cartographer**, 15(4), October, 379-385.

DeFanti, T. (1980) Language Control Structures for Easy Electronic Visualization. **BYTE**, 5(11), 90-106

Gilmartin, Patricia and E. Shelton (1989) Choropleth Maps on High Resolution CRT's: The Effects of Number of Classes and Hue on Communication, **Cartographica**, 26(2),40-52.

Gregory, Richard L.(1978) **Eye and Brain, the Psychology of Seeing**, 3d ed. New York: McGraw-Hill.

Laurel, Brenda, Ed. (1990) **The Art of Human Computer Interface Design**. New York: Addison Wesley Publishing Company Inc., 269-278.

Mills, M.I. (1981) Telidon Behavioural Research 3: a Study of the Human Response to Pictorial Representation on Telidon. as quoted in Taylor, D.R.F. (1982) The Cartographic Potential of Telidon, **Cartographica**, 19(3,4), 18-30.

Montaho, F. S. (1979) Human Vision and Computer Graphics **Computer Graphics**, 121-25.

Myers, B. (1988) A Taxonomy of Window Manager User Interfaces. **IEEE Computer Graphics and Applications**, 8(5), 65-84

Olsen, D. and Dance, J. (1988) Macros by Example in a Graphical UIMS. **IEEE Computer Graphics and Applications** vol. 8(1), 68-78

Poggio, Tomaso (1984) Vision by Man and Machine **Scientific American**

Rock, Irvin (1984) **Perception**, New York: W.H. Freeman & Company.

Spector, Alhed Z. (1984) Computer Software for Process Control, **Scientific American** .

Wilhelms, J. (1987) Toward Automatic Control, **IEEE Computer Graphics and Applications**, 7(4), 11-21.

## 1.4 Algorithms, Geometrical and Numerical Models for Animation

- Ahuja, Narendra and Bruce J. Schachter (1983) **Pattern Models** New York: John Wiley & Sons Inc.
- Aken, J. and Killebrew, C. (1988) Better Bit-Mapped Lines. **BYTE**, 13, 249-253
- Atherton, P., K. Weiler and D. Greenberg (1978) Polygon Shadow Generation. **Computer Graphics**, 275-81.
- Barnhill, Robert E. and Richard F. Reisenfeld (1984) **Computer Aided Geometric Design**, New York: Academic Press.
- Blinn, J. F. (1982) Light Reflection Functions for Simulation of Clouds and Dusty Surfaces. **Computer Graphics**, 16(3), 21-29.
- Blinn, J.F. and Newell, M. (1976) Texture and Reflection in Computer Generated Images. **Communications of the ACM**, 19(10), 542-547.
- Blum, R. (1979) Three Dimensional Objects in your Computer. **BYTE**, 4, 14-25.
- Burtnyk, N. and Wein, M. (1976) Interactive Skeleton Techniques for Enhancing Motion Dynamics in Key Frame Animation. **Communications of the ACM**, 19(10), 516-521.
- Carlson, W. (1982) An Algorithm and Data Structure for 3D Object Synthesis Using Surface Path Intersections. **Computer Graphics**, 16(3), 255-263.
- Carlson, W. (1982) An Algorithm and Data Structure for 3D Object Synthesis Using Surface Path Intersections. **Computer Graphics**, 16(3), 255-263.
- Carpenter, L., A. Fournier, and D. Fussell. (1981) Fractal Surfaces **Communications of the ACM**.
- Catmull, E. (1975) Computer Display of Curved Surfaces. **Proceedings IEEE Conference, Computer Graphics, Pattern Recognition and Data Structures**, May, 11.
- Chasen, Sylvan H.(1978) **Geometric Principles and Procedures for Computer Graphic Applications**, Englewood Cliffs, NJ: Prentice-Hall.
- Ching, Francis D. K. (1979) **Space, Form, and Order**, New York: Van Nostrand Reinhold.
- Chuang, R. and Entis, G. (1983) 3-D Shaded Computer Animation - Step by Step. **IEEE Computer Graphics and Applications**, 3(9), 18-25.
- Cook, R. L. and K. Tonance (1981) A Reflectance a Model for Computer Graphics. **Computer Graphics**, 307-16.

- Cook, R., Porter, T. and Carpenter, L. (1984) Distributed Ray Tracing. **Computer Graphics**, 18(3), 137-144.
- Crow, F. (1977) Shadow Algorithms for Computer Graphics. **Computer Graphics**, 242-248.
- Distante, A. and Veneziani, N. (1982) A Two Pass Filling Algorithm for Raster Graphics. **Computer Graphics and Image Processing**, 20, 288-295.
- Distante, A. and Veneziani, N. (1982) A Two Pass Filling Algorithm for Raster Graphics. **Computer Graphics and Image Processing**, 20, 288-295.
- Enns, S. (1986) Free-Form Curves on Your Micro. **BYTE**, 11(13), 255-230.
- Faux, I. D. and M. J. Pratt (1979) **Computational Geometry for Design and Manufacture**, New York: John Wiley & Sons Inc.
- Gasson, Peter C. (1983) **Geometry of Spatial Forms**, New York: John Wiley & Sons.
- Gibson, L. and Lucas, D. (1982) Vectorization of Raster Images Using Hierarchical Methods. **Computer Graphics and Image Processing**, 20, 82-89.
- Glassner, A. (1988) Spacetime Ray Tracing for Animation. **IEEE Computer Graphics and Applications**, 8(2), p.60-70.
- Gouraud, H.(1971) Continuous Shading of Curved Surfaces. **IEEE Transactions on Computers**, 623-28.
- Graef, G. (1989) Graphic Formats **BYTE**, 14, 305-310.
- Graham, Frank (1948) **Mathematics and Calculations for Mechanics**, New York: Audel & Co..
- Hanrahan, P. (1983) Ray Tracing Algebraic Surfaces. **Computer Graphics**, 17(3), 83-90.
- Haroney, G. (1986) Graphing Quadratic Surfaces. **BYTE**, 11(3), 215-224.
- Haruyama, S. and Barshy, B. (1984) Using Stochastic Modeling for Texture Generation. **IEEE Computer Graphics and Applications**, 4(3), p.7-19
- Holden, Alan (1971) **Shapes, Space and Symmetry**, New York: Columbia University Press.
- Hubschman, H. and Zucker, S. (1981) Frame to Frame Coherence and the Hidden Surface Computation: Constraints for a Convex World, **Computer Graphics**, 15(3), 45-54.
- Kajiya, J. (1983) New Techniques for Ray Tracing Procedurally Defined Objects. **Computer Graphics**, 17(3), 91-99.
- Knuth, Donald E. (1977) Algorithms ,**Scientific American** ,63-80

- Kornfeld, C. (1987) The Image Prism:A Device for Rotating and Mirroring Bitmap Images. **IEEE Computer Graphics and Applications**, 7(5), 21-30.
- Kovalevsky, V. (1989) Finite Topology as Applied to Image Analysis. **Computer Vision, Graphics and Image Processing**, 46, 141-161.
- Kurlander, D. (1988) Graphical Search and Replace. **Computer Graphics**, 22(4), 113-120.
- Lalvani, Haresh (1977) **Transpolyhedra** NewYork: Red Ink Productions.
- Lane, J., Carpenter, L., Whitted, T. and Blinn, J. (1980) Scan Line Methods for Displaying Parametrically Defined Surfaces, **Communications of the ACM**, 23(1), 23-34.
- Levoy, M. (1988) Display of Surfaces from Volume Data. **IEEE Computer Graphics and Applications**, 8(3), 29-37.
- Li, M., Grosky, W. and Jain, R. (1982) Normalized Quadtrees with Respect to Translations **Computer Graphics and Image Processing**, 20, 72-81.
- Mamrak, S., O'Connel, C. and Parent, R. (1989) The Automatic Generation of Translation Software for Graphic Objects. **IEEE Computer Graphics and Applications**, 9(6), 34-42.
- Marshall, R., Wilson, R. and Carlson, W. (1980) Procedure Models for Generating Three-Dimensional Terrain, **Computer Graphics**,vol 14(3), 154-158.
- Mewell, M. E., R. G. Newell, and T. L. Sancha. (1972) A New Approach to the Shaded Picture Problem. **Proceedings ACM National Conference**, 443
- Moore, M. and Wilhelms, J. (1988) Collision Detection and Response for Computer Animation. **Computer Graphics**, 22(4), 289-297
- Nishihara, S. and Ikeda, K. (1982) False Contour Removal by Random Blurring. **Computer Graphics and Image Processing**, 20, 391-397.
- Norton, A. (1982) Generation and Display of Geometric Fractals in 3-D. **Computer Graphics**, 16(3), 61-67.
- Parke, F. (1980) Adaption of Scan and Slit-Scan Techniques to Computer Animation. ,vol. 14(3), p. 178-181
- Pearce, Peter (1978) **Structure in Nature as a Strategy for Design**. Cambridge, MA: MIT Press.
- Peli, T. and Malah, D. (1982) A Study of Edge Detection Algorithms, **Computer Graphics and Image Processing**, 20, 1-21.
- Phong, Bui-Tuong (1975) Illumination for Computer-Generated Pictures. **Communications of the ACM**, 18, p.311- 317.

- Potmesil, M. and Chakravarty, I. (1983) Modeling Motion Blur in Computer Generated Images. **Computer Graphics**, 17(3), 389-398.
- Reeves, William T. (1983) Particle Systems-A Technique for Modeling a Class of Fuzzy Objects **Computer Graphics**, 17, p. 359-76.
- Rogers, David F. (1985) **Procedural Elements for Computer Graphics**, New York: McGraw Hill.
- Rogers, David F., and J. Alan Adams (1976) **Mathematical Elements for Computer Graphics**, New York: McGraw-Hill.
- Ross, R. (1989) The Map Geometric Transformation. **IEEE Computer Graphics and Applications**, 9(3), p.70-75.
- Schillinger, Joseph (1966) **The Mathematical Basis for the Arts**, New York: Philosophical Library.
- Smith, A.R. (1979) Tint Fill. **Computer Graphics '79**, 13(2), p. 276-283.
- Smith, A.R. (1984) Plants, Fractals, and Formal Language. **Computer Graphics**, 18(3), p. 1-10.
- Smith, A. R. (1978) Color Gamut Transform Pairs. **Computer Graphics**, 12 12-19.
- Sutherland, Ivan, R. F. Sproull, and R. A. Schumacker (1974) A Characterization of Ten Hidden-Surface Algorithms. **ACM Computing Surveys**, 6, p. 1-55.
- Thompson, D'Arcy (1971) **On Growth and Form**, London: Cambridge University Press.
- Warnock, J.A. (1969) A Hidden-Surface Algorithm for Computer Generated Half Tone Pictures. University of Utah, Computer Science Department. Mimeograph.
- Watkins, G. S. (1970) A Real-Time Visible Surface Algorithm. University of Utah, Computer Science Department. .
- Wayner, P. (1988) Modeling Chaos, **BYTE**, 13, 253-258.
- Whitted, T (1980) An Improved Illumination Model for Shaded Display, **Communication of the ACM**, 343- 49
- Wilhelms, J. (1987) Toward Automatic Control. **IEEE Computer Graphics and Applications**, 7(4), 11-21
- Wilhelms, M. (1988) Collision Detection and Response for Computer Animation. **Computer Graphics**, 22(4), 289-97.
- Witted, T. (1983) Anti-Aliased Line Drawing Using Brush Extrusion. **Computer Graphics**, 17(3), 151-156.



## Section 2 VIDEO TAPES AND MOVIES

Pricing information for each videotape is included where appropriate, excluding postage and handling costs. Anyone interested in obtaining any of these videotapes should contact the appropriate sources to determine availability and current pricing information. Where they are known, citations in the literature are included that refer to a particular animation. At the end of this section, a list of videotapes and movies is appended for which ordering information, formatting and prices are not known.

---

### Association for Computing Machinery SIGGRAPH (produced annually) **ACM SIGGRAPH Video Reviews**

Format: 1/2 VHS (NTSC), 3/4 U-matic (NTSC)  
Cost: \$ 60 each

Source: SVR Order Department  
c/o First Priority  
P.O. Box 576  
Itasca, Illinois 60143-0576 USA  
800-523-5503 (information and orders)  
708-250-0807 (overseas orders)

Contents:  
Excerpts of newly issued computer animations shown at annual ACM SIGGRAPH conferences (varies with video review issue)

Citation:

SIGGRAPH Video Review Listing, **Computer Graphics**, (1990), 24:3, 129-135.

---

### (Author unknown) (1990) **Supercomputing Review: Volume 1**

Format: 1/2 VHS (NTSC)  
Length: 30 minutes  
Cost: \$ 25

Source: Media Magic  
P.O. Box 507  
Nicasio, California 94946 USA  
800-882-8284 (orders)  
415-662-2426 (inquiries)  
415-662-2225 (Fax orders)

---

Baecher, R.M. (1987) **The Dynamic Image: Pioneering Computer Graphics at the University of Toronto, 1967-1987, Restrospective**

Format: 1/2 VHS (NTSC or PAL)  
Length: 53 minutes  
Author: Ronald M. Baecher, Producer and Director  
Cost: \$125 (ISBN 1-55860-030-2)  
\$ 10 Preview Copy (ISBN 1-55860-030-P)

Source: Morgan Kaufmann Publishers  
2929 Campus Drive, Suite 260  
San Mateo, California 94403  
415-578-9911 (inquiries)  
800-745-7323 (orders)  
415-578-0672 (Fax orders)

Contents:

A historical compilation of work by the students, faculty, staff and alumni of the University of Toronto illustrating the advances in human-computer interface design and the production of realistic computer-generated graphical imagery.

Citations:

Danahy, J.W. (1987) Sophisticated image rendering in environmental design review, **Conference Proceedings, Human Factors in Computing Systems and Graphics Interface**, April 5-9, Toronto, Ontario, 211-218.

Danahy, J. W., and R. Wright (1988) Exploring design through 3-dimensional simulations, **Landscape Architecture**, 78(5), 64-71.

---

Chesters, D. and Krueger, A.J. (1989) **Animated Atlas of TOMS Ozone Data, 1978-1988**

Format: 1/2 VHS (NTSC)  
Length: 40 minutes  
Cost: \$ 20

Source: National Space Science Data Center  
Request Coordination Office  
NASA / Goddard Space Flight Center / Code 633.4  
Greenbelt, Maryland 20771  
301-286-6695

Contents:

This video consists of sequences of time-lapse imagery from the Total Ozone Mapping Spectrometer (TOMS) on NASA's NIMBUS-7 weather satellite. The video was originally produced as a browsing tool for the TOMS digital database. It illustrates global atmospheric physics and dynamic climatological features.

Citation:

Chesters, D., and A.J. Krueger (1989) A video atlas of TOMS ozone data, 1978-88, **Bulletin of the American Meteorological Society**, 70(12), 1564-1569.

---

DiBiase, D., Krygier, J., Reeves, C., MacEachren, A. and Brenner, A. (1991)  
**Elementary Approaches to Cartographic Animation.**

Format: 1/2 VHS (NTSC)  
Length: 30 minutes  
Cost: \$ 10 or send blank tape

Source: Department of Geography  
302 Walker Bldg.  
Penn State Univeristy  
University Park, PA 16802

Contents:

“Uses of the Temporal Dimension in Carotgraphic Animation presents a variety of applications of time that can be exploited in geographical analysis and communication. “The Visual and Dynamic Variables of Cartographic Animation“ explores elementary design principles devised in the context of static graphics and the impact of adding a temporal dimension to a display.

---

(Editor unknown) (1990) **Visualization in Scientific Computing**

Format: 1/2 VHS (NTSC)  
Length: 60 minutes  
Cost: \$ 65

Source: Media Magic  
P.O. Box 507  
Nicasio, California 94946 USA  
800-882-8284 (orders)  
415-662-2426 (inquiries)  
415-662-2225 (Fax orders)

Contents:

Computer Simulation of the Global Climatic Effects of Increased Greenhouse Gases. W.M. Washington, T.W. Battge, G.A. Mechl, L. VerPlank and J.B. Yest  
Study of a Numerically Modeled Severe Storm  
R. Wilhelmson, H. Brooks, B. Jewett, C. Shaw and L. Wicker  
Modeling the Pacific Ocean Response to Forcing by Wind and Waves  
M. Johnson, J.J. O'Brien and A. Davies  
Photometric Classification of Cloud Types on Jupiter. W.R. Thompson

Citation:

**Visualization in Computational Science: The International Journal of Supercomputer Applications**, 4(2), 1990, MIT Press, Cambridge Massachusetts.

---

Fisher, P. F. (1991) **Modelling soil map-unit inclusions by Monte Carlo simulation.**

Format: TURBO Pascal executable on IBM 720 MB DOS diskette  
Cost: Contact the author

Source: Dr. Peter Fisher  
Department of Geography  
University of Leicester, UK

Contents:

A raster graphics simulation of soil parcel attribution where the likelihood of a pixel being displayed as a particular type of soil is determined by a combination of its likelihood of being that type of soil and a random process. Animation techniques are used to iterate the display in viewing time, according to a Monte Carlo process.

Citation:

Fisher, P. F. (1991) Modeling and Visualizing Uncertainty in Geographic Data. In: Beard, M.K., Bittenfield, B.P. and Clapham, S.B. (1991) **Scientific Report of the Specialist Meeting on Visualizing the Quality of Spatial Information.** NCGIA Technical Report, Santa Barbara California, forthcoming.

Fisher, P. F. (in press) Modelling Soil Map-Unit inclusions by Monte Carlo simulation. **International Journal of Geographic Information Systems.**

---

Hibbard, W and Santek, D (1989) **Presidents' Day Storm**

Format: 1/2 VHS (NTSC)  
Length:  
Cost: No charge - send a blank videotape

Source: Dr. William Hibbard  
Space Science and Engineering Center  
University of Wisconsin - Madison  
Madison, Wisconsin 53706

Citation:

Hibbard, W., L. Uccellini, D. Santek, and K. Brill (1989) Application of the 4-D McIDAS to a model diagnostic study of the president's day cyclone, **Bulletin of the American Meteorological Society**, 70(11), 1394-1403.

---

Higley, D.K. K.I. Takahashi, and R.F. Mast (1990) **Interactive Display of Petroleum Exploration Through Time Across the Continental United States.**

Format: ten 3 1/2 in. diskettes  
Length:  
Cost: \$101.50  
Source: North Carolina Geological Survey Field Office  
OF 90-0676

Contents:

A color animation which shows the type of petroleum produced within adjacent 1 sq. mile areas, or cells, for 49 petroleum provinces across the U.S. Maps are displayed in cumulative 5-year increments for each province. The oil, gas, oil and gas, or nonproduction category of each cell is coded by color with sympols.

---

Klein, F.W. and Walter, S.R. (1989) **Aftershocks of the Loma Prieta Earthquake: Computer Animations**

Format: 1/2 VHS (NTSC)  
Length: 22 minutes  
Cost: \$ 21 No charge for borrowing (two-week loan)  
Source: U.S. Geological Survey (for purchasing video)  
Books and Open-File Reports  
Federal Center, Box 25425  
Denver, Colorado 80225 USA

U.S. Geological Survey Library (for borrowing video)  
Special Collections MS 955  
345 Middlefield Road  
Menlo Park, California 94025 USA  
415-329-5009

Contents:

The various types and aspects of aftershocks from the October, 1989 Loma Prieta, California earthquake are illustrated using computer animated sequences. The aftershocks are viewed from a variety of three-dimensional perspectives.

Citation:

**Aftershocks of the Loma Prieta Earthquake: Computer Animations.** U.S. Geological Survey Open-File Report 89-0687.

---

Moellering, Harold (1978) **A Demonstration of the Real Time Display of Three Dimensional Cartographic Objects** distributed by Harold Mollering, Ohio State University.

Format: VHS  
Length: 13 minutes  
Cost: shipping and handling

Source: Professor Harold Moellering  
Department of Geography  
Ohio State University  
Columbus Ohio 43210

Contents:  
A demonstration and explanation of the modeling of 3D block diagram of terrain, and of 3D prism map, with narration and music.

---

NASA / Jet Propulsion Laboratory **Digital Landscapes... A View from Space**

Format: 1/2 VHS or Beta (NTSC)  
Length: 24 minutes  
Author: NASA/JPL  
Cost: \$ 19.95

Source: Video Publishing Group, Inc.  
5055 NW 159th Street  
Miami, Florida 33014  
305-621-7283

Contents:  
Earth the Movie Mars the Movie LA the Movie Miranda the Movie  
Mars Mission Rover

---

NASA / Jet Propulsion Laboratory **Earth the Movie; Mars the Movie; LA the Movie; Miranda the Movie**

Format: 1/2 VHS (NTSC)  
Length: 20 minutes  
Author: NASA/JPL  
Cost: \$ 29.95

Source: The Video Tape Company  
10523-45 Burbank Boulevard  
North Hollywood, California 91601-2280  
818-753-3057

---

NASA (1990) **Northern Great Plains Video**

Format: 1/2 VHS (NTSC)  
Length: 6 minutes  
Cost: No charge - provide a blank videotape

Source: EROS Data Center  
Sioux Falls, South Dakota 57198 USA  
605-594-6028

Contents:

This video depicts an animated sequence of greenness change over the 1987 and 1988 growing seasons in the northern Great Plains. Vegetation index images from the NOAA-9 Advanced Very High Resolution Radiometer (AVHRR) are used in the animation. A narrator discusses the effects of drought, land cover changes and other phenomena that can be observed.

---

NASA / Jet Propulsion Laboratory (1988) **L.A. The Movie**

Format: 1/2 VHS (NTSC)  
Length: 4 minutes  
Cost: No charge for borrowing (two-week loan)

Source: U.S. Geological Survey Library  
Special Collections MS 955  
345 Middlefield Road  
Menlo Park, California 94025 USA  
415-329-5009

Contents:

An animated three-dimensional fly through of the Los Angeles basin and surrounding region produced from digital elevation data and Landsat satellite imagery.

---

National Center for Supercomputing Applications (NCSA) (1990) **Scientific Visualizations: Volume 1**

Format: 1/2 VHS (NTSC)  
Length: 60 minutes  
Cost: \$ 25

Source: Media Magic  
P.O. Box 507  
Nicasio, California 94946 USA  
800-882-8284 (orders)  
415-662-2426 (inquiries)  
415-662-2225 (Fax orders)

Contents:  
Study of a numerically modeled severe storm  
Landscape dynamics of Yellowstone national park: The role of fire 1690 to 1990  
Smog: Visualizing the components

Citation:

Kovacic, D. A., A. Craig, R. Patterson, W. H. Romme, and D. G. Despain (1990)  
Fire dynamics in the Yellowstone landscape from 1690-1990: An animation,  
**Proceedings: Resource Technology'90**, November 12-15, Washington,  
D.C., 1-9.

---

National Center for Supercomputing Applications (NCSA) (1990) **Scientific  
Visualizations: Volume 2**

Format: 1/2 VHS (NTSC)  
Length: 60 minutes  
Cost: \$ 25

Source: Media Magic  
P.O. Box 507  
Nicasio, California 94946 USA  
800-882-8284 (orders)  
415-662-2426 (inquiries)  
415-662-2225 (Fax orders)

Contents:  
Model of an expanded (closed) universe    Maize growth development  
Visualization idioms

---

National Center for Supercomputer Applications (NCSA) (1991) **NCSA Visualization  
SIGGRAPH Sampler**

Format: 1/2 VHS (NTSC)  
Length: 25 minutes  
Cost: \$ 40

Source: Attention: Documentation Orders  
University of Illinois at Urbana-Champaign  
605 East Springfield Avenue  
Champaign, IL 61820

Contents:  
Study of a numerically severe storm  
Smog: visualizing the components  
Landscape dynamics of Yellowstone Park: The role of fire 1690 to 1990

---



National Center for Supercomputer Applications (NCSA) (1991) **NCSA RealTime #1**

Format: 1/2 VHS (NTSC), BETACAM, 3/4 U-matic(NTSC), 8mm  
Length: 26 minutes  
Cost: \$ 9 (VHS), \$ 23 (BETACAM), \$ 28 (U-matic), \$ 10 (8mm)

Source: Attention: Documentation Orders  
University of Illinois at Urbana-Champaign  
605 East Springfield Avenue  
Champaign, IL 61820

Contents:  
Seeing is Believing      Microburst Alert

---

National Center for Supercomputer Applications (NCSA) (1991) **NCSA RealTime #2**

Format: 1/2 VHS (NTSC), BETACAM, 3/4 U-matic (NTSC), 8mm  
Length: 27 minutes  
Cost: \$ 9 (VHS), \$ 23 (BETACAM), \$ 28 (U-matic), \$ 11 (8mm)

Source: Attention: Documentation Orders  
University of Illinois at Urbana-Champaign  
605 East Springfield Avenue  
Champaign, IL 61820      USA

Contents:  
Sounding the Data

---

Nielson, G.M. and B. Shriver (editors) 1990. **Visualization in Scientific Computing**. IEEE Computer Society Press, Las Alamitos, California.

Format: VHS (NTSC)  
Length: 120 minutes  
Cost: \$ 134.50 (nonmembers)  
\$ 107.50 (members)

Source: IEEE Computer Society Press  
10662 Los Vaqueros Circle  
P.O. Box 3014  
Los Alamitos, California 90720-1264 USA  
800-272-6657 or 714-821-8380 (orders)

Contents:  
This videotape is a companion to the book by the same title. Most of the chapters are presented in the video by their authors.

---

Tobler, W.R. (1970) **A Computer Movie Simulating Urban Growth in the Detroit Region**

Format: VHS  
Length: 8 minutes  
Cost: shipping and handling

Source: Professor Waldo R. Tobler  
Department of Geography  
University of California  
Santa Barbara CA 93106

Contents:  
A model of population as a growing Z-surface over the Detroit region.

---

Weber, C. R. (1991) **A Cartographic Animation of Average Yearly Surface Temperatures for the 48 Contiguous United States: 1987-1986**. NCGIA Technical Report 91-3, Santa Barbara California.

Format: Macromind Director executable on Macintosh diskettes (2400KB)

Length: 15 minutes  
Cost: shipping and handling

Source: Chris Weber  
NCGIA  
Department of Geography  
105 Wilkeson Quad  
SUNY-Buffalo  
Buffalo, NY 14261

Contents:  
A keyframe animation showing isopleth maps of deviations from average temperature for 344 weather stations in the United States over a 90 year period. Images created using SURFACE-2 and ported into Macromind Director. Temporal legend indicates position in the 90 year period in real time.

---

Willgoose, G.W., Bras, R.L. and Rodriguez-Iturbe, I. (1990) **Computer Animation of River Basin Evolution**

Format: 1/2 VHS (NTSC)  
Length: unknown

Source: Rafael L. Bras  
Parsons Laboratory for Hydrodynamics and Water Resources  
Massachusetts Institute of Technology, Room 48-311  
Cambridge, MA 02139  
617-253-2117

Citation:

Willgoose, G., R. L. Bras, and I. Rodriguez-Iturbe (1990) A model of river basin evolution, **Eos**, 71(47), 1806-1807.

---

US Army CERL (1990) **Global Data and the Animation of Vegetation Production**

Format: 1/2 VHS (NTSC)  
Length:  
Cost: No charge for borrowing (two-week loan)

Source: US Army CERL  
P.O. Box 4005  
Champaign, Illinois 61821-4005 USA  
217-373-7220

---

U.S. Geological Survey (1989) **Yosemite National Park: A New Perspective**

Format: 1/2 VHS (NTSC)  
Length: 5 minutes  
Cost: No charge for borrowing (two-week loan)

Source: U.S. Geological Survey Library  
Special Collections MS 955  
345 Middlefield Road  
Menlo Park, California 94025 USA  
415-329-5009

Contents:

An animated three-dimensional fly through of Yosemite National Park produced from stereo SPOT satellite imagery and conventional aerial stereo photography.

Citation:

Fequay, J.W., J.M. Thormodsgard and G.G. Kelly (1989) Yosemite National Park: a new perspective, **Technical Papers: ASPRS/ACSM Proceedings 1989**, 2 Image and Data Processing, 80-87.

## Section 3 OTHER SOURCES OF INFORMATION

### 3.1 Periodicals Having Some Focus on Animation

ACM Transactions on Graphics.  
Association for Computing Machinery  
11 West 42nd Street  
New York, NY 10036

Anderson Report.  
4265 Avenida Simi  
Simi Valley, CA 93063

BYTE Magazine  
70 Main Street  
Peterborough, NH 03458

CAD/CAM Digest  
PO Box 8100  
Dallas TX 75205

Cinefex  
PO Box 20027  
Riverside, CA 92516

Computer Aided Design  
IPC Science and Technology Press, Ltd.  
32 High Street  
Guildford, Surrey, UK Gu1 3EW

Computer Aided Publishing Report  
52 dragon Court  
Woburn, MA 03117

Computer Graphics Special Interest Group  
(SIGGRAPH)  
Association for Computing Machinery  
11 West 42nd Street  
New York, NY 10036

Computer Graphics and Applications  
Institute for Electrical and Electronic Engineers  
(IEEE)  
10662 Los Vaqueros Circle  
Los Alamitos, CA

Computer Vision, Graphics and Image  
Processing  
Academic Press, Inc.  
111 Fifth Avenue  
New York, NY 10003

Computer Graphics Today  
8401 Arlington Blvd.  
Fairfax VA 22031

Computer Graphics World  
1714 Stockton St.  
San Francisco, CA 94133

Computer Pictures  
Backstage Productions, Inc.  
165 West 46th Street  
New York, NY 10036

Computers and Graphics  
Pergammon Press, Inc.  
Maxwell House, Fariview Park  
Elmsford, NY 10523

Klein Newsletter  
PO Box 89  
Sudbury, MA 01776

Millimeter  
2 East 46th Street  
New York, NY 10017

Pixel: The Computer Animation Newsletter  
217 George Street  
Toronto, Ontario Canada M5A 2M9

### **3.2 Professional Societies and Conferences**

National Computer Graphics Association (NCGA)  
8401 Arlington Blvd  
Fairfax, VA 22031

Computer Graphics Special Interest Group (SIGGRAPH)  
Association for Computing Machinery  
11 West 42nd Street  
New York, NY 10036

Society for Moving Pictures and Television Entertainment (SMPTE)  
862 Scarsdale Avenue  
New York, NY 10583

### **3.3 Other Sources of Information and Video Material**

DeFanti, Tom, ed. Siggraph Video Review  
UIC/EECS, Mail Stop 154  
PO Box 4348  
Chicago, IL 60680

George, James and Steven Levine, eds. Frontiers in Computer Graphics  
Microfiche Supplements to Computer Graphics  
Association for Computing Machinery  
11 West 42nd Street  
New York, NY 10036

SIGGRAPH slide sets  
Association for Computing Machinery  
11 West 42nd Street  
New York, NY 10036

How to abbreviate "Bibliography on Animation of Spatial Data"? "Bibliography on Animation of Spatial Data" can be abbreviated as BASD. Q: A: What is the meaning of BASD abbreviation? The meaning of BASD abbreviation is "Bibliography on Animation of Spatial Data". Q: A: What is BASD abbreviation? One of the definitions of BASD is "Bibliography on Animation of Spatial Data". Q: A: What does BASD mean? BASD as abbreviation means "Bibliography on Animation of Spatial Data". Q: A: What is shorthand of Bibliography on Animation of Spatial Data? The m