

SIGGRAPH '85

Technical Slide Set Credits

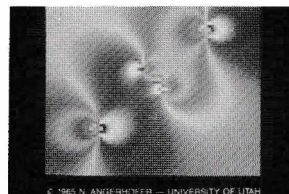
Edited by: Gregory MacNicol

The technical slide set represents examples of the latest work in computer graphics demonstrating technical expertise. Each slide is printed here in black and white to facilitate locating information about the images. The full color 35mm slide set can be ordered from: ACM Order Department, P.O. Box 64145, Baltimore, MD 21264; 1-800-526-0359, ext. 75.

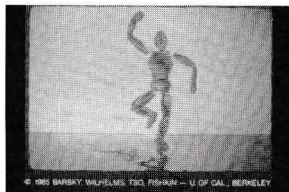
1. ROBERT ABEL, Robert Abel and Associates, 953 N. Highland Ave., Hollywood, CA, 90038; (213) 462-8100. "Sexy Robot." Hardware used was a VAX 11/780, a Silicon Graphics workstation, an Evans and Sutherland PS-2 and a Raster Technologies One/80 frame buffer with 1280 X 1024 resolution. Software for motion control and rendering was developed in-house. Director/designer was Randy Roberts and technical directors were Tim McGovern, Richard Bailey and Ann Kerbel.



2. NORMAN ANGERHOFER, University of Utah, (Computer Science Dept. - MEB), Salt Lake City, UT 84112; (801) 581-8800. "Contours in the S-plane." This image was created using the visualization of contours in the S-plane (complex plane), with colors showing the effects of poles and zeros on the function. Only the real component is displayed. An AED 512 frame buffer was used.



3. BRIAN BARSKY, JANE P. WILHELMS, PAULINE Y.J. TS'O, KENNETH P. FISHKIN, MARK DIPPE, University of California Berkeley, Berkeley Computer Graphics Laboratory, Berkeley, CA 94720; (415) 642-9838. "Ribbon Man." This image was rendered on an Adage/Ikonas RDS-3000 raster display system attached to a VAX-11/750 host computer using UNIX 4.2 bsd. It shows a human figure with 12 segments and 36 degrees of freedom. The body is internally represented as a tree structure of segments and intervening joints. By sending positions to the joints, a particular spatial configuration is achieved. Associated with each segment is a max-min box representing its extent in space. The Ribbon Man image is developed by associating a helix with each max-min box, and rendering the helices as sequences of thin triangles. The background was painted using "Blot," an experimental "paint program" developed at the Berkeley Computer Graphics Laboratory for the creation and testing of color and paint algorithms.

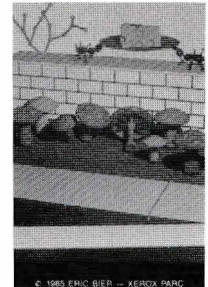


4. PIERRE LACHAPELLE, PHILLIPE BERGERON, PIERRE ROBIDOUX, DANIEL LANGLOIS, Universite de Montreal, 11793 Drapeau, Montreal-Nord (Quebec) Canada H1H 3K7; (514) 737-4800 (Bergeron), (514) 325-0524 (LaChapelle). "Tony de Pel-

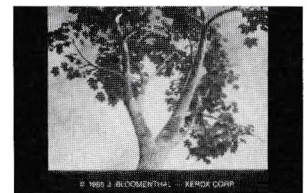


trie." This frame of an animated piece was created using the in-house software DADS graphics package (Digital Animation Display Software) written in Pascal, and the TAARNA 3-D interactive graphics system programmed with DADS. Logical resolution: 2560 x 1782. The computers are the CDC Cyber 835/855. The terminal is a Raster Technologies One/25S system (physical resolution 512 x 358). Contributing artists and programmers are Pierre Robidoux, Pierre LaChapelle and Daniel Langlois.

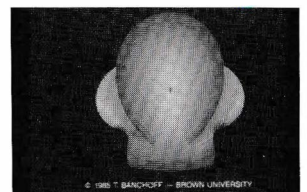
5. ERIC BIER, Xerox PARC, 291 28th Ave., San Francisco, CA 94121; (415) 643-2897 or (415) 642-9542 (UC Berkeley office). "The Ant Picnic." This image was generated using the PARC 3D editor and uses ray tracing for interactive painting. The limbs of the ants, the branches of the tree, the holes in the swiss cheese and the mushrooms in the garden were positioned this way. Similarly, the mushroom spots were painted on interactively. This slide was photographed from a 3' x 3' color Versatec plot. It was assembled and rendered on the Dorado personal work station.



6. JULES BLOOMENTHAL, Xerox Corp., 333 Coyote Hill Rd., Palo Alto, CA 94304; (415) 494-4827. "Acer Graphics." The tree was formed by bump mapping real-world bark patterns onto generalized cylinders whose axes are space curves passing through stochastically generated points. The leaves are polygonal structures capable of flexing in the "wind." The sky background was stochastically modeled in three dimensions by Kevin Hunter. Image produced at New York Institute of Technology.



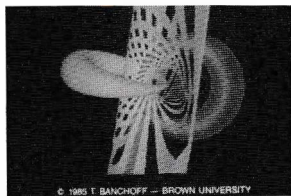
7. BROWN UNIVERSITY GEOMETRY GROUP, Mathematics Dept., Brown University, Providence, RI 02912; (401) 863-3319. "Fly, Pedal Surface." This image was described using the DIAL Animation Language (IEEE CG & A, Sept. '82) on a VAX 11/780 running Berkeley 4.2 UNIX, and rendered on a Lexidata Solidview. The image exhibits a swallowtail point in the pedal surface of a quartic curve. This slide was made using a Matrix D4/2 ACM recorder. Contributing artists are: Thomas Banchoff, David Laidlaw and David Margolis.



8. BROWN UNIVERSITY GEOMETRY GROUP, Mathematics Dept., Brown University, Providence, RI 02912; (401) 863-3319. "Ellipsoid Focal Surfaces." This image was described using the DIAL Animation Language (IEEE CG & A, Sept. '82) on a VAX 11/780 running Berkeley 4.2 UNIX, and rendered on a Lexidata Solidview. This image exhibits a half-ellipsoid and its two focal surfaces. The slide was made using a Matrix D4/2 film recorder. Contributing artists are: Thomas Banchoff, David Laidlaw and David Margolis.



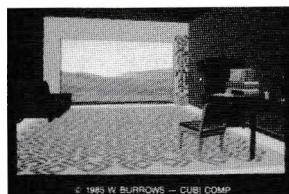
9. BROWN UNIVERSITY GEOMETRY GROUP, Mathematics Dept., Brown University, Providence, RI 02912; (401) 863-3319. "Hopf Tori Sequence." This image was described using the Dial Language (IEEE CG & A, Sept. '82) on a VAX 11/780 running Berkeley 4.2 UNIX and rendered in the deformation from one Hopf Torus to another in a sphere in 4-space. The slide was made using a Matrix D4/2 film recorder. Contributing artists are: Thomas Banchoff, David Laidlaw, David Margolis, Huseyin Kocak and Fred Bishop.



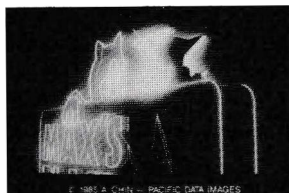
10. MARILYN ANN BURNS, Digital Image Corp., Loraine Building, Suite 600, 124 E. Fulton, Grand Rapids, MI 49503. "I Can Can." Equipment used was a Cromemco Z2 with SDI graphics and two 48 KTP image planes, a Mitsubishi color monitor, a Houston Instruments graphics tablet, a Via Video frame grabber with a black and white video camera and Matrix Instruments film recorder. Images are created by transforming a digitized frame of video. The artist is Marilyn Burns; David Cook and Walter Wright are contributing programmers.



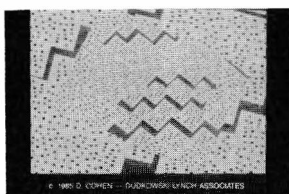
11. WILSON BURROWS, Cubicomp, 3165 Adeline St., Berkeley, CA 94703; (415) 540-5733. "The Green Hills." This image was created using Cubicomp's solid modeling software running on the IBM PC with Cubicomp's own frame buffer. It was photographed with a Matrix Instruments 3800 color film recorder. Programmers were Peter DeVrode, Ed Berlin, David Low, Stephen Crane and Darrel Parlee.



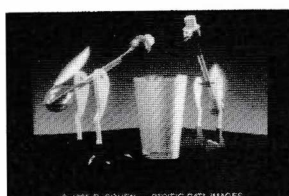
12. ADAM B. CHIN, Pacific Data Images, 1111 Karlstad Drive, Sunnyvale, CA 94089; (408) 745-6755. "Seaside Cafe." The image was designed and rendered on Ridge 32C computers using a Raster Technologies frame buffer.



13. DONNA COHEN, Dudkowski-Lynch Associates, 4397 25th St., San Francisco, CA 94114; (415) 821-3488. "Linoleum." The hardware and software used was a Quantel PF3 paintbox and a Rembrandt film recorder.



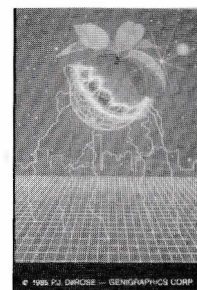
14. RICHARD COHEN, Pacific Data Images, 1111 Karlstad Drive, Sunnyvale, CA 94089; (408) 745-6755. "Happy Drinking Birds." The image was designed and rendered on Ridge 32C computers using a Raster Technologies frame buffer.



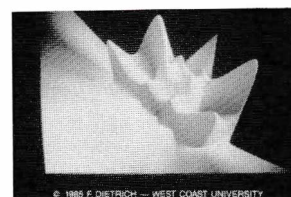
15. SABINE COUQUILLART, MICHEL GANGNET, Ecole Nationale Supérieure des Mines de Saint-Etienne, Ecole des Mines de Saint-Etienne 158, Cours Fauriel 42023 Saint-Etienne Cedex France, (77) 25-20-23. "Terrain seen from above." The terrain in this image was generated by ray tracing techniques on an HP9000 computer with a Lexidata frame buffer.



16. PATRICK J. DE ROSE, Genigraphics Corp., 3495 Piedmont Rd., N.E., Bldg 9, Suite 100, Atlanta, GA 30305, (404) 266-8755. "Peach Dazzle." This slide was created on the Genigraphics SGI System and imaged on the PS-2000.



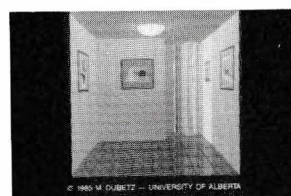
17. FRANK DIETRICH, University of California at Berkeley, 3477 South Ct., Palo Alto, CA 94306; (415) 494-9019. "Antartica." This image is composed of uniformly shaped Beta-splines with Vedic Square data. Color is a function of the geometry of the surface. The image was produced at Berkeley Computer Graphics Laboratory, UC Berkeley on a VAX 11/750, Ikonas framebuffer, and Evans & Sutherland PS-300. Beta-spline, PS-300 pre-viewing and rendering software by Brian Barsky, Tony DeRose and Mark Dippe with assistance by Ken Fishkin and Pauline Ts'o.



18. BOB DREBIN, Computer Division, Lucasfilm Ltd., P.O. Box 2009, San Rafael, CA 94912; (415) 499-0239. "Woman's Pelvis." Forty-nine computed tomographic (CT) transaxial scans were used to generate these three-dimensional reconstructions. The reconstruction algorithm, by Bob Drebin and Loren Carpenter, produces colored, anti-aliased views of image volumes. Each tissue may be assigned a different color and opacity. Her bone is solid white, muscle and organs are semi-transparent red, and fat is a very transparent green. The images were created on the Lucasfilm Pixar Image Computer. CT scans courtesy of Siemens Medical Systems, Inc.



19. MARTIN DUBETZ, University of Alberta, Department of Computing Science, University of Alberta, Edmonton, Alberta, T6G 2H1; (403) 432-2651. "Art Gallery." Part of the diffuse lighting component of the image was generated using a distributed ray tracing algorithm. Each pixel was over-sampled 16 times to obtain 25 unique diffuse lighting values.



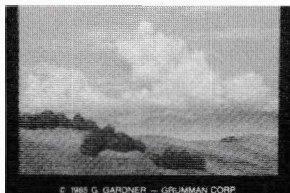
20. WILLIAM FERSTER, MIMI KOLOBOTOVIC, West End Film, Inc. 2121 Newport Place NW, Washington, DC 20037; (202) 331-8087. Equipment used was the Number Nine graphics board in an IBM PC with West End Film's Art-work software.



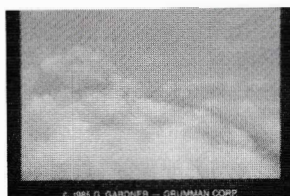
21. FOWLER, DONAHUE, Boeing Aerospace, P.O. Box 3999 M/S 9E-45, Seattle, WA 98124; (206) 251-4899. "Space Station." A Z-buffer algorithm with shadows and texture mapping (the earth) was used to create this image.



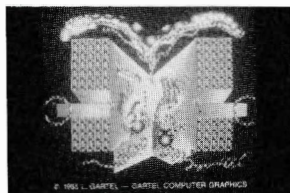
22. GEOFFREY Y. GARDNER, Grumman Corp., MS A08-35, Bethpage, NY 11714. "Cloudscape." The original algorithm used 107 textured quadratic surfaces. Computation time was 25 minutes on a Data General Eclipse S/250 minicomputer. The frame buffer was a Genisco GCT-3000 with 480 x 640 pixel resolution with 24 bit-planes.



23. GEOFFREY Y. GARDNER, Grumman Corp., MS A08-35, Bethpage, NY 11714. "Quadric Clouds." The original algorithm used 187 textured quadratic surfaces. Computation time was 20 minutes on a Data General Eclipse S/250 minicomputer. The frame buffer was a Genisco GCT-3000 with 480 x 640 pixel resolution with 24 bit-planes.



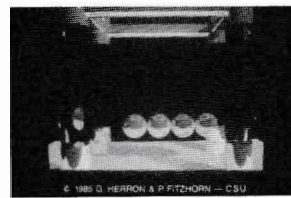
24. LAURENCE M. GARTEL, Gartel Computer Graphics, 150-38A Union Turnpike, Flushing, NY 11367, (718) 969-8616, (718) 229-8509, (212) 580-2800. "Dali's Dilemma." This image was created on the Artronics Arton 2000 Studio Computer.



25. JONATHAN I. HELFMAN, AT & T Bell Laboratories, Room 3A-445, 600 Mountain Ave., Murray Hill, NJ 07974; (201) 582-5087. "Bonefield 4." This image was both specified and computed by a keyframe animation system called "spankey" which uses a unique iconic user-interface. Contributing programmers are Jonathan Helfman and Jerry Weil; artist is Jonathan Helfman.



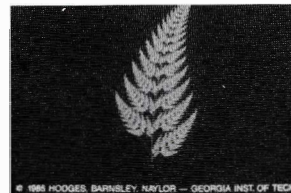
26. GARY HERRON, PATRICK FITZHORN, Colorado State University, Computer Science Department, Fort Collins, CO 80523. This image was produced on an Evans & Sutherland PS-340, and a VAX 11/780 running Berkeley UNIX, at Colorado State University.



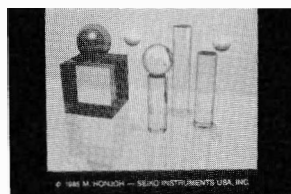
27. GARY HERRON, PATRICK FITZHORN, Colorado State University, Computer Science Department, Fort Collins, CO 80523. This image was produced on an Evans & Sutherland PS-340, and a VAX 11/780 running Berkeley UNIX, at Colorado State University.



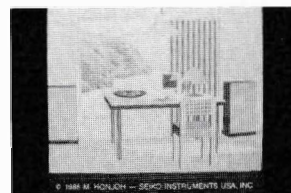
28. LAURA HODGES, M. BARNSELY, BRUCE NAYLOR, Georgia Institute of Technology, School of ICS, Atlanta, GA 30332; (404) 894-3160. "Black Spleenwort Fern." The fractal fern was rendered using an implementation of the iterated function system theory. Only four 2-dimensional affine transformations were required to specify the object.



29. MASA HORI HONJOH, Seiko Instruments USA, Inc., Graphic Devices & Systems Division, 1623 Buckeye Dr., Milpitas, CA 95035; (408) 943-9100. "Clear Spheres, Cubes, and Cylinders." This image was produced using a VAX 11/750 equipped with a 16-bit parallel interface (DR-11W) and a Seiko GR-2414-50 graphics display terminal.



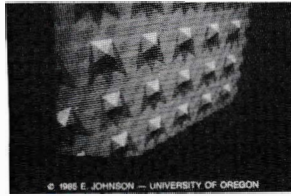
30. MASA HORI HONJOH, Seiko Instruments USA, Inc., Graphic Devices & Systems Division, 1623 Buckeye Dr., Milpitas, CA 95035; (408) 943-9100. "Interior." This image was produced using a VAX 11/750 and a Seiko GR-2414-50 graphics display terminal.



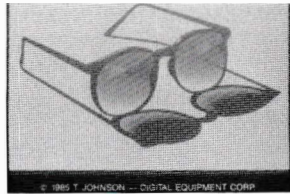
31. MASA INAKAGE, Visual Language Workshop, Media Lab, Massachusetts Institute of Technology, Cambridge, MA 02139; (617) 253-4416. "Sandstorm." A Perkin-Elmer 3220 computer was used with a 27-bit Grinnell frame buffer with 512 x 512 resolution. The software was based on an improved ray-tracing algorithm for fuzzy objects.



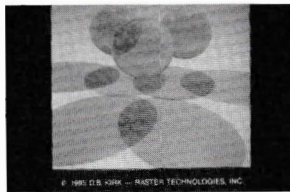
32. ERIK JOHNSON, University of Oregon, 170 E. 24th Pl., Eugene, OR 97405; (503) 345-8480. "Wall in Space." This image was developed using in-house software and hardware. The image was generated by less than 50 lines of BASIC code written on an Apple IIe driving a Vectrix VX-384A graphics card.



33. TONY JOHNSON, Digital Equipment Corporation, (Computer Images Department), 12 Crosby Dr., Bldg. F, Bedford, MA 01730; (617) 276-4621. "Looking Glasses." The image was created on a Gen-igraphics 100B console with a digitizing tablet using RSX program software. The image within the glasses was created using two separate exposures (files).



34. DAVID B. KIRK, Raster Technologies, 9 Executive Park Drive, North Billerica, MA 01862; (617) 667-8900. "Light & Shadow I." The image was produced using a cone tracing algorithm. The fast ray tracing part of the code was developed with Olin Lathrop of Raster Technologies, Inc. and recorded with a Dunn Instruments 631.



35. DAVID B. KIRK, Raster Technologies, 9 Executive Park Drive, North Billerica, MA 01862; (617) 667-8900. "Circles of Confusion." The image was produced using a cone tracing algorithm. The fast ray tracing part of the code was developed with Olin Lathrop, also of Raster Technologies, Inc. Image was recorded with a Dunn Instruments 631.



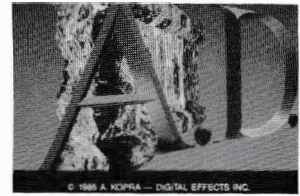
36. DAVID B. KIRK, Raster Technologies, 9 Executive Park Drive, North Billerica, MA 01862; (617) 667-8900. "Light and Shadow 3." The image was produced using a cone tracing algorithm. The fast ray tracing part of the code was developed with Olin Lathrop, also of Raster Technologies, Inc. Recording device used was a Dunn Instruments 631.



37. SHOICHI KITAOKA, Computer Science Dept., University of Utah, Salt Lake City, UT 84112; (801) 532-4239. "The Scene with Corkscrew." A ray tracing program was used which can handle primitives such as general sweeping or free form surfaces as well as simple traditional primitives. Their combinations can also be rendered with set operators.



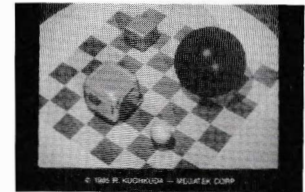
38. ANDY KOPRA, Digital Effects Inc., 321 W. 44th St., New York, NY 10036; (212) 581-7760. This image is one frame from an animated sequence utilizing image mapping, shadow generation, and Phong shading. Hardware used was a Harris 800 mini super computer; software is DEI's Visions®.



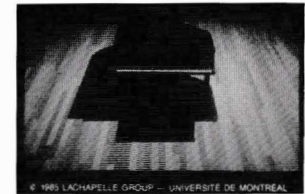
39. ROMAN KUCHKUDA, Megatek Corporation, 9645 Scranton Rd., San Diego, CA 92121; (619) 455-5590. "Wine Glass." A ray traced scene using reflection, refraction, and surfaces of revolution with multiple light sources. Produced on a VAX 11/780 and displayed on a Megatek Merlin.



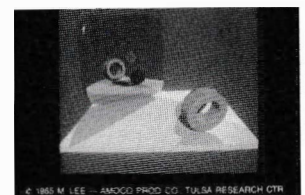
40. ROMAN KUCHKUDA, Megatek Corporation, 9645 Scranton Rd., San Diego, CA 92121; (619) 455-5590. "Cubic." A ray traced scene which includes supercubics. This image was produced on a VAX 11/780 and displayed on a Megatek Merlin.



41. PIERRE LACHAPELLE, PHILLIPE BERGERON, PIERRE ROBIDOUX, DANIEL LANGLOIS, Universite de Montreal, 11793 Drapeau, Montreal - Nord (Quebec) Canada H1H 3K7; (514) 737-4800 (Bergeron), (514) 325-0524 (LaChapelle). "Still from 'Tony de Peltrie'." In-house software designed and supervised by P. LaChapelle: the DADS graphics package, written in PASCAL, and the TAARNA 3-D interactive graphics system, written with DADS. This slide is from a storytelling 3-D computer generated animated short: "Tony de Peltrie" with full 3-D organic character animation. Hardware used are CDC Cyber 835/855 Computers, Raster Technologies 1/25, Gradicon, Tektronix.

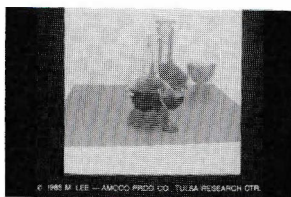


42. MARK LEE, JOHN FAUSS, Amoco Products Co., Tulsa Research Center, P.O. Box 3385, Tulsa, OK, 74102; (918) 660-3556. The computer used was an IBM 3033 and the display device was a Raster Technologies Model One/25. The camera was a Dunn Inst. 632. The software used was a distributed ray tracing algorithm developed in-house.

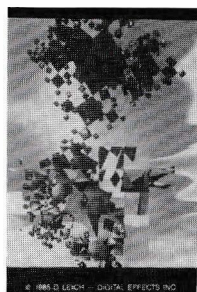


43. MARK LEE, RICH REDNER, SAM USELTON, Amoco Production Center, Tulsa Research Center, P.O. Box 3385, Tulsa, OK, 74102; (918) 660-3556. The computer used was an IBM 3033 and the display device was a Raster Technologies Model One/25.

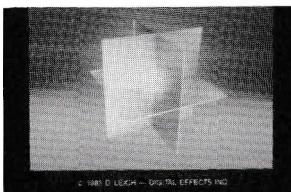
The camera was a Dunn Inst. 632. The software used was a distributed ray tracing algorithm developed in-house.



44. DONALD LEICH, C. ROBERT HOFFMAN III, D.L. DEAS, Digital Effects, Inc., 321 W. 44th St., New York, NY 10036; (212) 581-7760. The image was made using a Harris 800 super mini-computer and a Dicommed D48 film recorder.

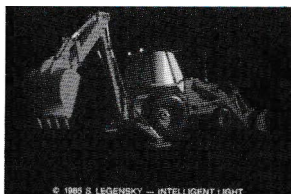


45. DONALD LEICH, C. ROBERT HOFFMAN III, D.L. DEAS, Digital Effects, Inc., 321 W. 44th St., New York, NY 10036; (212) 581-7760. The image was made using a Harris 800 super mini-computer and a Dicommed D48 film recorder.



46. STEPHEN LEGENSKY, Intelligent Light, P.O. Box 65, Fair Lawn, NJ 07410; (201) 794-0200 X351. "Case 580 E Backhoe." Frame from Tenneco Commercial, produced for McCall/Coppola, NYC. Creators are: J. Butler and D. Stipe.

Image was computed on DEC VAX 11/780 using the Intelligent Light software system for modeling, animation and rendering. Final resolution is 1024x1024, with 24 bits of color depth. Film recording was done via an IKONAS RDS 3000 frame buffer and Dunn 632 color camera. Software developed by Daniel Hiepler and Steve Legensky.

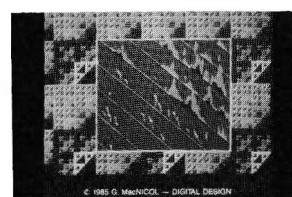


47. STEPHEN LEGENSKY, Intelligent Light, P.O. Box 65, Fair Lawn, NJ 07410; (201) 794-0200 X351. "Kitchaide Dishwasher Demo." From Kitchen aide Commercials, produced by McCall/Coppola, NYC. Creators are: S. Cohen and S. Legensky.

Image computed on DEC VAX 11/780, using the Intelligent Light™ software system for modeling, animation and rendering. Final resolution is 1024x1024, with 24 bits of color. Film recording was done via an IKONAS RDS-3000 frame buffer and Dunn 632 color camera. Software developed by Daniel Hiepler and Steve Legensky.



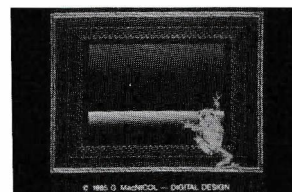
48. GREGORY MACNICOL, Digital Design, 222 S. Branciforte, Santa Cruz, CA 95062; (408) 426-0403. "Fire in Fractal Valley." The image was produced on an Apple and Vectrix frame buffer. It has a resolution of 480 x 672 with 512 displayable colors. The image was made with a paint system written by Gregory MacNicol.



49. GREGORY MACNICOL, Digital Design, 222 S. Branciforte, Santa Cruz, CA 95062; (408) 426-0403. "Design." The image was produced on an Apple and Vectrix. The software is a simple 2-D animation system where each "player" has a role in a script. Each object in the animated piece moves independently or in relationship to other objects.



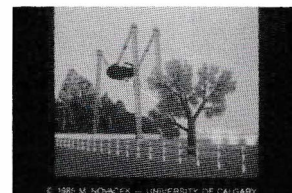
50. GREGORY MACNICOL, Digital Design, 222 S. Branciforte, Santa Cruz, CA 95062; (408) 426-0403. "Buffa-Nova." The image was produced on a Ridge and Vectrix. The image was made on a paint system designed for mixing traditional paint capabilities with other programs such as solid modeling.



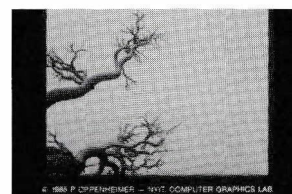
51. JOHN MAREDA, Sandia National Laboratories, Div. 2644, Albuquerque, NM 87185; (505) 844-6672. "Watercolor." The water was generated using a filtering technique on a fractal data-base developed by Gary Mastin. A Dicommed film recorder was used for the 1217 x 811 resolution image. Submitted image was one of a stereo pair.



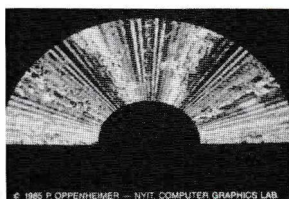
52. MILAN NOVACEK, University of Calgary, Department of Computer Science, 2500 University Dr., NW, Calgary, Alberta, Canada, T2N 1N2; (403) 284-6009. "Martian Heat Ray." This image was produced by using a combination of various primitives, plus hazed mountains. The ray and the explosions are rendered using a gamma filter function which is also defined by a parameter to obtain different effects. Contributing artist/programmer(s): Brian Wyvill and Craig McPheeters.



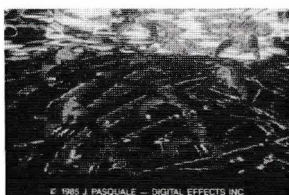
53. PETER OPPENHEIMER, New York Institute of Technology Computer Graphics Lab. Old Westbury, NY 11568.



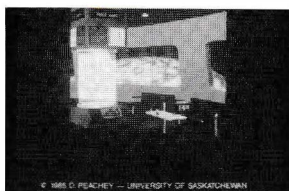
54. PETER OPPENHEIMER, New York Institute of Technology Computer Graphics Lab, Old Westbury, NY 11568.



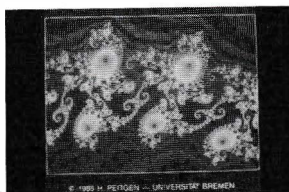
55. JOE PASQUALE, Digital Effects, 321 W. 44th St., New York, NY 10036; (212) 581-7760. "Merch." This image employs both image and texture mapping. Geometric compositions and colors are specified using APL Visions. Special software is by C. Robert Hoffman III.



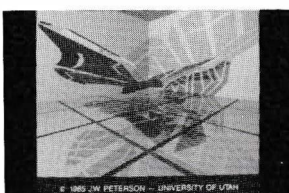
56. DARWYN PEACHY, University of Saskatchewan, Department of Computer Science, 86 Commerce Bldg., Saskatoon, Saskatchewan, Canada S7N 0W0; (306) 966-4909. "Observation Deck." The image was generated at 512x512 resolution using the PORTRAY experimental ray tracing system. Objects were modeled using constructive solid geometry with quadric primitives. Several different texturing techniques were used to add surface detail to the objects.



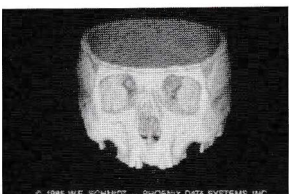
57. HEINZ-OTTO PEITGEN, Universitat Bremen, Graphics Lab, FB Mathematik, D-2800 Bremen 33 West Germany, 0421-274936. "Frontiers of Chaos." This image is an authentic math experiment. Hardware used was an AED 7E7 and NORDAGE.



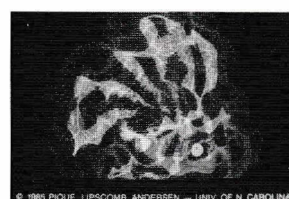
58. JOHN W. PETERSON, University of Utah, Department of Computer Science, 3160 M.E.B., Salt Lake City, UT 84112; (801) 581-8861. "Butterfly." The butterfly was modeled using an object-oriented modeller implemented in Lisp. The image was rendered at 512x512 resolution (with adaptive anti-aliasing) by a ray tracing program implemented in Pascal on an Apollo workstation.



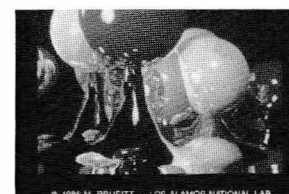
59. WILLIAM E. SCHMIDT, Phoenix Data Systems, Inc., 80 Wolf Road, Albany, NY 12205; (518) 459-6202. "CT Bone Study." This image was produced using 4.2 mb of CT scanner. Bone density data shown at speeds exceeding one image per second by the Phoenix Data Systems Solid Modeling Computer. Special thanks to Thompson CGR, Medical Equipment Branch for the raw CT data.



60. MICHAEL E. PIQUE, JAMES S. LIPSCOMB, ANNE C. ANDERSEN, University of North Carolina at Chapel Hill, NC 27514. "Trip Through Molecule of Super-oxide Dismutase." This image was created using an Evans and Sutherland PS-300 display and an Adage RDS-3000 display to design and preview the sequence of images. DEC VAX-11/780 and 11/750 computers and a Gould SEL 8750 computer was used to calculate the images. A Dicommed film recorder was used to paint the images onto film. Software was obtained from other OMNIMAX film-makers and written by us in FORTRAN, C and AWK programming languages, all running under the UNIX operating system. In this image the chain of amino acids in the molecule is a multicolored ribbon that forms, as it were, the backbone of the molecule. The skin or surface of the molecule is formed from purple whickers, and the blue molecular bonds from the skeleton. The two spheres are the copper atom (red-orange) and the zinc atom (blue-white).



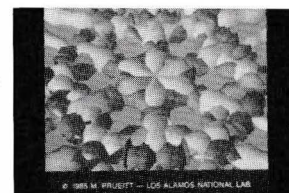
61. MELVIN L. PRUEITT, Los Alamos National Laboratory, MS-D415, Motion Picture Group, Los Alamos, NM 87545; (505) 667-4452. "Reflection." This image was calculated on a Cray computer and plotted on a Dicommed.



62. MELVIN L. PRUEITT, Los Alamos National Laboratory, MS-D415, Motion Picture Group, Los Alamos, NM 87545; (505) 667-4452. "Sparkling Molecule." This image was calculated on a Cray computer and plotted on a Dicommed.



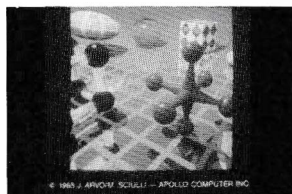
63. MELVIN L. PRUEITT, Los Alamos National Laboratory, MS-D415, Motion Picture Group, Los Alamos, NM 87545; (505) 667-4452. "Bonds." Image was calculated on a Cray computer. It was plotted on an ILL FR80.



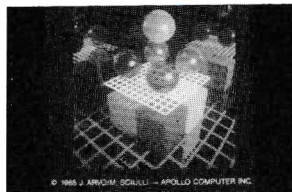
64. GIOVANNI DELLA ROSSA, EIDOS, Via Fontana, 16, 20122 Milano (02) 5458621. This is an image of a three dimensional reconstruction of the old tower of Rialto (Venice) which fell in the 1500's and was painted in 'Il miracolo della reliquie della croce' of Carpaccio. Image is by Forges Davanzati and Stefania Mason using a Computer Vision Designer V with Computer Vision CADDS4 software.



65. JAMES ARVO, MICHAEL SCIULLI, Apollo Computer Inc., 15 Elizabeth Drive, Chelmsford, MA 01824; (617) 256-6600. The image was made using an in-house ray-tracing program where computation was done on several workstations using the DOMAIN network.



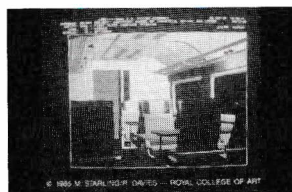
66. JAMES ARVO, MICHAEL SCIULLI, Apollo Computer Inc., 15 Elizabeth Drive, Chelmsford, MA 01824; (617) 256-6600. The image was made using an in-house ray-tracing program where computation was done on several workstations using the DOMAIN network.



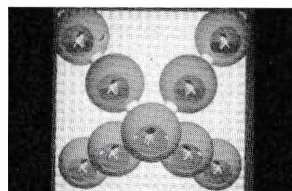
67. PATRICIA SEARCH, Rensselaer Polytechnic Institute, CIG CCI21, Troy, NY 12180; (518) 266-6011. "Joie De Vivre." Ray tracing (Barr-Edwards-Loring Ray Tracer) was used to render this image which was modeled with superquadrics. Form and color were designed to reduce the rigid symmetry of superquadrics. The image was computed on a Prime 750.



68. MICHAEL STARLING, ROGER DAVIES, Royal College of Art, Kensington Gore, London SW7 England, (01) 584-5020. "Rail Car Interior Model." This image was created for a project with Industrial Design studies for the British Railways Board. A VAX 11/730 and a Lexidata SV2 terminal were used to create this image along with the SDR/CAE International IDEAS software package.



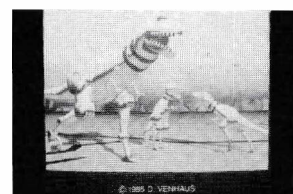
69. ANDY MORFFEY, IBM United Kingdom Limited, P.O. Box 32, Alencon Link, Basingstoke, Hampshire RG21 1EJ England; (0256) 56144. "Will."



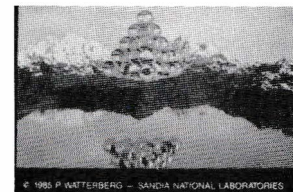
70. BEN TRUMBORE, KELAN PUTBRESE, Brown University, Box 1910, Providence, RI 02912 and Rhode Island School of Design, (401) 863-3666. "Afternoon at the Club." An in-house, high level scene description language was used exclusively to model this image on a VAX 11/780 running 4.2 BSD UNIX. Recording device is a Matrix Instruments QCR D-4/2. All local modeling, rendering and animation software is based on this scene description language. Programmers are: Paul Strauss, David Laidlaw, Michael Shantzis, Jeff Vroom and John Airey.



71. DON VENHAUS Pacific Data Images, 1111 Karlstad Drive, Sunnyvale, CA 94089; (408) 745-6755. "Chromosaurus." The image was designed and rendered on Ridge 32C computers using a Raster Technologies frame buffer.



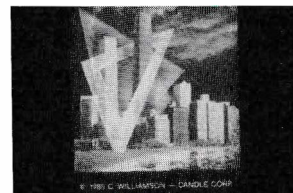
72. PETER WATTERBERG, Sandia National Laboratories, 335 Broad St. A-5, Augusta, GA 30901; (404) 724-0795. "Tahoe Afternoon." Experimental ray tracing software was used to render fractal mountains, clouds and ripples. The image was recorded on a Dicomed D48C at 1800x1200 resolution. The clouds and terrain used the same data-base created from algorithms by Richard Voss.



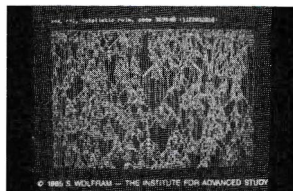
73. JERRY WEIL, AT&T Bell Laboratories, 600 Mountain Avenue, Murray Hill, NJ 07974; (201) 582-7833. "Bathroom Sequence." The image was created on a user-friendly animation system with an iconic interface. The artist is Jerry Weil; programmers are Jerry Weil and Jonathan Helfman.



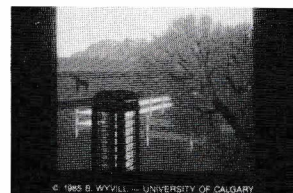
74. C. WILLIAMSON, Candle Corp., 1355 N. Gardner, Los Angeles, CA, 90046; (213) 850-7777. "Chicago." Equipment used was the MCI Quantel paint box.



75. STEPHEN WOLFRAM, The Institute for Advanced Study, Princeton, NJ 08540; (609) 734-8000. This image arose from modeling various complex physical phenomena. It illustrates the mathematical principle that complexity can be generated even when the components of a system are quite simple. Further background on this image can be found in my article in the September 1984 issue of *Scientific American*, in *Nature*, volume 311, page 419.



76. BRIAN WYVILL, University of Calgary, Department of Computer Science, 2500 University Drive NW, Calgary T2N1N2 Alberta, Canada, (403) 284-6009. The Graphicsland Animation system was used where objects have been composed of multiple typed primitives. The fractal mountains, particle grass, particle leaves, and polygonal trees are rendered in a single pass.



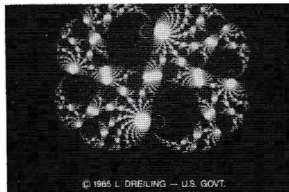
77. MAUREEN STONE,
ERIC BIER, Xerox Corporation,
Xerox PARC, 3333
Coyote Hill Rd., Palo Alto, CA
94304; (415) 494-4849. "The
Doctor's Table."

The image was designed using an interactive, three dimensional illustration program called "Solidviews." Solidviews implements a constructive solid geometry system with pattern mapping. The slide is a photograph of a hardcopy produced on the Versatec color plotter.



78. LESLIE A. DREILING,
U.S. Government, 738 Ridge
Dr., McLean, VA 22101; (703)
351-6553. "Feeding Fish." This
self-squared "z-plane" fractal
was created with a FORTRAN
program developed by the sub-
mitter. An IBM 3083 was used
for calculation, which took 5

hours. Calculations were made on a point by point basis for the 4000 line resolution image. ISSCO's DISSPLA graphics software was used to generate the image on a Dicomed D148CR film recorder in vector mode. Approximately a quarter of a million points on the complex plane were iteratively calculated using the equation $z = wz(1-z)$, where $w = 1.00155 - i 0.0627$ and $z = x + iy$.



79. PETER QUARENDON,
STEPHEN TODD, IBM
United Kingdom, Scientific
Centre, Athelstow House, St.
Clement St., Winchester,
HMNTS, UK, S0239DR,
(0962) 68191. "Fisheye." View
from the center of pre-albumin
using a fisheye lens.

