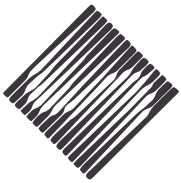
ACM SIGGRAPH Video Review
Issue 49

Special issue on Visualization in Scientific Computing, July 1989.



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1. Mars: The Movie

Contact:

Betsy A. Hall
Jet Propulsion Laboratory (JPL)
4800 Oak Grove Dr., M/S
168-522
Pasadena, CA 91109
(818) 354-6257

Credits:

Produced and directed by Kevin Hussey; Programming and animation by Robert A. Mortensen and Charles Thomas Kelley; Animation assistant Betsy A. Hall.

Technical Notes:

A fly-by over the distinctive Mars' surface, using satellite data of the Valles Marineris system of canyons and the Tharsis Montes volcanoes, represents the first animated look available of these geographically-intriguing regions.

Hardware: MicroVAX II, VAX 8600, Alliant FX/80-4. Software: VICAR 2, JPL's image processing environment, JPL prototype visualization software, PICS Planetary Image Cartography System (USGS).

2. Earth: The Movie

Contact:

Betsy A. Hall
Jet Propulsion Laboratory (JPL)
4800 Oak Grove Dr., M/S
168-522
Pasadena, CA 91109
(818) 354-6257

Credits:

Written by Moustafa Chahine, Kevin Hussey and Jeffrey R. Hall; Animation by Jeffrey R. Hall; Principal investigators: Moustafa Chahine (JPL) and Joel Susskind (Goddard Space Flight Center); Produced by the Image Processing Laboratory and the Digital Image Animation Laboratory at JPL.

Technical Notes:

This tape animates a cloud cover over the Earth, and simulates a flight around the Earth's surface.

Hardware: MicroVAX II, VAX 8600, Sun 4. Software: VICAR 2, JPL's image processing environment, and JPL prototype visualization software.

3. 1988 CFD Highlights

Contact:

Val Watson
NASA Ames Research Center
M/S 258-2
Moffett Field, CA 94035
(415) 694-6421

Technical Notes:

Excerpts of research in computational fluid dynamics. Hardware: Silicon Graphics' workstations, Cray supercomputers, Abekas Digital Video System. Software: Plot3D, SURF, GAS (from NASA Ames).

4. Visualizing Shuttle Flow Physics and Fluid Dynamics

Contact:

Gordon Bancroft
NASA Ames Research Center
MS 258-2
Moffett Field, CA 94035
(415) 694-4052

Credits:

Workstation Application Office and Code RFA, NASA Ames Research Center.

Technical Notes:

Visualization techniques are used to study flow fields derived from computational simulations. In this tape, NASA is analyzing air flow and surface pressures on a 3D computer model of the space shuttle, fluid flow within the main engine, and spin-off technologies and research based on the fluid dynamics work.

Hardware: Silicon Graphics 4D/70GT, Abekas Digital Video System. Software: Graphics Animation System, SURF, Plot3D.

5. Self-Portrait

Contact:

Jeff Goldsmith
Jet Propulsion Laboratory (JPL)
4800 Oak Grove Dr., M/S
510-202
Pasadena, CA 91109
(818) 397-7555

Credits:

Shya-Chyuan Huang, Jeff Goldsmith and Joan Salmon (Jet Propulsion Laboratory and California Institute of Technology); Music by R. Feynman and R. Leithton.

Technical Notes:

One processor grows into a 4D hypercube and rotates around in four dimensions. Hardware: NCUBE Hypercube. Software: In-house parallel ray-tracing software.

6. The Etruscan Venus

Contact:

George K. Francis
Math Dept.
Univ. of Illinois at
Urbana-Champaign
1409 W. Green St.
Urbana, IL 61801
(217) 333-5565

Credits:

George Francis (UIUC); Donna Cox and Ray Idaszak (NCSA).

Technical Notes:

The deformation (homotopy) of a surface in 4-space (projected into 3-space) becomes a model for experiments in computer graphics and electronic art.

Hardware: Silicon Graphics IRIS 4D/70GT. Software: Custom FORTRAN programs, Wavefront.

7. Numerical Relativity: Black Hole Spacetimes

Contact:

David Hobill
National Center for Supercomputing Applications (NCSA)
605 E. Springfield Ave.
Champaign, IL 61820
(217) 333-6077

Credits:

Research by David Hobill, David Bernstein and Larry Smarr; Visualization by Donna Cox and Ray Idaszak.

Technical Notes:

This tape on black hole spacetimes describes: (1) embedding diagrams, (2) geodesic slicing of a single black hole spacetime, (3) maximal slicing of a single black hole spacetime, and (4) gravitational radiation generated by an oscillating black hole.

Hardware: Computation done on a CRAY XMP and CRAY-2; Rendering done on an Alliant VFX/80 and Silicon Graphics IRIS. Software: In-house computation software uses PCGPACK for linear algebra; Wavefront for rendering.

8. The Lorenz Attractor

Contact:

David Hobill
National Center for Supercomputing Applications (NCSA)
605 E. Springfield Ave.
Champaign, IL 61820
(217) 333-6077

Credits:

David Hobill, Daniel Simkins, Michael Welge and Jeff Yost.

Technical Notes:

This tape is a visualization of a particular solution to the Lorenz system. One sequence describes the sensitivity of the system to initial conditions.

Hardware: Computation on the Cray-XMP; Rendering on an Alliant VFX/80 and SGI IRIS.

Software: Computation done using in-house software; Rendering done using Wavefront software.

9. Kodak's Supercomputational Science '88

Contact:

Lawrence A. Ray
Kodak/NCSA
605 E. Springfield Ave.
Champaign, IL 61820
(217) 244-1271

Credits:

Lawrence A. Ray and Richard Ellson (Kodak); Donna Cox, Carl Hoyer, Michael Rubinstein and Marc Olano (NCSA); Jozef Cohen(UIUC).

Technical Notes:

These simulations represent major Kodak research projects: (1) polymer dynamics, the motions of a polymer entangled in a fixed lattice, (2) injection molding, animating the temperature, flow direction and magnitude, and pressure of plastic being injected into a mold, and (3) computational color theory proposed by Jozef Cohen, which correlates color with the frequency response of the human visual system. Hardware: IRIS, Abekas. Software: Wavefront.

10. Hydrogen Diffusion on a Platinum Surface

Contact:

Lawrence A. Ray
Kodak/NCSA
605 E. Springfield Ave.
Champaign, IL 61820
(217) 244-1271

Technical Notes:

This is a simulation of an experimental process known as LITD. Surface hydrogen motion is driven by a gradient in the chemical potential. The color and height of hydrogen atoms indicate the atoms' energy levels. When hydrogen atoms are visualized on a post, it means they are absorbed to the surface. Hardware: Rendering on an AT&T Pixel Machine; Cray X-MP for Monte Carlo simulation. Software: Pixel Machine's RAYLIB library.

11. Double Diffusive Convection: Saltfingering

Contact:

Larry Rosenblum
Naval Research Laboratory
Code 5170
Washington, DC 20375
(202) 767-2384

Credits:

Model by Colin Shen; Animation by Larry Rosenblum.

Technical Notes:

The animation depicts the growth of salt fingers, a double diffusive process, using data from a numerical simulation. The results match well with what has been observed in the ocean and in laboratory experiments. Such numerical simulations help discriminate among

different types of local turbulence that arise naturally in the ocean.

Hardware: Cray, HP-1000, Dicomed.

12. Simulated Treatment of an Ocular Tumor

Contact:

Wayne Lytle
Cornell National Supercomputer Facility (CNSF)
B49 Caldwell Hall, Garden Ave.
Ithaca, NY 14853
(607) 255-4162

Credits:

Simulation by Mark Rondeau. Data acquisition by Anne Dumke.

Technical Notes:

This is a computer simulation of the treatment of an ocular tumor with a high-intensity ultrasound beam. The video shows how data is acquired by scanning an eye, how a model is constructed of the tumor and eye, and how the temperature of the tumor changes over time.

Hardware: Simulation on the IBM 3090. Rendering on the IBM 3090 and IRIS 4D/80GT. Software: Wavefront.

For information regarding purchase of the SIGGRAPH Video Review tapes contact:

ACM Order Department
P. O. Box 64145
Baltimore, MD 21264
(800) 342-66264