



SIGGRAPH 1992

*19th International Conference
On Computer Graphics and
Interactive Techniques*

*McCormick Place, Chicago
July 26 - 31*

COURSE NOTES

6

HDTV ARCHITECTURES
FROM A COMPUTER
GRAPHICS PERSPECTIVE

Organizer

Gary Demos
DemoGraFX

Lecturers

Jim Clark
Silicon Graphics, Inc.

Branko Gerovac
Digital Equipment Corp./MIT Media Lab.

Walter Gish
Terabit

Michael Liebhold
Apple Computer, Inc.

Don Miskovich
Eastman Kodak

Eric Petajan
AT&T Bell Labs.

HDTV Architectures from a Computer Graphics Perspective

Table of Contents

Section	Author	Topic
0		Schedule Speaker Biographies
1	Gary Demos	HDTV Formats and Issues
2	Walter Gish	Antialiasing and HDTV
3	Mike Liebhold	Compound Media and Interoperability
4	Eric Petajan	AT&T HDTV System Architecture
5	Jim Clark	A TeleComputer
6	Don Miskowich	Electronic Intermediate System

Papers

Demos, "An Example Hierarchy of Formats for HDTV"

Demos, "The Use of Logarithmic and Density Units for Pixels"

Demos, "Real Time and Synchronization Issues"

Demos, "A Comparison of Hierarchical High Definition Imagery
Coding Schemes"

Gish, "Hardware Antialiasing of Lines and Polygons"

Liebhold, "Towards an Open Environment for Digital Video"

HDTV Architectures From A Computer Graphics Perspective

Chair: Gary Demos

Tuesday

Course 6

Schedule:

8:45 AM to 8:55 AM	Introduction Of Schedule and Speakers (Gary Demos)
8:55 AM to 10:30 AM	Gary Demos - HDTV Formats and Issues
10:30 AM to 10:45 AM	Break
10:45 AM to 11:15 AM	Walter Gish - Anti Aliasing Shapes to A Raster
11:15 AM to 12:00 Noon	Branko Gerovac - Header, HDTV& Computing
12:00 Noon	Break for Lunch
1:15 PM to 2:00 PM	Mike Liebhold - Multimedia, Networks, Standards
2:00 PM to 2:45 PM	Eric Petajan - AT&T HDTV System Architecture
2:45 PM to 3:00 PM	Break
3:00 PM to 3:30 PM	Jim Clark - The Telecomputer, HDTV and 3-D
3:30 PM to 4:25 PM	Don Miskowich - Electronic Intermediate System
4:25 PM to 4:45 PM	Panel Discussion (All speakers)
4:45 PM	(End)

SPEAKER BIOGRAPHIES

Gary Demos

Gary Demos is the founder and president/CEO of DemoGraFX. For 20 years, he has produced high-resolution computer graphics for film and video. He is one of the founders of the Information International motion picture group, and of Digital Productions, which used a Cray to produce motion picture imagery. He also has worked with other supercomputers, such as the massively parallel Connection Machine and MasPar. Demos is an active participant in the international HDTV standards-making processes.

Jim Clark

Jim Clark, Chairman, founded Silicon Graphics, Inc. in 1981. Silicon Graphics designs, manufactures, markets, and services high performance 3D computers which are used by engineers, scientists, and creative professionals for conceptual design, analysis, and simulation of 3D objects and phenomena. The Company's systems are currently used in applications such as mechanical computer-aided engineering, animation, visual simulation, and various scientific applications including molecular modeling and computational fluid dynamics.

He has worked as a systems programmer, a consultant, and a professor of computer science. For three years he was an associate professor of electrical engineering at Stanford University, where he led the VLSI research team that developed the Geometry Engine. Clark holds a Ph.D. in computer science from the University of Utah and M.S. degree in physics from the University of New Orleans.

Clark has lectured extensively at universities and conferences worldwide, sharing his experience and insight in technology, leadership, and business development.

Walter Gish

Walter Gish is Executive Scientist at Terabit Computer Engineering where he is responsible for the architectural design of advanced visual systems. He received his BS (with Honors) and MS degrees in Physics and Applied Mathematics from the California Institute of Technology. As much fun as getting a Ph.D. in high energy physics is, he managed to tear himself away to join a rock 'n' roll band. He's never been the same since...

He has twenty years experience in signal processing and scientific programming. He wrote an interactive, window based DSP package running on an IDI display in 1977. This convinced him that graphics was fun but FORTRAN was not. He wrote software to create fractal rocks, mountains, and asteroids at Digital Productions for the movie "The Last Starfighter" (still in FORTRAN). He has eight years experience in graphics hardware, including a stint as Chief Technical Officer for Interactive Machines (no more FORTRAN). Walter is a member of the ACM, IEEE, Audio Engineering Society, Computer Music Association, and the Ventura Surf Club.

Mike Liebhold

Mike is currently Manager of Media Architectures Research in the Advanced Technology Group at Apple Computer, Inc.

Mike is responsible for long term investigations into architectures and applications of convergent interactive computing, high speed communications and high resolution media technologies. Since 1984, Mike has served as principal investigator, and manager of groups and projects within Apple Computer, responsible for a variety of hypermedia and broadband network applications and technologies. Most recently, Mike has contributed to the development of Quicktime, Apple's media extensions to the Macintosh operating system. Mike was project leader (and principal designer) for many of Apple's first CD-ROM and videodisc hardware, software, and multimedia information products and has been responsible for many of Apple's strategic partnerships in the communications and information industries.

Before joining Apple Computer, Inc., Mike served as Director for the Strategic Systems Research Laboratory at the Atari Division of Warner Communications, where he was responsible for work on educational, entertainment, and business applications of optical and network information systems. He was Manager of Advanced Application Development at ByVideo, Inc. (network videodisc-based transactions), a consultant to online and CD-ROM database publishing companies, and earlier has been employed in various management capacities for CBS, Warner Communications, and Pacific Telephone and Telegraph.

Mike has also served in various support capacities for his wife's enterprise: Bonnie Bird Animation and Video Schools and Camps for Children and Adults 1971 - 1991.

Don Miskowich

Don Miskowich has worked in film and computer animation for nineteen years. A Clio winner, he has worked on numerous film and TV projects, including commercials for Ford, 7-Up and Zeinith, logos for ABC, CBN and Columbia Pictures, and the films *Star Trek* and *Endangered Species*. He taught computer animation and has written training texts and articles on the subject. He marketed 3D computer animation systems and is currently marketing a film resolution computer graphic system for Kodak. Member ACM, SMPTE and IEEE.

Eric Petajan

B.S., Physics, University of Utah, 1978

M.S., Physics, University of Illinois, 1980

Ph.D., EE, University of Illinois, 1984

Member of Technical Staff, Principal Investigator, AT&T Bell Laboratories, Computing Systems Research Lab, 1984 - Present

Supervisor, 1989 - Present

Interests: HDTV, video coding, computer vision, speech recognition, interactive 3-D graphics, computer-human interfaces, architectures