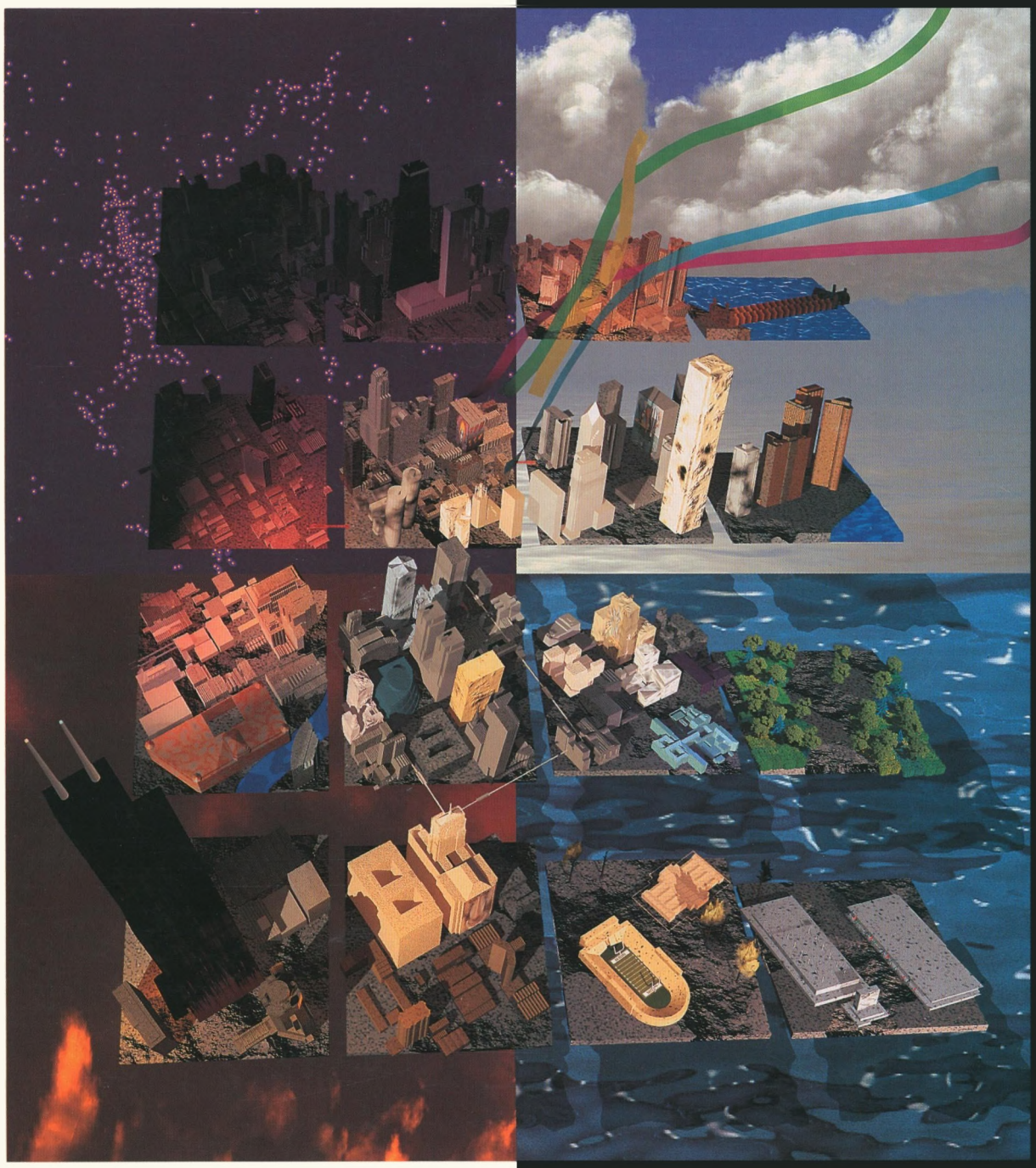
SIGGRAPH

'92 FINAL PROGRAM

JULY 26–31 1992



ACM SIGGRAPH '92

July 26-31, 1992

Chicago, Illinois

Sponsored by the Association for Computing Machinery's Special Interest Group on Computer Graphics in cooperation with the IEEE Computer Society's Technical Committee on Computer Graphics

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SIGGRAPH

'92 FINAL PROGRAM

19th Annual International Conference on Computer Graphics and Interactive Techniques

CHICAGO

Conference

July 26-31

1992

Exhibition

July 28-30

1992

HOW TO USE THIS FINAL PROGRAM

The *SIGGRAPH '92 Final Program* includes comprehensive descriptions of the technical program, conference events, and exhibition. The venue descriptions include the committee members, speakers/contributors, and other credits. To make it easier after the conference to obtain additional information about things you see or to contact people you meet at SIGGRAPH '92, there are numerous contact listings throughout the *Final Program*. The table of contents provides a quick guide to finding information—a more detailed index appears on each section divider—and a handy conference at a glance schedule is on page 4. Times and locations for all conference activities and a chart explaining what is included with your registration appear in the *Conference Locator*.

WELCOME

Welcome to the excitement, the energy, the enthusiasm, and the experiences that make up SIGGRAPH '92! The conference theme, "Insight Through Images," emphasizes our collective belief that pictures indeed have a purpose. We strongly believe it is SIGGRAPH's responsibility to educate the technologists, scientists, engineers, artists, and practitioners on the power of the picture.

Three years in the making, SIGGRAPH '92 launches the computer graphics industry to new heights. We're emphasizing interactive real-time demonstrations over networks. We're projecting high-definition animations in their original HDTV format. And, we're providing plenty of places for people to meet—whether it's for small talk, serious conversation, or just good times!

We are all participants in an amazing week of information exchange, networking, presentation, demonstration, and exhibition—where our collective involvement creates a tremendous force that rejuvenates the lifeblood of the computer graphics industry. SIGGRAPH '92 is much more than pushing buttons, looking at pictures, and eating great food.

First and foremost, there is a focus on innovation. Traditional events have creative new twists. New events look at state-of-the-art uses of visualization and bring a larger, international view to specialized areas.

In Showcase, this year's flagship event, computational scientists and engineers demonstrate applied scientific visualization techniques in a high-performance computing and communications environment. To contrast such high-end technologies, students and researchers in G-tech demonstrate works in progress on basic, stand-alone desktop computers. And proving that computer graphics is not just for the educated elite, we've created the SIGKids Learning Lab, a real-world experience for elementary and high school-aged computer users.

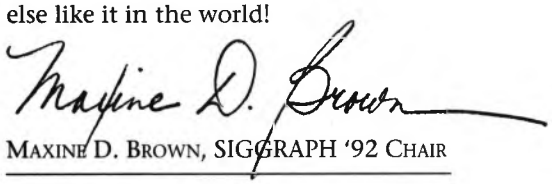
"I, Richard M. Daley, Mayor of the City of Chicago, do hereby proclaim, **JULY 26-31, 1992**, *to be* **COMPUTER GRAPHICS WEEK IN CHICAGO**, *and urge all citizens to recognize the tremendous influence the computer graphics industry has had on businesses and education worldwide."*

We expanded the scope of SIGGRAPH to acknowledge application areas that rely upon the many technical disciplines that make up the computer graphics industry for more knowledgeable decision making and more sophisticated problem solving. To reach this new audience, we developed technical groupings in visualization, modeling, and simulation; visual communication and multimedia; visual computer systems and networks; and visualization policies, ethics, and standards. We then integrated the technical program into specialized market areas which include financial services, printing and publishing, medical visualization, and molecular modeling.

In the past three years, the world has experienced economic downturn, war, and productivity losses in traditional industries. SIGGRAPH's stature as a leading-edge, high-technology conference enables us to weather these unfortunate circumstances by offering a program that leaves participants filled with ideas and innovation that can open doors for new growth and development back in our own real worlds.

During this special conference week, I wish to thank all participants—attendees and contributors—for being part of SIGGRAPH '92. There is no conference without you. I also wish to thank a talented and dedicated conference committee for providing direction and organization to this phenomenal event. And, special thanks to each and every participant's family, friends, and employer for their "in kind" support of SIGGRAPH '92.

See it, believe it, experience it at SIGGRAPH '92! There really is nothing else like it in the world!



MAXINE D. BROWN, SIGGRAPH '92 CHAIR

SIGGRAPH advances technology transfer for the '90s.

The SIGGRAPH '92 technical program covers topics not taught anywhere else. It provides the right type of information businesses need to be more competitive in the global marketplace today and tomorrow.

SIGGRAPH participants frequently are surprised to learn how much computer graphics technology has changed—even if out of college only a year or two.

The '92 technical program of courses, papers, and panels offers opportunities to research the latest advances in computer graphics impacting workstation development, supercomputing, networking, virtual reality, HDTV, mass storage, and user interface.

Throughout the week, attendees learn about the newest ways computer graphics is being applied by talking with experts from around the world and meeting people who are interested in the same types of things that interest them.

Whether you are just discovering the potential of computer graphics or are well-based in its technologies, the conference adds another dimension to how you think about what comes next. See it, believe it, experience it at SIGGRAPH '92. There really is nothing else like it in the world.

SIGGRAPH is...

Through its many conference venues, SIGGRAPH '92 balances late-breaking developments in computer graphics with cutting-edge discoveries in emerging technologies. In addition to our traditional focus, this year SIGGRAPH explores how visualization technologies can help generate more sophisticated solutions to problems and encourage more knowledgeable decisions in four major markets. SIGGRAPH's broad scope of technological content is represented by the icons that appear to the right, followed by icons for the market applications. These symbols appear throughout the technical program descriptions to help you determine which events to attend. The guide is only a beginning to discovery. Your imagination should lead you on your own personal exploration of SIGGRAPH.

Visualization, Modeling, and Simulation

Animation

Color

Computer-aided design

Data visualization

Fractals

Geometric modeling

Image analysis

Image synthesis and rendering

Scientific visualization

Visual Communication and Multimedia

Art

Computer-supported collaborative work

Computer-human interface

Education

Graphic design

HDTV (High-definition television)

Image compression, decompression, and manipulation

Multimedia

Publishing: print, video, and desktop

Virtual reality

Visual Computer Systems and Networks

Computer architecture

Computer software

Networking and telecommunications

Visualization Policies, Ethics, and Standards

Emerging policy

Intellectual property rights

Graphics standards

Molecular Modeling

Medical Visualization

Printing and Publishing

Financial Services

Who attends SIGGRAPH

The really nice thing about SIGGRAPH is that it can be enjoyed on so many levels, whether you do computer graphics for a living or something else. SIGGRAPH exhibitors create the best opportunity anywhere to see how the latest computer graphics products and services can improve your work. The conference attracts as many as 25,000 participants from around the world and hundreds of media representatives.

The fundamentals seminar provides computer graphics novices with a thorough introduction to terminology and technologies. It is a good refresher for intermediate-level computer graphics users, too. Some of the technical programs can reach high levels of detail that challenge the more experienced computer professionals, yet many of the programs are geared toward other interests.

There are plenty of opportunities for computational scientists and engineers to explore massive data in visual ways; as well as opportunities for artists to discover new realms of expression and design. SIGGRAPH '92 also is focusing on applying visualization technologies in four major markets: molecular modeling, medical visualization, printing and publishing, and financial services.

Conference At A Glance

	Sunday July 26	Monday July 27	Tuesday July 28	Wednesday July 29	Thursday July 30	Friday July 31
Registration/ Merchandise	12noon–10:00pm	7:30am–7:00pm	7:30am–7:00pm	8:00am–6:00pm	8:00am–6:00pm	9:00am–1:00pm
Fundamentals Seminar	2:00pm–5:00pm					
Welcoming Reception	5:00pm–8:00pm					
Courses Full-Day		8:45am–4:45pm	8:45am–4:45pm			
Courses Half-Day			8:45am–12:00noon 1:30pm–4:45pm			
Art Show	5:00pm–8:00pm	9:00am–7:00pm	9:00am–7:00pm	9:00am–6:00pm	9:00am–6:00pm	9:00am–1:00pm
SIGKids		10:00am–4:00pm	10:00am–4:00pm	10:00am–4:00pm	10:00am–4:00pm	10:00am–4:00pm
Courses Reception		7:00pm–10:00pm				
G-tech			9:00am–7:00pm	9:00am–6:00pm	9:00am–6:00pm	
Exhibition			10:00am–6:00pm	10:00am–6:00pm	10:00am–3:30pm	
Showcase			10:00am–6:00pm	10:00am–6:00pm	10:00am–3:30pm	
Electronic Theater			6:00–7:45pm 8:45–10:30pm	7:30pm–9:15pm	7:30pm–9:15pm	
Keynote Address/ Recognition				8:45am–10:15am		
Computer Graphics Screening Room		9:00am–7:00pm	9:00am–7:00pm	9:00am–6:00pm	9:00am–6:00pm	9:00am–1:00pm
Papers				10:30am–4:45pm	8:45am–4:45pm	8:45am–4:45pm
Panels				10:30am–4:45pm	8:45am–4:45pm	8:45am–4:45pm
Papers/Panels Reception					7:00pm–10:00pm	

Technical Program

WE STRONGLY BELIEVE it is SIGGRAPH's responsibility to educate the technologists, scientists, engineers, artists, and practitioners on the power of the picture.

Courses: offer classroom discussions on a broad range of current topics. Courses are categorized in three levels:

Beginning: no prerequisites for introductory courses, but prior experience with computing or graphics may be helpful.

Intermediate: attendees should have working knowledge of the subject, based on introductory courses, reading, and practical experience. Courses supply substantial technical content in detail, such as algorithms, techniques, and architectures.

Advanced: narrow topics covered in substantial technical depth. Presentations may include challenging mathematical concepts and programming examples.

Papers: presentations of leading-edge theory, applications, and cross-disciplinary topics.

Panels: exchange of ideas and group discussion of timely topics.

Special Sessions: presentations of non-traditional, one-of-a-kind topics.

Courses

Papers Sessions

Panels and Special Sessions

Key to Icons


Modeling and Simulation


Communication and Multimedia


Systems and Networks


Policies, Ethics, and Standards


Molecular Modeling


Medical Visualization


Printing and Publishing


Financial Services

Courses

Courses challenge the mind. Probe the depth and breadth of new concepts, or simply study the basics of computer graphics using creative techniques and state-of-the-art technologies. Courses provide time for complete exploration of a wide range of technical subject matter.

Application courses are offered for people specifically interested in emerging visualization technologies in molecular modeling, medical visualization, printing and publishing, and financial services. National researchers and industry experts, who are pioneering advancements through computer graphics in each of these areas, discuss possible solutions to current problems.

Courses are documented in the *SIGGRAPH '92 Course Notes*. Individual notes are included with course registration. As quantities permit, full sets, as well as individual course notes, may be purchased at the conference.

Courses Chair
Alan Norton
IBM T.J. Watson Research Center

Assistant
Glenn Cho *School For Visual Arts*

Committee
Frank Bliss *EDS*
Ed Council *Timberfield Systems*
Rich Ehlers *Evans & Sutherland*
Lauretta Jones *IBM T.J. Watson Research Center*
Nan Schaller *Rochester Institute of Technology*
Dino Schweitzer *U.S. Air Force Academy*

Papers

Technical papers bring new ideas to reality. SIGGRAPH is the leading forum for the presentation of technical papers on new, unpublished research and innovative applications in other disciplines, such as math and science.

Paper presentations are designed to keep the industry informed about the state of the art in computer graphics. The categories of papers have been broadened this year to include four new kinds of papers: pedagogical, cross-disciplinary, video, and multimedia, in addition to research, systems, and applications papers.

The SIGGRAPH '92 papers committee reviewed more than 200 submissions and selected an intriguing array of papers on current computer graphics topics, from complex graphics algorithms and geometric modeling to computer animation and beyond. These insights and broad, well-rounded perspectives on particular topics are available to conference attendees in the *SIGGRAPH '92 Conference Proceedings*.

This year, for the first time, SIGGRAPH is providing a CD ROM version of the proceedings, in addition to the traditional book format.

Selected videos from paper presentations are available in the *SIGGRAPH '92 Video Review*.

Paper and panel sessions run concurrently.

Papers Chair
Edwin E. Catmull
Pixar

Assistant
Kay Seirup *Pixar*

Committee
Alan H. Barr *California Institute of Technology*
Forest Baskett *Silicon Graphics Computer Systems*
Richard J. Beach *Xerox PARC*
Loren Carpenter *Pixar*
Richard Chuang *Pacific Data Images, Inc.*
Elaine Cohen *University of Utah*
Robert L. Cook *Light Source Computer Images, Inc.*
Frank Crow *Apple Computer, Inc.*
Henry Fuchs *University of North Carolina at Chapel Hill*
Donald P. Greenberg *Cornell University*
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Paul Heckbert *Delft University of Technology*
James T. Kajiya *California Institute of Technology*
Marc Levoy *Stanford University*
Jock Mackinlay *Xerox PARC*
Nelson Max *Lawrence Livermore National Laboratory*
Don P. Mitchell *AT&T Bell Laboratories*
Darwyn Peachey *Pixar*
Craig Reynolds
Robert Sproull *Sun Microsystems, Inc.*
Craig Upson *Silicon Graphics Computer Systems*
Andries van Dam *Brown University*
Turner Whitted *Numerical Design, Ltd.*
Lance Williams *Apple Computer, Inc.*
Andrew Witkin *Carnegie Mellon University*

CD ROM Support
Apple Computer, Inc.
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Panels

Panels offer discussion, debate, and rare consensus. SIGGRAPH's panels are candid, thought-provoking discussions of trends, controversies, and viewpoints in the computer graphics industry—covering the broad range of SIGGRAPH topics.

Panel topics include: virtual reality, digital TV, artificial life, graphics standards, hardware, color, and multimedia. Panel abstracts are published in the *SIGGRAPH '92 Conference Proceedings*.

Paper and panel sessions run concurrently.

Panels Chair
Bruce H. McCormick
Texas A&M University

Assistant
Sherry Escalante *Texas A&M University*

Committee
Richard J. Beach *Xerox PARC*
Donna J. Cox *National Center for Supercomputing Applications*
Robert L. Judd *Los Alamos National Laboratory*
Mike Keeler *Kubota Pacific Computer, Inc.*
Jaron Lanier *VPL Research, Inc.*
Richard L. Phillips *Los Alamos National Laboratory*
Vibeke Sorensen *California Institute of the Arts*
Steven L. Tanimoto *University of Washington*
James M. Winget *Silicon Graphics Computer Systems*

Course	Introduction to Scientific Visualization Tools and Techniques	Fundamentals and Overview of Computer Graphics
Who Should Attend	Anyone starting to do or interested in learning more about visualization. Useful to people researching solutions to particular visualization problems but lacking sufficient knowledge to guide them.	Technical professionals and managers who are unfamiliar with computer graphics and desire a general understanding.
Level/Prerequisite	**Beginning** Some familiarity with scientific data sets, fundamental mathematics, and introductory computer graphics.	**Beginning** No background in computer graphics or mathematics is required. Some exposure to computers and programming would be helpful.
Objectives	The course offers an overview of scientific visualization and specific methods for solving scientific visualization problems. It provides a working knowledge of the concepts, techniques, and available tools for scientific visualization. Lecturers also explain tools and techniques used in the development of hardware and software across platforms. The end result is a clear idea of procedures to follow when creating images from scientific data.	The course helps people who have heard terms such as pixel, CSG, Z-buffer, and trackball, and would like a more global context in which to make sense of them and understand how they fit together.
Description	Rather than describe whiz-bang visualization systems, which might not be available to attendees, the course presents useful information by approaching visualization from a data domain point of view. Actual tools and techniques for visualizing a variety of scientific data sets are discussed and provided in the course notes. The course approaches scientific visualization by looking at color, data models, and different classes of data—2D and 3D fields, fields on unstructured grids, multivariate data sets—and by providing the fundamental concepts followed by specific tools and techniques for visualizing these data domains.	This course begins with a brief historical perspective of computer graphics and an introduction to fundamental concepts—covering the current state of the industry and important trends. The majority of the course is a survey of topics. Emphasis is on breadth of coverage, not technical details. Attendees get an intuitive understanding of many concepts, rather than details of only a few.
Organizer	**Chuck Hansen** *Los Alamos National Laboratory*	**Olin Lathrop** *Cognivision, Inc.*
Lecturers	**Todd Elvins** *San Diego Supercomputer Center* **Larry Gelberg** *AVS, Inc.* **Chuck Hansen** *Los Alamos National Laboratory* **Mike Krogh** *National Center for Supercomputing Applications* **Gregory Nielson** *Arizona State University* **Lloyd Treinish** *IBM T.J. Watson Research Center* **Alexander Yarmarkovich** *Advanced Visual Systems, Inc.*	**Norman Badler** *University of Pennsylvania* **Richard M. Fichera** **Olin Lathrop** *Cognivision, Inc.* **Carl Machover** *Machover Associates Corporation*
Organizer Biography	Chuck Hansen is a project leader for visualization in the Advanced Computing Laboratory at Los Alamos National Laboratory. He is responsible for the scientific visualization environment for the Department of Energy's High-Performance Computing and Communication Center. He has extensive experience in scientific visualization, particularly as it applies to very large-scale computational environments. Research interests include scientific visualization, 3D shape representation and geometry, and computer vision.	Olin Lathrop is a founder and vice president of research at Cognivision, Inc., a company specializing in data visualization software and services. His current interests are visualization algorithms and techniques, and learning how to best present information for human understanding. Lathrop is an occasional lecturer on computer graphics and data visualization at conferences and universities; he also enjoys teaching the basics to newcomers to the field.

5 Graphic Design for User Interfaces

This is for the product developer, software engineer, marketer, scientist, member of technical staff, application developer, human factor specialist, graphic or industrial designer, or technical editor.

Intermediate
Some previous experience in designing graphical user interfaces for reasonably complex applications.

This course gives developers, graphic designers, and users valuable insight into key graphic design issues and shows how to achieve effective visual communication. It introduces terminology, principles, guidelines, and heuristics for using information-oriented, systematic design in the development of graphical user interfaces (GUIs), especially for the design of metaphors, icons, control panels and dialogue boxes, and navigational devices.

Skillful graphic design for GUIs is crucial to the success of innovative computer-based products. Participants observe and analyze techniques for making products and displays more intelligible, functional, aesthetic, and marketable. Perceptual, conceptual, and communication issues in typography, symbol systems, color, spatial composition, animation, and sequencing are covered. The course is relevant to window manager paradigms, such as Motif and Open Look, and to application software development. The course emphasizes analyzing and designing metaphors, mental models, navigation in the model, appearance characteristics, and interaction techniques.

Aaron Marcus *Aaron Marcus and Associates*

N. Gregory Galle *Aaron Marcus and Associates*
Grant Letz *Aaron Marcus and Associates*
Aaron Marcus *Aaron Marcus and Associates*

Aaron Marcus is an internationally recognized authority on graphic design for computer graphics, especially chart, form, document, icon, and screen design. He has given knowledge visualization, user interface design, and document design tutorials at major conferences and companies, both nationally and internationally. Marcus has written books and articles on graphic design for computer graphics for technical and professional journals.

7 Distributed Scientific Visualization on High-Performance Networks

Software developers or computer users wanting to know how networks work and how to use them for scientific visualization.

Intermediate
Some experience in networked computing from a user standpoint. No knowledge of network concepts or technology required. Some knowledge of distributed computing would be helpful.

This course teaches basic networking and reviews the software commonly used for general distributed computing and distributed scientific visualization. It also covers the capabilities and problems of networked computing. Participants learn how to determine what network technologies are best suited for their applications.

This course provides an overview of distributed scientific visualization from a scientist's perspective. It describes enabling technologies of networks and distributed computing software. Basic networking concepts, wide-area networks, and emerging technologies are discussed. Distributed computing is described, with a comparison of software tools used to create distributed applications.

The course includes case studies of SIGGRAPH '92 Showcase demonstrations. Showcase presenters provide detailed descriptions of their applications, examine the benefits and problems of their implementations, and discuss performance issues surrounding their solutions.

Charles E. Catlett *National Center for Supercomputing Applications (NCSA)*
Jeffrey A. Terstriep *NCSA*

Charles E. Catlett *NCSA*
William Hibbard *University of Wisconsin*
Patrick Moran *NCSA*
Michael L. Norman *NCSA*
Jeffrey A. Terstriep *NCSA*

Charles E. Catlett is associate director for computing and communications at NCSA, University of Illinois. He is principal investigator for NCSA's work developing applications and programming environments for the BLANCA gigabit/second network testbed, one of five such testbeds being coordinated by the Corporation for National Research Initiatives with funding from industry, the National Science Foundation, and the Defense Advanced Research Projects Agency.

Jeffrey A. Terstriep is a project leader in the Networking Development Group at NCSA. Presently, he is leading the effort to develop distributed applications on the BLANCA testbed and teaches computer graphics courses at a community college.

9 Implementation of Immersive Virtual Environments

This course covers the design and implementation of working, high-performance, immersive, interactive, virtual environments.

Intermediate
Moderate experience in graphics programming and some awareness of interfacing serial devices to computers. Concepts such as transformation matrices, use of graphics libraries, and basic Cartesian geometry are assumed. No knowledge of virtual environments is required.

The course provides an understanding of how to develop a fully immersive, interactive, virtual environment. Attendees learn how to select hardware for a particular virtual environment, outline the appropriate software structure, and implement that structure in a way that gives the greatest possible performance.

This course discusses the integration of hardware, software, and program design to create the illusion of virtual worlds. Developers who have designed some of the most famous and successful virtual worlds describe their implementations of fully immersive virtual environments and discuss their work on a detailed level. Also covered are solutions to integration difficulties and various options when developing virtual worlds.

Steve Bryson *NASA Ames Research Center*

Chuck Blanchard *VPL Research, Inc.*
William Bricken *University of Washington*
Steve Bryson *NASA Ames Research Center*
Lew Hitchner *NASA Ames Research Center*
Rick Jacoby *NASA Ames Research Center*
Creon Levit *NASA Ames Research Center*
Warren Robinett *University of North Carolina at Chapel Hill*

Steve Bryson is with Computer Sciences Corporation working under contract for the Applied Research Office of the Numerical Aerodynamics Simulation Systems Division at NASA Ames Research Center. He does research in the application of virtual reality techniques to scientific visualization, of which the virtual wind tunnel is his main focus. Bryson previously worked at NASA Ames' VIEW lab and at VPL Research.

Course	11 Radiosity	13 Causes and Cures of Performance Anxiety in Graphics Systems
Who Should Attend	People involved in the development or use of algorithms for image synthesis or the design of systems that can take advantage of image synthesis techniques.	Designers or systems programmers who develop or support graphics Application Programmer Interfaces (APIs), application programmers, and people selecting an API to match application requirements.
Level/Prerequisite	**Intermediate** Some experience in or working knowledge of image synthesis and comfort with college-level calculus.	**Intermediate** Understanding of graphics support systems and APIs.
Objectives	Attendees learn underlying principles that led to the development of radiosity for image synthesis. The course provides insight into the decisions and trade-offs encountered in implementing a radiosity system, and develops realistic expectations for what can be achieved with current and potential technology.	Attendees learn how to design or use a graphics API, or architect a system within which a graphics API runs. Course information is presented from an architectural, not implementation, viewpoint. Attendees learn to avoid performance and functional pitfalls, and to exploit available features to their fullest. Immediate-mode graphics systems, as opposed to display-list systems, are emphasized.
Description	The course focuses on a body of realistic image synthesis algorithms which model the inter-reflection of light within an environment. It covers basic formulation of radiosity through development of energy equilibrium integral equations and the discretization of such equations to make their solutions computable. Recent algorithmic techniques that make radiosity an attractive alternative to image synthesis are described. The course contains new material on practical problems in developing and using radiosity algorithms encountered by researchers and developers who implemented early systems. Some human perception issues as they relate to image synthesis also are covered.	The course provides in-depth presentations on the historical evolution and the architectural design of accelerator-level, system-level, and application-level aspects of graphics systems. Emphasis is on performance and total system throughput. Attendees are exposed to aspects and issues of graphics API/systems, with focus on immediate mode. Topics covered are: choosing an API, structuring applications, advantages and drawbacks of immediate-mode graphics, architectural issues in coordinating other graphics services (imaging, realistic rendering, animation), impact of graphics requirements on state-of-the-art system architectures, and benefits of object-oriented approaches.
Organizer	**Michael F. Cohen** *Princeton University*	**Eileen McGinnis** *Sun Microsystems, Inc.*
Lecturers	**A.T. Campbell III** *ALFA Engineering, Inc.* **Michael F. Cohen** *Princeton University* **Donald P. Greenberg** *Cornell University* **Patrick M. Hanrahan** *Princeton University* **Holly E. Rushmeier** *National Institute for Standards and Technology* **François X. Sillion** *École Normale Superieure, France* **John R. Wallace** *3D/EYE, Inc.*	**Dave Cooper** *Hewlett-Packard Company* **Eileen McGinnis** *Sun Microsystems, Inc.* **Patrick Maillot** *Sun Microsystems, Inc.* **Bob Sproull** *Sun Microsystems, Inc.* **Kevin Weiler** *Kubota Pacific Computer, Inc.*
Organizer Biography	Michael Cohen is an assistant professor of computer science at Princeton University. He previously was on the faculty at the University of Utah and in the Program of Computer Graphics at Cornell University where he conducted research in realistic image synthesis. He also worked on the development of the radiosity method. Current interests include constrained optimization for animation, image synthesis, interactive graphical user interfaces, and scientific visualization.	Eileen McGinnis is an engineering manager at Sun Microsystems. Over the last 13 years, she has been designing graphics API/systems, including real-time motion, video, realistic rendering, imaging, and color-support systems. She has been active in the development of many vendor-defined immediate-mode graphics interfaces, and in the public definitions of Core, GKS, PHIGS, PHIGS+, PEX, and RenderMan. She is the head of the US delegation to ISO in the area of graphics APIs.

15 Curve and Surface Design: From Geometry to Applications

CAD developers, programmers, analysts, animators, researchers, and educators who want to learn the geometric foundations of curve and surface modeling.

Intermediate
Vector calculus, linear algebra, and basic computer graphics are recommended. Basic numerical analysis is helpful.

Attendees learn the basic concepts of curve and surface design techniques. Attendees gain an understanding of advanced Computer-Aided Geometric Design (CAGD) techniques and applications.

Foundations for curve and surface design are presented with applications, algorithms, and live interactive demonstrations. Course notes provide a detailed background in CAGD which is required to use the techniques discussed. Notes enable attendees to pursue topic areas in more detail.

Alyn P. Rockwood *Arizona State University*

Thomas A. Foley *Arizona State University*
Hans Hagen *Universität Kaiserslautern*
Gregory M. Nielson *Arizona State University*
Alyn P. Rockwood *Arizona State University*

Alyn Rockwood is an associate professor in the Department of Computer Science at Arizona State University; his interests include volume rendering, blending surfaces, and computer-aided sculpturing. Previously, at Silicon Graphics, he helped develop the real-time display of NURBS for the IRIS workstation. At Evans & Sutherland, he supervised graphics software for the first Phase III flight simulator and helped develop the first general blending capability in the geometric modeler ROMULUS II.

17 Advanced Techniques in Human Modeling, Animation, and Rendering

Artists and scientists who want to know how to generate realistic-looking humans.

Intermediate
Basic knowledge of computer graphics and computer animation is recommended.

The course updates attendees on current research in human modeling, animation, and rendering. It shows what is needed to generate realistic humans and well-known personalities. The course introduces several advanced techniques: hair rendering, cloth animation, use of natural language in human animation, physically based facial animation, and vision-based behavioral animation.

This course discusses the development of computer-generated human characters: shape creation, animation, textures, deformation of limbs during motion, facial expressions, and behavior simulation. The impact of 3D and video input devices on the design and animation of the human body and face is shown.

The course also reviews methods for rendering hair, modeling hairstyle, and applying skin texture; techniques for designing and animating clothes; and, the role of natural language in the animation of human figures. Finally, it presents an innovative way of animating actors at a high level based on the concept of synthetic vision.

Daniel Thalmann *Swiss Federal Institute of Technology*

Norman Badler *University of Pennsylvania*
Nadia Magnenat-Thalmann *University of Geneva*
Demetri Terzopoulos *University of Toronto/Schlumberger Laboratory*
Daniel Thalmann *Swiss Federal Institute of Technology*

Daniel Thalmann is full professor, head of computer science, and director of the Computer Graphics Laboratory at the Swiss Federal Institute of Technology. He also is an adjunct professor at the University of Montreal. Thalmann co-chairs the Eurographics' Working Group on Computer Simulation and Animation. He has co-published a number of papers and books and co-directed several computer-generated films. He is also co-editor of two major computer graphics journals.

19 An Introduction to Physically Based Modeling

Researchers and implementors who want to develop a solid understanding of physical methods applied to animation and modeling.

Intermediate
Familiarity with mainstream computer graphics modeling and animation. Graphics math skills—matrix and vector manipulations—plus basic calculus. Those with more extensive math backgrounds will benefit; experts might find parts slow.

Attendees learn how to do physically based modeling. A student with good basic implementation skills should be able to implement the techniques presented. Lecturers impart a basic understanding of each topic, while the course notes provide the detailed background required to work the mathematics and implement the methods.

During the past few years, physically based modeling has emerged as an important approach to computer animation and computer graphics modeling. This course provides a systematic introduction to physically based modeling, including the dynamics of particles and mass/spring systems, continuum methods for simulating water and non-rigid objects, summation notation, simulating systems described by arbitrary parameters, rigid body dynamics, kinematics and dynamic constraints, and collision and contact. Presentations favor visual, spatial explanations over formal, symbol manipulation. New mathematical material is presented, requiring sustained concentration.

Michael Kass *Apple Computer, Inc.*
Andrew P. Witkin *Carnegie Mellon University*

David Baraff *Cornell University*
Alan Barr *California Institute of Technology*
Michael Kass *Apple Computer, Inc.*
Andrew P. Witkin *Carnegie Mellon University*

Michael Kass is a staff research scientist with the Advanced Technology Group of Apple Computer. Before joining Apple Computer, he worked at Schlumberger Palo Alto Research in computer graphics and computer vision. His research focus is on the use of physical simulation for computer graphics.

Andrew Witkin is professor of computer science at Carnegie Mellon University. Prior to joining the faculty at Carnegie Mellon, he headed the Perception and Graphics Group at Schlumberger Palo Alto Research. His research interests include computer animation, computer vision, and simulation.

Course	21 Writing RenderMan Shaders	23 Procedural Modeling and Rendering Techniques
Who Should Attend	Anyone who would like to write RenderMan shaders for high-quality image or animation production.	People interested in procedural modeling, shading, and texturing techniques; various design approaches and techniques; and procedures for producing realistic images.
Level/Prerequisite	**Advanced** A solid background in 3D computer graphics and programming. Some familiarity with the RenderMan Shading Language is strongly encouraged. Fluency in the C programming language is expected.	**Advanced** Basic working knowledge of rendering, shading, and solid texturing techniques. Some knowledge of fractals and basic volume rendering techniques is useful, but not required.
Objectives	The course covers the theory and practice of writing sophisticated RenderMan shaders to simulate natural and artificial objects and effects, such as bricks, plants, fruit, fire, water, and special light sources, in rendering styles ranging from photorealistic to cartoon style.	Attendees gain understanding of procedural techniques for solid texturing and insight into design approaches in developing procedures. The course offers a toolbox of specific procedures and basic primitive functions (noise, turbulence, etc.) to produce realistic images, several advanced procedural approaches for modeling object geometry (hypertextures, gases, fractals), and an introduction to animating these procedural objects and textures.
Description	The RenderMan Shading Language is a special-purpose programming language that performs shading calculations in RenderMan rendering programs. Shading language programs, called shaders, are used to model materials and effects in a physically realistic way or in an unrealistic, artistic style. Attendees learn how to write shaders that create a rich visual world in applications, such as animation, CAD, and presentation graphics. Examples of successful RenderMan images and animations are presented as detailed case studies to give attendees an injection of practical experience with the shading language.	This course imparts a working knowledge of procedural approaches in modeling, shading, rendering, and animation. Procedural approaches include 2D and solid textures, hypertextures, volume density functions, fractal, and genetic algorithms. In-depth descriptions of basic primitive functions are presented, including noise and turbulence functions. Animations using these techniques are shown. The course also describes fractal applications and their relationship to other procedural techniques. Participants see details about these techniques, including useful and practical guidelines for selecting parameter values, which normally are left out of technical papers.
Organizer	**Tony Apodaca** *Pixar* **Darwyn Peachey** *Pixar*	**David S. Ebert** *The Ohio State University*
Lecturers	**Tony Apodaca** *Pixar* **Darwyn Peachey** *Pixar* **Tom Porter** *Pixar* **Rick Sayre** *Pixar* **Eliot Smyrl** *Pixar*	**David S. Ebert** *The Ohio State University* **F. Kenton Musgrave** *Yale University* **Darwyn Peachey** *Pixar* **Ken Perlin** *New York University*
Organizer Biography	Tony Apodaca is a senior engineer and project manager in the RenderMan Division at Pixar. He is co-developer and reigning chief architect of the RenderMan Interface Specification. He also is one of the unknown implementors of Pixar's image synthesis products. His screen credits include *Tin Toy*, *knickknack*, and *Terminator 2*. Darwyn Peachey is an animation scientist at Pixar. Since 1988 he has worked on the design and implementation of the RenderMan renderers and in-house animation software. Prior to joining Pixar, he developed UNIX kernel software and was a member of the computer science research staff at the University of Saskatchewan.	David Ebert is an instructor in the Department of Computer and Information Science at The Ohio State University. His current research interests include rendering and animating gases and fluids, combining volume and surface-based rendering, texturing, and animation control issues. His work has appeared at previous SIGGRAPH conferences and in various publications.

2 Interactive Multimedia Authoring and Publishing

Artists, writers, graphic designers, animators, musicians, software engineers, software publishers, and people interested in how multimedia documents are created.

Beginning
Prior exposure to interactive computer graphics, especially WIMP systems (Window, Icon, Menu, and Pointer) and digital media, is helpful.

The course provides instruction on fundamentals and methods of multimedia content authoring and on production of CD-I and CD-ROM disk titles. Attendees receive a broad perspective of the current scope of multimedia document authoring, production, and publication. Detailed demos of authoring tools provide insight into the workings of cutting-edge digital creations, including CD-ROM and CD-I title publishing.

An emerging form of digital publication, the multimedia document, holds the promise of enormous growth for computer and consumer electronics markets. The theory and practice of using multimedia authoring tools, such as MacroMind Director, Cats Meow, MediaView for NeXT, and MediaMogul for CD-I development, are discussed and demonstrated.

Other topics are: multimedia resources; project planning; development cycle for CD-ROM and CD-I titles; human factors in authoring; communication and transmission of multimedia documents; file formats and compression technology; platform-independent multimedia authoring; prototyping and testing before CD publishing; and glimpses into the future.

Hank Grebe *AT&T Bell Laboratories*

Hank Grebe *AT&T Bell Laboratories*
Richard L. Phillips *Los Alamos National Laboratory*
Craig Rispin *Optimage*
Mike Saenz *Reactor, Inc.*
Brad Warnick *Nautilus*
Ken Yapkowitz *Tiger Media*

Hank Grebe is a consultant in the User Interface Planning and Design Department at AT&T Bell Laboratories, where he provides technical support and graphic design input to human factors engineers. He also is a freelance multimedia developer for a New York design firm and an interactive CD software publisher. He previously worked as a graphical user interface programmer and system administrator. Grebe's earlier work was in conventional cel animation, computer animation, and video post production.

4 Video Technology for Computer Graphics

Computer graphics professionals who anticipate using or are using video technology and want a stronger technical background and better understanding of current techniques and work in the field.

Intermediate
Some familiarity with computer animation techniques is assumed.

A rigorous technical overview of video theory explains the underlying principles of why video works the way it does. Attendees gain proficiency with video production and post-production techniques to use with their computer animations.

This course covers the theory and practical application of video technology. The theory portion covers scanning, monochrome video signal, NTSC color video signal, color encoding, signal measurement, and reviews current video formats, including D-1 and D-2 digital video and HDTV. Also covered are electronic image processing, special effects, and contemporary video production and post-production techniques. Specifics include video special effects hardware, combining Computer Graphics Imagery (CGI) and video special effects, video compositing/layering, combining CGI with live action, and other topics. Examples of video art and commercial production are presented.

Dean Winkler *Post Perfect, Inc.*

Dean Winkler *Post Perfect, Inc.*

Dean Winkler is vice president and director of creative services at Post Perfect, Inc., an electronic special effects facility in New York. Winkler is an internationally recognized computer/video artist. He holds a patent and has received numerous awards in the television industry. He lectures frequently both nationally and internationally.

6 HDTV Architectures From a Computer Graphics Perspective

Anyone involved in integrating video and computers, and intending to work with high-definition television, HDTV. Knowledgeable computer graphics people can benefit from this introduction.

Intermediate
Knowledge of pixel raster common to digital video and computer graphics displays and frame buffers. Some familiarity with RGB, color component luminance formats, and beginning digital signal processing. Basic calculus is assumed; knowledge of Fourier Transforms may help.

The course provides an overview of HDTV technical issues and describes cutting-edge developments involving the integration of digital HDTV with computers.

It is anticipated that HDTV imaging will have a major impact on computer graphics just as multimedia is the beginning of moving video imagery on the desktop. This course is especially relevant to anyone who has ever wondered why multimedia video on a computer screen seems to have funny motion, appear fuzzy, and the wrong color and contrast.

Learn about the technical issues, many of which are being developed and resolved within numerous standards bodies, involved in the evolution of digital HDTV. Issues include: colorimetry and digital pixel representations, resolution conversion (transcoding), frame-rate conversion issues, and digital image compression.

Gary Demos *DemoGraFX*

Jim Clark *Silicon Graphics Computer Systems*
Gary Demos *DemoGraFX*
Branko J. Gerovac *Digital Equipment Corporation/MIT Media Laboratory*
Walter Gish *Terabit*
Michael Liebhold *Apple Computer, Inc.*
Don Miskowich *Eastman Kodak Company*
Eric Petajan *AT&T Bell Laboratories*

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.

Course	8 Introduction to Volume Visualization	10 Color Theory and Models for Computer Graphics and Visualization
Who Should Attend	Computer scientists and professionals who develop visualization techniques for volume data, and professionals in scientific, engineering, and biomedical disciplines who use or plan to use these techniques.	People who want a fundamental background of basic color theory to improve their day-to-day graphics/visualization in research, development, and implementation.
Level/Prerequisite	**Intermediate** Basic knowledge of hidden-surface methods, rendering models, and computer organization is recommended. The course is moderately difficult, due to the level of detail of the algorithms and methodologies.	**Intermediate** General understanding of and some experience with computer graphics/visualization.
Objectives	Attendees become familiar with the technology and several major applications, understand the available tools and techniques, and recognize the challenges confronting this emerging field. They also receive a broad background in the major issues of volume visualization.	Students gain a basic understanding of color vision and theory. They learn to apply that knowledge to computer graphics and visualization in order to avoid common problems and generate displays that are more efficient from a human vision point of view.
Description	Volume visualization is emerging in the '90s as a key technology with an array of techniques for visualizing sampled, simulated, and synthetic 3D data. This course provides an overview of the nomenclature, technology, and techniques, with an emphasis on the algorithms, software tools, and associated applications. The course covers and compares different approaches in volume representation, fitting of surfaces to volume data, volume viewing, volume shading, volume synthesis, commercially available software, and applications of volume visualization. Slides, videos, and live demonstrations illustrate state-of-the-art volume visualization techniques.	Color is a powerful aid to visual data representation, when used appropriately. It can be used to code qualitative or quantitative, single- or multi-parameter data. However, the large number of possibilities can degrade the representation rather than improve it. Because of this risk, the use of color has become very controversial. This course introduces color theory and addresses issues on the use of color in graphics and visualization.
Organizer	**Arie E. Kaufman** *State University of New York at Stony Brook*	**Haim Levkowitz** *University of Massachusetts at Lowell*
Lecturers	**Scott Dyer** *Lamb & Company* **Arie E. Kaufman** *State University of New York at Stony Brook* **William Lorensen** *General Electric Corporation* **William L. van Zandt** *Vital Images, Inc.* **Roni Yagel** *The Ohio State University*	**Haim Levkowitz** *University of Massachusetts at Lowell* **Phillip K. Robertson** *CSIRO Division of Information Tech., Australia* **Bernice E. Rogowitz** *IBM T.J. Watson Research Center*
Organizer Biography	Arie Kaufman is a professor of computer science and the director of the Cube project for volume visualization at State University of New York at Stony Brook. His interests include volume visualization, computer graphics architectures, algorithms and languages, user interfaces, and scientific visualization. He holds several patents and has published numerous technical papers and manuscripts on volume visualization. Kaufman is the chair of the IEEE Computer Society's Technical Committee on Computer Graphics.	Haim Levkowitz is an assistant professor of computer science and a founder of the Institute for Visualization and Perception Research, University of Massachusetts. His research interests include graphics, imaging, color, human-computer interaction, computers in music and sound, and evaluation techniques, in particular as related to visualization and perception. He has presented numerous papers and taught courses on color in graphics and visualization.

12 Fractals: From Folk Art to Hyperreality

Students and professionals from universities, industry, and art who want an understanding of fractals in computer graphics with an emphasis on recent results.

Intermediate
Working knowledge of fundamental computer graphics and the ability to follow arguments in various areas of mathematics (calculus, production systems, complex numbers, probability theory) are assumed. An in-depth knowledge of any particular area of mathematics is not needed.

This course presents state-of-the-art applications of fractals in computer graphics. Lecturers provide the theoretical background required for attendees to understand the mathematics and reproduce the algorithms.

The course offers in-depth discussions of fractals, from recursive drawings found in ancient folk art, to fractal models of natural phenomena, to visualizations of mathematical objects without a counterpart in the physical world. Fractal generation using stochastic methods, iterated function systems, and L-systems, are discussed in detail. The course includes new methods for visualizing fractals and highlights recent applications of fractals to image analysis, image enhancement, encoding, and compression.

Przemyslaw Prusinkiewicz *University of Calgary, Canada*

Yuval Fisher *San Diego Supercomputer Center, UCSD*
John C. Hart *University of Illinois at Chicago*
Heinz-Otto Peitgen *Universität Bremen*
Przemyslaw Prusinkiewicz *University of Calgary, Canada*
Dietmar Saupe *Universität Bremen*
Richard Voss *IBM T.J. Watson Research Center*

Przemyslaw Prusinkiewicz is a professor of computer science at the University of Calgary. He developed a method for creating images of plants and fractals based on L-systems, a mathematical model of plant development. It provided the foundation for two books he authored. Previously he was a professor at the University of Regina, a visiting professor at Yale University and at l'Ecole Polytechnique Federale de Lausanne, and an invited researcher at the University of Bremen.

14 The OpenGL Graphics Interface

This course is intended for interactive 3D application programmers who want to use OpenGL. People interested in implementing OpenGL on different platforms also will find this course useful.

Intermediate
A working knowledge of 3D computer graphics (e.g. transformations, rasterization, texture mapping). Programming experience with a high-level 3D graphics library is highly recommended.

Participants without previous GL experience learn an immediately applicable subset of OpenGL in order to write 3D graphics applications using advanced features, such as lighting, anti-aliasing, and texture mapping. Participants with previous GL experience gain knowledge to port existing GL applications to the multi-vendor supported OpenGL interface.

OpenGL is a procedural interface that supports interactive 3D graphics. It provides developers access to both simple and advanced rendering techniques. Basic capabilities of OpenGL include support for viewing, lighting, and shading. Advanced features include anti-aliasing, texture mapping, and control over accumulation buffers, stencil buffers, and auxiliary buffers. OpenGL is designed to be window-system neutral. This course covers the use of OpenGL, explores the philosophy which should be used by application implementors, highlights differences from previous versions of GL, and describes the multi-vendor organization that supports the OpenGL effort.

Randi J. Rost *Kubota Pacific Computer, Inc.*

Kurt Akeley *Silicon Graphics Computer Systems*
Randi J. Rost *Kubota Pacific Computer, Inc.*
Mark Segal *Silicon Graphics Computer Systems*
Linas Vepstas *IBM Corporation*
Mason Woo *Silicon Graphics Computer Systems*

Randi Rost is chief architect for graphics software at Kubota Pacific Computer, Inc. His responsibilities include participating in emerging graphics standards efforts and supporting technology relationships with other organizations. Prior to joining Kubota, Rost was a principal engineer in Digital Equipment Corporation's workstation engineering group based in Palo Alto. He was one of the chief architects for PEX and served for four years as the PEX document editor. He also participated in the design of OpenGL and led Digital's OpenGL implementation effort.

16 Particle System Modeling, Animation, and Physically Based Techniques

Implementors and researchers interested in the progression of ideas, techniques, and developments of particle systems for modeling highly deformable materials.

Intermediate
Working knowledge of modeling and rendering techniques for computer graphics, and comfort with fundamental calculus for physics.

The course introduces some of the latest work in particle-system modeling of highly complex phenomena using systems of mutually interacting particles. Students gain an understanding of particle-simulation tools and techniques, and learn which applications benefit from particle-system modeling.

Particle systems have been used to model phenomena as diverse as fire and snow, grass and drifting leaves, liquid and draping cloth. This course moves from a retrospective to a tutorial on the latest uses of physically based techniques to model highly complex materials and phenomena.

Lecturers show how particles can be used at several levels of detail in choreographing animation. Examples of work incorporating particle-particle interactions range from modeling heat-dependent fluid flow to choreographing the draping behavior of woven cloth. Presentations are illustrated with sample animations.

Donald H. House *Williams College*

David E. Breen *Rensselaer Polytechnic Institute*
David Haumann *IBM T.J. Watson Research Center*
Donald H. House *Williams College*
William Reeves *Pixar*
David Tonnesen *University of Toronto/DEC Cambridge Research*

Donald House is an associate professor of computer science at Williams College, and a visiting research scientist at the Rensselaer Design Research Center. His current work is in computer graphics and animation, focusing on particle-based physical models of complex materials. He previously did work in industrial process automation, and pursued research in computational neuroscience investigating depth perception in frogs and toads.

Course	18 Global Illumination	30 PEX Programming, a Mixture of PHIGS, PEXlib, X, and Motif
Who Should Attend	Researchers and programmers working in any area of science or engineering (not just computer graphics) who are interested in understanding global illumination at an advanced level.	Experienced and novice application programmers who need to write PEX applications. PEX, X, and Motif system programmers who want to broaden their horizons.
Level/Prerequisite	**Advanced** Knowledge of calculus and an interest in advanced numerical techniques are essential. Some familiarity with radiosity and ray-tracing algorithms is recommended.	**Beginning** Experience with the C language and the X-Window system is helpful, but not required. A general familiarity with computer graphics also is helpful.
Objectives	This course explores global illumination from a mathematical perspective, employing symbolic techniques to describe the phenomena of reflection, transmission, and scattering of light, and the use of numerical techniques to create fast, accurate simulations. Techniques that have been derived and verified theoretically are favored over ad hoc techniques. Unsolved problems and promising areas of research are discussed.	This course gives application developers a head start in developing PEX applications. Attendees become familiar with the PDRAW application that demonstrates the concepts and features of PEX and its integration with X and a user interface toolkit. Attendees learn how to apply PDRAW to existing applications or adapt it to their needs.
Description	This course investigates the phenomenon of global illumination (the scattering of light in 3D scenes) and current algorithms for its simulation, including both radiosity and ray-tracing approaches. Mathematical tools such as integral equations, finite element methods, and Monte Carlo techniques are described. Current techniques are described for extending radiosity methods to non-diffuse and foggy environments, and for extending ray-tracing methods to diffuse environments.	This course presents a brief overview of PEX concepts and various Application Programmer Interface (API) choices. Differences between PEXlib and PHIGS are highlighted, as are the differences between immediate-mode and mixed-mode graphics. The course shows how to create applications using PEXlib, X, and Motif. PDRAW, a small drawing application, demonstrates the PEXlib programming interface; a PHIGS version explains PHIGS-specific issues. Topics include how to get events from the user interface, mix X and PEX graphics to provide appropriate feedback, respond to window-system events, use PEX utility requests to map window locations, and allow the application to pick.
Organizer	**Paul Heckbert** *Delft University of Technology, The Netherlands*	**Jan "Yon" Hardenbergh** *Oki Advanced Products Division*
Lecturers	**Paul Heckbert** *Delft University of Technology, The Netherlands* **Holly E. Rushmeier** *National Institute for Standards and Technology* **Peter Shirley** *Indiana University* **François X. Sillion** *Ecole Normale Superieure, France* **Greg Ward** *Lawrence Berkeley Laboratory*	**Jan "Yon" Hardenbergh** *Oki Advanced Products Division*
Organizer Biography	Paul Heckbert is a postdoctoral researcher at the Delft University of Technology, The Netherlands. Heckbert has consulted for a number of companies on graphics software engineering, image filtering, and ray tracing. While at Pixar and New York Institute of Technology, he developed rendering software and participated in animation projects for television and film. His early research included color image quantization, texture mapping, and global illumination.	Jan Hardenbergh is the PEX project leader for Oki Advanced Products Division. His current interest is providing an integrated application environment in the PEX, X, and user interface world. An interest in exposing the inherent immediate mode in PEX led him to develop the PEXIM interface and explore adding immediate mode to PHIGS. Hardenbergh is actively involved in PEX standards work.

32 Business Visualization Applications

Business people who have the need to develop advanced business visualization processes to assist management and line personnel to relate and respond to complex and fast changing business data.

Intermediate
An understanding of computer graphics techniques sufficient to create simple business graphics applications. Advanced competency in the development of business information systems that use some form of computer graphics.

This course promotes interaction between business and computer graphics developers by demonstrating the need for structure and consistency in business computer graphics. Attendees develop an understanding of how advanced visualization techniques make it possible to see a complete data context of the business environment, and develop an understanding of the limitation of advanced multimedia techniques in business applications.

Standardization of output for special purposes, such as complex business data presentations, is as critical to the development of visualization as was standardization of computer compatibility. This course examines the emerging roles of advanced visualization techniques in the present and future business environment, in particular how virtual worlds and high-performance graphics can be utilized to visualize and understand financial data. Techniques discussed include virtual worlds, parallel coordinates, interactive 3D graphics, multimedia presentations, and a financial graphic alphabet.

Steve Cohen *University of Illinois at Chicago*
Irwin Jarett *Graphic M*I*S, Inc.*

Steve Cohen *University of Illinois at Chicago*
Steven Feiner *Columbia University*
Irwin Jarett *Graphic M*I*S, Inc.*
Carl Machover *Machover Associates Corporation*

Steve Cohen is a graduate student at the Electronic Visualization Laboratory at the University of Illinois at Chicago. He is working as a research assistant doing technology transfer with enterprising Illinois businesses.

Irwin Jarett, CPA, is co-founder and chairman of Graphic M*I*S, Inc., a firm pioneering the presentation of financial graphics. Jarett has created a financial graphic alphabet that graphically describes the implications of business operations. This alphabet provides the foundation for the financial graphics standards proposed by the Illinois Society of CPAs. Jarett is the first and current organizer of the Illinois CPA Society's Midwest Computer Show and has published a book and a number of articles on financial visualization.

34 3D Visualization in Medicine

People interested in the application of computer graphics and image processing to medical data.

Intermediate
Interest in medical imaging and familiarity with image processing techniques. Specific medical knowledge is not a prerequisite.

Attendees gain an understanding of the techniques and clinical applications of 3D visualization in medicine. The course presents the state of the art in 3D medical visualization, including the algorithms used in the processes, and the directions of future research.

Computer visualization of medical data is an important part of clinical medical imaging. The synergy between computer and physician allows for better patient care in such fields as orthopedic surgery and oncology. This course surveys the best techniques used to visualize 3D or n-dimensional medical data. It shows how physicians use visualization tools in actual clinical settings. The course covers rendering methods, including volumetric rendering, the Heidelberg ray-tracing model, segmentation or classification techniques, and future areas of research. It also covers applications in orthopedics, soft-tissue imaging, and multi-modality imaging.

Elliot K. Fishman *Johns Hopkins Medical Institutions*
Derek Ney *Johns Hopkins Medical Institutions*

Elliot K. Fishman *Johns Hopkins Medical Institutions*
Patrick M. Hanrahan *Princeton University*
Hans-Peter Meinzer *German Cancer Research Center*
Derek Ney *Johns Hopkins Medical Institutions*

Elliot K. Fishman, M.D., is director of abdominal imaging at Johns Hopkins and a professor in the Department of Radiology. He pioneered the use of volume rendering techniques for 3D imaging in the clinical arena. His interests include using the computer to solve medical imaging problems in clinical practice. Current research includes 3D imaging in radiology and the development of computer-based educational training programs.

Derek Ney is director of the Advanced Medical Imaging Laboratory at Johns Hopkins and an assistant professor in the Department of Radiology. Current research interests include development of high-level interactive 3D segmentation tools, generic programming tools for implementing 3D rendering algorithms, and new 3D volume rendering algorithms.

50 Computer Graphics in the Production of *FernGully: The Last Rainforest*

Computer graphics software designers, technical directors, systems engineers, art directors, animators, producers, directors, illustrators, and students.

Intermediate
Basic understanding of both traditional animation production processes and terminology and computer graphics terminology would be useful.

Attendees learn philosophical and practical issues of exploiting new technology without compromising artistic concepts. The course illustrates the problems and potential of using computer graphics in productions that have been the exclusive domain of hand-drawn processes. Speakers discuss wire-frame animation, plotter art, integrating hand-drawn art with 3D environments, computerized colorization of 2D art, and digital compositing and filming.

The course illustrates extensive and innovative applications of computer graphics in *FernGully, The Last Rainforest*, a $22 million animated feature film. It utilizes extensive computer technology to produce a "traditional" animated film. The unbreakable rule of production was to keep computers invisible within the design style. Computers were used to build plants, animals, machinery, forest environments, and characters; to animate characters, props, and camera moves; to create special effects impossible to do by traditional methods; to colorize 2D imagery; and to digitally composite elements for effects never seen in a cartoon film.

Bill Kroyer *Kroyer Films, Inc.*

Bill Kroyer *Kroyer Films, Inc.*
Mark Pompian *Kroyer Films, Inc.*
Brian Schindler *Kroyer Films, Inc.*
Steve Wright *Sidley-Wright & Associates*

Bill Kroyer is president of Kroyer Films, Inc. He received an Academy Award nomination for the animated short *Technological Threat*. *Tron* marked his introduction to computerized image making; he directed 15 minutes of high-resolution computer graphics for the film. He has directed *FernGully, The Last Rainforest*, a major theatrical feature film released by 20th Century Fox this year; and directed the animated title sequences for *Honey, I Shrunk the Kids, Troop Beverly Hills*, and *National Lampoon's Christmas Vacation*.

Course	42 How to Design Something That Cannot be Printed: The Artist and Digital Pre-press	44 Applications of Computer Graphics to Molecular Modeling
Who Should Attend	Artists, graphic designers, and digital or traditional pre-press professionals.	People who actively are involved in scientific visualization, especially chemistry, or who support those researchers through design of computer graphics applications.
Level/Prerequisite	**Intermediate** Some experience in either art and design or printing and publishing.	**Intermediate** Working knowledge of 3D chemical structures (first-year undergraduate chemistry) and at least one software system used for molecular structure display either on a workstation or PC. Some background in proteins is helpful.
Objectives	To provide attendees with a coherent understanding of the changes in the creative and production processes taking place as a result of new electronic tools. Attendees learn how to design something that can be printed. Art and production professionals learn how to categorize available draw, paint, page-layout, and related programs, as well as hardware systems, by price/performance levels.	The course covers the application of molecular modeling in its widest sense, by demonstrating new ways for research chemists to look at familiar modeling data. Examples focus on how computer graphics is being used to develop and refine models of molecular structure. The course provides practical applications of computer graphics technologies in molecular modeling and explores opportunities to improve technology to satisfy chemists.
Description	As art becomes electronic it must link and calibrate to the final reproduction media. This session examines the technical issues and evolving relationship between graphic designers and printers. Digital designs reproduced on paper in large quantities are limited by print press variables, such as water and ink, platemaking, resolution, and ink impurity. Designers are hampered by trapping, color consistency, fonts, and graphic handling. The digital pre-press process converts an image into the form needed for printing. If this process is not understood, it is easy to design something that cannot be printed.	Computer graphics offers opportunities to help solve both theoretical and experimental chemical research problems. This course examines how computer graphics applications developed in the last year or two are being used successfully with the most current chemical information and research taking place in labs today. Protein modeling/interaction, 3D data contours, and data bases for 3D and 4D NMR are discussed. The course also covers output methods including slides, postscript, color printers and plotters, film, video, and novel techniques such as phscolograms.
Organizer	**Frank Romano** *TypeWorld*	**TJ O'Donnell** *O'Donnell Associates*
Lecturers	**Frank Romano** *TypeWorld*	**Charles Hutchins** *Abbott Laboratories* **Glen Kellogg** *University of Virginia* **TJ O'Donnell** *O'Donnell Associates* **Ed Olejniczak** *Abbott Laboratories* **Arthur J. Olson** *Scripps Research Institute*
Organizer Biography	Frank Romano is editor of *TypeWorld* and *Color Publishing* magazines and assistant editor of the *International Paper Pocket Pal*. He is author of seven books and an adjunct professor at Northeastern University.	TJ O'Donnell is a computational chemist and computer graphics specialist. He has devised and applied techniques for visualization to a wide range of chemical data. As a postdoctoral fellow at the National Resource for Computation in Chemistry, he created the program GRAMPS, used by researchers throughout the world. While at Abbott Laboratories, he designed a molecular modeling system based on GRAMPS. He has published research articles and created several films and videotapes in the field of chemistry.

10:30am–12noon

Papers: Morphing

Chair
Richard Chuang *Pacific Data Images, Inc.*

Feature-Based Image Metamorphosis
Thaddeus Beier *Silicon Graphics Computer Systems*
Shawn Neely *Pacific Data Images, Inc.*

Scheduled Fourier Volume Morphing
John F. Hughes *Brown University*

A Physically Based Approach to 2D Shape Blending
Thomas W. Sederberg *Brigham Young University*
Eugene Greenwood *Brigham Young University*

Shape Transformation for Polyhedral Objects
James R. Kent *The Ohio State University*
Wayne E. Carlson *The Ohio State University*
Richard E. Parent *The Ohio State University*

Panel: Graphics Software Architecture for the Future

Architects of well-known graphics Application Programmer Interfaces (APIs) discuss the limitations of existing architectures and outline the characteristics and design tradeoffs of future systems. These systems will be able to exploit concurrent processing, time-critical modeling, and object-oriented programming to achieve new levels of expressiveness and interactivity.

Chair
Andries van Dam *Brown University*

Organizer
Carl Bass *Ithaca Software*

Panelists
Salim Abi-Ezzi *Sun Microsystems, Inc.*
Carl Bass *Ithaca Software*
Rikk Carey *Silicon Graphics Computer Systems*
Mark Tarlton *Micro Electronics and Computer Corporation*

Panel: From "Le Musée Imaginaire" to Walls Without Museums

The disembodiment of electronic images through digital representation, coupled with the development of broadband networks and new display media of ever-increasing resolution situates Andre Malraux's visionary notion of his "Museum Without Walls" in cyberspace. Imagine interactive viewing of vast networks of images that can be accessed on demand wherever a suitable display or output device exists. CD-ROM users already accustomed to taking virtual tours of the Louvre or the National Gallery of Art can now visit Apple Computer's "Virtual Museum." Potentially any artist with access to a computer and modem, fax or picture-phone may participate in network art shows. Van Gogh TV's Piazza virtuale, featured at Documenta IX, in Kassel, Germany, with its 24-hour-a-day interactive, networked participatory broadcast events, simply ignores the museum. Likewise at the Tepai High Technology Pavilion in Tokyo the virtuality of HDTV visual environments become "walls without museums." These walls require a newly defined human computer interface where "smart displays" respond to movement, gesture, and sound of the viewer.

Co-Chairs
Greg Garvey *Concordia University*
Brian Wallace *The Computer Museum*

Panelists
Rene Paul Barilleaux *Madison Art Center*
Vincent Bilotta *Advance Multi-Media Systems*
Eric Hoffert *Apple Computer, Inc.*
Masahiro Kawahata *Tepai High Technology Pavilion*
Gavin Miller *Apple Computer, Inc.*
Dan Sandin *University of Illinois at Chicago*
Rand Wetherwax *multimedia composer-performer*

1:30pm–3:00pm

Papers: Efficient Polygonal Surfaces

Chair
Marc Levoy *Stanford University*

Re-Tiling Polygonal Surfaces
Greg Turk *University of North Carolina at Chapel Hill*

Decimation of Triangle Meshes
William J. Schroeder *General Electric Company*
Jonathan A. Zarge *ConSolve, Inc.*
William E. Lorensen *General Electric Company*

Surface Reconstruction From Unorganized Points
Hugues Hoppe *University of Washington*
Tony DeRose *University of Washington*
Tom Duchamp *University of Washington*
John McDonald *University of Washington*
Werner Stuetzle *University of Washington*

Smoothing Polyhedra Using Implicit Algebraic Splines
Chandrajit L. Bajaj *Purdue University*
Insung Ihm *Purdue University*

Panel: What Will Gigabit Networks Do for Visualization?

The High Performance Computing and Communications (HPCC) federal initiative, as well as private sector initiatives in the telecommunications industry, are creating an entirely new environment for visualization and graphics. HDTV, video-on-demand, multimedia services, video teleconferencing, visual tele-science, and remote control of supercomputers will be widely available with the federally-supported National Research and Education Network (NREN) and with advanced network services in the private sector. The panel brings together visionaries who paint a picture of the opportunities these changes are bringing to visualization and graphics professionals.

Chair
Steve Wolff *National Science Foundation, Division of Networking and Communications Research and Infrastructure*

Panelists
Gary Demos *DemoGraFX*
Robert Kahn *Corporation for National Research Initiatives*
Robert W. Lucky *AT&T Bell Laboratories*

3:15pm–4:45pm

Papers: Humans and Clothing

Chair
Lance Williams *Apple Computer, Inc.*

Pump It Up: Computer Animation of a Biomechanically Based Model of Muscle Using the Finite Element Method

David T. Chen *Massachusetts Institute of Technology*
David Zeltzer *Massachusetts Institute of Technology*

Dressing Animated Synthetic Actors with Complex Deformable Clothes

Michel Carignan *University of Montreal*
Ying Yang *University of Geneva*
Nadia Magnenat-Thalmann *University of Geneva*
Daniel Thalmann *Swiss Federal Institute of Technology*

Three Dimensional Apparel CAD System

Hidehiko Okabe *Research Institute for Polymers and Textiles*
Haruki Imaoka *Nara Women's University*
Takako Tomiha *Toray Industries, Inc.*
Haruo Niwaya *Research Institute for Polymers and Textiles*

A Simple Method for Extracting the Natural Beauty of Hair

Ken-ichi Anjyo *Hitachi Ltd.*
Yoshiaki Usami *Hitachi Ltd.*
Tsuneya Kurihara *Hitachi Ltd.*

Panel: Implications of Merging Digital Television, Communications, and Computing

The convergence of television, communications, and computing into an interactive digital infrastructure promises to open new approaches to visual communication and visualization. This panel explores the impending interplay and merger of the industries. It explores how they will foster innovation and stimulate rapid development in the utility and diversity of visually-oriented products and services. Panelists represent commercial, government, and academic programs working in the merging industries.

Chair
Branko Gerovac *Digital Equipment Corporation/MIT Media Laboratory*

Panelists
Larry Irving *House Telecommunications and Finance Subcommittee*
Russ Neuman *MIT*
Bruce Sidran *MCC First Cities*
Greg Thagard *Color Systems Technology Entertainment Imaging*

Panel: Design, Creativity, and Process

This panel examines the current state of computer graphics hardware and software and its future development from the perspective of the designer. Panelists explore how their individual areas of design—print, architecture, broadcast design, and high-end R&D applications—are impacted by current technology. They review successes and failures, effects of the developer on design process and creativity, and possible directions for new hardware and tool development.

Chair
Renée LeWinter *Odyssey Communications*

Panelists
Terrence Heinlein *Wentworth Institute of Technology*
Frank Romano *computer artist*
Joe Shingelo *Telezign*
Graham Walters *Pacific Data Images, Inc.*
Rob Wyatt *Telezign*

8:45am–10:15am

Papers: Mathematical Techniques

Chair
James T. Kajiya *California Institute of Technology*

Interval Analysis for Computer Graphics
John M. Snyder *California Institute of Technology*

Interval Arithmetic and Recursive Subdivision for Implicit Functions and Constructive Solid Geometry
Tom Duff *AT&T Bell Laboratories*

Computing the Antipenumbra of an Area Light Source
Seth J. Teller *University of California at Berkeley*

Topological Design of Sculptured Surfaces
Helaman Ferguson *Supercomputing Research Center*
Alyn P. Rockwood *Arizona State University*
Jordan Cox *Purdue University*

Panel: Research Topics in Virtual Reality

Virtual reality is at the top of the "food chain." It is a technology that feeds from a variety of other fields–graphics, sensory interfaces, robotics, and psychology, to name a few. Yet, it also is a field in its own right, characterized by a tight coupling of human factors and enabling technologies.

This panel attempts to present a brief survey of research work in the field from laboratories that have not been heard from in the past. The intent is to produce a fresh look at the depth and variety of the ever evolving field that is virtual reality.

Chair
Linda Nonno *Los Alamos National Laboratory*

Panelists
Grigore Burdea *Rutgers–The State University of New Jersey*
Scott Delp *Northwestern University*
S. Kicha Ganapathy *AT&T Bell Laboratories*
Stephen Jacobsen *The University of Utah*
Steven Pieper *Dartmouth College*

10:30am–12noon

Papers: Free-Form Surfaces and Deformations

Chair
Paul Heckbert *Delft University of Technology*

Variational Surface Modeling
William Welch *Carnegie Mellon University*
Andrew Witkin *Carnegie Mellon University*

Functional Optimization for Fair Surface Design
Henry P. Moreton *University of California at Berkeley*
Carlo H. Séquin *University of California at Berkeley*

Direct Manipulation of Free-Form Deformations
William M. Hsu *Digital Equipment Corporation*
John F. Hughes *Brown University*
Henry Kaufman *Brown University*

Surface Modeling with Oriented Particle Systems
Richard Szeliski *Digital Equipment Corporation*
David Tonnesen *University of Toronto*

Panel: Progress Report From the Global Village

Technology visionaries address the issues of delivering high-technology tools to the average global villager. The panelists present demonstrations and discuss current and future trends in consumer electronics, multimedia computing, electronic networks, and telephony.

Chair
Hank Grebe *AT&T Bell Laboratories*

Panelists
Marc Canter *Canter Technology*
Denise Caruso *Digital Media: A Seybold Publication*
Oliver Jones *PictureTel Corporation*
Mitchell Kapor *Electronic Frontier Foundation*
Tim Onosko *Entertainment Industry Consultant*

Special Session: SIGKids Learning Laboratory

Go behind the scenes at the SIGGRAPH '92 SIGKids Learning Lab. The lab is where junior and senior high school students present computer graphics projects they have worked on since the beginning of the year, with assistance of local volunteer mentors.

This special session looks at how multimedia and computer graphics have opened up the classroom to different styles of learning. Many have worked hard to get technology into the classroom. Is it worth it? What success are the experimental programs having? What can be done for schools that have limited technology available to them?

Chair
Coco Conn *Homer & Associates*

Panelists
Stephen Long *Creating with Technology*
Roy Pea *Northwestern University*
Peter Rowley *The Ontario Institute for Studies in Education/CSILE*
Judy Sachter *IBM Corporation*

1:30pm–3:00pm

Papers: Virtual Reality

Chair
Henry Fuchs *University of North Carolina at Chapel Hill*

High Resolution Virtual Reality
Michael Deering *Sun Microsystems, Inc.*

Merging Virtual Objects with the Real World: Seeing Ultrasound Imagery within the Patient
Michael Bajura *University of North Carolina at Chapel Hill*
Henry Fuchs *University of North Carolina at Chapel Hill*
Ryutarou Ohbuchi *University of North Carolina at Chapel Hill*

Sound Rendering
Tapio Takala *Helsinki University of Technology*
James Hahn *The George Washington University*

An Algorithm with Linear Complexity for Interactive, Physically-Based Modeling of Large Proteins
Mark C. Surles *University of North Carolina at Chapel Hill*

Panel: Debating Multimedia Standards

The panel presents a perspective and comparison of emerging industry standards for integrated media, both de facto and chartered by a standards committee. Panelists active in championing new multimedia standards, such as those based on HyTime, QuickTime, UNIX media, Application Programmer Interfaces (APIs), and PC multimedia standards, describe the architectural models, implementation trials and tribulations, and future of these emerging standards. Audience participation is expected and encouraged in the debate on whether committee standards groups, trade associations, user groups, or platform vendors are driving the new media integration standards.

Chair
Rita Brennan *Apple Computer, Inc.*

Panelists
Phil Dodds *Interactive Multimedia Association*
Jim Green *Microsoft Corporation*
Brian Knittel *Silicon Graphics Computer Systems*
John Koegel *University of Massachusetts at Lowell*

Panel: Visualization in Computational Biology

Computational biology, from biochemistry to ecology, is producing some of the most exciting new applications of scientific visualization. This panel discusses the visual and computational strategies behind creating dazzling portraits of molecules at work as well as brain cells in health and illness.

They talk about visualizing how blood circulates, bones knit, plants grow, and populations interact. Life scientists are pioneering new ways to see problems and to process on scales from the microscopic to the global, and are finding new ways to use the tools of computation, both locally and globally.

Chair
Sid Karin *San Diego Supercomputer Center*

Panelists
Mark Ellisman *University of California at San Diego*
Helmut Heller *University of Illinois at Urbana-Champaign*
Robert Langridge *University of California at San Francisco*
John Wooley *National Science Foundation*

3:15pm–4:45pm

Papers: Hardware and Multimedia

Chair
Forest Baskett *Silicon Graphics Computer Systems*

PixelFlow: High-Speed Rendering Using Image Composition

Steven Molnar *University of North Carolina at Chapel Hill*
John Eyles *University of North Carolina at Chapel Hill*
John Poulton *University of North Carolina at Chapel Hill*

A Scalable Hardware Render Accelerator Using a Modified Scanline Algorithm

Michael Kelley *Apple Computer, Inc.*
Stephanie Winner *Apple Computer, Inc.*
Kirk Gould *Apple Computer, Inc.*

Fast Shadows and Lighting Effects Using Texture Mapping

Mark Segal *Silicon Graphics Computer Systems*
Carl Korobkin *Silicon Graphics Computer Systems*
Rolf van Widenfelt *Silicon Graphics Computer Systems*
Jim Foran *Silicon Graphics Computer Systems*
Paul Haeberli *Silicon Graphics Computer Systems*

A Fast and Accurate Light Reflection Model

Xiao D. He *Cornell University*
Patrick O. Heynen *Cornell University*
Richard L. Phillips *Los Alamos National Laboratory*
Kenneth E. Torrance *Cornell University*
David H. Salesin *Cornell University*
Donald P. Greenberg *Cornell University*

Panel: Artificial Life

Artificial life is a new field of science dedicated to duplicating the emergent mechanics of biology in silicon. Using a "bottom-up" approach, practitioners of artificial life attempt to use simple rules and algorithms to generate the complex behavior of living organisms: things like reproduction, evolution, animal foraging, and locomotion behavior. The techniques of artificial life already are providing powerful new tools for computer graphics. In the future, if artificial life fulfills its promise to "grow" a computational organism, a revolution will be born, both inside the computer and out.

Chair
Steven Levy *MacWorld*

Panelists
Chris Langton *Los Alamos National Laboratory, Santa Fe Institute*
Przemyslaw Prusinkiewicz *University of Calgary*
Craig Reynolds
Karl Sims *Thinking Machines, Inc.*
Larry Yaeger *Apple Computer, Inc.*

Special Session: SIGGRAPH Town Hall Meeting

This special session focuses on how to participate more effectively in SIGGRAPH venues, such as papers, panels, courses, electronic theater, and art show. The panel provides important information about how to volunteer, prepare venue proposals, and plan SIGGRAPH presentations.

Recent surveys indicate that many conference attendees believe that the SIGGRAPH organization and conferences are run by insiders. Some individuals believe that preference is given when selecting certain types of technical papers, films and videos, and courses. The panelists discuss these concerns and encourage audience questions about SIGGRAPH, both the conference and the organization.

Chair
Donna J. Cox *National Center for Supercomputing Applications*

Panelists
Donna Cox *SIGGRAPH '93 panels chair*
Steve Cunningham *SIGGRAPH director for publications*
Rich Ehlers *SIGGRAPH '93 courses chair*
Robert L. Judd *SIGGRAPH '93 conference co-chair*
Jim Kajiya *SIGGRAPH '93 papers chair*
Alyce Kaprow *SIGGRAPH '93 designing technology chair*
Adele Newton *SIGGRAPH director for conferences*
Simon Penny *SIGGRAPH '93 machine culture: virtual frontier chair*
Mark Resch *SIGGRAPH '93 conference co-chair*
Jamie Thompson *SIGGRAPH '93 electronic theater chair*

8:45am–10:15am

Papers: Rendering

Chair
Pat Hanrahan *Princeton University*

Predicting Reflectance Functions From Complex Surfaces
Stephen H. Westin *Cornell University*
James R. Arvo *Cornell University*
Kenneth E. Torrance *Cornell University*

Measuring and Modeling Anisotropic Reflection
Gregory J. Ward *Lawrence Berkeley Laboratory*

An Importance-Driven Radiosity Algorithm
Brian E. Smits *Cornell University*
James R. Arvo *Cornell University*
David H. Salesin *Cornell University*

Illumination From Curved Reflectors
Don Mitchell *AT&T Bell Laboratories*
Pat Hanrahan *Princeton University*

Panel: 3D Graphics Standards Debate: PEX vs. OpenGL

The issue of standards always has created problems for the graphics community. Proprietary, vendor-specific standards compete against portable, potentially low-performance standards. The announcement of the public licensing of OpenGL from Silicon Graphics puts the graphics industry again in the difficult position of choosing between PEX, a technology based on PHIGS, and OpenGL, a historically proprietary, immediate-mode Application Programmer Interface (API).

Representatives from companies endorsing OpenGL and PEX, as well as application software developers and system vendors with a viewpoint, shoot it out over the pros and cons—technical and nontechnical—of the 3D graphics environments.

Chair
James Foley *Georgia Institute of Technology*

Organizer
Bill Glazier *Silicon Graphics Computer Systems*

Panelists
Kurt Akeley *Silicon Graphics Computer Systems*
Murray Cantor *IBM Corporation*
Mark Goldstein *SDRC*
Marty Hess *Sun Microsystems, Inc.*
Jeff Stevenson *Hewlett-Packard Company*

Panel: Graphics Education for Computer Science

Over the past decade, there have been major advances in the computer graphics field: in computer graphics techniques, the trend toward object-oriented programming, and availability of relatively inexpensive high-resolution graphics hardware and sophisticated rendering packages. This suggests that a re-evaluation of the traditional computer graphics syllabus for computer science students is appropriate. The panelists from industry as well as academia begin this process.

Chair
Nan Schaller *Rochester Institute of Technology*

Panelists
Albert Bunshaft *IBM Corporation*
Toby Howard *University of Manchester*
Wilf LaLonde *Carleton University*
Dino Schweitzer *U.S. Air Force Academy*
Carolyn Wasikowski *Minnesota Supercomputer Center*
Zhigang Xiang *Queens College*

10:30am–12noon

Papers: Animation

Chair
Andrew P. Witkin *Carnegie Mellon University*

Interactive Spacetime Control for Animation
Michael F. Cohen *University of Utah*

Dynamic Simulation of Non-penetrating Flexible Bodies
David Baraff *Cornell University*
Andrew P. Witkin *Carnegie Mellon University*

Dynamic Deformation of Solid Primitives with Constraints
Dimitri Metaxas *University of Toronto*
Demetri Terzopoulos *University of Toronto*

Smooth Interpolation of Orientations with Angular Velocity Constraints Using Quaternions
Alan H. Barr *California Institute of Technology*
Bena Currin *California Institute of Technology*
Steven Gabriel *Sage Design*
John F. Hughes *Brown University*

Panel: Beyond Gouraud-Shaded Polygons...Where Will Graphics Hardware Go Next?

Graphics hardware has been evolving at a breathtaking rate. Many new ideas, not restricted to a narrow focus on zillions of simple polygons/second, may differ considerably from what you expect. The same technology seen in hot-box workstation CPUs permits analogous improvements in graphics hardware. How has this opportunity been seized? What will you soon be able to do at your desk that you could not do before?

This panel summarizes recent ideas and projects which push the hardware envelope. Attendees gain a clearer idea of what is possible in hardware, what to expect short term from commercial products, and what new avenues of exploration are reasonable.

Chair
Douglas Voorhies *Silicon Graphics Computer Systems*

Panelists
Kurt Akeley *Silicon Graphics Computer Systems*
Nick England *Sun Microsystems, Inc.*
Fred Kitson *Hewlett-Packard Labs*
Turner Whitted *Numerical Design, Ltd.*

Panel: From Perception to Visualization

Visualization is the process of transforming information into a visual form, enabling users to observe the information. Knowledge of the way the brain and the visual system perceive information can be used to greatly improve the visualization process and its results. Issues discussed include perception of depth, motion, color, symmetry, shape, and visual illusions.

This panel addresses the issue: what can be learned from visual perception to help us improve existing visualization methods or create innovative new ways to represent the data visually.

Chair
Nahum Gershon *The MITRE Corporation*

Panelists
Richard Friedhoff *Visicom Corporation*
Margaret Livingstone *Harvard Medical School*
Vilayanur Ramachandran *University of California at San Diego*
Robert Savoy *The Rowland Institute for Science*

1:30pm–3:00pm

Papers: Interactive Systems and Techniques

Chair
Craig Upson *Silicon Graphics Computer Systems*

CONDOR: Constraint-Based Dataflow
Michael Kass *Apple Computer, Inc.*

Through-the-Lens Camera Control
Michael Gleicher *Carnegie Mellon University*
Andrew Witkin *Carnegie Mellon University*

An Object-Oriented 3D Graphics Toolkit
Paul S. Strauss *Silicon Graphics Computer Systems*
Rikk Carey *Silicon Graphics Computer Systems*

Using Deformations to Explore 3D Widget Design
Scott S. Snibbe *Brown University*
Kenneth P. Herndon *Brown University*
Daniel C. Robbins *Brown University*
D. Brookshire Conner *Brown University*
Andries van Dam *Brown University*

Panel: Color Space Wars

For years, people have been promising that color on the desktop is just around the corner. The choice of color space is an important part of making this promise a reality. But which color space is best is the source of much contention. Is XYZ the ultimate standard? Are there better alternatives? With audience participation, the discussions should prove lively.

Chair
Robert L. Cook *Light Source Computer Images, Inc.*

Panelists
Jacob Aizikowitz *Electronics for Imaging*
Don Carli *Mills Davis, Inc.*
Ed Giorgiani *Eastman Kodak Company*
Ed Granger *Light Source Computer Images, Inc.*
Maureen C. Stone *Xerox PARC*

Panel: Data Compression for Multimedia Systems

Modern data compression techniques can reduce the data rates of good quality audio and video streams to the point of manageability within commonplace networks and storage devices. But are the new international data compression standards JPEG, MPEG, and Px64 premature for this active area of research? Leaders in the research, commercialization, and standardization of multimedia data compression provide insights on this key issue.

Chair
Greg Wallace *Digital Equipment Corporation*

Panelists
Bernd Girod *Academy of Media Arts*
Didier J. LeGall *C-Cube Microsystems*
Hans-Georg Musmann *Universitat Hannover*

3:15pm–4:45pm

Papers: Modeling

Chair
Darwyn Peachey *Pixar*

Interactive Inspection of Solids: Cross-Sections and Interferences
Jarek Rossignac *IBM T.J. Watson Research Center*
Abe Megahed *IBM T.J. Watson Research Center*
Bengt-Olaf Schneider *IBM T.J. Watson Research Center*

A Collision-based Model of Spiral Phyllotaxis
Deborah R. Fowler *University of Calgary and University of Regina, Canada*
Przemyslaw Prusinkiewicz *University of Calgary*
Johannes Battjes *University of Amsterdam*

Generative Modeling: A Symbolic System for Geometric Modeling
John M. Snyder *California Institute of Technology*
James T. Kajiya *California Institute of Technology*

Modeling Seashells
Deborah R. Fowler *University of Calgary and University of Regina, Canada*
Hans Meinhardt *Max-Planck-Institut für Entwicklungsbiologie*
Przemyslaw Prusinkiewicz *University of Calgary*

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Conference Events

WE ARE ALL PARTICIPANTS in an amazing week of information exchange, networking, presentation, demonstration, and exhibition—where our collective involvement creates tremendous force that rejuvenates the lifeblood of the computer graphics industry.

The art show confirms what is seen all around SIGGRAPH—a computer-generated picture is worth more than a thousand words. The juried art show presents highly imaginative uses of computer graphics in performance, animation, on-line and interactive works, gallery shows, 2D projects, and 3D sculpture.

The art show is documented in the *SIGGRAPH '92 Art Show Slide Set* and in the *SIGGRAPH '92 Visual Proceedings.*

In conjunction with the art show at McCormick Place, SIGGRAPH '92 is holding a special showing of Midwest artists at the State of Illinois Building's Gallery, July 27–September 11, curated by Jane Stevens.

Art Show Chair
John Grimes
Institute of Design, Illinois Institute of Technology (IIT)

Assistant
Alex Traube *Institute of Design, IIT*

Committee
Paul Brown
Marla Schweppe *Tornado Productions*
Joan Truckenbrod *School of the Art Institute of Chicago*

Jury
John Pearson *Oberlin College*
Patric Prince *California State University at Los Angeles*
John Sturgeon *Carnegie Mellon University*
Lynne Warren *Museum of Contemporary Art, Chicago*

Special Assistance
Peter Beltamacchi *Institute of Design, IIT*
Ron Clark *Institute of Design, IIT*
Larry Kolasch *AT&T Bell Laboratories*
Irv Moy *Argonne National Laboratory*
Dietmar Winkler *Kansas City Art Institute*
Kirk Woolford *Techtron Imaging Centre*

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...where you have to see it to believe it. The electronic theater presents a juried selection of innovative new computer graphics animation and performance work. The best of the best in the last year, the evening show is considered the Academy Award or Nobel Prize celebration of the computer graphics industry. This international collection touches disciplines from science and art, to education and corporate communications. In addition to traditional film and video contributions, HDTV animations were solicited. For the first time, SIGGRAPH '92 projects high-definition works in HDTV format in the evening show.

The electronic theater is presented in a large theater setting. The computer graphics screening room and the video living room feature additional material in small, intimate settings.

The electronic theater and screening room are documented in the *SIGGRAPH '92 Visual Proceedings* and *SIGGRAPH '92 Video Review.*

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Sylvie Rueff
Joel Welling *Pittsburgh Supercomputing Center*

Evening Show Jury
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Copper Giloth *University of Massachusetts at Amherst*
Bill Reeves *Pixar*
Craig Upson *Silicon Graphics Computer Systems*

Performance and Openings Jury
Jamie Dixon *Pacific Data Images*
Michael Wahrman

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Showcase provides insight into the future. This new conference venue demonstrates leading-edge visualization research and applications that rely on high-performance computing and communications. It is a success story—a true demonstration of the cooperation of business, academia, and government.

Showcase uniquely illustrates interactive and collaborative computer graphics research, applications, and products which rely on high-performance computing in a networked environment. More than 35 projects illustrate "science in action," using the workstations networked to supercomputers via FDDI on the floor or to remote resources via a T3 link to NSFNET. Showcase consists of 12 demonstration booths, each shared by three different projects. Each booth is equipped with a workstation, a large-screen projection display, an audio amplification system, and electronic signage.

Multiple viewer virtual reality applications are experienced in the adjoining CAVE, a 3D rear-projection theater made up of three walls and a floor, projected in stereo and viewed with "stereo glasses." As the viewer with the location sensor moves within its display boundaries, the correct perspective and stereo projections of the environment are updated, and the image "moves with and surrounds the viewer." The other viewers in the CAVE are like passengers in a bus, along for the ride!

A selection of PHSColograms, full-color 3D images, decorate the outside walls of the CAVE. These computer-generated barrier-strip autostereograms explore the aesthetic possibilities of science and technology without the need for special viewing apparatus. They are on loan from the Illinois Institute of Technology's (Art)n Laboratory.

A description of the CAVE and many of the Showcase projects appears in a special section of the *Communications of the ACM*, June 1992, published by the Association for Computing Machinery (ACM), New York, New York.

Chair

James E. George
Meso Graphics, Inc.

Committee

Charlie Catlett *National Center for Supercomputing Applications (NCSA)*
Carolina Cruz-Neira *University of Illinois at Chicago*
Thomas A. DeFanti *University of Illinois at Chicago*
Branko J. Gerovac *Digital Equipment Corporation/ MIT Media Laboratory*
Andrew C. Goodrich *RasterOps*
Maggie Hallam *University of Illinois at Chicago*
John C. Hart *University of Illinois at Chicago*
Tim Kuhfuss *Argonne National Laboratory*
Gary Lindahl *University of Illinois at Chicago*
Kathy O'Keefe *University of Illinois at Chicago*
Ralph Orlick *University of Illinois at Chicago*
Dana Plepys *University of Illinois at Chicago*
Maggie Rawlings *University of Illinois at Chicago*
Dan Sandin *University of Illinois at Chicago*
Lewis Siegel *University of Illinois at Chicago*
Larry Smarr *NCSA*
Rick Stevens *Argonne National Laboratory*

Corporate Support

Advanced Network & Services, Inc
Amphenol Corporation
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Silicon Graphics Computer Systems
Sun Microsystems, Inc.
Systran Corporation
WellFleet

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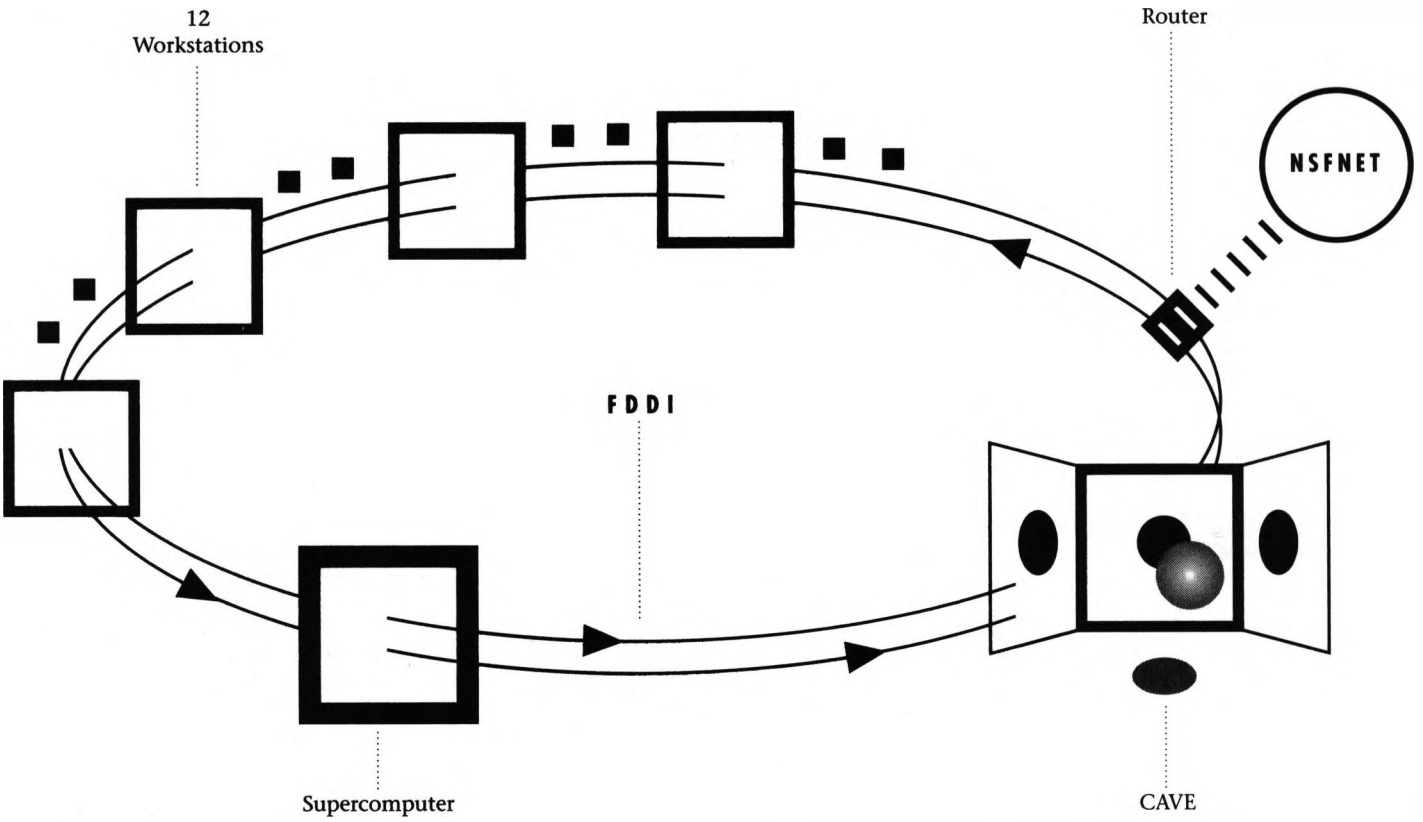
Extraordinary Support

Argonne National Laboratory

Electronic Visualization Laboratory, University of Illinois at Chicago

National Center for Supercomputing Applications, University of Illinois at Urbana-Champaign

University of Illinois at Chicago



Showcase Specifications

Workstations

- Silicon Graphics, Inc.
  Four Crimson VGXT
  64MB with two 1.6GB disks
  Two Crimson VGXT
  256MB with two 1.6GB disks
  Two 4D/440 VGX
  128MB with two 1.6GB disks
  One 4D/420 VGX
  64MB with two 1.6GB disks
- Sun Microsystems, Inc.
  Three SPARCstation2
  64MB, 3GB disk
- Digital Equipment Corporation
  Two DEC5000 with
  Four FDDI DECconcentrators, DECbridge
  One DECmpp 12000 supercomputer
- IBM Corporation
  Two RS/6000
  One 7245 PVS Model 3, 1024MB, IOP
  One 9570 Model 110
  (21GB disk array)

Supercomputer

- Convex Computer Corporation
  C3440, 2GB with two VIOP, two FDDI,
  20 GB disk, two IDC, DAT, HIPPI

Large Screen Projection

- Electrohome Projection Systems
  Twelve ECP 4100 Projectors, Troopers
- DataDisplay Corporation
  Video switchers, design, and setup

Audio System

- DataDisplay Corporation
  Twelve Extron ADA-3, speakers, microphones

Electronic Signage

- General Parametrics
  Twelve VideoShows

Networking

- Advanced Network and Services, Inc.
  ENSS RS/6000 Router, network access
- cisco
  Router
- Illinois Bell/Ameritech
  T3 line
- inmac
  Networking cables and concentrators
- WellFleet
  Router
- Ultra Network Technologies
  Ultranet
- Amphenol Corporation
  ST termination assembly
- Optical Cable Corporation
  FDDI cable

Other

- NASA
  BOOMs
- Argonne National Laboratory
  Staging and network access

CAVE Specifications

Equipment

- Silicon Graphics, Inc.
  Five Crimson VGXT workstations
  256MB with two 1.6GB disks
- Ascension Technology Corporation
  Flock of Birds location sensor
- Electrohome Projection Systems
  Four ECP 4100 projectors
- DataDisplay Corporation
  Audio visual support
- Stereographics Corporation
  Stereo glasses, controllers
- Systran Corporation
  Five SCRAMNet Network Interfaces

Design

- Electronic Visualization Laboratory,
  University of Illinois at Chicago
- DataDisplay Corporation
- Argonne National Laboratory
- Spacecraft, Inc.

Argonne National Laboratory

Hyperspectral Imagery Program

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David G. Zawada *Argonne National Laboratory*

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The potential use of hyperspectral imagery in global ecological model verification is illustrated by using hyperspectral imagery on a desert to determine if it is advancing or receding. To assess the condition of a certain area, one needs to identify the types of ground cover contained in it. Some plant species are more tolerant of heat and drought than others and, thus, can be taken as indicators of a desert environment. Hyperspectral imagery is used to determine the kinds of plants present.

Mapping the Human Genome

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GenoGraphics is a generic utility for constructing and querying one-dimensional linear plots. Its development arose out of a need by researchers involved in the Human Genome Project to computerize the construction of genetic and physical chromosomal maps. GenoGraphics uses an interactive, intuitive, graphical interface which supports viewing multiple maps simultaneously, zooming, and mouse query. By expediting plot generation, GenoGraphics gives a scientist more time to analyze data and a novel means for drawing conclusions.

Remote Interactive Computing for Design and Optimization

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Nonlinear 3D structural dynamic simulations play a central role in nuclear reactor safety as well as crashworthiness studies. This demonstration features a distributed interactive environment with supercomputer computation and workstation visualization.

The dynamic crash response of an s-rail, a front-end automobile structural component, impacting a rigid wall is performed on a supercomputer. This environment allows an analyst to interactively redesign the s-rail by introducing lighter materials at noncritical sections without changing the collapse load. The analyst's goal is the optimal design from the weight-cost-manufacturability perspective. Two modes of interaction are supported: interaction with the visual display (changing object and observer positions, lighting, etc.) and interaction with the simulation (altering material properties).

Argonne National Laboratory and the University of Illinois at Chicago

Molecular Dynamics of Membrane Protein and Receptor Protein Binding

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Christina Vasilakis *University of Illinois at Chicago*

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This project uses computer graphics to develop an understanding of structural biology dynamical processes. The graphics illustrate the probable means by which cholera toxin transports an intact protein through a target cell's external membrane while intoxicating the cell. In this process, cholera toxin recognizes and binds an external membrane-bound receptor, triggering a dynamic change in the structure of the toxin and the membrane; a portion of the toxin and enzyme enter the cell.

Regional Scale Weather Display in 3D

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Carolina Cruz-Neira *University of Illinois at Chicago*
Mike Papka *University of Illinois at Chicago*

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This demonstration uses the PSU/NCAR Mesoscale Model V4 in a parallelized form, running on the Intel Touchstone Delta, to create a 3D display of weather systems over a region of North America.

Users are able to move around in the model space and view the developing weather systems as though they themselves were of regional scale. The representation allows viewing from any location and is directed toward displaying how physical processes interact as weather systems go through their life cycles, including moisture distributions, temperature changes along an air stream, topographic effects, clouds, and airstream motion.

Remote Visualization of Diffraction Patterns from NSLS X8C User Station

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This project allows researchers in federal, university, and corporate labs to remotely view diffraction data collected at the National Synchatron Light Source (NSLS) X8C Beam Line on workstations in their labs. Currently, researchers must travel to Brookhaven National Laboratory to view the results of beam interactions with their crystals. This project uses the network to connect researchers to the collection devices at Brookhaven and addresses some of the needs for image compression and image processing.

California Institute of Technology and the University of Illinois at Chicago

Realistic Modeling of Brain Structures with Remote Interaction Between Simulations of the Inferior Olive and the Cerebellum

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Maurice Lee *California Institute of Technology*
Jason Leigh *University of Illinois at Chicago*
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Interactions between realistic neuronal simulations in different locations along with a listening post at the concurrent First Annual Computation and Neural Systems Meeting in San Francisco illustrate a novel use of the network. A simulation of the mammalian inferior olive on a workstation at SIGGRAPH and a simultaneous simulation of a cerebellar Purkinje cell on the Intel Delta at Caltech allows the Chicago demonstrator to provide an electrical stimulation of the inferior olive which initiates an action potential over the network to the Purkinje cell at Caltech.

Colorado State University

Daylighting Simulation of the Zero Energy Building

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This simulation Illustrates the design of a zero energy building, i.e., a building which requires no energy from public utilities. A significant design component of the concept is to use natural sunlight to light interior spaces, as this displaces electrical energy for lighting fixtures. MONT3D, Monte Carlo photon tracing code developed for Lawrence Livermore National Laboratory, is extended to model daylighting for this simulation.

Cornell University and IBM Corporation

Cornell and IBM Scientific Visualization

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Rich Garner *Cornell University*
Bruce Land *Cornell University*
Chris Pelku *Cornell University*
Lloyd Treinish *IBM Corporation*
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Scientific research projects are demonstrated: density of gas in a simulation of the NASA AMPTE experiment; water waves interacting with pier structures; three helical turns of DNA rendered as a ball and stick model; zooplankton density in the ocean; Global Basins Research Project; normal modes vibrations of quartz; ab-initio calculation of reaction of ozone with atomic chlorine; tsunami simulation in the Sea of Japan; ultrasound intensity in biological structures; flow of particles driven by wave action; cooking of a potato in a microwave oven; and, distribution of galaxies in the sky.

IBM PVS demonstrations illustrate:

- interactive analysis and browsing of ozone climatology from space observations;
- the Greenhouse Effect Detection Experiment; and
- correlative analysis in space plasma physics or solar-terrestrial physics.

Digital Equipment Corporation (DEC)

Interactive Modeling and Visualization of Medical and Biological Data

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Kristen M. Harris *Children's Hospital, Boston*
William Hsu *Digital Equipment Corporation*
Gudrun Klinker *Digital Equipment Corporation*
Richard Szeliski *Digital Equipment Corporation*
Demetri Terzopoulos *University of Toronto*
Michael Vannier *Washington University School of Medicine*
Keith Waters *Digital Equipment Corporation*

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Registration, segmentation, 3D reconstruction, and visualization aspects of modeling and rendering for neuroscience, embryology, radiology, and surgical planning are illustrated using massively parallel resources in a networked environment.

Two registration techniques are demonstrated: interactive registration through a digital blink comparator and automatic registration through minimization. The digital blink comparator technique is used to register sections of a neuronal dendrite from transmission electron microscopy, and to register pre- and post-contrast midsaggital MRI head scans. Minimization is used to register serial sections of an embryo from light microscopy.

Digital Equipment Corporation and the University of Toronto

Teleconferencing with Personable Computers

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Patrick Chan *Digital Equipment Corporation*
Jim Gettys *Digital Equipment Corporation*
Larry Palmer *Digital Equipment Corporation*
Ricky Palmer *Digital Equipment Corporation*
Demetri Terzopoulos *University of Toronto*
Greg Wallace *Digital Equipment Corporation*
Keith Waters *Digital Equipment Corporation*

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This is a demonstration of futuristic "hands-on" teleconferencing. Attendees talk not only to people but also to computers at remote sites. These computers have personable characters with expressive faces capable of synchronized synthetic speech and of understanding limited spoken language. Facial articulations, speech, and visual information are directed by a remote server and the images transmitted to the client machine via a network, thereby enabling limited discourse with these personable computers.

3D Object Input, Modeling, and Manipulation

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This system automatically acquires the 3D shape and appearance of real-world objects. Unlike active rangefinders, it is passive and requires only a regular video camera and a turntable. The shape of the object is reconstructed from the sequence of images as the object rotates on the turntable, and is then interactively manipulated and refined by the user.

A texture-mapped version of the object's abstracted model is displayed by the workstation, either locally or remotely. The model can be interactively rotated and the shape can be refined using a novel surface modeling tool based on interacting oriented particles. Showcase attendees are invited to bring their own objects to model and interactively refine.

Lawrence Berkeley Laboratory and Pittsburgh Supercomputing Center (PSC)

A Distributed Visualization Demonstration Using Workstations, A Heterogeneous Supercomputer Environment, and High-Speed Network Protocols

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This demonstration represents one model of how scientists, researchers, and physicians can benefit from the combination of local, inexpensive workstations, high-speed networking, and remote supercomputing facilities. It consists of three parts: the application itself, the network infrastructure, and the workstation visualization and control.

The application utilizes PSC's distributed heterogeneous supercomputing environment to generate a surface tessellation from a 3D scalar field using the dividing cubes algorithm and to render an image. The image is sent over the network to a Showcase workstation to display the result. A graphical interface on the workstation allows interactive exploration of the 3D data, sending new parameters to the heterogeneous supercomputing environment for reprocessing and re-rendering as the exploration proceeds.

Los Alamos National Laboratory

Pion Propagator Visualization from Quantum Chromodynamics (QCD) Simulation

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Rajan Gupta *Los Alamos National Laboratory*

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This visualization shows the propagation of a pion, the lightest particle described by Quantum Chromodynamics, which is the fundamental theory of strong interactions. The pion propagator is calculated on a16x16x16x32 lattice generated on a supercomputer. The long direction is Euclidian time, and the propagator is averaged over one of the three spatial dimensions and displayed as a function of x and y (the two short axes). The event represented is the creation of a pion near the center of the volume, and its propagation in space both forward and backward in time. The magnitude of the propagator determines the size of the bubbles in this visualization, and an animated iso-surface of amplitude is displayed. From the rate at which the amplitude dies out as a function of time, the mass of the pion can be calculated.

NASA Ames Research Center

The Distributed Virtual Windtunnel

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A shared distributed virtual environment for the visualization of 3D unsteady fluid flows is demonstrated. This exhibit involves two complete virtual environment stations networked to a supercomputer. Each virtual environment station consists of a head-tracking display, dataglove, workstation, and a video projection screen. The demonstration involves two expert users, one at each station, visualizing the same flow data in a cooperative way. This is an innovative example of collaborative problem solving and should not be missed!

NCSA

Cosmic Explorer

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The Cosmic Explorer is motivated by Carl Sagan's imaginary space ship in the PBS series *Cosmos*, in which he explores the far corners of the universe. In this implementation, the user explores the formation of the universe, the generation of astrophysical jets, and colliding galaxies by means of numerical simulations and virtual reality technology. This application demonstrates human-oriented paradigms for examining large sets of data that contain spatial and temporal information. By allowing a human to explore these databases as they might explore a physical place, a user can take advantage of human experience rather than technological prowess to comprehend the data.

Digital Library of Astronomical Imaging Data

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The Digital Library demonstrates the access and display of astronomical images and simulation data from NCSA's Laboratory for Astronomical Imaging.

Interactive Visualization of CT Data of a Dog Heart

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Patrick Moran *NCSA/Beckman Institute*
Clint Potter *NCSA/Beckman Institute*

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"Tiller" demonstrates the use of a remote, massively parallel computer for volume rendering and animation of time-sequenced, 3D data. It features an easy interface with adjustable imaging parameters and selectable viewing frames. Custom animations are produced by specifying frame sequences. In Showcase, "Tiller" interactively develops animations featuring volume rendered images from a series of CT volumes of a dog heart, representing one cardiac cycle. The data set is from Mayo Clinic's Dynamic Spatial Reconstructor.

Pathfinder—Probing ATmospHeric Flows in an INteractive and Distributed EnviRonment

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Brian Jewett *NCSA*
J. Haedorn *NASA*
S. Koch *NASA*
Gautam Mehrotra *NCSA*
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Atmospheric science researchers pursue a better understanding of severe thunderstorm features in an effort to improve weather prediction. Special observing programs are coupled with numerical modeling studies to explore the relationship between these features and larger scale weather conditions. Scientists can interactively explore downburst evolution near the ground through a coupled model by interpreting and comparing downburst model data with 3D storm/mesoscale model data.

Scientific Digital Library

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The Scientific Digital Library is available for browsing and data analysis at Showcase. The library contains numerical simulation data, images, audio, and other types of data, as well as application software available for the display and analysis of the data. It currently contains elements from radioastronomy, astrophysics, and meteorology.

NCSA/Beckman Institute

Interactive Imaging of Atomic Surfaces

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This project demonstrates the integration of remote instrumentation with a data flow visualization system. A scanning tunneling microscope (STM) at Beckman Institute, which can image and alter surfaces at atomic resolution, is remotely controlled from a workstation at Showcase, using a data flow visualization environment. A graphical user interface allows scientists to control STM imaging parameters, display the images as they are collected, and perform visualization of selected images. All operations local to the STM are supported via the remote interface.

Virtual Molecular Reality

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Mike Krogh *NCSA/Beckman Institute*
Rick Kufrin *NCSA/Beckman Institute*
Klaus Schulten *NCSA/Beckman Institute*
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This project demonstrates the interaction between a virtual reality system and a molecular dynamics program running on a supercomputer. The programs are capable of simulating very fast macromolecular assemblies for studies in structural biology. The new generation of parallel machines allows one to simulate the response of biological macromolecules to small structural perturbations, administered through the virtual reality system, within a short time, even for molecules of a few thousand atoms.

Northwestern University

Visualization of a Dynamic Model of Combustion

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Gary Greenberg *Northwestern University*
Bernard Matkowsky *Northwestern University*

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This project involves visualizing the complex spatial and temporal patterns which occur in nonadiabatic gaseous combustion. In the configuration under study, a flame is established in the region between two concentric cylinders. The combustible mixture is fed in through the inner cylinder and the products of combustion are exhausted through the outer cylinder. The model accounts for heat transfer with the environment to the outer cylinder, through the outer wall.

San Diego Supercomputer Center (SDSC)

The Distributed Laboratory (TDL): An Interactive Visualization Environment for Electron Microscopy and 3D Imaging

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Mark H. Ellisma *UCSD Microscopy and Imaging Resource*
T. Todd Elvins *San Diego Supercomputer Center*
Kevin Fall *University of California, San Diego (UCSD)*
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TDL demonstrates real-time "steerable" data acquisition, visualization, and data analysis from an intermediate voltage electron microscope at the UCSD Microscopy and Imaging Resource (SDMIR) laboratory. Workstations at SDMIR and a supercomputer at SDSC process and image the data and then send stereo image pairs or animation sequences to Showcase. The data acquisition apparatus at UCSD and the visualization parameters are manipulated from Showcase to explore the material under investigation.

Sandia National Laboratories

Production Scientific Visualization Environment from Sandia National Laboratories

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Dino Pavlakos *Sandia National Laboratories*
Larry Schoof *Sandia National Laboratories*

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This project provides a production scientific visualization environment for analysts at Sandia to visualize and animate the results of finite element and finite difference calculations from supercomputers and massively parallel machines. The resulting databases can be large (several gigabytes), so adaptive meshing and high-speed access are essential for reasonable response times.

A visualization server concept is used where one or several high-powered graphics machines are used to perform the graphics manipulations, with the resulting images transmitted to a display on an analyst's desk. AVS is used as the foundation for the visualization software.

Supercomputer Computations Research Institute

Interactive Display and Steering of Remote Computations with the SciAn Scientific Visualization Package

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SciAn, a locally developed, general-purpose scientific visualization and animation package, is shown monitoring computations in progress over the network. Its network facilities allow computations or copies of SciAn to publish objects, which can be accessed via IP sockets. The object-oriented design of the SciAn user interface allows easy access to objects published by other processes. The computations process runs independently of SciAn.

University of California, Los Angeles and University of Chicago

Brain Volume Visualization

Blake Drolson *University of Chicago*
Robert Grzeszczuk *University of Chicago*
Martin Ryan *University of Chicago*
Arthur Toga *UCLA School of Medicine*

Arthur Toga
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The project acquires arbitrary cross-sections through large volumes of data (multiplanar reformation) in real time. A user interactively selects a cross-section by specifying the position and orientation of the slicing plane. The specified modeling and viewing transformation matrices are subsequently sent to a remote supercomputer which acquires the selected slice and sends it back for display.

University of Chicago

Graphical Planning for Brain Surgery

Blake Drolson *University of Chicago*
Robert Grzeszczuk *University of Chicago*
David Levin *University of Chicago*
Martin Ryan *University of Chicago*

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This presentation includes demonstrations of brain surgery planning software that currently is being clinically tested. The procedure employs a 3D localizer as a means of interactively transferring spatial relationships from MRI-derived 3D anatomical models directly onto the patients.

The Showcase presentation allows participants to interactively manipulate the localizer around a plastic model of a human head (or a live volunteer) and get immediate feedback in the form of a stereoscopic model.

University of Chicago and University of Illinois at Chicago

Mapping Cognitive Function with Subdural Electrodes and Registration of Cerebral Evoked Potentials on 3D MRI

Steve Cohen *University of Illinois at Chicago*
Robert Grzeszczuk *University of Chicago*
Martin Ryan *University of Chicago*
Leo Towle *University of Chicago*

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This process first maps the cortical areas associated with such cognitive processes as language, attention, and memory onto 3D images of the brain surface created from MRIs. It then determines whether measurements from passive recordings of the electrocorticogram during cognitive tasks can be used as objective measures to localize cognitive functions onto the cortical surface. Anatomically precise maps of cortical function allow a more quantitative evaluation of individual differences due to the influence of handedness, gender, and plasticity on cortical organization.

The experimental design also provides an opportunity to examine the patterns of electrophysiologic covariance between cortical electrodes, to test hypotheses that suggest that cognitive functions are organized as parallel processes distributed throughout the brain. It is hoped that these maps have the practical effect of improving surgical outcome while also increasing our understanding about how cognitive processes are organized within the human brain.

During neurosurgical procedures involving frontal or parietal cortex it is imperative to identify the critical motor, sensory, and speech areas so that they may be spared. Neurosurgeons often find it necessary to map these areas during surgery, because there is great variability in the cortical functional organization between people. Having this information available before surgery would allow the surgeon to confidently plan the best approach for cortical resections.

University of Illinois at Chicago

Fractal Exploratorium

Randy Hudson *University of Illinois at Chicago*

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The Fractal Exploratorium (FEX) enables participants to explore 3D fractals and chaotic attractors by moving around them, changing their shapes and colors, and displaying them with different graphical primitives. Attractors of several discrete and continuous mathematical systems are shown, including those of iterated function systems (IFSs) and the 3D Julia set of the quaternion quadratic function. All of these objects form exotic shapes in 3D space.

The Database Computing Project: Analyzing High-Energy Physics (HEP) Data

Robert Grossman *University of Illinois at Chicago*
Jason Leigh *University of Illinois at Chicago*
Mike Papka *University of Illinois at Chicago*

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This is a scalable, extensible, object-oriented database designed to analyze HEP data from the SuperConducting SuperCollider Laboratory via simple queries. The results of these queries are visualized, enabling scientists to interactively indicate the presence of a new particle from among hundreds of thousands of less interesting events. Each event contains approximately 1,000 K bytes of information. This large quantity of data—up to 1,000 terabytes per year—along with an expected 1,000 physicists highly distributed around the globe, requires a data access design that is able to handle an increase of approximately four orders of magnitude in total access.

The Snowstorm

Dan Sandin *University of Illinois at Chicago*

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This project visualizes 3D vector fields with several techniques: short vectors attached to 3D lattice points, linear tracers, isopotential curves, etc. Of special interest is a large number of particles flowing through the field whose velocity is proportional to field strength. Examples are selected from the Lorenz Attractor, steepest descent algorithm, and more. Additionally, attendees can create their own 3D fields by combing a virtual space with a wand.

The Virtual Embryo

Michael Doyle *University of Illinois at Chicago*
Adrian Noe *National Museum for Health and Medicine, Armed Forces Institute of Pathology*

Michael Doyle
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Real-time interactive 3D visualization of the anatomy of a 7-week-old human embryo is demonstrated in a virtual reality environment. Distributed processing allows dynamic manipulation of voxel-based and surface-based representations of embryonic morphology extracted from a database at the National Museum for Health and Medicine. This work enables researchers to extract new information about various aspects of human development by re-examining existing collections of specimens with visualization and analysis tools.

The Visible Embryo

Michael Doyle *University of Illinois at Chicago*
Adrian Noe *National Museum for Health and Medicine, Armed Forces Institute of Pathology*

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A distributed visualization application is demonstrated with a workstation and a supercomputer. A software pipeline is shown that allows interactive volume visualization of the internal anatomy of a 7-week-old human embryo, reconstructed from a collection at the National Museum for Health and Medicine. The project demonstrates the feasibility of providing remote access to human morphological data and of distributing the computational load across network resources. Modules compute on the workstation and on supercomputers at various locations.

Visualization for the Management of Renewable Resources in an Uncertain Environment

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Dennis Jarvis *University of Illinois at Chicago*
Mike Vetter *University of Illinois at Chicago*
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This application illustrates the management of a renewable resource, such as a multi-species fishery, with both background fluctuations and disastrous random fluctuations. The application uses a combination of biology, economics, mathematical modeling, and massively parallel processing to find the optimal economic value and multidimensional control laws which govern the modeling.

This project provides hands-on experience for managing renewable resources through tuning the bio-economic parameters of this dynamic model. The results of the model are useful in helping the resource manager make decisions to optimize the output of the resource over a long time horizon. In addition, computation and visualization of the more general model has application to other areas, such as the control of vibrations in multi-body space structures, aerodynamics under uncertain weather conditions, and management of financial portfolios in an uncertain market.

University of Minnesota

High-Speed Data Visualization

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An example of computationally intensive visualization is the volume rendering, with perspective, of data from 3D time-dependent simulations of fluid flow. For a grid of 256x256x256 computational cells, the raw data for a snapshot of the flow is a 200 MByte disk file. The simulation sends images representing the flow over the network to the workstation at Showcase, and the scientist sends commands back over the network to steer the calculations.

Kuwaiti Oil Fires

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The Kuwait Smoke Plume visualization software shows a section of the Kuwaiti smoke plume as it drifts downwind along the Persian Gulf. The grid domain encompasses the entire Persian Gulf and the simulation spans 24 hours. Smoke particles are released from a single oil fire and travel on the wind while being dispersed by turbulence effects. The software allows the user to interactively roam through the scene, permitting views from above, near the source, and even from within the plume.

University of Pennsylvania

Jack

Norman I. Badler *University of Pennsylvania*
John Granieri *University of Pennsylvania*
Cary Phillips *University of Pennsylvania*

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Jack is a workstation-based system for the definition, manipulation, animation, and human factors performance analysis of simulated human figures. Built on a powerful representation for articulated figures composed of joints and segments with boundary geometry, Jack offers the user a simple, intuitive, and yet extremely powerful interface into any 3D articulated world using a three-button mouse, keyboard, and pop-up menus.

Though interaction is mediated primarily through the mouse and menus, other 3D input devices are utilized with some of the control information coming from remote networked systems. Simultaneous control of body position and posture from two workstations is supported, and the result is a virtual environment, with each user controlling one of two synthetic people in a shared environment.

University of Wisconsin

Distributed Visualization of Large Atmospheric Data Sets

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Brian Paul *University of Wisconsin*

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VIS-5D enables researchers to visualize very large atmospheric data sets in real time. The software transforms a data set into geometric primitives for visualization. These primitives are sent to a graphics workstation where the user controls the rendering.

The VIS-AD (VISualization for Algorithm Development) system allows visual monitoring of data structures, which aids in algorithm development. It is a debugging and development tool with the ability to visualize the structure of any data object. Network extensions allow visualization of distributed algorithms.

G-Tech goes beyond the limits. It shows off the newest and latest work in interactive computer graphics and expands on SIGGRAPH's special demonstrations, hypermedia exhibits, and virtual reality encounters. Decide for yourself what the "G" in G-Tech means...is it guerrilla, groovy, germinal, gimmicky, grand, gutsy, glamorous, gritty, graphic, or great? Is it all of the above or something else? You really won't know until you experience it.

G-Tech Chair

Branko Gerovac
Digital Equipment Corporation/MIT Media Laboratory

Technical Director

John Huszar *Designer Visuals*

Apple Computer, Inc.

The Virtual Museum

Sally Ann Applin *New York University*
Dean Blackketter *Apple Computer, Inc.*
Shenchang Eric Chen *Apple Computer, Inc.*
Jim Hanan *University of Regina*
Eric Hoffert *Apple Computer, Inc.*
Gavin Miller *Apple Computer, Inc.*
Elizabeth Patterson *Apple Computer, Inc.*
Steve Rubin *Apple Computer, Inc.*
Derrick Yim *Massachusetts Institute of Technology*

Gavin Miller
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The Virtual Museum is an interactive electronic museum. Users can move from room to room of the museum and select any exhibit for more detailed examination.

The museum space is divided into five rooms: (1) An Atrium entrance to the museum; (2) A Medicine Room which contains exhibits on medical imaging technology; (3) A Plant Room which contains animations of plants growing and changing shape; (4) An Astronomy Room which includes simulations of the Big Bang, a galaxy evolving over time, and a flythrough over the surface of Mars; and (5) An Environment Room which allows the examination of Earth at different scales.

The exhibits in the museum combine precomputed animation with novel algorithms for doing real-time image warping, allowing an interesting range of interactions with a variety of scientific data.

Art & Science, Inc.

Notes Toward a Mental Breakdown—An Interactive Fiction

J.G. Ballard, original text
Murry C. Christensen, interactive realization *Art & Science, Inc.*
Max Ernst, original illustrations

Murry C. Christensen
Art & Science, Inc.
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The 1976 story by English author J.G. Ballard that forms the base material of this work consists of a single 18-word sentence, each word of which is footnoted. The interplay between the footnotes constitutes the narrative detail of the story. This formalist structure has many similarities to the linked text structures we have come to call "hypertext." This hypermedia realization is an extension of that basic structure, expanding the number and complexity of the links, adding illustrations, and grounding the (new) whole in a computer-mediated form.

The illustrations that accompany the text are derived from Max Ernst's 1934 collage novel *Une Semaine de Bonte*. There are significant connections between Ballard and Ernst (one of Ernst's poems is quoted in *Notes...*) and Ballard has produced collage art of his own. Finally, collage is one of the forms associated with post-modern sensibility. It is only appropriate that this interactive realization use the collage sensibility, transforming it into a new medium.

1934, 1976, 1992: *Notes Toward a Mental Breakdown* should be seen as a collaboration between three "authors" over a span of years and involving quite different aesthetic worlds.

Hypermedia Productions

A Memory Project: An electronic collage about memory and forgetting

Henry W. See *Hypermedia Productions*

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Hypermedia Productions
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Canada

A Memory Project is an interactive exploration of memory and forgetfulness in humans and computers. The content is presented from two perspectives: the scientific and the artistic. Areas of interest on the scientific side include the physiology of memory, the psychology of memory, epistemology, artificial intelligence, and neural networks. The artistic side poses questions about the relationship of humans to computers. The project unfolds temporally into two parts. Part 1 looks at memory; Part 2 looks at forgetfulness. The system reflects this change by beginning to forget itself. Menu choices disappear. Sections which were once available are now forgotten. The cartoon agent "Bob" serves as host and personification of the project. When the system begins to forget, it is through Bob that this forgetting is translated to the user.

MIT Media Lab

A System for Distributed Physical Interactions

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Bradley Horowitz *MIT Media Laboratory*
Alex Pentland *MIT Media Laboratory*

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This system for distributed real-time execution of physical simulations demonstrates efficiency increasing as a nearly linear function of the number of processors involved. Users can interactively apply forces and constraints to deformable 3D models and immediately see the physical effects of their changes. The algorithm for physical simulations uses a pre-computed modal breakdown of object dynamics and non-rigid behavior, speeding dynamics computation. The network bandwidth necessary for object updates between processors is minimized by using this very compact modal representation for deformable models. The system allocates computational resources among workstations involved using a simple, efficient "market-based" strategy, avoiding the problems of central control. This system shows an interesting and rarely seen virtual environment where many users at different sites can interact together with 3D physical models.

Northwestern University

CreANIMate: A Biology Tutor

John Cleave *Northwestern University*
Daniel Choy Edelson *Northwestern University*
William Fitzgerald *Northwestern University*
Kenneth Greenlee *Northwestern University*
Robert Kaeding *Northwestern University*
Riad Mohammed *Northwestern University*
Diane Schwartz *Northwestern University*

Diane Schwartz
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The CreANIMate program teaches elementary school children about animals and how they survive in the wild. The program invites students to create new animals by taking existing animals and modifying them in some way. For example, a student might request a bee with a large nose. The task of creating the new animal was selected because it encourages creativity and because it provides rich opportunities for learning. Once a student proposes an animal, the program initiates a dialog in which various aspects of the student's animal are considered. The discussion is accompanied by video of actual animals in the wild that illustrate relevant principles. The lesson that underlies the entire interaction is the relationship between the physical features of animals and the ways in which they use those features to help them survive in their environment. The particular examples of these basic principles that any student sees depend entirely on the individual interests expressed by the student.

Rhode Island School of Design (RISD)

Free Range Chicken

Free Range Team *RISD*

Hari Kumar Nair
Director of Academic Computing
Rhode Island School of Design
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Providence, RI 02903

The project code named "Free Range Chicken" at the RISD Advanced Computing Center was born out of a search for a new paradigm for output devices. The current printers and plotters perform a discrete output function independent of the creative process. There are three discrete events in our normal interaction with a computer graphics workstation. At present: (1) drawing or painting using a mouse, digitizer tablet, or other input device, (2) feedback from the monitor about what is being drawn or painted, and (3) final hardcopy output of the image. In the traditional process using paper and pencil, these events are simultaneous. Creative thinking relies on this "seamless ideation/feedback/regeneration cycle," missing in the computer interface. This requires the "print" activity (event 3) to exist simultaneously with the act of drawing or painting (event 1).

Free Range technology addresses this simultaneity issue through "free-running, remote controlled, paint-carrying devices" which respond to mouse or digitizer input executing the artwork in real time. It also eliminates the restrictions on media types and sizes. The artist may exercise choices ranging from the traditional (painting on a large piece of canvas) to the electronic (a free-range device executing the image at a different time and place).

Naimark

Virtual Environments of Actual Places through Field Recording and Human Crafting

Michael Naimark
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San Francisco, CA 94133

The goal is to explore "sense of place" by making computer models based on the physical world. These models are made in a *Verité* tradition of working in uncontrolled environments with minimum disturbance to them. The first phase of an 18-month project is presented here: using a fisheye camera, a single point rangefinder, existing maps, and common sense knowledge about the world (rather than AI), a virtual dome is created and then "hand-crafted" to a more accurate spatial representation.

Psychic Lab Inc.

IBVA Biofeedback Hypermedia Workstation

Masahiro Kahata *Psychic Lab Inc.*
Jim Suhre *Psychic Lab Inc.*

Masahiro Kahata
Psychic Lab Inc.
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The Interactive Brainwave Visual Analyzer System (IBVAS) consists of headband, transmitter, and computer software, which allows users to view their brainwaves on a standard Macintosh. The workstation attempts to use the raw data of the brainwaves to trigger responses from a MIDI-compatible synthesizer, a laserdisk, and animation from another computer (i.e., when the subject is relatively relaxed, sound and video are similarly relaxed). The subject being studied watches and listens to the video and sound triggered by their brainwaves.

SIGGRAPH '92 Multimedia Paper

A Fast and Accurate Light Reflection Model

Donald P. Greenberg *Cornell University*
Xiao D. He *Cornell University*
Patrick O. Heynen *Cornell University*
Richard L. Phillips *Los Alamos National Laboratory*
David H. Salesin *Cornell University*
Kenneth E. Torrance *Cornell University*

Richard L. Phillips
Los Alamos National Laboratory
Los Alamos, NM 87545

SIGGRAPH's first multimedia paper is shown on several NeXT computers in G-Tech. Attendees are able to sit down at the station and interact with the paper.

Sun Microsystems, Inc. and David Sarnoff Research Center

DARPA High Resolution Video Workstation

J. Duane Northcutt *Sun Microsystems, Inc.*
Glenn Reitmeier *David Sarnoff Research Center*
Curt G. Thiem *Sun Microsystems, Inc.*

J. Duane Northcutt
Sun Microsystems, Inc.
MS MTV18-211
2550 Garcia Avenue
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Sun Microsystems, Inc. and David Sarnoff Research Center have collaborated in a DARPA-supported research program to integrate High Resolution Video (HRV) into the workstation programming environment. The HRV Workstation project involves the creation of new workstation hardware and software in order to permit the integration of digital video as a first class data type within the system. The hardware developed for the HRV Workstation provides the basic capabilities needed to acquire, store, process, transport, and display raw (i.e., uncompressed) high-resolution digital video in a robust, responsive window system environment with high-quality motion and color.

University of Illinois at Chicago

Knowledge From Beauty: Applying Expert Systems to Aesthetic Judgement

Paul Adelson *University of Illinois at Chicago*
Terry Franguiadakis *University of Illinois at Chicago*

Paul Adelson
Design Visualization Laboratory
School of Art and Design
University of Illinois at Chicago
Chicago, IL 60680

Knowledge From Beauty generates simple 3D vessel forms defined by seven control points which specify a profile. The control points can be restricted to meet, for instance, ergonomic constraints (e.g., diameter easily grasped by an adult hand). The control points are generated randomly within their limits. There are more than six million possible combinations for the profile. Users rate the forms on a seven-point scale. An expert system module within the program uses geometric factors (such as the width of the base and number of "humps" in the profile) to learn about user likes and dislikes. After the program has some experience with the user, it begins to "filter" the forms which are shown, rejecting geometries that the user is predicted to dislike. After 50 to 70 images, the program's ability to predict preferences usually improves, and the filtering becomes more accurate. In some cases, the program can learn to be almost as accurate as a person's own consistency. They also show that the geometric factors that most influence preference can vary a good deal between individuals. *Knowledge From Beauty* originated as an industrial design master's degree thesis project at the University of Illinois at Chicago's Design Visualization Laboratory.

U.S. Geological Survey

Landslides and Debris Flows: An Interactive Animation

Linnea Larsen *U.S. Geological Survey*

Linnea Larsen
U.S. Geological Survey
345 Middlefield Road, MS 951
Menlo Park, CA 94025

Landslides and debris flows are significant geologic hazards throughout the world. In 1982, landslides and debris flows caused 25 deaths and $66 million in property damage in the San Francisco Bay Area, California. *Landslides and Debris Flows* is a hands-on interactive multimedia presentation produced in a non-technical and entertaining format with the intent to educate the general public on landslides and debris flows. It uses examples from the San Francisco Bay Area. The user can select from 10 different short presentations which describe the causes and show the devastation that can result from landslides and debris flows.

Come visit the SIGKids learning lab and showcase and see what happens when students are given access to technology and mentors. An enthusiastic, talented, and creative group of students, grades 6-12, present computer graphics projects which explore the inter-relations between math, science, and art. You are sure to want to meet this energizing group, and they look forward to meeting you.

The SIGKids learning lab participants were nominated by technology teachers at schools primarily in the Chicago area and asked to submit applications describing the projects that interested them. Their projects—many of which were created with the same tools that SIGGRAPH '92 attendees use—take on a broad range of topics. In addition to developing their projects, the learning lab students participated in monthly meetings and tours during the spring academic semester to help them develop a better understanding of computer graphics in the commercial world and research environments. As needed, the students worked with mentors and learned new software to help them expand and improve their ideas. The lab is open all week, except for a few closed sessions posted in the area.

SIGKids experience SIGGRAPH like everyone else, along with their own special learning opportunities. They choose a panel or paper to attend, see the electronic theater and art show, and tour the exhibition. A major part of their week focuses on presentations about their projects and short tutorials by guest speakers.

During the conference, the students videotape their experiences and keep electronic journals using CSILE. Their multimedia documentary will be shared with students during the upcoming school year and with educators who are interested in better understanding how students approach computer graphics projects. A resource computer in the SIGKids area is available to all conference attendees to contribute information or raise questions about education and technology issues.

Another group of students and their teachers from around the country are participating in the SIGKids showcase which is open all week. A small screening area features tapes showcasing student animations and demonstrating current hardware and software applications in education. Many of the participants are on hand to talk about their projects. Projects by the 10 students who are spending the week taking the Amiga Art Workshop, which combines traditional and computer art, also are displayed in the area. Exhibits of student art work are displayed in the SIGKids' lab and showcase.

At SIGGRAPH '87 in Anaheim, SIGKids featured a panel of student computer users, grades 4-12. Today, those students still talk about that experience and its impact. SIGGRAPH continues to break new ground by giving students and teachers a voice and a platform. What is gained from this experience is a better insight on how we teach and how we learn. Providing students with tools to express what they understand about a subject is our window to their minds.

SIGKids Chair
Coco Conn
Homer & Associates

Assistant
Janet Longson

SIGKids Committee
Scott Kim *Scott Kim & Associates*
Judy Sachter *IBM Corporation*
Diane Schwartz *The Institute for Learning Sciences*
Maria Schweppe *Tornado Productions*

Mentors
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Andy David *Chicago Teacher Center*
Chris Drown *Landrum & Brown*
Curt Kass *Ontological Survey*
Peter Peavoy *consultant*
Kenneth Rehor *AT&T Bell Laboratories*

Tutorial Presenters
Christine Chang *Bluth Animation*
Greg Coats *U.S. Geological Society*
Peter Conn *Homer & Associates*
Matt Elson *computer animation consultant*
Enrique Godreau III *Xerox PARC*
Amanda Goodenough *The Voyager Company*
Chris Herot *Lotus*
Leo Hourvitz *NeXT*
Elizabeth Keith *ReZ.n8*
Scott Kim *Scott Kim & Associates*
Andy Kopra *Video Image*
Dave Levitt *VPL*
Peter Rowley *CSILE Project on journal keeping*
Todd Rundgren *Utopia Software*
Karl Sims *Thinking Machines Corporation*
Susan Van Baerle *Texas A&M University*
David Zeltzer *MIT Media Laboratory*

On-site Educational Observers
Rachel Carpenter *California Institute of Integral Studies*
Maria Milenkovic *IBM Corporation*
Nancy Navin *developmental psychologist*
Cynthia Solomon *Computer Environments for Children*

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Silent Software, Inc.
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SuperMac Technology
The Ontario Institute for Studies in Education
US Geological Society
US Robotics
Vertis Inc.
Virtual Reality Laboratories, Inc.
Volotta Interactive Video

Addison Trail High School
Addison, Illinois

Computer art

Teacher: John Yakel
Students: Tom Colgan
Joe Eddikkanthy
Technology: IBM
Corel Draw Arts and Letters
VistaPro
Distant Sun

Evanston Township High School
Evanston, Illinois

Digital photo journalism/writings

Teacher: Nadine Pool
Student: Eric Curtis Bond
Technology: Mac IIsi
Hypercard
Ultrapaint

Lincoln Hall Middle School
Lincolnwood, Illinois

Program with music, graphics, and animation

Mentor: Peter Peavoy
Student: Adam Mathes
Technology: IBM 486
Disney Animation

Deforestation and mapping

Mentors: Chris Drown
Burt Andrews
Students: Becki Adelman
Aviva Gibbs
Technology: Atlas GIS
Corel Draw Arts & Letters
AutoCAD

Reavis High School
Burbank, California

Virtual worlds and computer animation

Teacher: Carol Brown
Students: Al Aubin
Mike Aubin
Technology: IBM
MicroSoft Windows
Paint Brush
Draw Perfect
Deluxe Paint Animator
Virtual Reality
Studio

Victor J. Andrew High School
Tinley Park, Illinois

Scanned, collage, and painted abstract drawings

Teacher: Jeanne Krapauskas
Student: Ed Ignacio
Technology: Mac LC
Microtech Scanner
Adobe PhotoShop
Macromind Paracomp Magic

Hinsdale Central High School
Hinsdale, Illinois

Color theory based on the works of Monet and Van Gogh

Teacher: Mark Wanner
Students: Jason Barishman
Rob Rys
Technology: *Preview:*
Apple IIGS
Paintworks
Hyperstudio
Final project:
Mac IIcx
Pixel Paint
Macromind Director

Lincolnwood School
Lincolnwood, Illinois

Computer music

Teacher: Shelly Foster Gurin
Student: Christopher Tynan
Technology: Mac

Roosevelt School
Elkhart, Indiana

Alien culture

Teacher: Dana Knapp
Student: Nathan Fredrickson
Technology: Amiga 500
Deluxe Paint
Deluxe Music
Deluxe
Video
Vista Pro
video camera

Alexander Graham Bell School
Chicago, Illinois

The Great Chicago Flood

Mentor: Gene Aronin
Student: Wolfgang McKeown
Technology: Apple IIGS
LCSI's Ensemble

Homewood-Flossmoor High School
Flossmoor, Illinois

2D art projects using scanned/painted images

Teacher: Lorelei Jones
Students: Marianne Bosch
John Thoeming
Technology: Mac IIci
Pixelpaint

3D imaging and ray tracing

Student: Christopher Horvath
Technology: Mac IIci
Pixelpaint
Virtus Walkthrough
SwivelPro

Maine East High School
Niles, Illinois

Animated station and program promos

Teacher: James Wunderlich
Student: Eric Kinzle
Technology: 2000 HD
Pro Video Post
Deluxe Paint III

For more information about SIGKids, contact:

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Crossroads
Santa Monica, California

Galapagos Stack

Mentor: Bob Stein
Student: Murphy Stein
Technology: Mac
Hypercard

Kealing Junior High
Austin, Texas

Animation project

Mentors: Judy Sachter
David Zeltzer
Student: Ari Sachter-Zeltzer
Technology: Mac II
Macromind 3D

Prospect High School
Arlington Heights, Illinois

Virtual worlds

Mentor: Mark Uelan
Students: Matt Majer
Dan Zlogar
Technology: Mac
Virtus Walkthrough

Alta High School
Salt Lake City, Utah

Wayne Tyler *contact*

Students in the advance placement art class created six video computer animations.

Technology: MS-DOS machines and custom software

Amiga Arts Corner

Curt Kass *organizer*

Bob Casey *Queen of Martyrs High School, Chicago, Illinois*
Nathan Fredrickson *Roosevelt School, Elkhart, Indiana*
Michelle Gonzalez *Kelly High School, Chicago, Illinois*
Paul Hunt, Chris Montoya, Corey Murray *Oak Lawn High School, Oak Lawn, Illinois*
Jim Kelly *Marist High School, Evergreen Park, Illinois*
John Kubo, *Rowland High, Walnut, California*
Hui Young Pak, Helen Choi *McPhearson School, Chicago, Illinois*

This hands-on, week-long SIGKids workshop features skilled artists and art educators acting as mentors to 10 students working with Amiga computers in graphic and video arts. Hardcopy output includes: a videotape, video print, or ink-jet print.

Technology: Amiga, Toaster, scanners, printers, silk screening

Autodesk, Inc.

Laura Anne London *contact*

The Education Department of Autodesk brings a team of animation specialists together to collaborate with kids on a multimedia project of their own design. The project team works with a variety of Autodesk products, including Autodesk Multimedia Explorer, Animator Pro, 3D Studio, James Gleick's CHAOS, The Software, and CA LAB.

Brøderbund Kid Pix Corner

Don Albertson *organizer*

A group of children create pictures using Brøderbund's Kid Pix and then color their art for a wall quilt.

Creating With Technology School
Fenelon Fall, Ontario, Canada

Stephen Long *organizer*

The mission of Creating With Technology is to enable and empower children and adults to express themselves confidently and creatively in a technological world. Classes also are available by satellite. One of Long's students, David Henderson (from Vancouver), presents the school's work for the last eight years. This year, the students created a multimedia project about their local cattle ranching industry. Classes include: robotics, space explorations, and high-tech adventure.

Technology: various equipment

Electronic mail/bulletin board

Alex Milenkovic, a student from Florida, is SIGKids' electronic mail and bulletin board expert.

Image and Communication
Brooklyn College, Brooklyn, New York

Richard Navin *organizer*

Find out how to get your school's computer lab involved in mentor programs...how to target businesses which would benefit from working with design students at your school...how to help talented youngsters who show an interest in design, drawing and publishing, yet have no access to technology or art training. Nicky and Chris Navin demonstrate.

Kid Architecture
Southern Illinois University at Carbondale, Carbondale, Illinois

Sunand Bhattacherya, Jon Davey *organizers*

Two Kid Architecture students present the results of a week-long workshop which includes access to computer graphics and a hearty dose of design thinking. The students explore why buildings look the way they do and why buildings stand up...what architects and designers do...how do we define space...use of construction materials...and many more thoughts.

Technology: Animator, AutoCAD with a 3D interface, Alias, Iris workstation, IBM 386-486 systems

Paradigm Software
Cambridge, Massachusetts

Mohammed Zaidi *organizer*

Students from Shrewsbury High School (Shrewsbury, Massachusetts) are designing, programming, and building a plotter out of LEGO bricks. They use the latest developments in Macintosh-based robotics control through Paradigm's Pearl Controller. The plotter is controlled via an object-oriented script using Object Logo where what is drawn on the screen is translated into a physical pen-drawing by the plotter. The students answer questions about working with the LEGO setup and discuss the potential and possibilities that the object-oriented environment of Object Logo bring to it. The students also lead workshops in object-oriented LEGO robotics.

The Rock: The Streams of a Story from Apple

I. Kenneth Miller *organizer*

This project uses a touch-sensitive screen and soothing water sounds to make it a cool get-away-from-it-all. A large rock contains a computer screen showing video water and floating fish.

Rowland High School Animation Workshop
Walnut, California

Dave Master *contact*

Students give an animation workshop to SIGKids. Using a videophone at the Electronic Cafe in Santa Monica, California, Bert Klein, Brian Master, and Phil Garcia talk about story development, special effects, claymation/CGI compositing, and other techniques used to create award winning films. Rowland again took top honors at the 14th Annual Los Angeles Student Film Institute Film Festival. The students' films include: *Everlasting* David Swanston, Terrell Tangonan; *War Prayer* Brian Master, Bert Klein, Phil Garcia, Ryan Jhono, John Iskander; *The Factory* Janette Fu; *Crac Kills* Rinna Dabao, Heintje Djoha

Technology: various hardware, software, effects, traditional animation, and film and video techniques

Seabury Hall High School
Maui, Hawaii

Harold Miller *organizer*

Students in Hawaii create computer animations.

Technology: Mac LC, Animation Works, Macromind Director, Canvas

Keynote Session/ Recognition

Welcome to SIGGRAPH '92

Maxine D. Brown
SIGGRAPH '92 Chair

State of SIGGRAPH

James J. Thomas
SIGGRAPH Executive Committee Chair

The 1992 SIGGRAPH Computer Graphics Achievement Award

Presented by
Bertram Herzog
SIGGRAPH Awards Chair

To
Henry Fuchs
University of North Carolina at Chapel Hill

Guest Speaker

Jim Clark
Chairman
Silicon Graphics Computer Systems

Keynote Address

Robert W. Lucky
Executive Director
Communications Sciences Research Division
AT&T Bell Laboratories

Henry Fuchs

SIGGRAPH recognizes Henry Fuchs for his singular contributions to high-performance, parallel display architectures, as well as for his continuing contributions to computer graphics, by presenting him the SIGGRAPH Computer Graphics Achievement Award.

Through an ongoing series of projects on hardware for real-time rendering which span the past 15 years, the ideas developed by Fuchs have contributed significantly to the goal of achieving truly interactive 3D graphics. In particular, he advanced the state of the architecture of image displays through the innovative use of parallelism. His research has had significant impact on the practical implementation of massively parallel high-speed display processors—Pixel-Planes.

Fuchs obtained his PhD in computer science from the University of Utah in 1975. After graduation, he joined the faculty of the University of Texas at Dallas as an assistant professor of mathematical sciences. He has been a faculty member at the University of North Carolina at Chapel Hill since 1978, where he is the Federico Gil Professor of Computer Science. He also was adjunct associate professor in the Department of Medical Computer Science, University of Texas Southwestern Medical School, from 1979-82. Since 1988 he has been an adjunct professor of Radiation Oncology at University of North Carolina School of Medicine. In addition, he is an active consultant and advisor to industry and leads many workshops and technical advisory panels.

Previous award winners

1991 James T. Kajiya
1990 Richard Shoup and Alvy Ray Smith
1989 John Warnock
1988 Alan H. Barr
1987 Robert L. Cook
1986 Turner Whitted
1985 Loren Carpenter
1984 Jim Clark
1983 James F. Blinn

Jim Clark

Jim Clark has been designing and implementing hardware and software for special purpose computer graphics and computer-aided design systems since 1970. He founded Silicon Graphics, Inc. in November 1981 to produce high-performance workstations.

Clark received the 1984 SIGGRAPH Computer Graphics Achievement Award for his work on the development of the "geometry engine," which brought custom silicon capabilities to the highly-demanding area of real-time computer graphics. He received a MS in physics and PhD in computer science from the University of Utah.

Robert W. Lucky

Robert W. Lucky is a leading expert, author, and commentator on the state and future of data communications technology. He authored one of the most frequently cited textbooks on data communications and the popular book, *Silicon Dreams*, which is a semi-technical and philosophical discussion of the ways in which humans and computers deal with information.

At Bell Laboratories, Lucky invented the adaptive equalizer, a revolutionary technique for correcting distortion in telephone signals that is used in all high-speed data transmissions today. He now leads AT&T's research into methods and technologies on future communications systems, including optical fiber technology, data networks, mobile communications, image processing, and broadband communications services. He is a Fellow of the IEEE and a member of the National Academy of Engineering. Lucky attended Purdue University where he received a BS degree in electrical engineering, followed by MS and PhD degrees.

Fundamentals Seminar

The Terminology of Computer Graphics

The language spoken at SIGGRAPH can seem like a foreign language to first-time conference attendees. This seminar takes the guesswork out of computer graphics terms by explaining the concepts behind the terminology.

The fundamentals of computer graphics hardware, software, and related application areas are presented in a way that is as nontechnical as possible. The speakers relate the terms to examples and presentations you'll see at SIGGRAPH. All attendees and exhibitors are encouraged to attend.

Seminar Chair
Wayne E. Carlson *The Ohio State University*

Speakers
Mike Bailey *San Diego Supercomputer Center*
Judy Brown *University of Iowa*
Wayne E. Carlson *The Ohio State University*

Corporate Sponsor
Sun Microsystems, Inc., course notes

Chair Biography
Wayne Carlson is the director of the Advanced Computing Center for the Arts and Design at The Ohio State University. He also is an assistant professor in the Department of Industrial Design. Carlson is a past director of SIGGRAPH and has taught courses, presented technical papers, and contributed to the electronic theater at SIGGRAPH conferences. He holds a graduate degree in mathematics from Idaho State University and a doctorate in computer graphics from The Ohio State University. He was formerly vice president of research and development at Cranston/Csuri Productions.

Social Functions

Receptions

The courses reception on Monday night at Navy Pier is open to all badged course registrants and presenters. Tickets for guests may be purchased in the registration area during conference hours.

The papers/panels reception on Thursday night at the Hyatt Regency Chicago is open to all badged papers/panels registrants and presenters. Tickets for guests may be purchased in the registration area during conference hours.

T-shirt contest

The judges of the special interest group T-shirt contest look for outrageous, creative, bizarre, and just-plain clever computer graphics T-shirts. Enter your one-of-a-kind or mass produced design. Awards are presented at the papers/panels reception. The contest is organized by Jock Mackinlay, Xerox PARC.

SIGband

A group of conference attendees put away their computers and pick up the beat to entertain at the papers/panels reception under the direction of Steve Levine, the band leader.

SIGGRAPH at night

Do you come to life after dark? Can't sleep until the wee hours of morning? Or want to meet some more of the really great people at SIGGRAPH? Then stop by one of the SIGGRAPH-at-night locations in each of the conference hotels. Everyone is invited.

Events Planning Chair
Ellyn Gore
Convex Computer Corporation

Special Interest Groups and Birds of a Feather

Special interest groups bring like minds together. They are a great way for people to meet, exchange ideas, and share information on a wide variety of computer graphics interests. Topics, times, and locations of these meetings are posted in the registration area or below, as requested by the sponsors.

Birds-of-a-feather gatherings offer other opportunities for people to get together. During SIGGRAPH '92, individuals can organize one of these impromptu meetings simply by using the sign-up board in the registration area.

Events Planning Chair
Ellyn Gore
Convex Computer Corporation

ACM SIGGRAPH Education Committee Community College Curriculum
G. Scott Owen
Georgia State University
Atlanta, Georgia

ACM SIGGRAPH Education Committee
G. Scott Owen
Georgia State University
Atlanta, Georgia

ACM SIGGRAPH Education Committee Computer Arts Curriculum
G. Scott Owen
Georgia State University
Atlanta, Georgia

ACM SIGGRAPH Education Committee Computer Science Curriculum
G. Scott Owen
Georgia State University
Atlanta, Georiga

Amiga 3D Graphics and Animation
Mark Thompson
Radiant Image Productions
Merrimack, New Hampshire

AVS Users Group Meeting
Ian Reid
Advanced Visual Systems
Waltham, Massachusetts

Community College Curriculum Committee
Carol J. Sutton
Portland Community College
Portland, Oregon

Component Recording VideoDisc Users Group
Lou Skriba
Sony, Business and Professional Group
Itasca, Illinois

Computer Graphics in Computer Science Education
Jeffrey J. McConnell
Canisius College
Buffalo, New York

Edugraphics "Birds of a Feather"
Dennis Crawley
Computed Design/YISD
El Paso, Texas

Edugraphics Committee
Dennis Crawley
Computed Design/YISD
El Paso, Texas

Friends of Ithaca Software Social
Jennifer Kennedy
Ithaca Software
Alameda, California

Graphics Performance Characterization (GPC) Committee
Bob Cramblitt
Cramblitt & Company
Cary, North Carolina

Interactive Computer Graphics Technical Committee
R.G. Belie
Lockheed Advanced Development Co.
Sunland, California

International Art, Science, Technology: Leonardo/ ISAST; ISEA; TISEA (1992, Sidney); FISEA (1993, Minneapolis)
Roman Verostko
FISEA '93 (Fourth International Symposium on Electronic Art, 1993, Minneapolis, USA)
Minneapolis, Minnesota

IRIS Explorer User Group
Crystal VanBrug
Silicon Graphics Computer Systems
Mountain View, California

Ithaca Software HOOPS User Group (HUG) Meeting
Jennifer Kennedy
Ithaca Software
Alameda, California

The Khoros Group
Tom Sauer
The Khoros Group
Albuquerque, New Mexico

Liant Software Corporation
Jodi Forrest
Liant Software Corporation
San Diego, California

Molecular Graphics
Michael E. Pique
The Scripps Research Institute
La Jolla, California

OpenGL
Bill Glazier
Silicon Graphics Computer Systems
Mountain View, California

PEX-IC (PEX Interoperability Committee)
Lynn Thorsen
Evans & Sutherland
Salt Lake City, Utah

PHIGS User Group
Jodi Forrest
Liant Software Corporation
San Diego, California

Prego-Open Graphical Environment
Richard F. Puk
Puk Consulting Services
Carlsbad, California

Ray Tracing Roundtable
Eric Haines
3D/Eye Inc.
Ithaca, New York

SIG E.M. (SIGGRAPH)
Ellyn Gore
Convex Computer Corp.
Richardson, Texas

SIGGRAPH Arts and Design Committee
Jane Veeder
San Francisco State University
San Francisco, California

SIGTSHIRT T-Shirt Contest
Jock Mackinlay
Xerox PARC
Palo Alto, California

SMPTE Study Group Image Compression
Gary Demos
DemoGraFX
Culver City, California

Sonification: Data Driven Sound
Tom Palmer
North Carolina Supercomputing Center
Research Triangle park, North Carolina

Sun Microsystems Graphics Users Group
Doug Schiff
Sun Microsystems, Inc.
Research Triangle Park, North Carolina

Teaching Computer Imaging as Art
Andy Argyropoulos
Western Michigan University
Chicago, Illinois

Technology in Design
Lorraine Justice
The Ohio State University
Columbus, Ohio

Temporary Art Zone
Beverly Reiser
YLEM/Artists Using Science & Technology
Oakland, California

Truevision Developer SIG
Todd Morin
Truevision Inc.
Indianapolis, Indiana

University Group Animation Project '93
Barbara Mones-Hattal
Ken O'Connell
George Mason University
Fairfax, Virginia

University of North Carolina at Chapel Hill Alumni Reunion
Sharon Walters
University of North Carolina at Chapel Hill
Chapel Hill, North Carolina

Video Toaster User Group
Mike Amron
Images Illustration
San Diego, California

Visual Development
Crystal VanBrug
Silicon Graphics Computer Systems
Mountain View, California

Wavefront Users Group– WAVE 92
Rhonda Sanders Olsen
Rhonda Graphics Inc.
Phoenix, Arizona

Works on Paper
Renée LeWinter
Odyssey Communications
Somerville, Massachusetts

Technical Slide Set Contributors

The SIGGRAPH '92 slide sets include:

Technical: state-of-the-art efforts in computer graphics ranging from front-line advances in research to some of the most compelling images in the industry.

Application/Industry: examples of the diversity of computer graphics for visualizing, communicating, and abstracting ideas in fields such as science, education, media, industry, and art, and their impact on problem solving.

Stereoscopic 3D: computer graphics techniques that exploit the wide latitude of human vision and perception to convey spatial experience not realized from normal projections. A stereo-slide viewer is included.

Art: a stunning selection of artistic images from the SIGGRAPH '92 art show.

In addition to slides collected by the conference, the SIGGRAPH Education Committee has prepared an *Educator's Slide Set.*

Slide Set Chair
John Fujii
Hewlett-Packard Company

Slide Set Jury
Edwin E. Catmull *Pixar*
Bruce H. McCormick *Texas A&M University*
F. Kenton Musgrave *Yale University*
Alan Norton *IBM T.J. Watson Research Center*
John Wallace *3D/Eye, Inc.*

Production
Diana Tuggle *Los Alamos National Laboratory*

Editor, Educator's Slide Set
Cynthia Rubin *University of Vermont*

Catalog number
Title
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1 Blowing in the Gentle Wind
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2 Extracting the Natural Beauty of Hair
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3 End of the Season
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4 Neuro Network Reconstruction (II)
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Biocomputation Center
NASA Ames Research Center
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5 CG Simulation of Cracks in Glaze of Chinaware
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6 CG Simulation of a Botanical Tree and Flames
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7 Shadow Play
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8 Quark Structure of the Proton
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9 3D Lyapunov Space
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10 Lyapunov Space
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11 NSFNET T1 Backbone and Regional Networks
Donna Cox
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12 Windy Coffee
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13 Interactive Drumming—MusicWorld
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14 Enzyme Electrostatic Potential
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15 Sea of Galilee
Craig Gotsman
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16 Inside of ChI_2
Susumu Handa
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34 Miyukigaoka
Tsukuba, Ibaraki 305
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17 The 3-D Fractal Pound Sign
John C. Hart
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18 n=4 Open and Closed Fermat Surfaces
Pheng A. Heng
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19 Fractal Emblem
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20 Multiple Ray Casting: Human Heads
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21 3D Anatomical Atlas of a Human Head
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22 Volume Visualization of Blood Vessels within their Anatomical Context
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23 Synthetic Chlorophytum
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24 Transformation #2
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25 Transformation #3
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26 Computationally Stained Brain Slice 2
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27 Peeling Banana
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28 Volume Rendered Jade Plant
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29 Human Hand
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30 Computationally Stained Brain Slice
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31 FIS
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32 A Future Vision of Virtual Reality Sculpture
William Latham
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33 Virtual Scalpel
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34 Virtual Smoke
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35 3D Unsteady Flow Animation
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36 The Curvature of a Fracture Zone
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37 Diffusion Through a Heterogeneous Medium
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38 VR Research NCSA - The Redshift Survey
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42 Roadside Trees
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43 Roadside Trees
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49 Precious Wentletrap
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50 Buttonbush
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51 Green Coneflower
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52 Mammillaria geminispina
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53 Goatsbeard
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54 Flower Shop
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55 Table of Cacti
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56 Spheres
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57 Terrain Decimation
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58 Medical Decimation
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59 Bonking a Jello Head
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60 Image from an Extinct Genome
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61 Parent and 19 Mutations
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62 Living Room Scene from "Going Bananas"
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63 Dining Room Scene from "Going Bananas"
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64 Silhouette Curve of a Bumpy Shape
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65 Four Renderings of a Bumpy Surface
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66 Cloth Design and Animation
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67 3D Synthetic Hair
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69 Color Planet 1
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70 New Alfa 33
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71 Science Experiment
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72 A Roman Spectra
Samuel P. Uselton
Computer Sciences Corp.
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73 Dynamic Texture
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74 Transparent Kiss
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75 Brushed Aluminum Wheel
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580 Theory Center
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76 Brushed Aluminum Teapot
Stephen H. Westin
Cornell University
Program of Computer Graphics
580 Theory Center
Ithaca, NY 14853

77 Black Nylon Cushion
Stephen H. Westin
Cornell University
Program of Computer Graphics
580 Theory Center
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78 Kitchen with Global Illumination
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3 Structure of Corannulene
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Advanced Digital Imaging, the makers of MacVAC, is showing the A.D.1 digital disk recorder. This new product connects to both Apple Macintosh and SGI computers. Graphics files will be transferred by SCSI to our A.D.1, then played back in real time (about 5 minutes). Options will include D1 in and out.

Booth 1739

Advanced Visual Systems Inc.
300 Fifth Avenue
Waltham, MA 02154
(617) 890-4300
(617) 890-8287 fax
ham@AVS.COM
Hambleton Lord
Director, Product Marketing

AVS is the industry standard platform-independent visualization software and application development environment. AVS helps application developers, scientists, engineers, and business professionals develop graphics-based applications and perform data visualization and analysis. AVS allows users to construct applications incorporating their own software algorithms, without knowledge of complex graphics programming techniques.

Booth 141

Accom Inc.
1490 O' Brien Drive
Menlo Park, CA 94025
(415) 328-3818
(415) 327-2511 fax
Lance Kelson
Vice President of Marketing

Accom presents the Accom RTD 4224 Real Time Disk Recorder. Its capabilities include: file transfers and control using Ethernet or SCSI for recording and playback of animation from host workstations; real-time random access to any field or frame; capacities from 32 seconds to 30 minutes of highest quality 4:2:2 digital video and key; and time expansion/picture smoothing in real time, single or dual user operation, 525 or 625 line standards.

Booth 851

ADDA Technologies, Inc.
48501 Warm Springs Boulevard #105
Fremont, CA 94539
(510) 770-9899
(510) 623-1803 fax
Amy S. Wong
Marketing Manager

ADDA exhibits its multimedia line of products, which include VGA-to-video genlock boards, PC video adaptor and Targa 16 compatible board. In addition, the company also is introducing its new VGA card, which can do NTSC output and 32K HiColor support.

Booth 458

Advanced Imaging & AVC Presentation
445 Broad Hollow Road
Melville, NY 11747
(516) 845-2700
(516) 845-2797 fax
Charles Grecky
Publisher

Advanced Imaging is the one and only international magazine specifically designed to meet the needs of the "imaging professional." Offering monthly coverage of video, photographic, and document-based imaging technologies used for the capture, processing, display, storage, output, transmission, and communication of images, text, and data. *AVC Presentation Development and Delivery* is the monthly magazine for the visual communicator. Focus is on details of the products and techniques available for effective presentations—AV, computer, video, and multimedia-based. Free issues and free subscriptions available.

Booth 2232

AGFA Division
Business Imaging Systems
One Ramland Road
Orangeburg, NY 10962
(914) 365-0190
(914) 359-3201 fax
Cathy McMahon
Marketing Communications Manager

AGFA's Business Imaging Systems group designs, manufactures, and markets a full line of film recorder products for the presentation graphics, prepress, photographic retouch, and cine markets. The product line includes the ProColor Premier entry-level film recorder, the new PCR II mid-range professional model, and the Forte high-performance professional model.

Booth 131

Alacron, Inc.
71 Spitbrook Road, Suite 204
Nashua, NH 03060
(603) 891-2750
(603) 891-2745 fax
sales@alacron.com
Cheryl L. (Stevens) Musser
Sales and Marketing Specialist

Alacron Inc., a leading manufacturer of i860 based computers for graphics and imaging is showing its new XP860 xpress product line consisting of a 300 MFLOP 3 processor distributed memory based single slot V ME/EISA board, with a unique 400MB/S interconnect bus. Digital I/O is provided at up to 100MB/S.

Booth 2419

The American Institute of Physics
335 East 45th Street
New York, NY 10017
(212) 661-9260
(212) 661-5615 fax
William Phillips
Marketing Coordinator

The American Institute of Physics is one of the world's foremost publishers of books and journals in physics, astronomy, and related fields. Its Electronic Publishing Division includes PINET, an information and e-mail service; PHYS, an on-line bibliographic database; and Physics Academic Software, peer-reviewed programs for classroom and personal use.

Booth 1936

AmPro Corporation
1301 Armstrong Drive
Titusville, FL 32780
(407) 269-6680
(407) 267-6211 fax
Frank McLanis
Vice President, Sales and Marketing

AmPro is the largest American manufacturer of large screen projection systems for video, data, and computer graphics applications. Its full line of projectors is the industry's broadest, featuring seven-, eight-, and nine-inch CRT-based models with scan rates from 15-90 KHz, light output to 1200 lumens, and resolution to 2000 lines.

Booth 751

ASG
4000 Bridgeway
Sausalito, CA 94965
(415) 332-2123
(415) 332-2146 fax
71171, 2277CSERVE
Alan Steel
Project Manager

ASG Model Vision was developed with Crystal Graphics Inc. to provide rendering and animation for 3D CAD models. Model Vision renders and animates with a variety of lighting, mapping, and modeling tools. ASG Model Vision has direct links to AutoCAD .dwg files through ASG Core.

Booth 1153

Aldus Corporation
One Tower Lane, #1130
Oakbrook Terrace, IL 60181
(708) 954-0474
(708) 954-0468 fax
Ashley Moon
Regional Administrative Assistant

Aldus Corporation creates computer software that helps people throughout the world effectively communicate information and ideas. Aldus product line includes Aldus PageMaker, Aldus PhotoStyler, Aldus Digital Darkroom, Aldus FreeHand, Aldus Gallery Effects, Aldus Personal Press, Aldus Persuasion, Aldus PrePrint, Aldus Supercard, Aldus SuperPaint, and Aldus Super 3D.

Booth 1637

Ameritech
30 South Wacker Drive, Floor 34
Chicago, IL 60606
(312) 609-6189
(312) 207-1602 fax
Leona Hall
Manager, Trade Shows

Ameritech is the parent of the Bell companies serving Illinois, Indiana, Michigan, Ohio, Wisconsin, and other information-related companies, both foreign and domestic, providing mobile communications, directory publishing, systems integration, lease financing, voice messaging, and audiotex services. Ameritech's 1991 revenues were $10.8 billion.

Booth 1722

Apple Computer, Inc.
333 West San Carlos Street
San Jose, CA 95110
(408) 974-5129
(408) 974-8644 fax
Kirk Shorte
Integrated Media Solutions Marketing Manager

Come by the Apple Computer booth to see the Macintosh personal computer and the latest solutions for scientific visualization, design, modeling, rendering, and animation applications, as well as unparalleled personal productivity applications, allowing individuals to address all aspects of their work.

Registration Area

Association for Computing Machinery (ACM)
1515 Broadway, 17th Floor
New York, NY 10036
(212) 869-7440
(212) 944-1318 fax

ACM is displaying its major journals, Special Interest Group (SIG) newsletters, and conference proceedings. SIGGRAPH newsletters and conference proceedings are featured. Individuals may join ACM, SIGGRAPH, or other SIGs at the booth.

Booth 2339

Alias Research Inc.
110 Richmond Street East
Toronto, Ontario M5C 1P1
Canada
(416) 362-9181
(416) 362-0630 fax
Susan Anderson
Tradeshow and Events Manager

Alias Research Inc. presents: Alias Animator, for post houses and corporate video; Alias PowerAnimator, our most advanced animation and visualization system; Alias Designer; Alias Studio, advanced design software; Alias Full Color, powerful prepress software; Alias Sonata, a revolutionary new CAD system; Alias Upfront, a 3D conceptual drawing tool; and Alias Sketch for 3D illustration and design.

Booth 753

Ampex Corporation
401 Broadway M/S 3A-01
Redwood City, CA 94063
(800) 562-3621
(415) 367-3850 fax
Mark Arola
DST Marketing Manager

Ampex presents DST (Data Storage Technology) mass storage products for high-performance computing. The DST 600 drive stores up to 165 GB per cartridge at 15 MB/sec. The DST 800 library puts 6.4 terabytes of data on-line. It holds 2 - 4 DST 600 drives up to 256 cartridges, and occupies only 21 square feet of floor space.

Booth 2234

Ascension Technology Corporation
P.O. Box 527
Burlington, VT 05402
(802) 655-7879
(802) 655-5904 fax
John T. Scully, Jr.
Vice President

Ascension showcases the latest advances in six degrees-of-freedom (6D) head, hand, and body tracking for virtual reality, character animation, CAD, and biomedical applications. Visitors can see the Flock of Birds, operating over unprecedented long ranges, simultaneously track the position and orientation of multiple targets.

Booth 107

Assoexpo
Via Domenichino 11
20149 Milano
Italy
(39)2- 481-5541
(39)2- 498-0330 fax
Roberto Pinna Berchet
President

Stop by the Assoexpo booth to see information on IBTS, 7th International Audio, Video, Broadcasting, and Telecommunications show; MEM, 4th International market for Audio, Video, and Multimedia programs and services, October 15-19, 1992 and Milan Fair, Padiglione Sud-Milan/Lacchiarella (Italy).

Booth 1915

AT&T Graphics Software Labs
3520 Commerce Crossing, Suite 300
Indianapolis, IN 46240
(317) 844-4364
(317) 575-0649 fax
Sara Ellis
Exhibits Manager

AT&T Graphics Software Labs specializes in color graphics applications for PC- and Macintosh-based systems. They are showcasing five of their popular graphics applications: TOPAS and MacTOPAS, 3D modeling, rendering and animation software; RIO, 2D design and animation software; Panorama, multimedia presentation software; and Comet/CG, character generation and video titling for the Macintosh.

Booth 1756

Autodesk
2320 Marinship Way
Sausalito, CA 94965
(800) 525-2763
(415) 491-8308 fax
Bob Bennett
Product Manager

The Autodesk booth includes live demonstrations of two popular animation software packages: Autodesk 3D Studio and Autodesk Animator Pro. Autodesk 3D Studio Release 2 is the latest version of this comprehensive 3D modeling, animation, and rendering software package. Autodesk Animator Pro is a powerful 2D animation and paint software product which complements 3D Studio. Application areas include video, virtual reality, and multimedia.

B

Booth 1544

AXA Corporation
17752 Mitchell, Suite C
Irvine, CA 92714
(714) 757-1500
(714) 757-1766 fax
RoseMarie Menapace
Exhibits Coordinator

AXA Animation Series is a 2D software package running under Microsoft Windows. It includes: Producer, an electronic exposure sheet; Ink & Paint, which inks lines and paints characters; Camera fx, which simulates an animation stand with 10 pegs, composites, and outputs to 35mm film, D2, or Betacam. AXA Corporation, Irvine, CA, is the developer of QuickCEL animation software.

C

Booth 105

Business People Inc. (BPI)
2985 Multifoods Tower, 33 S. 6th Street
Minneapolis, MN 55402
(612) 370-0550
(612) 344-1648 fax
David Aberman
President/CEO

Official ACM SIGGRAPH job search services and free resume exchange. Drop your resume (or our form) at the SIGGRAPH Job Search Services Booth. It will be distributed to companies with openings in the computer graphics field.

Job Matching Service matches your background with 2,000 employers in 40 major newspapers/publications nationwide, all skills and positions. Matched information given directly to appropriate employers.

Booth 2126

Audio DigitalImaging
511 West Golf Road
Arlington Heights, IL 60005
(708) 439-1335
(708) 439-1533 fax
Jean Monroe
Chairman and CEO

ADI engages in research and development of data compression technology related to still and full-motion video and audio used in the creation of its VLSI ASIC board products. ADI also creates original software system management programs designed for various vertical markets such as: Security Access Control; Badge & ID; IC Card Utilization; Electronic Catalog; and Very Large System Document and Image Database with Multiple Search Criteria.

Booth 666

autodessys, Inc.
2011 Riverside Drive
Columbus, OH 43221
(614) 488-8838
(614) 488-0848 fax
Chris Yessios
President

form, Z 2.0 General-purpose 3D solid and surface modeler for the Macintosh, capable of interactively generating any 3D form with unprecedented ease: boolean operators, 3D sculpting, terrain modeling, curves and curved surfaces (NURBS), high precision, unlimited Undos, drafting, rendering, and many more features integrated into a single package.

Booth 1654

Bit 3 Computer Corporation
8120 Penn Avenue South
Minneapolis, MN 55431
(612) 881-6955
(612) 881-9674 fax
Jerry Medley
Sales Manager

High-speed, memory-mapped, bus-to-bus adaptors for direct interconnection of various personal computers and workstations to VMEbus, MULTIBUS, and Q-bus systems: IBM PC/AT and RISC System/6000, Sun SPARCstations, HP 9000/700, DECstation 5000, SGI Indigo, and Apple Macintosh.

Booth 2332

Byte by Byte Corporation
9442-A Capital of Texas Highway North
Suite 650
Austin, TX 78759
(512) 795-0150
(512) 795-0021 fax
Scott A. Peterson
President

Byte by Byte Corporation demonstrates its complete line of Sculpt products for the Apple Macintosh. Sculpt integrates precision 3D modeling and animation with photorealistic ray-trace rendering into one seamless environment. Optional RISC-based acceleration delivers workstation-level rendering speeds. Demonstrations by experienced Sculpt professionals are offered throughout the show.

Booth 951

Aurora Systems
2230 Martin Avenue
Santa Clara, CA 95050
(408) 988-2000
(408) 986-0452 fax
trane!katcha@pacbell.com
Katcha Burnett
Marketing Director, Liberty

LIBERTY is a high-end, 32-bit, comprehensive drawing, painting, compositing, animation, and typography package used for NTSC, PAL, HDTV, film, and pre-press applications. The package features tightly integrated paint and extensive 2D animation tools, the result of 12 years of feedback from the computer graphics market.

Booth 1340

Avid Technology, Inc.
Metropolitan Technology Park
One Park West
Tewksbury, MA 01876
(508) 640-6789
AppleLink: AVID
Lisa LeBlanc
Marketing Communications Manager

Stop by for a demonstration of the Avid Media Composer, the world's best-selling digital non-linear editing system featuring advanced JPEG compression for full-resolution images direct from disk. Avid also showcases its multi-vendor open platform program, integrating the desktop and professional media environments. Get the industry's first look at the all-new Avid Media Suite, a digital video production system offering television-quality on the desktop for corporate, industrial, education, and government communicators.

Booth 1939

Brooktree Corporation
9950 Barnes Canyon Road
San Diego, CA 92121
1-800-VIDEO IC
(619) 597-0673 fax
Cathy Batchelor
Marketing Communications Manager

Brooktree Corporation develops high-performance digital-to-analog and analog-to-digital converters for computer graphics and imaging applications. Products include RAMDACs, VIDEODACs, video digitizers, video encoders, and other peripheral timing components. Products on display include the company's latest True-Color RAMDACs and Video Encoders for workstations and personal computers.

Booth 549

Canon USA, Inc.
One Canon Plaza
Lake Success, NY 11042
(516) 488-6700
(516) 488-6322 fax

Canon features the new CJ10, which produces full color documents and OHP transparencies.

D

Booth 1541

Chase Technologies, Inc.
10211 Pacific Mesa Boulevard
Suite 412
San Diego, CA 92121
(619) 558-3400
(619) 558-1425 fax
Sharon Bryant
Marketing Communications Manager

SoftVTR, the 100 percent software animation controller, controls broadcast and industrial videotape recorders and laser disks through a wide range of computers. It performs all VTR functions with single-frame accuracy. SoftVTR is compatible with all animation software that renders frames to disk and includes special drivers for TOPAS 3D Studio and Animator Pro software packages.

Booth 2422

Codonics, Inc.
17991 Englewood Drive
Middleburg Heights, OH 44130
(216) 243-1198
(216) 243-1334 fax
Frank Accordino
Product Manager

Codonics exhibits its NP-600 Photographic Network Printer. The NP-600 will network to virtually any computer and produce picture-perfect higher-resolution photographic-quality images at a cost-effective price. Utilizing state-of-the-art dye-sublimation technology with 16.7 million simultaneously printable colors, the NP-600 is ideal in any CAD/CAM photorealistic rendering or color imaging application.

Booth 228

Comtec Automated Solutions
10,000 Old Katy Road, Suite 150
Houston, TX 77055
(713) 935-3666
(713) 935-3650 fax
Debbie Denison
Vice President, Marketing and Sales

Comtec has the cure for your mass storage blues. Our state-of-the-art jukebox solutions can provide the storage capability your network needs. Backup and archival software solutions with jukeboxes and autoloaders provide automatic, unattended, reliable, and economical storage.

Booth 507

Cyberware
8 Harris Court, #3D
Monterey, CA 93940
(408) 373-1441
(408) 373-3582 fax
dabro@taurus.cs.nps.navy.mil
Michael McDowell
Sales Engineer

Cyberware presents color 3D digitizers for animation, science, and the arts. New techniques in data reduction and interfaces to modeling software are on display.

Booth 2119

Chromatek Inc.
c/o Chroma Technology Inc.
100 North Central Expressway, Suite 500
Richardson, TX 75080
(214) 680-3235
(214) 680-3324 fax
Dale Rochon
President

A series of scan converters are shown, including: Model 9120 featuring ultra-wide (15KHz-128KHz) input scan rate and unique smooth zoom (x0.25-x16). Model 9125 converts HDTV format to NTSC. Model 9135 converts NTSC computer signals to HDTV format and 31.5KHz scan rate for projection.

Booth 315

Computer Design, Inc.
2880 East Beltline N.E.
Grand Rapids, MI 49505
(616) 361-1139
(616) 361-5679 fax
Nan Frazee
Marketing Manager

Computer Design, Inc. is an industry leading supplier of computer-aided design products. The DesignConcept software is used extensively within the automotive, aerospace, apparel, furniture, textile, and consumer goods industries. Computer Design, Inc. features DesignConcept 3D for 3D product modeling, and U4ia for high-resolution printed fabric design and separations.

Booth 1744

Convex Computer Corporation
3000 Waterview Parkway
Richardson, TX 75080
(214) 497-4000
(214) 497-4141 fax
lambert@convex.com
Paul Lambert
Product Marketing Manager,
Visualization/Graphics

Convex Computer Corporation manufactures supercomputers for scientists, engineers, and technical users. By integrating high-speed computational capability with powerful visualization software, Convex delivers visual results for the large data sets resulting from the most challenging technical problems. Convex supplies distributed visualization for the full range of graphics workstations, X terminals, and PEX-capable graphics devices.

Booth 2420

Cymbolic Sciences International
100 Columbia #200
Aliso Viejo, CA 92656
(714) 362-0800
(714) 362-0500 fax
Christopher Gift
Corporate Communications

Cymbolic Sciences International, the leader in high-end output, manufactures high-end, continuous tone color film recorders for the graphic arts and computer graphics markets.

Booth 2417

CIRAD
B.P. 5035
Montpellier, 34032
France
(33) 67-10-15-75
(33) 67-10-15-99 fax
Alain Chauchard
Head of Administration

Advanced modeling and growth simulation of plants: pruning, seasons, snow, special environmental effects. Dynamic visualization of computerized flora, gardens, and landscapes, including buildings and automatic terrain modeling, are demonstrated.

Booth 529

Computer Graphics World/ SIGGRAPH Show Daily
One Technology Park Drive
P.O. Box 987
Westford, MA 01886
(508) 692-0700
(508) 692-7806 fax
Hope Mascott
Marketing Communications Director

The *SIGGRAPH '92 Show Daily* covers show highlights, new products, courses, and industry trends. *Computer Graphics World* covers all aspects of computer graphics. *Color Publishing* provides information about color systems. *TypeWorld* focuses on typesetting and electronic publishing systems. *Computer Artist* provides information for art and design professionals using electronic tools. Free trial subscriptions.

Booth 344

Corel Corporation
1600 Carling Avenue
Ottawa, Ontario K1Z 8R7
Canada
(613) 728-8200 ext. 1401
(613) 761-9330 fax
Debrah Boucher
Exhibits Manager

CorelDRAW 3.0 includes powerful and easy to use applications for all your graphic needs. You can draw, chart, paint, and show your best...communicating with graphics is easy with CorelDRAW! Corel will also be showing its SCSI solutions for the personal computer.

Booth 1549

Diaquest Inc.
1440 San Pablo Avenue
Berkeley, CA 94702
(510) 526-7167
(410) 526-7073 fax
Louise R. Ledeen
Director of Marketing

Diaquest demonstrates new and enhanced video control products for single frame animation recording, video editing, and sequential frame digitizing in broadcast, scientific visualization, and multimedia production. Diaquest's products interface with a wide range of graphics applications, computer platforms, and video formats. New products include DQ-232 and DQ-422+. Enhancements to ImageNode, DQ-Animaq, DQ-TACO, and Series II are featured.

E

Booth 956

Digital Arts
4531 Empire Avenue
Burbank, CA 91505
(818) 972-2112
(818) 972-2115 fax
Julia Kim
Marketing Assistant

Digital Arts creates 3D modeling, rendering, and animation software for the PC and SGI IRIS Indigo. On display: DGS 386/486 3D Build, Animation, Render Software; DGS Paint on PC using TrueVision's AT VISTA 4MB; Digital Artist RenderManager and Digital Artist Paint for Silicon Graphics IRIS Indigo.

Booth 1158

Discreet Logic Inc.
5505, Boul. St-Laurent, Suite 4201B
Monreal, Quebec H2T 1S6
Canada
(514) 272-0525
(514) 272-0585 fax
Richard Szalwinski
President

Discreet Logic Inc. produces Eddie, Eddie Paint, and Eddie Text workstation-based digital editing and image processing software for film, video, and special effects production; and distributes Flame by D.A. Technologies, digital editing software operating on the Silicon Graphics Inc. VGX platform.

Booth 1149

Du Pont Pixel
2000 Edmund Halley Drive, #290
Reston, VA 22091
(800) 542-1484
(703) 264-8754 fax
Michael King
Marketing Manager

Du Pont Pixel is demonstrating PX/IRIS GL for the Sun Sparcstations. PX/IRIS GL is source level compatible with the IRIS GL 4.0 API, and is targeted to developers porting IRIS GL-based applications to the Sun Sparcstations, and developers on Sparc requiring a portable, industry standard, 3D graphics API. Du Pont Pixel also offers a range of tightly integrated PX/IRIS GL accelerators for the Sparc platforms.

Booth 323

Electric Image, Inc.
117 East Colorado Boulevard, Suite 300
Pasadena, CA 91105
(818) 577-1627
(818) 577-2426 fax
Applelink ELECTRIC.IMG
Jay Roth
President/CEO

Electric Image Inc. premieres Electric Image Animation System Version 1.5. Electric Image 1.5 adds new shadow casting features, 255 levels of transparencies, transparency and environmental mapping, improved user interface, and more. Version 1.5 is free to all registered users. Electric Image customers produce work used in the broadcast and motion picture markets.

Booth 1316

Digital Equipment Corporation
146 Main Street
Maynard, MA 01754
(508) 493-5628
(508) 493-5142 fax
LESCOM::LYNCH
Betty Lynch
Marketing Specialist

Digital is demonstrating graphics workstations, utilizing 2D and 3D graphics accelerators for its RISC and VAX workstations. Digital also shows a wide variety of application solutions in visualization, video conferencing, multimedia, and 3D. New! Digital's true 64-bit architecture delivers quantum leap performance.

Booth 1061

Division Limited
400 Seaport Court
Suite 101
Redwood City, CA 94063
(415) 364-6067
Peter Cornwell
Chief Executive Officer

Division is the leading supplier of integrated virtual reality systems, comprising real-time computers integrated with high-performance stereo graphics, binaural sound, and tele-robotic peripherals. dVS, the first virtual reality operating system, easily manages the distributed processing systems dedicated to audio synthesis, visual image generation, positional tracking, and gesture recognition.

Booth 127

Dynamic Graphics, Inc.
1015 Atlantic Avenue
Alameda, CA 94501
(510) 522-0700
(510) 522-5670 fax
mktg.info@ dgi.com
Glenn Hansen
Marketing

Dynamic Graphics ,Inc. develops software for 2D and 3D modeling, mapping, visualization, and analysis used in earth resources disciplines. Application areas include oil and gas exploration and production, environmental assessment, mining, oceanography, and land planning. Three software products available from Dynamic Graphics are Interactive Surface Modeling, Interactive Volume Modeling, and Geologic Modeling Program.

Booth 936

ElectroGIG USA Inc.
30 E. Huron, Suite 3807
Chicago, IL 60611
(312) 573-1515
(312) 573-1512 fax
Phillip Moy
U.S. Sales Manager

ElectroGIG USA is the exclusive U.S. distributor for 3D-GO, a complete 3D design, rendering, and animation software package from ElectroGIG Nederland bv of Holland. In addition to 3D-GO, ElectroGIG USA is demonstrating several new products including GIG RaySketcher, an innovative tool which allows 3D-GO users to produce unique "painterly quality" ray-traced images.

Booth 2115

Digital F/X, Inc.
755 Ravendale Drive
Mountain View, CA 94043
(415) 961-2800
(415) 961-6990 fax
Beverly Burton
Trade Show Coordinator

Digital F/X, the Emmy award-winning manufacturer of digital video post-production systems, offers the Composium family of products. They allow rapid creation of stunning special effects by incorporating digital edit suite and video paint tools. The DDR-100, a 100-second digital disk recorder, and TitleMan, the PostScript title generator, are featured.

Booth 954

Double M Industries
1520 Royston Lane
Round Rock, TX 78664
(512) 251-4044
(512) 251-4807 fax
Barry M. Marks
President

Double M Industries is exhibiting film recorder cameras. Formats include 35mm pin registered bulk load (slide and cine), 70mm pin registered, 4 x 5, 8 x 10, and 7 x 9 roll film. Available for all popular film recorders.

Booth 1749

Eastman Kodak Company
343 State Street
Rochester, NY 14650-0315
(716) 253-0624
(716) 724-9416 fax
Angie Williams
Marketing Communications Assistant

Cineon Digital Film System provides the power of computers to manipulate images while retaining the quality of the original film. Cineon consists of three main components; a film scanner, an image computing workstation, and a film recorder. A motion picture will be shown which demonstrates camera negative film converted to a high-resolution digital format, manipulated on the Cineon Digital Workstation, and recorded back to film.

Booth 761

ENHANCE Memory Products, Inc.
18720 Oxnard Street, Suite 102
Tarzana, CA 91356
(818) 343-3066
(818) 343-1436 fax
Doug LaFountaine
Sales Manager

ENHANCE manufactures memory expansion products for laptops, PCs, workstations, and laserprinters that are covered by a lifetime warranty. A supplier of memory products to the world marketplace since 1978, current products include upgrades for the Mac Powerbooks, Zenith MasterPort Series, Sun SPARC Station IPX and ELC, Silicon Graphics, IBM Risc 6000 workstations, Toshiba Laptops, AST Executive Notebook, Compaq LTE 386s/20, IBM L40SX Notebooks, HP Palmtop, and HP Apollo 9000/700 models.

F

Booth 308

Eurographics
P.O. Box 16
1288 Aire-La-Ville,
Switzerland
(44) 61-275-6158
(44) 61-275-6236 fax
rjh@cs.man.ac.uk
Roger Hubbold
Chair of Promotions Board

Eurographics is the European Association for Computer Graphics, a professional association for those working in computer graphics, human-computer interfaces, multimedia, visualization, and related areas. Services include conferences, technical workshops, courses, and publication of the *Computer Graphics Forum* journal, conference and workshop proceedings, and technical reports.

Booth 1729

Evans & Sutherland
580 Arapeen Drive
Salt Lake City, UT 84108
(801) 582-5847
(801) 582-9413 fax
Pamela Donaldson
Marketing Coordinator

Evans & Sutherland features the latest in both simulation and graphics technology. See demonstrations of the ESIG-2000 low-cost image generator with applications in training, education, and entertainment. CDRS industrial design software, created for designers to develop, view, and evaluate free-form surface models, is also being demonstrated on the ESV high-performance graphics workstations.

Booth 958

Extron Electronics
13554 Larwin Circle
Santa Fe Springs, CA 90670
(310) 802-8804
(310) 802-2741 fax
Gary Kayye
Sales Manager

Extron Electronics is a manufacturer of computer-video interfaces, switchers, and distribution amplifiers that allow simultaneous connection to data monitors, projectors, LCD panels, and RGB printers. Extron products are engineered for optimum RGB video bandwidth performance and reliability. Other products include video test and measurement devices, CRT screen savers, and projector switchers with RS232 and projector control.

Booth 1469

5D Solutions Ltd. (known as 5D)
Southbank Technopark
90 London Road
London, SE1 6LN
United Kingdom
(44) 71-922-8814
(44) 71-401-8621 fax
Steve Hayes
Director

5D is a research and development company specializing in advanced 3D graphics and image processing techniques. 5D is showing TMorph (2D morphing) already very successful in Europe, KATY (computer-aided technical illustration) and JAWS, a PostScript Level 2 interpreter. Source licenses are available to OEMs and 5D is looking for distributors.

Booth 111

Focus Graphics, Inc.
1191 Chess Drive, Suite B
Foster City, CA 94404
(415) 377-0596
(415) 377-0598 fax
Elizabeth E. Maulick
Marketing Representative

Focus Graphics is a leader in full-color output technology. The ImageCorder line of film recorders is used extensively throughout the scientific visualization, animation, medical, and desktop publishing markets. The IS-2000 digital interface and ImageMaster software provide the product line with high-resolution recording, extensive file format compatibility, image processing, and networking.

Booth 513

Folsom Research, Inc.
526 East Bidwell Street
Folsom, CA 95630
(916) 983-1500
(916) 983-7236 fax
Ed Hart
Manager of Sales and Marketing Development

Folsom Research is introducing its newest scan converter product, the new OTTO. This converter automatically syncs to any workstation or medical image source. A user-friendly menu panel allows for ultimate user control over the scan conversion process. OTTO features full pan and zoom as well as adjustable filters for motion, flicker, and gamma correction.

Booth 749

FOR.A Corporation of America
313 Speen Street
Natick, MA 01760
(508) 650-3902
(508) 651-8729 fax
Nicola Cataldo
Show Management

FOR.A Corporation of America, Imaging Products Group, is providing electronic imaging solutions for PCs and workstations. January 1992, REBO Research joined FOR.A in the co-development of the HD-DCS (High Definition-Digital Camera System). The HD-DCS is one of the first interactive applications of HDTV technology being used in industry today.

Booth 769

Fox River Graphics
600 Willow Lane
West Dundee, IL 60118
(708) 428-5068
(708) 428-4644 fax
Joseph O'Dowdell
President

Fox River Graphics is a full-line computer graphics dealer exhibiting film recorders, the new Brother "hot melt" printer technology, the Sayett MediaShow, Polaroid's Bravo Slide Maker and scanners.

Booth 1829

Fraunhofer Computer Graphics Research Group
1527 Route 12, P.O. Box 648
Gales Ferry, CT 06335
(203) 464-2623
(203) 464-6323 fax
fhg@cc.gatech.edu
Peter R. Bono
Managing Director

Representing a German graphics R&D institute employing over 120 people and 200 students, the U.S. office provides picture, video, and imaging solutions for today's virtual reality, visualization, and modeling applications. We also assist U.S. companies in bringing their products to Europe and European companies which are looking for U.S. technology partners.

G

Booth 2334

FSI (F and S, Inc.)
1019 14th Street
Columbus, GA 31901
(706) 324-6308
(706) 324-6495 fax
Susan Morgan
Vice President

FSI presents software for the designer, artist, service bureau, and printer. The Kolorist is extremely easy for anyone to use. You no longer have to accept "good enough" color. The Kolorist quality surpasses high-end systems and is the only system to address any ink set with quality that is consistent, repeatable, and reliable.

Booth 1922

General Electric, Projection Display Products Operation
Electronics Park 7, Mail Stop 12
Syracuse, NY 13221
(315) 456-2152
(315) 456-2862 fax
R.P. Higgins
National Sales Manager

GE is exhibiting commercial and professional large-screen video/data/graphics projectors including Talaria light valve projectors, Imager CRT projectors, and Imager LCD projectors with brightness up to 10,000 lumens. Projectors are suitable for front or rear screens from 4' to 30' wide.

Booth 236

Geobyte Magazine
1444 South Boulder Avenue
Tulsa, OK 74119
(918) 584-2555
(918) 584-6999 or 0469 fax
Ken Milam
Managing Editor

Geobyte is a bimonthly journal focusing on computer applications in exploration and development of petroleum and energy minerals. The slick, full-color format includes peer-reviewed papers, industry-specific articles, columns, and news. *Geobyte* is published by the American Association of Petroleum Geologists.

H

Booth 1523

Helios Systems
1996 Lundy Avenue
San Jose, CA 95131
(408) 432-0292
(408) 432-7323 fax
Greg Bauer
Vice President & General Manager

Helios Systems is a leading supplier of workstation-compatible memory, data communication, and networking products. Memory upgrades include a 30-day money back guarantee and lifetime warranty. Helios supplies the industry's only high-speed SBus Data Modem and SBus Fax/Modem. Networking products include NFS Acceleration boards, SBus Multiplexors, and TCP-IP Terminal Server/Concentrators.

Booth 108

High Color Magazine
21 Elm Street, 3rd floor
Camden, ME 04843
(207) 236-6267
(207) 236-6018 fax
Michael Forcillo
Publisher

High Color, the magazine of PC graphics and video, will keep you up to date on high-color graphics in business presentations, mulitmedia communications, color electronic publishing, and graphic arts. Stop by the booth for a sample issue of *High Color* and save over 50 percent off the cover price when you sign up for a special show subscription.

Booth 2425

Herstal Automation
3171 West 12 Mile Road
Berkley, MI 48072
(313) 548-2001
(313) 548-2010 fax
Cathy Melchert
Office Manager

Herstal manufactures memory board products and data storage peripherals for users of HP 1000 and 9000 computer systems worldwide. Low-cost products for HP-UX users include disk drives, memory expansion boards, 4MM and 8MM tape drives, rewritable magneto-optical disk drives, and automatic media changers. Users of RTE-A systems can benefit from our extensive technical expertise with HP 1000 systems. Our expandable ECC memory array boards provide long-term reliability and flexibility for system memory.

Booth 765

Hotronic, Inc.
1875 South Winchester Boulevard
Campbell, CA 95008
(408) 378-3883
(408) 378-3888 fax
Linada Chang
Marketing Manager

Hotronic manufactures TBC/frame synchronizers. Models AP41, AP41-SF, AP41-SP TBC/frame synchronizer, low-cost, high-quality, upgradable, infinite window, freeze frame shield, strobe and dropout compensator, are perfect for VHS, S-VHS, HI-8, 3/4-inch U-matic, camcorder, and consumer VCRs.

Booth 1715

Hewlett-Packard Company
3000 Hanover Street
Palo ALto, CA 94304
(415) 857-1501
(415) 857-5518 fax
Corporate Development

Hewlett-Packard brings speed and realism to the computer graphics market, through innovative products based on industry standards. HP provides a wide variety of worldclass solutions which address the needs of science, industry, and business. The Hewlett-Packard exhibit features HP's broad range of price-performance leading, RISC-based graphics workstations.

Booth 1546

Howtek, Inc.
21 Park Avenue
Hudson, NH 03051
(603) 882-5200
(603) 880-3843 fax
Jean Vosler
Manager, Marketing Communications

Howtek exhibits its new Scanmaster D4000 professional drum scanner. In addition, the Scanmaster 3+ 1200 dpi scanner and the 600 dpi personal color scanner are displayed. Howtek also is showing the Colorscan electronic pre-press system. Howtek color products are marketed toward desktop graphic arts and electronic pre-press systems.

I

Booth 1329

IBM Corporation
1503 LBJ Freeway
Dallas, TX 75234
(214) 406-7442
(214) 406-7226 fax
Keith Sams
Visualization Market Development

IBM presents a wide spectrum of computer systems, including multimedia PS/2s, high performance graphics workstations, and parallel supercomputers. IBM's partnerships are highlighted by leading business partner demonstrations. In keeping with IBM's commitment to industry standards and open systems, IBM features price/performance solutions that address the needs of science, industry, and business.

Booth 1436

IEEE Computer Society
10662 Los Vaqueros Circle
Los Alamitos, CA 90720-1264
(714) 821-8380
(714) 821-4010 fax
H.Rex@compmail.com
Heidi Rex
Advertising Manager

IEEE Computer Society is the publisher of *IEEE Computer Graphics & Applications* magazine and graphics-related books and proceedings. As one of the most prestigious professional associations in the world, IEEE Computer Society serves its membership of almost 100,000 through many publications, conferences, and workshops. Membership information, magazines, and books are on display.

Booth 339

IEEE Visualization '92 Conference
1730 Massachusetts Avenue N.W.
Washington, D.C. 20026-1903
(202) 371-1013
(202) 728-0884 fax
chunter@llnl.gov
Carol Hunter
Program Co-Chair

After only two years, the annual IEEE Visualization Conference has already become an important forum for the dissemination of research results in the area of scientific data visualization. The third Visualization Conference promises to be even more exciting and significant. Forty-four papers, 12 case studies, and six panels will be presented.

Booth 1934

IGES Data Analysis, Inc.
2001 North Janice Avenue
Melrose Park, IL 60160
(708) 344-1815
(708) 344-2840 fax
support@ida.ch.il.us
Charlene Hess
Director of Marketing

IGES Data Analysis is introducing several new products. IGESVIEW allows users to view, manipulate, markup, and integrate CAD/CAM graphics without the use of an expensive CAD system. Graphics can be converted to various 2D formats, i.e., Interleaf, CGM, FrameMaker. Two other new products include an Interleaf to IGES translator, Leaf2IGES, and a high level IGES graphics editor, IGESXpert.

Booth 661

Image Manipulation Systems
17595 Partridge Street N.W.
Andover, MN 55304-1456
(612) 753-5602
(612) 753-5603 fax
imsinfo%thumper@src.honeywell.com
Stephanie Schaeffer
Technical Support

Image Manipulations Systems makes video graphics S-bus cards for the SPARCstation. The IMS1000 provides real-time video right onto your SPARCstation. 32 bits per pixel allow 24 bits for true color with 8 bits for graphics/control. The live video appears in a standard X-window, sizable (on any pixel boundary) from full screen to 1 x 1 pixel. The three video-in ports take NTSC, S-VHS, PAL, or SECAM video formats. The IMS1001 daughter board provides real-time JPEG data compression/decompression and video cost capability.

Booth 121

Imagina - INA
4 Avenue de l'Europe
Bry-sur-Marne, 94360
France
(33) 49-83-26-84
(33) 49-83-31-85 fax
Pierre Henon
Pixel INA Prize organizer
Philippe Queall
Program Chairman

Imagina is an international event about computer graphics, virtual realities, and special effects. It will take place February 17-18, 1993, in Monte Carlo and is organized by INA and the Festival de Television de Monte Carlo, in collaboration with the Centre National de la Cinematographie.

Booth 436

IMSL, Inc.
14141 Southwest Freeway, #3000
SugarLand, TX 77478
(713) 279-1161
(713) 242-9799 fax
Sally Love
Public Relations

IMSL, Inc. is the world's leading developer and distributor of mathematical, statistical, and graphics visualization software for FORTRAN and C application programs.

Booth 1753

Intelligent Light
P.O. Box 65
Fairlawn, NJ 07410
(201) 794-7550
(201) 794-6215 fax
kramer@light.com
Sales/Marketing Department

Intelligent Light, a leading supplier of scientific visualization software, shows the latest release of the FIELDVIEW product. FIELDVIEW, the premier interactive visualization package designed specifically for volumetric and fluid dynamics data, is currently being used in applications such as aerospace, automotive, environmental, materials processing, and propulsion, among others.

Booth 1761

International AVS Center
3021 Cornwallis Road
Research Triangle Park, NC 27709
(919) 248-1182
(919) 248-1101 fax
davidb@ncsc.org
David Bennett
AVS Director

Vision Dome—Today's Partnerships Prototyping Tomorrow's Realities. The Vision Dome Prototypes future large-scale presentation environments suited to high spatial fidelity and participatory involvement in scientific visualization. Workstations demonstrate presentation technology in use today with focus on potential applications in real science and collaboration using AVS.

Booth 146

ISTR, Inc.
812 Main Street
Buffalo, NY 14202
(716) 855-0295
(716) 855-0299 fax
Joseph A. Rosati, Jr.
Vice President

"Magic Inkwell Photo Editor": This full-color photo-retouching and design package, running on the Sun SPARC, is for the serious professional doing time-critical work. "MI Photo Editor" handles images of unlimited size faster than any off-the-shelf package in the world. With features light years ahead of Photoshop, the "MI Photo Editor" gives you the capability of a Quantel Harry for a mere fraction of the cost.

Booth 2015

Infotronic SpA
Viale Berbera 49
20162 Milan
Italy
(39) 2-647-2441
(39) 2-647-2445 fax
Irene Pfenninger
Marketing Manager

Infotronic is a leading manufacturer of innovative high-end graphics solutions for PC AT, EISA, MCA, NuBus, and OEM bus architectures. On display is ISP, Infotronic's 3D processor for real-time shading and rotation within AutoCAD, MSWindows, and Microstation; noninterlaced XGA boards for AT bus, high-resolution truecolor boards; and high-speed multimedia electronic archiving subsystems.

Booth 337

Intelligent Resources Integrated Systems, Inc.
3030 Salt Creek Lane, Suite 100
Arlington Heights, IL 60005-5000
(708) 670-9388
(708) 670-0585 fax
IR.MKTG
Julie Moore
Product Development Manager

Intelligent Resources' Video Explorer is the first and only video processing card for the Macintosh designed by video professionals for video professionals. The Video Explorer is the heart of an expanding, modular computer video/graphics system. The Explorer provides complete real-time full bandwidth digital effects processing, multiple I/O configurations, and much more. RGB and D1 Serial I/O modules are currently shipping and YUV begins shipping this summer.

Booth 663

International Interactive Communications Society
P.O. Box 1862
Lake Oswego, OR 97035
(503) 649-2065
(503) 649-2309 fax
Heidi Fieschko
IICS/SIGGRAPH Coordinator

The International Interactive Communications Society (IICS), formed in 1983, is an association of communication industry professionals dedicated to the advancement of interactive multimedia technologies. The Society provides a forum for users and vendors to share ideas, applications, and techniques for effective use of interactive media. The organization has over 50 chapters or organizing groups in the United States, Europe, Australia, and Japan.

Booth 1525

Ithaca Software
1001 Marina Village Parkway
Alameda, CA 94501
(510) 523-5900
(510) 523-2880 fax
Amy@Ithaca.com
Amy Romanoff
Marketing Manager

Ithaca Software is demonstrating HOOPS, a graphics framework used by leading software developers to build interactive 2D and 3D applications. HOOPS provides a single interface to all major platforms, window managers, and graphics devices that lets programmers develop superior applications and port them across PCs and workstations without modifications.

Booth 633

Integrated Computer Solutions, Inc.
201 Broadway
Cambridge, MA 02139
(617) 621-0060
(617) 621-9555 fax
info@ics.com
Amy Gelpey

Integrated Computer Solutions (ICS) is a full-service provider of products and services that support the easy implementation of open systems. ICS is showing the Widget Databook, the place where Motif developers turn to find high-quality, tested widgets. Also on display, the latest version of Builder Xcessory, ICS's GUI builder that runs under X and Motif. ICS is a leading supplier of open, distributed computing products, including OSF/Motif and the X-Window System.

Booth 939

Intergraph Corporation
Huntsville, AL 35894-0001
(205) 730-2000
(205) 730-6445 fax
Marla Sims
Show Manager

Intergraph is demonstrating a wide array of applications including visualization, mechanical design, publishing, scanning, office automation, and microstation on our newest C400 RISC workstations and servers. Our large 27-inch, color display provides the best view of our technical solutions for today's business challenges. We invite you to visit the Intergraph booth to learn more about our solutions.

Booth 539

IRIS Graphics, Inc.
Six Crosby Drive
Bedford, MA 01730
(617) 275-8777
(617) 275-8590 fax
George Hauser
Manager of Industry Marketing

IRIS is presenting a demonstration of technology featuring PassPort, the company's new print server developed specifically for use with IRIS's full line of high-resolution color printers. A true Adobe PostScript server, at SIGGRAPH PassPort will accept image files from a Macintosh, an IBM RISC System/6000, an SGI 4D/25, and a Sun SPARCStation.

Booth 336

C. Itoh Technology Inc.
2515 McCabe Way
Irvine, CA 92714
(714) 757-4464
(714) 757-4423 fax
Terry Susaki
Director of Sales and Marketing

C. Itoh is demonstrating a new generation of digital printer: the Pictrography 2000. The Fujix Pictrography is a high-speed, easily operated color printer, which excels in long-term stability. Perfect for graphic-intensive, vertical applications that require a high-quality output. Its brilliant images are so rich in color and texture, they are comparable to photographic quality.

J

Booth 766

Jobo Fototechnic, Inc.
251 Jackson Plaza
Ann Arbor, MI 48103
(313) 995-4192
(313) 995-8886 fax
Sharon L. Small
Product Manager, Darkroom Products Division

Jobo features their new, fully-automated slide processor, the ATL-1000. It is designed for those who need high-quality slides, but who have little or no experience in photographic processing. Slides can be processed in-house in 35 minutes. The compact design is perfect for offices with limited space, and no darkroom is required.

Booth 132

Jones and Bartlett Publishers
One Exeter Plaza, 14th floor
Boston, MA 02116
(617) 859-3900
(617) 859-7675 fax
Kristie A. Hughes
Marketing Assistant

Jones and Bartlett Publishers present a program of textbooks and advanced monographs, as well as innovative publications on new media. View the award-winning video *Not Knot*, ask for a demo of SNAPSHOTS, the latest in fractal image compression, and inspect new titles for computer graphics professionals: *The Science of Fractal Transform, Multiprocessor Methods for Computer Graphics Rendering, Computer Facial Animation, Geometric Methods for Geometric Design*, and others. New and forthcoming titles are available at a 20 percent discount.

Booth 1349

JVC Professional Products Company
41 Slater Drive
Elmood Park, NJ 07407
(201) 794-3900
(201) 523-2077 fax
Ellin Everson
Manager, Advertising Sales Promotion

JVC Professional Products Company exhibits a complete line of high resolution cameras for computer imaging. Included are the TK-F7300U maximum resolution (2208 x 1728) frame capture camera which is light weight, uses a single CCD, and has square pixels ideal for computer image processing. Also on display are the KY-F30U 3-CCD camera, the TK-1070 and TK-870 single CCD RGB frame capture cameras.

K

Booth 1569

Kaiser Corporation
3555 N. Prospect Street
Colorado Springs, CO 80907
(719) 636-3864
(719) 636-3865 fax
Dennis R. Hoover
President

Kaiser has manufactured premium quality plastic slide mounts for 27 years. We were the first to offer pin registered mounts to the computer graphics industry. Kaiser offers stylized mounts with your company name and logo and phone number. A complete line of pin-registered mounters available for all volume levels. Standard mounts and mounters available.

Booth 1426

Kingston Technology Corporation
17600 Newhope Street
Fountain Valley, CA 92708
(714) 435-2698
(714) 435-2618 fax
Jill Allen
Sales

Kingston Technology Corporation manufactures a wide range of memory upgrades and storage enclosures for workstations. All Kingston workstation memory products are backed by a lifetime warranty and are designed to be 100 percent compatible with your systems's hardware and software. Kingston carries workstation memory for Data General, DEC, Hewlett-Packard, IBM, NeXT, Silicon Graphics, and Sun.

Booth 1536

Knowledge Industry Publications/Montage Publishing, Inc.
701 Westchester Avenue
White Plains, NY 10604
(914) 328-9157
(914) 328-9093 fax
Jim Stonaker
Circulation Manager

AV Video and *Computer Pictures* are two magazines which provide a network in visual communications. *AV Video* covers production and presentation technology for the hands-on professional. *Computer Pictures* is written for creators and producers of graphic and multimedia presentations.

L

Booth 460

Kozmo
Budakeszi UT 51
Budapest 1122
Hungary
(361) 176-3642 or 3638
(361) 176-3881 fax
Zsolt Krajcsik
Computer Systems Manager

Kozmo presents video morphosis and effects programs for Silicon Graphics and IBM-PC computer systems.

Booth 208

Lasertechnics, Inc.
5500 Wilshire Avenue N.E.
Albuquerque, NM 87113
(505) 822-1123
(505) 821-2213 fax
Louis F. Bieck III
Marketing Coordinator

The Lasertechnics StarBurst Dual Mode Color Printer produces accurate, consistent, high-quality, full-color prints on paper or transparencies that are perfect for high-resolution imaging applications. The unit is based on thermal transfer technology and provides both continuous tone and dithered images. The StarBurst is capable of producing images using either Dye Diffusion Thermal Transfer (D2T2) or Thermal Wax Transfer (D1T2).

Booth 1346

LAZERUS
P.O. Box 13249
Oakland, CA 94661
(510) 339-6263
(510) 339-9636 fax

Three new products: (1) ExpressSqueeze, true-color real-time, lossless image and motion compression/decompression; (2) ExpressWindows, accelerates true-color Windows graphics software; (3) The Visualization Solution, complete personal scientific workstation. NTSC/PAL to highest resolution. Real-time 3D. Image-grab. True-color or software selectable 1 to 32 bits/pixel. Expandable hardware reprogrammable. For demanding visualization environments. Plus, the high performance Expressway line of graphic stations.

Booth 667

LEAD Technologies, Inc.
8701 Mallard Creek Road
Charlotte, NC 28262
(704) 549-5532
(704) 548-8161 fax
Richard G. Little
President

LEAD Technologies' products, LEADVIEW and LEADTOOLS, provide image compression, graphics file conversion, and image processing for end users and application developers. All products support JPEG compression as well as LEAD's proprietary compression process which out-performs JPEG, compressing some images to over 200 times smaller than their original size. DOS and Windows versions available.

Booth 1533

Liant Software Corporation
9920 Pacific Heights Boulevard, Suite 200
San Diego, CA 92121
(619) 459-5359
(619) 452-2547 fax
uscd!tgs!robert
Terry Baker
Vice President Sales & Marketing

Liant Software Corporation is the largest independent provider of standards based graphics application development tools. The industry leading PHIGS+ implementation, FIGARO+, is complemented with high-level programmer productivity tools: FIG+, FIGraph, and PCI. Liant offers an Open Graphics Environment for platform independent graphics application development.

Booth 1066

Lightscape Graphics Software
2 Berkeley Street, Suite 600
Toronto, Ontario M5A 2W3
Canada
(416) 862-2628
(416) 862-5508 fax
Stuart Feldman

Lightscape Graphics Software is introducing an advanced visualization system for use in 3D modeling and simulation applications. Incorporating both radiosity and ray-tracing techniques, Lightscape produces physically accurate simulations which are useful for architectural design evaluation, interactive and non-interactive presentations, and lighting analysis.

M

Booth 1770

Lightwave Communications, Inc.
84 Research Drive
Milford, CT 06460
(203) 878-9838
(203) 874-0157 fax
LIGHTWAVE@MCIMail.com
Pete Henderson
National Sales Manager

Lightwave demonstrates the brand new VDE/200 video display extension system. This low-cost fiber-optic link provides a completely transparent connection for high-resolution graphics and user keyboard/mouse data up to a distance of 3,000 feet. Also shown is a variety of other fiber optic data links.

Booth 342

Mathematica, Inc.
402 South Kentucky Avenue, Suite 210
Lakeland, FL 33803
(813) 682-1128
(813) 686-5969 fax
Joan Davies
Communications Manager

Mathematica, Inc. has developed a line of affordable easy-to-use multimedia software programs. They are Tempra Pro for high-quality image-editing and paint ng, Tempra Gif, a low-end version of Tempra Pro, Tempra Show, for dynamic presentations and demos, and Tempra Turbo Charger, an add-on accelerator. Tempra features cardinal technology graphics solutions.

Booth 1522

MediaShare Corporation
2035 Corte Del Nogal
Carlsbad, CA 92009
(619) 931-7171
(619) 431-5752 fax
Jeff Anderson
Director of Marketing

MediaShare presents digital video boards for laptop computers, network digital solutions, and prism-product information systems for sales and marketing.

Booth 1834

Microtime, Inc.
1280 Blue Hills Avenue
Bloomfield, CT 06002
(203) 242-4242
(203) 242-3321 fax
Mike Barsness
Midwest Regional Manager
(612) 758-3036

Microtime presents real-time, render-free, 3D variable image transformation video processing.

Booth 1553

Lyon Lamb Video Animation Systems, Inc.
4531 Empire Avenue
Burbank, CA 91505
(818) 843-4831
(818) 843-6544 fax
Sheldon Pines
Vice President of Sales and Marketing

Lyon Lamb is exhibiting all of its animation controllers: the Pro-Vas, the Mini-Vas 2, the Micro-Vas, the I-Vas, and the PC-VAS. Also on display are the ENC 7 sync generator, the RTC, and the Real-Time Scan Converter.

Booth 953

Maximum Strategy Inc.
2185 Old Oakland Road
San Jose, CA 95131
(408) 456-8880
(408) 456-8887 fax
Sandy Staufenbiel
Manager, Marketing Communications

Maximum Strategy, Inc. is the industry leader in Redundant Array of Inexpensive Disks (RAID) technology for high-performance computing environments. The company's line of high-performance, cost-effective reliable mass storage solutions is based on industry standards and is available in a broad range of configurations for supercomputer, mini-supercomputer, and high-performance workstation users who run storage-intensive applications.

Booth 562

META Corporation USA
201 West 72nd Street #4M
New York, NY 10023
(212) 787-4476
(212) 787-3789 fax
Masayuki Hori
Producer/Director

META Corporation USA is the affiliate company of META Corporation Japan, the only company in the world producing the 3D modeling software (METAEDITOR) for Meta Ball (3D primitive). The METAEDITOR exercises its power for 3D modeling of the human body and other natural beings. It manifests a new powerful modeling capability, supporting the Meta Ball's polygonal conversion function.

Booth 1246

Midwest Litho Arts, Inc.
125 East Oakton
Des Plaines, IL 60018
(708) 296-2000
(708) 296-2785 fax
Tim Clark
3D Imaging Department

Midwest Litho Arts, known for the very highest quality color separations and Scitex image retouching capabilities, enters its second year as a source for 3D imaging services. Our 3D imaging center is the world's finest RenderMan service bureau, offering accelerated RenderMan rendering. Transparencies, slides, IRIS 3024 color printer, or four-color separations are some hard copy output options available. Of interest to animators, Midwest Litho is offering a frame-accurate video recorder.

Booth 1926

Management Graphics, Inc.
1401 East 79th Street, Suite 6
Minneapolis, MN 55425
(612) 854-1220
(612) 851-6159 fax
keep@mgi.com
Sheri Keep
Marketing Coordinator

MGI features award winning Solitaire Digital Film Recorders that produce 2K, 4K, 8K, and 16K images in formats from 35mm slides through 8" x 10" transparencies. In addition, MGI's imaging solution for large corporate networks, LANslide, is demonstrated.

Booth 350

Meckler
11 Ferry Lane West
Westport, CT 06880
(203) 226-6967
(203) 454-5840 fax
Marilyn Reed
Vice President, Marketing and Conferences

Meckler features the publications, *The QuickTime Forum*, the only newsletter devoted to applications of Apple's QuickTime software; *Multimedia Review; Multimedia/CDPublisher*, and *Virtual Reality Report*. Meckler also sponsors Virtual Reality '92, an annual conference and exhibition being held September 23-25, 1992 at the Fairmont Hotel, San Jose, California. Programs are available at the booth.

Booth 1253

Microfield Graphics, Inc.
9825 S.W. Sunshine Court, A1
Beaverton, OR 97005
(503) 626-9393
(503) 641-9333 fax
John R. Liskear
Vice President, Marketing Development

New: X8, joining the 1280x1024 family of PC ISA/EISA and Micro Channel bus products T8(V), V8(V), and V8/2: 10x I/O transfer rate using 2K-word FIFO; high-performance Microsoft Windows and 14 variations of UNIX X11 Windows, and IMAGRAPH Corporation, (subsidiary of Microfield), showing: frame grabbers and customized imaging and graphics controllers.

Booth 2431

Minolta Corporation
101 Williams Drive
Ramsey, NJ 07446
(201) 818-3571
(201) 825-4374 fax
Charles Monanian
Advertising Manager

Minolta is a manufacturer of CRT color analyzers and convergence meters as well as other color and light measuring instrumentation.

Booth 2216

The MIT Press
55 Hayward Street
Cambridge, MA 02142
(617) 625-8569
(617) 625-6660 fax
Bob Prior
Computer Science Editor

The MIT Press is featuring the exciting new journal *Presence: Teleoperators and Virtual Environments*. Also on display is the paperback edition of Michael Benedikt's *Cyberspace: First Steps*, which includes a new short story by William Gibson. The MIT Press also features a wide selection of titles in computer science, artificial intelligence, and cognitive science.

Booth 320

Mitsubishi – Professional Electronics Division
800 Cottontail Lane
Somerset, NJ 08873
(908) 563-9889
(908) 563-0713 fax
Russell Novy
Advertising Manager

Mitsubishi's Professional Electronics Division displays its full line of printers, monitors, and VCRs. Presentation monitors range from 26–35". Printers offer outstanding quality hardcopy from video, PCs, and certain workstations. Multimedia VCRs are controllable via RS-232 port video and data projectors are also available. Contact our New Jersey office 1-900-PED-VIEW.

Booth 1361

Morgan Kaufmann Publishers, Inc.
2929 Campus Drive, Suite 260
San Mateo, CA 94403
(415) 578-9911
(415) 578-0672 fax
morgan@unix.sri.com
Christine Bunje
Marketing Coordinator

New books in Morgan Kaufman's series in computer graphics are *User Interface Management Systems* by Dan Olsen and *Graphics Interface '92*. Backlist titles include, *Making Them Move: Mechanics, Control, and Animation of Articulated Figures*, by Norman Badler, Brian Barsky, and David Zeltzer; *Geometric and Solid Modelling*, and *An Introduction to Splines for Use in Computer Graphics and Geometric Modeling*.

Booth 237

NASA Tech Briefs
41 East 42nd Street, Suite 921
New York, NY 10017
(212) 490-3999
(212) 986-7864 fax
Nipa Joshi
Advertising Coordinator/Trade Coordinator

NASA Tech Briefs is a monthly publication reporting new inventions and innovations by NASA and its contractors in electronics, materials, science, computer software, mechanics, and other high-tech fields.

Booth 533

Mitsubishi Electronics American Inc., Information Systems Division
5665 Plaza Drive, Box 6007
Cypress, CA 90630-0007
(714) 220-2500
Mike Foster
Executive Vice President

Mitsubishi demonstrates color monitors and printers compatible with DOS, Macintosh, Windows, and UNIX environments. Mitsubishi's latest new product, the Diamond Pro 17, and Mitsubishi's Diamond Color Print 300, a 300 dpi dye-sublimation printer, are displayed.

Booth 1531

ModaCAD
1954 Cotner Avenue
Los Angeles, CA 90025
(310) 312-6632
(310) 444-9577 fax
Linda Freedman
Vice President of Marketing

ModaCAD 2D and full 3D visualization CAD systems provide highest resolution rendering. They apply 3D surface detail to 2D imagery with photo-realistic results and replace samples and prototype production in a host of industries—industrial design, aerospace, automotive, interiors, architecture, furniture, textile, and garment design. ModaCAD products are demonstrated on Macintosh, Digital, and DOS systems.

Booth 429

Motorola Inc.
6501 William Cannon Drive West, OE314
Austin, TX 78735-8598
(512) 891-2039
(512) 891-2947 fax
Jane Bates
DSP Business Manager

Motorola features the DSP96002, IEEE-754 compliant floating-point digital signal processor with a high throughput dual bus I/O structure, special graphics-oriented instructions, and On-Chip Emulation (OnCE). Motorola also features the 24-bit fixed-point DSP56001 and DSP 56002 DSP chips, plus its new DSP56401, AES/EBU transceiver.

Booth 1347

National Computer Graphics Association
2722 Merrilee Drive, Suite 200
Fairfax, VA 22031
(703) 698-9600
(703) 560-2752 fax
ncga@cup.portal.com
Debi Baione
Exhibits Coordinator

NCGA has unveiled Direction '90s, its plan to add value to both corporate and individual memberships. Stop by NCGA's booth to hear more. Also, pick up information on NCGA '93, April 26-29, 1993 at the Philadelphia Civic Center, including Call for Entries for NCGA's 8th Annual International Computer Animation Competition.

Booth 2319

Mitsubishi International Corporations
701 Westchester Avenue
White Plains, NY 10604
(914) 997-4999
(914) 997-4976 fax
Anna Dipasquale
Senior Marketing Coordinator

Mitsubishi International features the recently introduced Shinko CHC-S446i Colorstream/DS. The CHC-S446i is the first dye-sublimation color printer to implement ROM card technology. This innovative technology allows the printer to access several functions by inserting printer emulation cards, such as a 24-bit Postscript interpreter, font cards, and additional function cards that may develop in the future. With a superfast and 29050 RISC processor, the CHC-S446i produces 300 dpi resolution and prints as large as 8.5"x11".

Booth 227

Mondo 2000
P.O. Box 10171
Berkeley, CA 94709
(510) 845-9018
(510) 649-9630 fax
Jas. Morgan
Music and Arts Editor

Mondo 2000 is a quarterly magazine which covers the effect of high technology on popular culture. Issue #7, premiering at SIGGRAPH '92, features coverwoman Brenda Laurel, Myron Krueger, and the computer graphics of David Em.

Booth 2424

MULTIPOINT Technology Corporation
Suite 201
319 Littleton Road
Westford, MA 01886
(508) 692-0689
(508) 692-2653 fax
Judith Jones
Product Manager

The MULTIPOINT Z Mouse is the first low-cost 3D mouse for CAD, animation, modeling, rendering, robotics, and visualization. Provides walk-through and direct manipulation of 3D objects. Features: 6D spatial inputs, 3D rotational data, collision-checking, telefocusing, multiple cursors, 2D mouse functions, trackball, ergonomic design. Device drivers for MS-DOS, Windows, AutoCAD, Macintosh, SGI, etc.

Booth 961

Network Computing Devices, Inc.
350 North Bernardo Avenue
Mountain View, CA 94043
(415) 691-2630
(415) 961-6958 fax
micki@ncd.com
Micki Ferris
Marketing Events Specialist

Network Computing Devices, Inc. (NCD) offers a spectrum of RISC- and CISC-based color and monochrome X terminals. Especially relevant are the RISC-based color NCD19c and NCD17cr running NCD's PEX software. They combine the 3D performance of a workstation and the benefits of an X–at an X terminal price.

N

Booth 327

Nippon Computer Graphics Association
Ogawa Building, 1-2-2, Uchikanda
Chiyoda-ku, Tokyo, 101
Japan
(81) 33-233-3475
(81) 33-233-3450 fax

NICOGRAPH, Japan's largest computer graphics convention, has been providing a forum for the exchange of information on advanced graphics technology since 1982. An estimated 40,000 people will attend NICOGRAPH '92 in Tokyo, November 9-13. It is an opportunity that is not to be missed, especially for those who have an interest in the Japanese computer graphics industry and its related markets.

O

Booth 651

Nth Graphics, Ltd.
1908-A Kramer
Austin, TX 78758
(512) 832-1944
(512) 832-5459 fax
sales@nth.com
Pat Price Monroe
Marketing Communications Manager

Nth Graphics is showing Nth Portable GL graphics library, which lets existing Silicon Graphics (SGI) applications run on other platforms by simply recompiling. The software is a platform-independent version of Silicon Graphics' IRIS GL v4.0 library. Nth is showing SGI code running on Sun, Hewlett-Packard, and Samsung workstations.

Booth 149

Northwestern University/Evanston Research Park
1033 University Place
Evanston, IL 60201
(708) 869-8900
(708) 869-8986 fax
Kristin Dean
Director of Marketing

You are the president. . . introducing Shadow President, a PC-based simulation of presidential world power developed by Robin Antonick and artist Charlie Athanas of D.C. True, Ltd. D.C. True is one of 50 companies in the Research Park, a Midwest center for the development of new technologies, where entrepreneurs can access the expertise and facilities of Northwestern University plus a full array of business support services.

Booth 965

O'Reilly & Associates, Inc.
103 Morris Street, Suite A
Sebastopol, CA 95472
(707) 829-0515
(707) 829-0104 fax
jeff@ora.com
Jeff Delasantos
Trade Show Coordinator

O' Reilly & Associates, Inc. is displaying the X Window System Series, as well as Nutshell Handbooks, books that help people get more out of computers.

Booth 866

NPES: The Association for Suppliers of Printing and Publishing Technologies
1899 Preston White Drive
Reston, VA 22091-4367
(703) 264-7200
(703) 620-0994 fax
Carol J. Hurlburt
Director of Communications

Information on: programs and services provided by the only U.S. trade association for manufacturers and distributors of equipment, systems, software, and supplies for all types of printing and publishing. The industry's leading exhibitions: GRAPH EXPO EAST 92, October 3-6, 1992, New York; CONCEPPTS, The 1993 Prepublishing Conference and Exhibition, February 24-27, Orlando, Florida.

Booth 345

Origin Instruments Corporation
2121 Windchime Drive
Grand Prairie, TX 75051
(214) 264-7212
Melvin Dashner
Vice President

Origin Instruments specializes in the manufacture of advanced electro-optic technologies for use in the interactive interface between people and machines. At SIGGRAPH '92, the company introduces the DynaSight sensor, a low-cost optical radar that is specifically optimized for tracking the passive, non-tethered human head in three dimensions. Applications include 3D virtual window displays for graphic workstations and head-controlled pointing systems for mouse augmentation.

P

Booth 1353

Oxberry, Division of Cybermetrics Products Inc.
180 Broad Street
Carlstadt, NJ 07072
(201) 935-3000
(201) 935-0104 fax
Steve Hallett
National Sales Manager

Oxberry exhibits a complete "film to digital to film" input/output system for motion picture and HDTV production. The CINESCAN 6200 incorporates a 2K x 2K CCD animation camera, interfacing software, pin-registered projector, and cinemagraphic camera. Also on display is the OX750 low-cost camera for bulk load slide production.

Booth 113

Panasonic Communications & Systems Company, Office Automation Group
2 Panasonic Way, MS7-FL
Secaucus, NJ 07094
(201) 392-4688
(201) 392-6910 fax

Booth 313

Panasonic Industrial Company
2 Panasonic Way
Secaucus, NJ 07094
(201) 348-5303
(201) 392-4482 fax
Frank Moros
Sales and Marketing Manager

Panasonic Industrial Company is exhibiting a line of high-resolution color monitors in multi-scan and fixed frequency configurations. Sizes range from 14" to 21". In addition, Panasonic Industrial is showing a line of CRTs designed for high-resolution graphics.

Booth 1144

Parallax Graphics, Inc.
2500 Condensa Street
Santa Clara, CA 95051
(408) 727-2220
(408) 980-5139 fax
her@parallax.com
Holly E. Reed
Sales Manager

XVideo is a videographics card for the SPARCstation, which can display two simultaneous full-motion video images in windows, and compress/decompress motion video to/from hard disk, using JPEG image compression techniques for networked digital video. XVideo can create video output for recording to VCR. Applications include training, teleconferencing, image databases, publishing, work group computing.

Booth 1067

Parsytec Inc.
245 W. Roosevelt Road
Building 9, Unit 61
West Chicago, IL 60185
(708) 293-9500
(708) 293-9525 fax
parsytec@ux2.cso.uiuc.edu
Reinhard Rinn
Vice President

Parsytec's Transputer based parallel processing systems and products are shown, including a demonstration of a real-time perspective view generator simulator running on a Parsytec system. It was developed to produce real-time battle simulations by providing digitized video images that are realistic representations of battle maneuvers.

Booth 1425

Peritek Corporation
5500 Redwood Road
Oakland, CA 94619
(510) 531-6500
(510) 530-8563 fax
Victor Gold
President

Peritek's new second generation VMEbus and Q-bus 24-bit true color display controllers. The highly integrated 34020-based single board design supports up to 1280 x 1024 x 24 bits, 8 bit overlay, 34082 FPU, Brooktree BT463 true color RAMDAC, hardware pan and zoom, hardware cursors, up to 32 MB of 34020 system memory, four serial I/O ports and SCSI. Proprietary X-Window System X11.R5 server executes on the board and includes local console terminal, keyboard, and mouse or trackball support.

Booth 1561

Philips Semiconductors-Signetics
811 East Avenue
P.O. Box 3409
Sunnyvale, CA 94088-3409
(408) 991-2439
(408) 991-2311 fax
SIGSCVI (DRAUGHON)
Aletha Draughon
Sales Promotion Specialist

Philips Semiconductors highlights integrated circuits for digital video signal processing.

Booth 1449

Pioneer Communications of America, Inc.
600 East Crescent Avenue
Upper Saddle River, NJ 07458
(201) 327-6400
(201) 327-9379 fax
Dallas Parcells
Marketing Coordinator

Pioneer's VDR-1000 Videodisc Recorder is a dual head broadcast quality component recording system providing true instant start, real-time non-linear playback, and virtually instant access to any frame on a 32-minute disc. The non-contact media can be recorded/erased over one million times without the need for pre-roll or post-roll. It has unlimited playback capability without signal degradation.

Booth 1156

Pixsys Inc.
1727 Conestoga Street
Boulder, CO 80304
(303) 447-0248
(303) 441-2487 fax
Martin Chader
Vice President of Sales and Marketing

"Firefly Pointer," the 3D digitizer, measures, coordinates, and captures the shape of real-world surfaces. "Firefly Tracker" tracks motion path of human actors. Both devices are optically-based, portable, accurate, and impervious to magnetic fields. Both are scalable to measure large areas and are compatible with most modelers.

Booth 143

Post Magazine
25 Willowdale Avenue
Port Washington, NY 11050
516-767-2500
516-767-9335 fax

Post Magazine is dedicated to post production, with the lastest news and features on editing graphics, animation, special effects and desktop post. *Post* also features all the equipment and services at various budget levels that are creating the best finished product.

Booth 1365

Photron Limited
1324 South Winchester Boulevard, #103
San Jose, CA 95128
(408) 370-1364
(408) 370-3161 fax
Yuki Fujikawa
Manager

Photron Limited features frame scan converters, FSC-64000VZ, a high-end scan converter with windowing capability; FSC-32000VZ, an affordable model supporting all workstations, as well as VGA and Mac; and FSC-8000, scan converter for VGA and Mac. Frame buffer boards: VideoGenesis/24, Micro Channel frame buffer adapter for IBM RS-6000; VideoGenesis/24-GIO, Video IN/OUT adapter for SGI INDIGO; and VideoGenesis/24-HD, HDTV frame buffer adapter for VME bus.

Booth 1244

Pixar
1001 West Cutting Boulevard
Richmond, CA 94804
(510) 236-4000
(510) 236-0388 fax
Joy Folla
Marketing Communications Manager

Pixar introduces our new font manipulation application, Typestry. Typestry turns Type 1 and TrueType fonts into 3D images. Features include a complete selection of preset lighting and special effects such as motion blur, patterns, shadows, embosses, and cut-outs. Typestry also features simple, snappy animation of both characters and words, and includes PhotoRealistic RenderMan magic to transform a simple word into an extraordinary picture.

Booth 144

Plustek USA, Inc.
3350 Scott Boulevard, #46
Santa Clara, CA 95054
(408) 980-1234
(408) 980-5184 fax
Linda Lee
Operation Manager

Plustek presents full lines of quality scanners such as Scanplus Color-3000, 300 dpi, and Color-6000, 600dpi color scanner, 24-bit, single-pass, full-page scanner. Also, Scanplus Gray-300 is an 8-bit, 256 gray-scale scanner that's great for image/text applications. All models are full page, support HP-scanjet emulation. Only color models are available for Macintosh. Scanplus black/white scanner offers affordable solutions to text-oriented users.

Booth 559

PRE-
8340 Mission Road, Suite 106
Prairie Village, KS 66206
(913) 642-6611
(913) 642-6676 fax
Maureen Waters
Editor

PRE- magazine is the magazine for prepublishing and prepress. It reaches design studios, ad agencies, print production firms, prepress facilities, service bureaus, publishers, and printers, and covers management and technology issues necessary to keep companies abreast of changes in the prepublishing and prepress industries.

Booth 2315

Pinnacle Systems, Inc.
2380 Walsh Avenue
Santa Clara, CA 95051
(408) 970-9787
(408) 970-9798 fax
Walter Werdmuller
Vice President of Sales

Pinnacle Systems features the Prizm video workstation with the DVEator option offering live video manipulations as well as mapping of live video images on complex 3D objects and surfaces in real time. Pinnacle's Sculptor 3D modeling software for DVEator animation creation will also be on display along with a new cost-effective high-speed video image database system called FlashFile.

Booth 561

PIXEL Magazine/PIXEL VISION
71 Rue De MAubeuge
75010 Paris
France
(33) 48-78-60-90
(33) 48-78-15-35 fax
Joel Laroche
Publisher

PIXEL magazine, in its French and American editions (*PIXEL VISION*), covers all facets of electronic imagery, still or animated, calculated from an analog original or created or processed with a computer. Through a combination of portfolios and reportages, columns, and tests, it covers computer graphics in advertising, publishing, television, graphic arts, graphic design, medical and scientific imaging, architecture, and art.

Booth 1146

Polhemus
P.O. Box 560, 1 Hercules Drive
Colchester, VT 05446
(802) 655-3159
(802) 655-1439 fax
Thomas Jones
Sales Representative, ext 234

Polhemus, the pioneer in 3D position/orientation measuring technology, is demonstrating two exciting new products. FASTRAK is a revolutionary new advancement in six degree-of-freedom tracking that virtually eliminates latency. 3DRAW is the first 3D digitizer tablet for the CAD and computer graphics markets at a surprisingly affordable price.

Booth 120

Prentice Hall
College Exhibits
Englewood Cliffs, NJ 07632
(201) 816-4155
(201) 816-4146 fax
Susan Aumack
Marketing Manager

Prentice Hall offers current textbooks and manuals in computer graphics.

Booth 140

Presentation Products Magazine
23410 Civic Center Way, Suite E10
Malibu, CA 90265
(310) 456-2283
(310) 456-8686 fax
Sharla Perry
Marketing Services Manager

Presentation Products serves managers responsible for creation and delivery of presentations using a variety of media, including audio, video, computer graphics, and multimedia. Our readers are responsible for making decisions about when these presentations take place, what the format will be, where they will take place, and what media are to be used.

Q

Booth 147

Programs Plus and Video
544 Queen Street
Chatham, Ontario N7M 2J6
Canada
(519) 436-0988
(519) 351-1334 fax
Adam Godfrey
Partner

Programs Plus and Video presents for the Amiga platform: Real 3D Pro/Turbo, a design, animation, and rendering program encompassing the advantages of creating with both CSG and polygon objects in one environment; and RCS Management products, including the Fusion Forty 68040 accelerator board with onboard 32-bit RAM for high-speed (33 MHz) rendering.

R

Booth 2322

Quarterdeck Office Systems
150 Pico Boulevard
Santa Monica, CA 90405
(310) 392-9851
(310) 314-3218 fax
Ray Gallardo
Trade Show Manager

Quarterdeck features its newest versions of DESQview and DESQview 386, its mulitasking, windowing DOS operating environments. Quarterdeck also features its newest versions of memory managers QEMM and QRAM and its new dazzling graphics environment DESQview/X.

Booth 346

RCM Data Corporation
231 South Frontage Road, Suite 1
Burr Ridge, IL 60521
(708) 887-1120
(708) 887-1684 fax
Vicki L. Paulsen
Director of Marketing

As a leading full-service distributor of computer printers, RCM features the new solid ink plain paper high-resolution color printer from Brother as well as the lowest cost 11x17 Postscript printer from Dataproducts Corporation. Stop by booth #346 to see the rest of our product offerings and be sure to ask about our "SIGGRAPH Show Specials!"

Booth 966

Primary Image, Inc.
12424 Research Parkway
Orlando, FL 32826
(407) 658-0557
(407) 282-3864 fax
Bill Ernul
Vice President of Sales

Booth 135

Publications and Communications
12416 Hymeadow Drive
Austin, TX 78750
(512) 250-9023
(512) 331-3900 fax
Cheryl Pruett
Marketing Assistant

PCI is the leading provider of vendor-specific computer newspapers and trade shows. Publications include *Silicon Graphics World, The Sun Observer, The HP Chronicle, Unisys World, Risc World,* and *HP/Apollo Workstation.*

Booth 430

Rainbow Technologies
9292 Jeronimo Road
Irvine, CA 92718
(714) 454-2100
(714) 454-8557 fax
Karen Tacy
Marketing Coordinator

Rainbow Technologies, the world leader in software protection, showcases the Sentinel family of software protection devices. These products protect the revenues of software developers by preventing unauthorized distribution and use of their software. Rainbow offers the widest variety of protection devices for today's PC, Apple, and LAN developers.

Booth 145

Redlake Corporation
718 University Avenue, Suite 100
Los Gatos, CA 95030
(408) 399-5000
(408) 354-7428 fax
Robert Jones
Director of Imaging Products

Redlake has board level products for Interactive Video, Photo Databases, and Motion Analysis. Video based color or black and white imaging for geographic medical, microscopy, training, desk to video, or simulators. Products include the Spectrum NTSC + Video Overlay Frame Grabber and PC2TV scan converter with anti-flicker feature (NTSC or PAL).

Booth 349

PRIOR Data Sciences Product Sales Inc.
240 Michael Cowpland Drive
Kahata, Ontario K2M 1P6
Canada
(613) 591-7235
(613) 592-1278 fax
Peter Hanschke
Manager, Product Marketing

PRIOR Data Sciences presents: GPHIGS, which conforms to the ISO PHIGS standard—a 3D Interactive Graphics Toolkit for the creation of applications in fields such as robotics, modeling, simulation, and schematic. PRIOR GKS, which conforms to the ISO GKS standard—a high-level 2D graphics development toolkit for applications such as command and control, computer-aided design and drafting, presentation graphics, and mapping.

Booth 122

QMS, Inc.
One Magnum Pass
Mobile, AL 36618
(205) 639-4434
(205) 633-4866 fax
Loni Jarman
Developer Relations Analyst

QMS is a leading manufacturer of color and monochrome printers for desktop publishing, graphic design, presentations, CAD and other applications requiring up to 11" x 17" or 600x600 dpi laser output. Serial, parallel and LocalTalk interfaces are standard, with direct network connectivity options. RISC-based processors allow extremely fast document processing.

Booth 2317

Raytheon Company Submarine Signal Division
1847 West Main Road
Portsmouth, RI 02871-1087
(401) 847-8000
(401) 842-5200 fax
John A. Lorea
Marketing Manager, Production Components

On display is a broad line of thermal hard copy data recorders, featuring up to 256 grey levels, up to 300 dots per inch, and available in three different versions: "free fall," "flatbed," and "fanfold." Applications include CRT hard copy, spectrum analysis, facsimile transmission, medical electronics, and surveillance.

Booth 1754

ReproCAD, Inc.
3650 Mt. Diablo Boulevard, #200
Lafayette, CA 94549
(510) 284-0400
(510) 283-7864 fax
Michele Thornton
Marketing Coordinator

Megachrome, a service available only through ReproCAD distributors across North America, enables the designer, graphic artist, or desktop publisher to print EPS (Encapsulated PostScript) files directly to a printer in four colors and in sizes up to 12" long by 42" wide.

ReproCAD now operates the largest reprographics service bureau network in North America, providing computer-aided design plotting services to engineers and architects.

S

Booth 758

RFX, Inc.
910 North Sycamore Drive
Hollywood, CA 90038
(213) 851-2100
(213) 851-2122 fax
Ray Feeney
President

RFX Inc. offers numerous products for the motion picture visual effects industry, including the RFX Model 104 35mm film input scanner based on a 4K x 4K, 2D CCD array. RFX also supplies film recorders supporting 35mm, 65/70mm, 8 perf 65mm, Imax and most other film formats, as well as providing film recording services to the industry.

Booth 2215

Ron Scott Inc.
1000 Jackson Boulevard
Houston, TX 77006
(713) 529-5868
(713) 529-9370 fax
Karla West
Show Coordinator

HiRes QFX 3.0 imaging software operates in true 32-bit protect mode accessing four gigabytes of memory, and features a redesigned menu system, multiple windows, ramps and spreads of variable transparency, and Draw Mode, including line, oval, rectangle, Bezier curves, and scalable type. HiRes QFX supports the Truevision line of graphics adapters for the PC.

Booth 1456

San Diego Supercomputer Center
P.O. Box 85608
San Diego, CA 92186-9784
(619) 534-5137
(619) 534-5113 fax
juliev@sdsc.edu
Julie Van Fleet
Manager, Public and Government Relations

SDSC is a National Science Foundation-sponsored computational laboratory available to academia, state and local government, and U.S. industry. This premier computational laboratory is helping transform engineering and scientific methodologies for its user community. This transformation has enhanced the competitiveness of SDSC's industrial community while supporting major advances in science.

Booth 119

Scientific Computing & Automation Magazine
301 Gibraltar Drive
Morris PLains, NJ 07950
(201) 292-5100
(201) 898-9281 fax
Calvin Carr
Publisher

Scientific Computing & Automation magazine serves scientists and engineers in industrial, academic, and government laboratories. Feature articles demonstrate the growing use of computer technology in a wide range of laboratory settings and in a broad cross section of research projects and information management environments. Topics include scientific visualization, graphics for scientists, graphics hardware and software, image processing and analysis, molecular simulation and modeling, presentation graphics, chemometrics.

Booth 2336

RGB Spectrum
950 Marina Village Parkway
Alameda, CA 94501
(510) 814-7000
(510) 814-7026 fax

RGB Spectrum manufactures videographic products for workstations and personal computers, including the RGB/Videolink line of real-time video scan converters, which transform high-resolution computer graphics to television (NTSC or PAL) video, the RGB/View line of video windowing controllers, which integrate live video with text and graphics on high-resolution displays, and the MediaWall multi-screen computer display. Applications include visualization, imaging, interactive video disc training, teleconferencing, and CAD/CAM.

Booth 351

RunTime Technologies
610 Newport Center Drive, Suite 600
Newport Beach, CA 92660
(714) 640-5426
(714) 640-5429 fax
Rod Pollum
Vice President Operations

Booth 2415

Santos Technology Inc.
383 Van Ness Avenue, #1604
Torrance, CA 90501
(310) 320-8888
(310) 212-6688 fax
AppleLink: Santos
Tamara Collins-Kaplan
Marketing Coordinator

The mira.35 from Santos Technology is the first affordable 35mm slide scanner that offers the high quality to satisfy the needs of today's demanding imaging and print design applications. Using patent-pending scanning technology, the mira.35 provides single pass, 2,700 DPI resolution with 30-bit dynamic range and captures color or monochrome images from any positive or negative 35mm slide or film.

Booth 123

Screen Magazine
720 North Wabash
Chicago, IL 60611
(312) 664-5236
(312) 664-8425 fax

Booth 1556

Roche Image Analysis Systems, Inc.
122 Orange Drive
Elon College, NC 27244
(800) 334-5161
(919) 584-9141 fax
Page Milliken
Division Product/Marketing Manager

Roche showcases the ProgRes 3012 Ultra High-Resolution Digital Color Camera and the Roche TeleImaging System with fast image transfer over standard phone lines with real-time two-way visual pointer and verbal communication capabilities. Capable of digital images in photographic quality the ProgRes 3012 offers complete flexibility and relative high speed. On-line viewing and image programmability are also standard features.

Booth 2136

Sampo Corporation of America
5550 Peachtree Industrial Boulevard
Norcross, GA 30071
(404) 449-6220
(404) 447-1109 fax
Chester Kramarski
Regional Sales Manager

Sampo exhibits their own brand of monitors: 17", 20", and 21" high-resolution multi-frequency (30-89KHz) color display monitors; 15", 20" and 24" high-resolution monochrome display monitors; 30 to 89KHz horizontal fixed frequency, resolutions up to 1600 x 1280; Engineering workstations; Also, 14", 15", 17", and 20" VESA standard multi-frequency color monitors.

Booth 1167

Science Accessories Corporation
200 Watson Boulevard
Stratford, CT 06497
(203) 386-9978
(203) 381-9270 fax
H.A. Cleveland
Vice President, Sales

The GP-8-3D is the only 3D digitizer that offers an active volume of up to 9'x9'x9', the use of up to 16 separate locators, and a resolution of .004". It comes with installation software to assist the user with setup, calibration, and environmental compensation to enhance precision and repeatability. It is readily interfaced to any host device through the use of either a standard RS-232-C serial port or a parallel port.

Booth 1519

Seiko Instruments USA, Inc.
1130 Ringwood Court
San Jose, CA 95131
(408) 922-5950
(408) 922-5840 fax
Cheryl Landman
Manager Marketing Communications

Seiko Instruments demonstrates ColorPoint PostScript language compatible color printers which produce high-quality, 300 dpi, A/B size prints on paper/film. Also featured are 14," 17," and 20" color monitors compatible with graphics standards with display resolutions up to 1024 x 768. The SpectraPoint color scanner and the Smart Label Printer Plus are also displayed.

Booth 1565

Sharp Electronics Corporation
Sharp Plaza
Mahwah, NJ 07430
(201) 529-9593
Kathy MacDowell
Assistant Product Manager–Color Products

Sharp Electronics is displaying color scanning, printing, and mass storage solutions featuring products for the commercial and professional user. Included is a true 600 dpi, 11"x17" flatbed scanner capable of scanning both reflective and transparent originals. Stop by our booth and see the new editions to Sharp's color imaging line.

Showcase

Showcase
University of Illinois at Chicago
c/o Thomas A. DeFanti
P.O. Box 4348, M/C 154
Chicago, IL 60680
(312) 996-3002
(312) 413-7585 fax
tom@siggraph.org

Registration Area

SIGGRAPH Education Committee
ACM SIGGRAPH
1515 Broadway
New York, NY 10036
Scott Owen
Chair, Education Committee
(212) 869-7440
(212) 764-5537 fax
owen@siggraph.org

The ACM SIGGRAPH Education Committee furthers the role of computer graphics education and computer graphics in education. The committee has several ongoing projects, including curriculum projects in art, computer science, and engineering. Other projects involve ways to support educators in graphics, such as materials development and communication with other educators.

Registration Area

SIGGRAPH Local Groups
ACM SIGGRAPH
1515 Broadway
New York, NY 10036
(212) 869-7440
(212) 764-5537 fax
katz@siggraph.org
Lou Katz
Chair, SIGGRAPH Local Groups Steering

Local SIGs are where SIGGRAPH happens in your area the other 51 weeks of the year. Stop by our booth to find out if one is currently operating in your region. If there isn't one yet, we can give you all the necessary information concerning how to start one.

Booth 510

Shima Seiki U.S.A., Inc.
22 Abeel Road
Cranbury, NJ 08512
(609) 655-4788
(609) 655-3989 fax
Helen Estakhrian
Graphics Division Manager

Shima Seiki announces the introduction of a new high-resolution paint system. This system can be configured with 8K X 10K frame memory on two buffers. An additional six pages of 8K X 10K reside in file memory with an access speed of 7 seconds/page. This way, multiple image composites at very high resolution can be made without the delay of loading images from the hard disk. The SGX was designed and built specificially for the print graphics marketplace.

Booth 207

Side Effects Software Inc.
20 Maud Street, Suite 300
Toronto, Ontario M5V 2M5
Canada
(416) 366-4607
(416) 366-6648 fax
Henry Yee
Director Sales and Marketing

Side Effects Software presents Prisms, an open and versatile 3D animation system with comprehensive features. Powerful character animation will be featured in demonstrations. Also featured is Mojo, an easy-to-use 2D software product which allows the animator to create superior morph jobs. Side Effects Software Inc. specializes in the development, marketing, and support of higher-end animation systems.

Booth 105

SIGGRAPH Job Search Services
See Business People Inc. listing

Registration Area

SIGGRAPH Video Review
Order Department
c/o 1st Priority
P.O. Box 576
Itasca, IL 60143-0576
(800) 523-5503 within USA
(708) 250-0807 outside USA
(708) 250-0038 fax
svr@siggraph.org

The internationally distributed *SIGGRAPH Video Review* is the premier videotape publication illustrating the latest concepts in computer graphics and interactive techniques. More than 86 issues, including issues on electronic theater and animation screening room material from recent SIGGRAPH conferences are available. Special issues present the latest developments in "Volume Visualization," "HDTV and the Quest for Virtual Reality," and Visualization Software." Call 1st Priority for a brochure.

Booth 756

SHOgraphics
1890 North Shoreline Boulevard
Mountain View, CA 94043
(415) 903-3886
(415) 960-2420 fax
randy@shograf.com
Randy Ochs
Manager, Market Development

SHOgraphics is a two-year-old startup company developing high-performance 3D graphics systems for a range of 3D applications. These systems are based on PEX, the open standard for 3D graphics. SHOgraphics has begun shipping a line of high-performance, network-based 3D PEX terminals and will begin shipping a line of high-performance 3D graphics add-ons for workstations.

Registration Area

SIGGRAPH 93
Conference Management Office
401 N. Michigan Avenue
Chicago, IL 60611
(312) 321-6830
(312) 321-6876 fax
For exhibition information
(708) 850-7779

ACM SIGGRAPH 93 will be held 1-6 August 1993 at the Anaheim Convention Center in Southern California. Stop by and meet SIGGRAPH 93 committee members and pick up a complimentary poster or pin, information on how to participate in the conference (ask for the Call for Participation), how to exhibit, or just for general information on what to expect at SIGGRAPH 93!

Registration Area

SIGGRAPH "Last Chance" Booth
ACM SIGGRAPH
1515 Broadway
New York, NY 10036
(212) 869-7440
(212) 764-5537 fax
cunningham@siggraph.org
Steve Cunningham, contact

SIGGRAPH is cleaning its warehouse and historical information is being sold at prices well below cost. The Last Chance booth offers: SIGGRAPH historical proceedings from 1982-1987; SIGGRAPH historical technical slides from 1983-1987; and SIGGRAPH historical art show slide sets from 1983-1987. The booth also offers back issues of more recent SIGGRAPH publications and slides.

Booth 139

SIGMA Electronics, Inc.
1184 Enterprise Road
East Petersburg, PA 17520
(717) 569-2681
(717) 569-4056 fax
Kent Porter

SIGMA offers wideband switching and distribution for graphics systems; encoding, decoding, and transcoding for multi-format applications, and assistance in integrating systems.

Booth 915 + 922

Silicon Graphics Computer Systems
2011 N. Shoreline Boulevard
Mountain View, CA 94039
(415) 390-1980
(415) 968-3579 fax
Crystal VanBurg
Senior Trade Show Specialist

Silicon Graphics is the leading manufacturer of visual computing systems, delivering 3D graphics, color, audio, video, and real-time technologies to the technical, scientific, and creative computing marketplace. Silicon Graphics shows its line of IRIS 4D workstations and servers, including its new top-of-the-line graphics systems with unmatched realism, and new IRIS Indigo RISC PC family members.

Booth 1363

Software Security, Inc.
1011 High Ridge Road
Stamford, CT 06905
(203) 329-8870
(203) 329-7428 fax
Jan Norman
Director of Marketing Communications

Software Security exhibits software protection devices for PCs, workstations, and Macintosh computers in standalone and networked versions. Software protected by these hardware keys can be copied freely but will not run unless a device is attached to the computer. Network devices limit the concurrent applications running on a network.

Booth 1249

Springer-Verlag New York, Inc.
175 Fifth Avenue
New York, NY 10010
(212) 460-1500
(212) 473-6272 fax
Jacqueline Jeng
Product Management, Computer Science

Springer-Verlag is a leading publisher of books and journals in computer graphics and computer science. We serve the graphics community in areas as diverse as graphic design, animation, medical imaging, scientific visualization, image processing, simulation, and modeling. We welcome you to stop by our booth and browse through our collection.

Booth 334

Strata Inc.
2 West St. George Boulevard, Suite 2100
St. George, UT 84770
(801) 628-5218
(801) 628-9756 fax
Bob Miller

Strata presents StrataVision 3D modeling, rendering, and animation. Version 2.5 adds faster rendering, Bezier text editing, System 7 savvy, QuickTime, new modeling tools including the Skin Modeler, and distributed rendering with RenderPro. New products include a 3D type utility and 3D clip art libraries, both with built-in StrataVision rendering without StrataVision 3D.

Booth 1441

Sixty Eight Thousand Inc.
160 Technology Circle
Scotts Valley, CA 95066
(408) 438-1777
(408) 438-2967 fax
Applelink:D1837
Doug Erickson
Director of Marketing

Sixty Eight Thousand Inc. is the original manufacturer of Macintosh tower workstations: the Dash 30fx. On display: Hurricane, a RISC processor that can run Adobe PhotoShop filters up to 20 times faster than the Quadra 950; Dash 40, a blazing multiple processor Macintosh workstation; Dashtalk II, a SCSI network 10 times faster than Ethernet; and Stallion, a 3-4 MByte per second FDDI gateway for all Macintoshes.

Booth 522

Sony Corporation
3 Paragon Drive
Montvale, NJ 07645
(201) 930-6158
Barbara Susi
Exhibits Manager

Sony is showing new A4 size Digital and Mulitscan Thermal Dye Sublimation Printers and new 3CCD MVC-7000 Pro Mavica Electronic Cameras. Also being shown is graphic display technology; DDM, 16x9 (Proto) GDM 1939 (Proto), GDM 1937, GDM 1934, GDM 1634, CPD-1791, CPD-1792 and CRT Demo; our 3-1/2 " and 5-1/4 " rewritable multifunction optical data storage solutions; and CRV Disc Hi 8-EV09650 in animation recording applications as well as CRV in a professional presentation also are shown.

Booth 558

Star Case Manufacturing Company, Inc.
648 Superior Avenue
Munster, IN 46321
(800) 822-STAR
(219) 922-4442 fax
Dennis Toma
President

Star Case displays its complete line of heavy-duty, custom and reusable shipping cases, and containers for all variations of computer components and peripherals. Standard cases as well as specially designed, custom cases are on exhibit.

Booth 929

Sun Microsystems, Inc.
2550 Garcia Avenue
Mountain View, CA 94043
(415) 960-1300

Sun is providing a unique Emersive Virtual Reality experience within the "Virtual Portal." This environment provides a total interactive experience using three projector displays, advanced head tracking, stereo, sound, and 3D environments. Advanced virtual reality techniques such as, accurate stereo, text on virtual paper, and reflective puppeting will be utilized. This three-minute experience will transport the user into a futuristic, almost holographic, experience on the show floor.

Booth 515

SOFTIMAGE Inc.
3510 St. Laurent Boulevard, #214
Montreal, Quebec H2X 2V2
Canada
(514) 845-1636
(514) 845-5676 fax
Pierre Rinfret
Director of Marketing

SOFTIMAGE offers a full solution to users of 3D animation systems with the release of version 2.6 of the SOFTIMAGE Creative Environment. Ranging from paint, 3D animation, and modeling, to real-time data input, SOFTIMAGE continues to set industry standards. SOFTIMAGE is the leading supplier of high-end 3D computer animation and simulation software.

Booth 1369

Specular International
233 North Pleasant Street
P.O. Box 888
Amherst, MA 01004
(413) 549-7600
(413) 549-1531 fax
AppleLink: Specular AOL: Specular I
Carolyn Herasimchuk
Director of Business Relations

Specular International offers Infini-D 1.5; this new upgrade is up to 500% faster, has ultra-crisp image quality, imports and exports QuickTime, PostScript, DXF, and much more. Specular introduces BackBurner: Render complex Infini-D images and animations in a fraction of the normal time using an unlimited number of Macintoshes.

Booth 1344

StereoGraphics Corporation
2171-H East Francisco Boulevard
San Rafael, CA 94901
(415) 459-4500
(415) 459-3020 fax
Wil Cochran
Vice President of Sales and Marketing

StereoGraphics is the leading manufacturer of proprietary electronic stereoscopic display equipment producing professional quality 3D images generated from computer or video cameras. CrystalEyes, wireless, comfortable electronic stereo eyewear and infrared emitter, work with unmodified computers, video recorders, and the company's large screen stereo projectors. New stereo video products permit simultaneous viewing and subsequent playback.

Booth 1322

Sun Microsystems Computer Corporation
2550 Garcia Avenue
Mountain View, CA 94043
(415) 960-1300

Sun Microsystems Computer Corporation invites you to discover the power of freedom. With Sun's Open Graphics Initiative (OGI), you can now choose the graphics solution that fits your need—at a price you can afford. Sun offers a full line of graphics workstations, as well as multimedia and printing solutions. See how Sun is changing the graphics industry and how you can benefit.

T

Booth 1633

Supercomputing '92
Minneapolis Convention Center
Minneapolis, MN 55403
(303) 497-1808
(303) 497-1298 fax
sc92 info@ncgr.ucar.edu
Susan Cross
Supercomputing '92 Publicity Chair

Supercomputing '92 invites you to join an international audience to discuss high-performance computing technology, research, development, applications, integration, and support. You can attend tutorials, invited lectures, and technical paper presentations. You can visit vendor and research exhibits, attend the visualization theater and poster sessions.

Booth 2426

TaraVisual Corporation
929 Harrison Avenue
Columbus, OH 43215
(614) 291-2912
(614) 291-2867 fax
ape-support%taravis@uunet.uu.net
Thomas M. Johnson
Director of Sales

TaraVisual showcases two software products: apE III, a robust UNIX visualization toolkit, utilizes an icon point-and-click menu to build graphics applications, transforming scientific, medical, engineering, and business data into photo-realistic images and animations; and CustomVu, a full-featured image post-processor, performs complex image transforms and signal processing.

Booth 2435

Techexport, Inc.
One North Avenue
Burlington, MA 01803
(617) 229-6900
(617) 229-7706 fax
Juliane M. Iannaco
Marketing Coordinator

Techexport, Inc. provides international distribution and support for a comprehensive range of computer graphics and video products. The company serves the videographics, 3D modeling and animation, presentation graphics, pre-press, and industrial display markets with hardware, application software, and peripherals. Techexport operates through subsidiary offices in Europe and Brazil, as well as 200 resellers worldwide.

Booth 2329

Thomson Digital Image
5601 West Slauson Avenue, Suite 272
Culver City, CA 90230
(310) 649-3358
(310) 568-9002 fax
Nick Tesi
National Sales Manager, TDI America

TDI presents the future of 3D animation and visualization: V3.0 software, featuring IPR for instantaneous rendering changes, a skeleton editor for natural character animation, interactive 2D mapping, an intuitive modeler combining surface and polygonal modeling, and a new dynamics option. Discover how TDI gives you the Power to Excel.

Booth 239

Supercomputing Review
8445 Camino Santa Fe, Suite 204
San Diego, CA 92121
(619) 452-4242
(619) 452-4224 fax

Booth 307

Tech Images International
P.O.Box 3719
Hollywood, CA 90078
(213) 469-8647
(213) 962-8559 fax
Jim Tucker
Director West Coast Operations

Tech Images International, the world's first digital computer images magazine, uses the latest in digital image technology in design image printing for computer graphics and professional film and broadcast professionals. Since 1988, TI International has been the leading European CGI magazine, based in Hollywood, and printing its US/UK edition at 50,000 copies every three months.

Booth 1336

Tektronix, Inc.
P.O. Box 1000
Wilsonville, OR 97070
(503) 682-3411
Dean Staley
Exhibit Manager

Tektronix features: color printers with 300 dpi Adobe Level 2 PostScript, Photorealistic output, plain paper and transparencies; new Stereotek MK II System consisting of stereo glasses and infrared transmitter; a passive stereo system; Avanzar Video System providing studio quality digital and analog video output for Silicon Graphics workstations; automatic and manual video test and measurement equipment; and the DDR-4400, a high-quality digital video recorder which can be configured to meet a variety of applications.

Booth 1265

Time Arts, Inc.
1425 Corporate Center Parkway
Santa Rosa, CA 95407-5453
(707) 576-7722
(707) 576-7731 fax
Britt MacKenzie
Sales Operations

Time Arts, the leading innovator in graphics software, is exhibiting multi-platform solutions for a wide variety of design, video, and multimedia applications. New products featured include Creative License for Silicon Graphics workstations and Lumena V3.7.

Booth 933

Symbolics, Inc.
6 New England Tech Center
555 Virginia Road
Concord, MA 01742
(508) 287-1000
(508) 287-1092 fax
Butch Fadely
Graphics Sales

Symbolics introduces "Bones" and "Gesterial Animation," two 3D animation upgrades, as well as a new paint program. Symbolics also showcases its "standards-proof" Unified Graphics systems, which integrate paint, 2D, and 3D animation capabilities for the seamless creation of computer animation and allow users to input and output NTSC, PAL, and a variety of HDTV resolutions.

Booth 1736

Tech-Source Inc.
442 S. North Lake Boulevard, Suite 1008
Altamonte Springs, FL 32701
(407) 830-8301
(407) 339-2554 fax
uunet! techsrc!jo
Jo Hunnicutt
Manager, Marketing Communications

The GXTRA family of SBus graphics accelerators allow multiple users to share a single SPARCstation. The GXTRA supports resolutions from 1600 x 1280 down to 640 x 480; provides 2D acceleration exceeding Sun's GX; and accelerates Sun's X11/NeWS, SunView, as well as MIT's X11R4/X11R5. The GXTRA drastically reduces the cost-per-seat by adding new users to existing SPARCstations.

Booth 1422

Texas Memory Systems, Inc.
11200 Westheimer Road, Suite 1000
Houston, TX 77042
(713) 266-3200
(713) 266-0332 fax
John Marsh
Vice President

The multi-ported SAM-2000 memory system with optional SSP-160 array processors is aimed at high-end image and signal processing applications. The SAM-2000 has fast, intelligent interfaces to supercomputers, workstations, display, and data acquisition devices. The SSP-160 offers very-high-speed processing power. The combination is ideal for the most demanding real-time or high-speed tasks.

Booth 326

Trident Microsystems, Inc.
205 Ravendale Drive
Mountain View, CA 94043
(415) 691-9211
(415) 691-9260 fax
Michael Maia
Vice President of Marketing

Trident, a developer and marketer of high-performance graphics and video processing chip sets, announces new chip sets including: a GUI accelerator, 64-grayshade and 256 color flat panel/CRT controllers, local bus VGA controllers, integrated RAMDAC and clock VGA controllers, and VideoView, a video processing chipset for PCs.

U

Booth 2217

Trix Company, Ltd.
1 Kandamatsunaga
Chiyoda-Ku, Tokyo 101
Japan
(81) 33-251-1961
(81) 33-251-6929 fax
Hitoshi Takamizawa
President

Trix is a manufacturer of high-speed RISC processor boards for prototyping and evaluating usage.

Booth 1139

Truevision Inc.
7340 Shadeland Station
Indianapolis, IN 46256
(317) 841-0332
(317) 576-7700 fax

Come by to see what is new. Bravado boards provide total integration of computer technology with full audio/video presentation capabilities for creation of mulitmedia presentations, interactive training, and educational materials. VideoMaker+ for the Mac and PC is a cost-effective, easy-to-use video production software package. Truevision has been revolutionizing videographics since 1984.

Booth 1356

University of Illinois/National Center for Supercomputing Applications
605 E. Springfield Avenue, 152 CAB
Champaign, IL 61820
(217) 244-1097
(217) 244-1987 fax
winckler@ncsa.uiuc.edu
hardin@ncsa.uiuc.edu
Ginger Winckler
Program Manager
Joseph Hardin
Associate Director

Experience hands-on use of the new NCSA scientific collaboration tools, Collage, which combine scientific visualization and network access allowing remote conferences on data, images, animations, text, and drawings across Macs, IBM PCs, X-Windows systems and SGIs. Presentations will be given on recent developments including Sonification, Alpha Shapes, and performance art.

V

Booth 1269

UNIX Review Magazine
600 Harrison Street
San Francisco, CA 94107
(415) 905-2200
(415) 905-2234 fax

UNIX Review serves the informational needs of systems integrators, VARs, OEMs, professional developers, and end users building solutions using UNIX as a platform. Technical editorial focuses on practical use of UNIX technology, news, and reviews of both hardware and software products. Visit our booth for complimentary issues and free subscriptions.

Booth 2429

UNIXWorld Magazine
1900 O'Farrell Street
San Mateo, CA 94403
(415) 513-6985
(415) 513-6986 fax
Kari Smith
Tradeshow Coordinator

UNIXWorld is directed to the Open Systems computing market covering systems integration and design topics for OEMs, VARs, and volume end-users. Editorial focuses on UNIX-based networks, workstations, multi-user systems, software, and associated peripherals. Articles provide industry news, market analysis, in-depth product reviews, and tutorials for programming and business applications.

Booth 1358

Vertigo Technology Inc.
Suite 301, 1134 Homer Street
Vancouver, British Columbia V6B 2X6
Canada
(604) 684-2113
(604) 684-2108 fax
Linda Fawcus
Vice President of Marketing and Sales

Vertigo 3D and Vertigo Designer are user-friendly, fully integrated and affordable visualization software packages for broadcast, post production, and AEC applications. High-speed rendering, surface patch modeling, object deformation, metamorphosis and interactive VTR control complement Vertigo's powerful modeling, animation, and output capabilities. Interfaces to a wide variety of image, geometry, and CAD file formats are available.

Booth 446

VideoLogic, Inc.
245 First Street
Cambridge, MA 02142
(617) 494-0530
(617) 494-0534 fax
Lynne Dacy
Marketing Coordinator

VideoLogic Inc., the leading independent supplier of graphics and multimedia hardware and software, provides complete integrated solutions with the Rapier 24 family of two-page graphics accelerators for Windows, DVA-4000 full motion digital video adapter, MediaSpace compression/decompression product for the PC, and Mediator print to tape device.

Booth 129

Videomedia, Inc.
175 Lewis Road
San Jose, CA 95111
(408) 227-9977
(408) 227-6707 fax
Michael Levin

New V-LAN compatible animation and desktop video products: ANIMAX animation controller board for IBM/Amiga with Autodesk 3D Studio Release 2. OZ for WINDOWS and OZ for MAC solution for 2 machine control animation and video editing directly from the computer. AutoPICT QT Quicktime-compatible capture/record animation software. SuperMICRON animation and editing system controlling the VideoToaster.

Booth 124

Video Systems Magazine
9800 Metcalf
Overland Park, KS 66212-2215
(913) 967-1834
(913) 967-1898 (fax)
Tom Brick
Marketing Director

Video Systems serves video, audio, and multimedia production management in business and industry, computer graphics production, medical and educational institutions, government agencies, religious and cable television studios, independent video and audio production, and presentation equipment dealers, distributors, consultants, and equipment manufacturers. *Video Systems* is the official publication of the International Television Association.

Booth 1539

VIDI
16309 Doublegrove Street
La Puente, CA 91744
(818) 918-8834
(818) 918-9935 fax

Presenter Professional represents a combination of VIDI's spline-based engineering technology and years of computer graphics experience. Nominated for the MacUser Eddy award, Presenter Professional is revered as being the most powerful 3D modeling software on the Macintosh. Accelerated rendering capabilities include Phong shading, ray tracing, and RenderMan.

Booth 1558

Viewpoint Animation Engineering
870 West Center
Orem, UT 84057
(801) 224-2222
(801) 224-2272 fax
John Thomas
Vice President of Production

Viewpoint has an extensive inventory of 3D datasets to be used in computer animation, simulation, graphics arts, and visualization. These are high-end, accurate models of vehicles, airplanes, full skeletons, human bodies, internal organs, animals, and others. Virtually all popular 3D software formats are supported.

Booth 1367

Will Vinton's Playmation
714 East Angeleno, Unit C
Burbank, CA 91501
(818) 566-8551
Jonathon B. Deaveaux
President, Anjon & Associates

Will Vinton's Playmation is a 3D character animation package that runs on both the IBM Windows and Commodore Amiga platforms. Features include spline modeling, keyframe animation, the ability to morph every single point on your objects, and ray-traced spline rendering. It's a soft image for the masses.

W

Booth 1670

Virtual Reality Group
800 Follin Lane, Suite 270
Vienna, VA 22180
(703) 242-0030
(703) 242-5220 fax
Christopher Lewis

VRG is a recognized leader in the design and delivery of prototype display systems to the government and military. We enter the commercial arena with an off-the-shelf, high-performance head-mounted display system. Delivering resolution of 1280 x 1024 per eye at two arcminutes per pixel, it is a state-of-the-art system for use in leading-edge VR and Telepresence systems. VRG also offers system design and integration services to the government for industry.

Booth 1737

Vivid Group
317 Adelaide St. West, #302
Toronto, Ontario M5V 1P9
Canada
(416) 340-9290
(416) 348-9809 fax
catinhat@well.sf.ca.us
SusanWyshynski
Vice President of Marketing

The Vivid Group presents our Mandala Virtual Reality System. This unique multimedia telepresence technology focuses on freedom of movement, providing unencumbered real-time experiences to the user. Our production services division has created interactive worlds for a diverse list of clients: corporate communication companies, educators, television producers (Nickolodeon's "Arcade"), telecommunication professionals, and museums such as the Smithsonian.

Booth 2122

Wacom Technology Corporation
501 S.E. Columbia Shores Boulevard
Suite 300
Vancouver, WA 98661
(206) 750-8882
(206) 750-8924 fax
Steven Smith
Trade Show Services

Wacom Technology Corporation is displaying its award-winning SD-Series graphics tablets with cordless, batteryless, pressure sensitive pens and cursors. Wacom's cordless digitizing tablet is the ideal input device for computer graphics, illustration, desktop publishing, and CAD. Wacom's quality provides you with a new sense of freedom in computer graphics and design.

Booth 553

Wavetracer, Inc.
289 Great Road
Acton, MA 01720
(508) 635-9000
(508) 635-9777 fax
ddr@wavetracer.com
Darlene Robertson
Marketing Specialist

Wavetracer's advanced software and hardware tools help solve and visualize complex problems in image processing, the physical sciences, mathematics, and other areas. Tools include: the Zephyr, the world's first deskside, affordable, 3D massively parallel computing system; a 2D/3D imaging library; and multiC, a multidimensional, parallel software development environment. Zephyr features a 32-bit HIPPI input/output port, a high-resolution, HIPPI compatible frame buffer.

Booth 1458

Visionetics International Corporation
21311 Hawthorne Boulevard., Suite. #235
Torrance, CA 90503
(310) 316-7940
(310) 316-7457 fax
James Liao
Vice President

VIGA+ is our latest real-time, true-color frame grabber which is register-compatible with Truevision's TARGA. It has advanced digital special effects and live window capability. Our recordable VGA products include: VIGA-VGA, superVGA card with NTSC output; VGALink, overlay board; VGA/TV Box, external VGA-to-NTSC box.

Booth 118

Volumetric Imaging, Inc.
2200 One Kendall Square
Cambridge, MA 02139
(617) 621-7007
(617) 577-1209 fax
76517.1577@Compuserve.com
Dennis J. Solomon
President

Volumetric Imaging provides concept research and development, and product development and manufacturing of true 3D imaging systems. Our group has ongoing projects in three areas —virtual reality, true volumetric imaging, and holographic systems. Our Volumetric Imager has been called the computer display of the future. Our 16" diameter Matrix Imager is live and interactive in our SIGGRAPH booth.

Booth 537

Wasatch Computer Technology, Inc.
123 East 200 South
Salt Lake City, UT 84111
(801) 575-8043
(801) 575-8075 fax
Mary Ware
Marketing

Wasatch Portfolio is a fully integrated software package that enables users to meet a variety of image needs, ranging from presentation graphics to graphic/illustration to photo retouch/compositing. The newly introduced version 2.4 of Wasatch Portfolio performs digital image retouching, filtering, and compositing. Wasatch also has announced the first version of the lower priced Wasatch Portfolio VGA designed to be used with mass-marketed Super VGA display cards.

Booth 1362

John Wiley and Sons, Inc.
605 Third Avenue
New York, NY 10158
(800) CALL-WILEY

John Wiley and Sons features the newest publications in the areas of documentation, computer graphics, and programming. Wiley publishes computer graphics books for the beginner to the advanced programmer. Stop by and sample Wiley books like *Windows Graphics Programming with Borland C++* by Loren Heiny and *Computer Graphics Using Object-Oriented Programming* by Steve Cunningham.

Booth 1929

Visual Software
21731 Ventura Boulevard, Suite 360
Woodland Hills, CA 91364
(818) 883-7900
(818) 593-3750 (fax)
Kim Burgoyne
Sales Manager

Visual Software shows Renderize, a photorealistic 3D rendering package for SGI Indigo, Sun SPARCstations and MS Windows. The latest version of this easy-to-use, affordable program includes the ability to import 2D true fonts, "explode" them, and save them as 3D models. Now it's easy to create professional, high-resolution images.

Booth 142

VREAM, Inc.
2568 North Clark Street, #250
Chicago, IL 60614
(312) 477-0425
(312) 477-9702 fax
Edward R. LaHood
President

VREAM is exhibiting the VREAM Virtual Reality Development System, an affordable, complete, off-the-shelf virtual reality system for DOS-based PCs. The VREAM system allows users to define, enter, and interact with 3D virtual worlds in real time, using a mouse-driven point-and-click user interface, and a variety of hardware interface devices.

Booth 944

Wavefront Technologies, Inc.
530 E. Montecito Street
Santa Barbara, CA 93103
(805) 962-8117
(805) 963-0410 fax
Catriona Gaeta
Marketing Communications Manager

Wavefront demonstrates its complete line of high-end animation, data analysis, visualization for engineering applications, paint, and desktop video production software.

Booth 536

Winsted Corporation
10901 Hampshire Avenue South
Minneapolis, MN 55438
(612) 944-8556
(612) 944-1546 fax
Randy Smith
Marketing Manager

Winsted offers the largest line of computer-video-graphics furniture anywhere. Our furniture features modular construction to allow you to build a custom system from our stock parts. New for SIGGRAPH is a series of ergonomically designed furniture featuring a recessed monitor well for easy viewing of your monitors.

X

Booth 649

Wolfram Research, Inc.
100 Trade Center Drive
Champaign, IL 61820
(217) 398-0700
(217) 398-0747 fax
info@wri.com
Jim Steinbacher
Sales Manager

Wolfram Research presents Mathematica, a sytem for doing numerical, symbolic, and graphical computation used both as an interactive calculation tool and a programming language. Numerical capabilities include arbitrary precision arithmetic and matrix manipulation. On systems with a sophisticated graphical user interface, users can create "Notebooks" that mix input, graphics, text, and sound. Mathematica generates graphics in PostScript form.

Booth 2326

XAOS Tools, Inc.
600 Townsend, Suite 271E
San Francisco, CA 94103
(415) 558-9267
(415) 558-9160 fax

What would you expect from XAOS tools? The unexpected. Pandemonium. Dazzling animated effects, XAOS style: nTitle, for stunning text generation and animation; SVideo, for video editing and compositing; and this year's highlight, Pandemonium, image processing, animation, incredible special effects. Also, come see XAOS Inc.'s latest works for *Lawnmower Man, Dolby, Grateful Dead, Michelin,* and lots more.

Booth 763

Xceed Technology
37560 31 Mile Road
Richmond, MI 48062
(313) 727-4085
Peter C. VanHeusden
Marketing Manager

Xceed Technology is a computer enhancement company. The products we support are video display adapters, memory enhancement boards, and modules for PC, Mac, and workstations. Current main products are high-end accelerated display adapters for PC, PC with/Windows, and with Mac computers.

Y

Booth 1529

Yamashita Engineering Manufacture, Inc.
1926 Okata
Atsugi-shi, Kanagawa 243
Japan
(81) 46-228-8883
(81) 46-229-1944 fax
Minoru Ohkubo
Marketing

YEM is introducing three new products: CVS-990 Supreme Automatic Scan Converter accepts horizontal scan frequencies of 15KHz-130KHz; EDEC-2000 DIGITAL EDTV Decoder to produce interlaced RGB NTSC and non-interlaced RGB video at 31.468KHz; and HSC-1125 UP-Converter from NTSC to HDTV format.

Booth 1056

Yarc Systems Corporation
975 Business Center Circle
Newbury Park, CA 91320
(805) 499-9444
(805) 499-4048 fax
uunet!amdcad!yarc!john or john@yarc.uucp
John Pryzibilla
Vice President/Marketing

3D rendering at workstation speed...on a Macintosh with a Yarc RISC board. See YARCRenderMan, a high-speed upgrade for Pixar's MacRenderMan, running on a single YARC board four to six times faster than a Quadra 900, with multiple boards giving even greater speed increases. Also see other accelerated products, including Presenter Professional and Sculpt 4D.

		Animation	Artificial Intelligence	Business and Financial Graphics	CAD/CAM/CAE/CIM/Robotics	Collaborative Products	Computer-Video Interfacing	Consulting	Data Analysis Software	Desktop Publishing	Digitizing Cameras and Scanners	Electronic Publishing Software/Systems	Encoders/Decoders	Graphic Art Systems	Graphic Design Systems	Graphics Accelerator Boards	Graphics Standards Software	Hardcopy Devices; Photographs/Slides	Hardcopy Devices; Printers/Plotters	HDTV	High Performance Graphics Processors	High Resolution Graphic Display Systems	Image Processing	Input Devices; Digitizers, Light Pens, Mice	Low Cost Graphics Systems	Mapping and Cartography	Medical Imaging Software	Molecular Modeling Software	Monitors and Displays	
1515	**Abekas**	●					●																							
115	**Academic Press, Inc.**																													
141	**Accom Inc.**												●																	
949	**Acrobat Graphics Systems Ltd.**	●													●					●			●							
851	**ADDA Technologies, Inc.**																													
1251	**Addison-Wesley Publishing Company**	●	●							●																				
665	**Advanced Digital Imaging**	●					●																							
458	**Advanced Imaging & AVC Presentation**																													
1636	**Advanced Technology Center**				●												●													
1739	**Advanced Visual Systems Inc.**	●		●																			●				●	●		
2232	**AGFA Division**																	●												
131	**Alacron, Inc.**															●							●							
1153	**Aldus Corporation**			●						●		●																		
2339	**Alias Research, Inc.**	●										●		●	●								●							
2419	**The American Institute of Physics**																													
1637	**Ameritech**						●																							
753	**Ampex Corporation***																													
1936	**AmPro Corporation**																													
1722	**Apple Computer, Inc.**	●													●						●									
2234	**Ascension Technology Corporation**	●			●																			●						
751	**ASG**	●			●					●																				
REG	**Association for Computing Machinery**																													
1915	**AT&T Graphics Software Labs**	●		●	●		●			●				●	●								●		●					
2126	**Audio Digitallmaging**	●				●	●						●	●	●								●							
951	**Aurora Systems**	●								●		●		●	●					●			●		●		●			
1756	**Autodesk**	●			●																									
666	**autodessys, Inc.**				●										●															
1340	**Avid Technology Inc.**					●	●			●																				
1544	**AXA Corporation**	●																												
	B																													
1654	**Bit 3 Computer Corporation**						●																							
1939	**Brooktree Corporation**												●																	
105	**Business People Inc. (BPI)***																													
2332	**Byte by Byte Corporation**	●			●									●	●						●									
	C																													
549	**Canon USA, Inc.***																													
1541	**Chase Technologies, Inc.**	●					●																							
2119	**Chromatek Inc.**	●			●		●						●							●										
2417	**CIRAD**	●			●										●								●							
2422	**Codonics, Inc.**						●												●											
315	**Computer Design, Inc.**																					●	●							
529	**Computer Graphics World/SIGGRAPH Show Daily**																													
228	**Comtec Automated Solutions**																													
1744	**Convex Computer Corporation**	●																		●			●				●	●		
344	**Corel Corporation**			●						●																				
507	**Cyberware**										●																			
2420	**Cymbolic Sciences International**																	●	●											
	D																													
1549	**Diaquest Inc.**	●					●								●										●					
956	**Digital Arts**	●												●	●										●					
1316	**Digital Equipment Corporation**			●						●		●										●	●	●					●	
2115	**Digital F/X, Inc.**																							●	●					
1158	**Discreet Logic Inc.**	●					●							●	●									●						
1061	**Division Limited**				●																	●								

	Multimedia/Hypermedia	Networking; Hardware/Software/Services	OEM Components	Paint Systems	PC Add-on Products	PC-Based Systems	Personal Computer Graphics Cards	Portable Products	Productivity Products	Projectors; HDTV	Projectors; Video	Publications	Rendering and Image Synthesis Software	Research Systems	Scanners; Scan Converters	Scientific Visualization Software	Software (other)	Storage Devices; Tape/Disk	Supercomputers	Systems Integrators	Telecommunications and Networking	terminals	Turnkey Systems	Video Technology	Virtual Reality	Visual Arts	Windowing Systems	Workstations	Workstations; High Performance	
																		●						●						Abekas
												●																		Academic Press, Inc.
																		●												Accom Inc.
				●																										Acrobat Graphics Systems Ltd.
	●																													ADDA Technologies, Inc.
	●											●																		Addison-Wesley Publishing Company
	●				●												●	●						●						Advanced Digital Imaging
												●																		Advanced Imaging & AVC Presentation
																														Advanced Technology Center
													●			●														Advanced Visual Systems Inc.
																														AGFA Division
																														Alacron, Inc.
	●																●													Aldus Corporation
	●												●				●													Alias Research, Inc.
												●					●													The American Institute of Physics
		●						●												●	●			●						Ameritech
																														Ampex Corporation
										●	●																			AmPro Corporation
						●							●			●								●						Apple Computer, Inc.
			●																						●					Ascension Technology Corporation
	●												●													●				ASG
																														Association for Computing Machinery
	●			●	●	●							●			●	●													AT&T Graphics Software Labs
					●	●							●								●		●				●			Audio DigitalImaging
				●		●											●						●	●		●				Aurora Systems
	●			●																					●					Autodesk
													●				●									●				autodessys, Inc.
		●															●			●			●	●						Avid Technology Inc.
	●			●									●				●			●			●	●		●	●			AXA Corporation
																														B
					●																							●	●	Bit 3 Computer Corporation
			●																					●						Brooktree Corporation
																														Business People Inc. (BPI)
	●					●							●													●				Byte by Byte Corporation
																														C
																														Canon USA, Inc.
																							●							Chase Technologies, Inc.
															●								●							Chromatek Inc.
													●			●	●													CIRAD
		●																												Codonics, Inc.
													●				●													Computer Design, Inc.
												●																		Computer Graphics World/SIGGRAPH Show Daily
		●																●												Comtec Automated Solutions
													●			●			●											Convex Computer Corporation
																														Corel Corporation
																														Cyberware
																														Cymbolic Sciences International
																														D
	●	●	●	●	●	●	●						●				●			●			●	●		●				Diaquest Inc.
				●		●							●				●									●				Digital Arts
	●	●											●			●	●							●	●		●	●	●	Digital Equipment Corporation
	●			●									●				●							●				●	●	Digital F/X, Inc.
				●																										Discreet Logic Inc.
																			●						●					Division Limited

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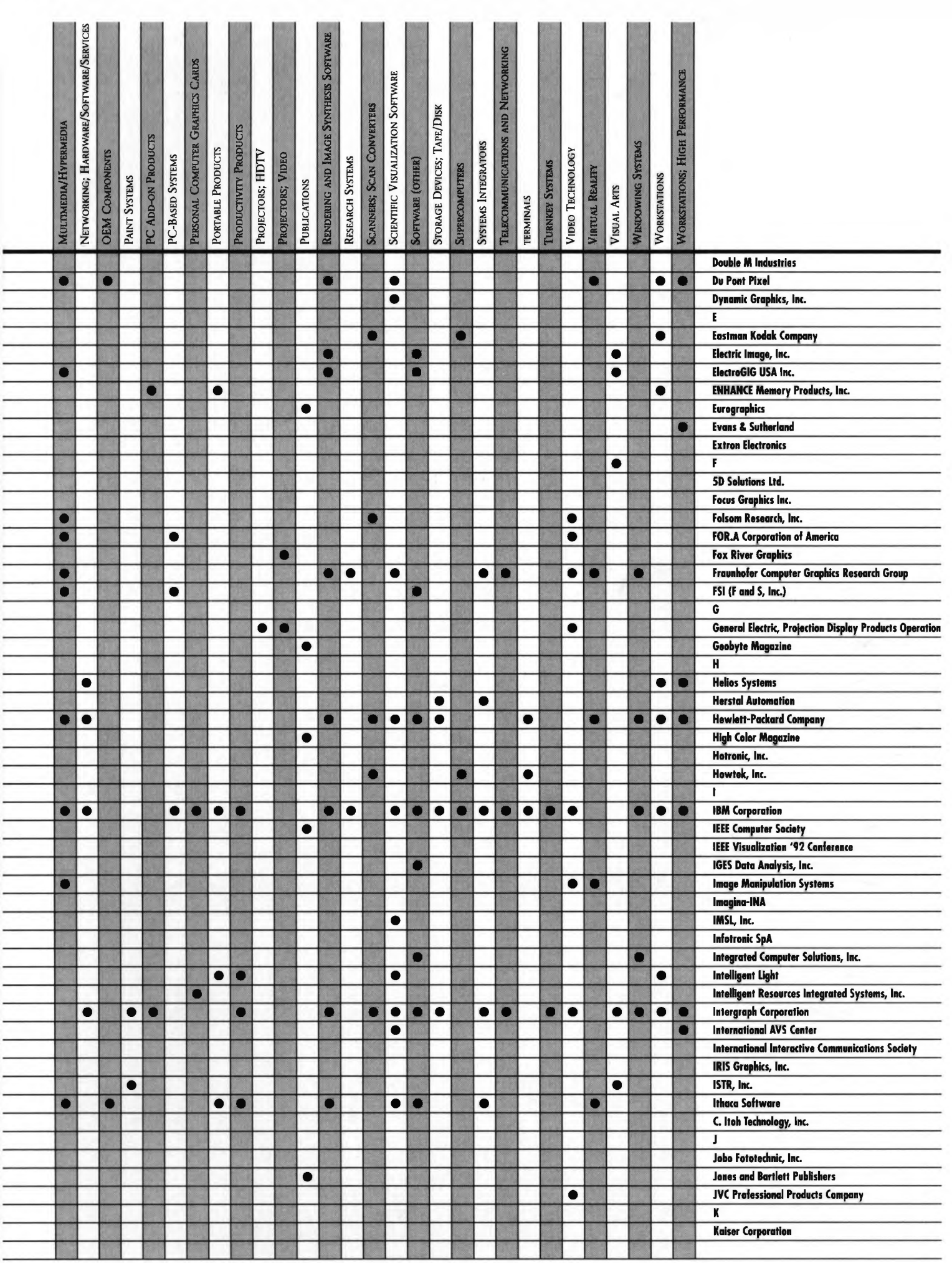
954	**Double M Industries**	●									●							●												
1149	**Du Pont Pixel**				●											●	●				●	●	●		●		●	●		
127	**Dynamic Graphics, Inc.**																									●				
	E																													
1749	**Eastman Kodak Company**										●									●			●							
323	**Electric Image, Inc.**	●													●					●										
936	**ElectroGIG USA Inc.**	●			●		●							●	●					●					●					
761	**ENHANCE Memory Products, Inc.**				●																									
308	**Eurographics**																													
1729	**Evans & Sutherland**																													
958	**Extron Electronics**						●																							
	F																													
1469	**5D Solutions Ltd.**	●			●					●		●																		
111	**Focus Graphics Inc.**																	●												
513	**Folsom Research, Inc.**	●					●																							
749	**FOR.A Corporation of America**	●				●				●	●									●		●								
769	**Fox River Graphics**			●							●			●				●	●											
1829	**Fraunhofer Computer Graphics Research Group**	●			●	●	●	●				●					●			●			●			●	●			
2334	**FSI (F and S, Inc.)**									●		●		●							●		●							
	G																													
1922	**General Electric, Projection Display Products Operation**																													
236	**Geobyte Magazine**																									●				
	H																													
1523	**Helios Systems**																													
2425	**Herstal Automation**							●																						
1715	**Hewlett-Packard Company**	●			●	●	●		●								●		●		●		●		●		●		●	
108	**High Color Magazine**																													
765	**Hotronic, Inc.***																													
1546	**Hawtek, Inc.**									●		●												●						
	I																													
1329	**IBM Corporation**	●	●	●	●	●	●	●	●	●	●	●					●			●	●	●	●	●	●	●	●	●	●	
1436	**IEEE Computer Society**																													
339	**IEEE Visualization '92 Conference***																													
1934	**IGES Data Analysis, Inc.**				●				●	●		●					●													
661	**Image Manipulation Systems**	●		●			●									●	●				●	●	●	●						
121	**Imagina-INA***																													
436	**IMSL, Inc.**																													
2015	**Infotronic SpA***																													
633	**Integrated Computer Solutions, Inc.**																													
1753	**Intelligent Light**	●							●																					
337	**Intelligent Resources Integrated Systems, Inc.**	●					●							●						●			●							
939	**Intergraph Corporation**	●		●	●		●		●	●	●	●		●	●		●		●		●	●	●		●	●				●
1761	**International AVS Center**					●			●												●							●	●	
663	**International Interactive Communications Society***																													
539	**IRIS Graphics, Inc.**																		●											
146	**ISTR, Inc.**													●	●								●		●			●		
1525	**Ithaca Software**	●		●	●				●	●							●									●				
336	**C. Itoh Technology, Inc.**																		●											
	J																													
766	**Jobo Fototechnic, Inc.**																	●												
132	**Jones and Bartlett Publishers**																						●							
1349	**JVC Professional Products Company**						●				●																			
	K																													
1569	**Kaiser Corporation***																													


Multimedia/Hypermedia
Networking; Hardware/Software/Services
OEM Components
Paint Systems
PC Add-on Products
PC-Based Systems
Personal Computer Graphics Cards
Portable Products
Productivity Products
Projectors; HDTV
Projectors; Video
Publications
Rendering and Image Synthesis Software
Research Systems
Scanners; Scan Converters
Scientific Visualization Software
Software (other)
Storage Devices; Tape/Disk
Supercomputers
Systems Integrators
Telecommunications and Networking
terminals
Turnkey Systems
Video Technology
Virtual Reality
Visual Arts
Windowing Systems
Workstations
Workstations; High Performance
Double M Industries
Du Pont Pixel
Dynamic Graphics, Inc.
E
Eastman Kodak Company
Electric Image, Inc.
ElectroGIG USA Inc.
ENHANCE Memory Products, Inc.
Eurographics
Evans & Sutherland
Extron Electronics
F
5D Solutions Ltd.
Focus Graphics Inc.
Folsom Research, Inc.
FOR.A Corporation of America
Fox River Graphics
Fraunhofer Computer Graphics Research Group
FSI (F and S, Inc.)
G
General Electric, Projection Display Products Operation
Geobyte Magazine
H
Helios Systems
Herstal Automation
Hewlett-Packard Company
High Color Magazine
Hotronic, Inc.
Howtek, Inc.
I
IBM Corporation
IEEE Computer Society
IEEE Visualization '92 Conference
IGES Data Analysis, Inc.
Image Manipulation Systems
Imagina-INA
IMSL, Inc.
Infotronic SpA
Integrated Computer Solutions, Inc.
Intelligent Light
Intelligent Resources Integrated Systems, Inc.
Intergraph Corporation
International AVS Center
International Interactive Communications Society
IRIS Graphics, Inc.
ISTR, Inc.
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C. Itoh Technology, Inc.
J
Jobo Fototechnic, Inc.
Jones and Bartlett Publishers
JVC Professional Products Company
K
Kaiser Corporation

		Animation	Artificial Intelligence	Business and Financial Graphics	CAD/CAM/CAE/CIM/Robotics	Collaborative Products	Computer-Video Interfacing	Consulting	Data Analysis Software	Desktop Publishing	Digitizing Cameras and Scanners	Electronic Publishing Software/Systems	Encoders/Decoders	Graphic Art Systems	Graphic Design Systems	Graphics Accelerator Boards	Graphics Standards Software	Hardcopy Devices; Photographs/Slides	Hardcopy Devices; Printers/Plotters	HDTV	High Performance Graphics Processors	High Resolution Graphic Display Systems	Image Processing	Input Devices; Digitizers, Light Pens, Mice	Low Cost Graphics Systems	Mapping and Cartography	Medical Imaging Software	Molecular Modeling Software	Monitors and Displays
1426	**Kingston Technology Corporation**																												
1536	**Knowledge Industry Publication/Montage Publishing, Inc.**																												
460	**Kozmo**	●																					●						
	L																												
208	**Lasertechnics, Inc.**																		●										
1346	**LAZERUS⋆**																												
667	**LEAD Technologies, Inc.**						●			●					●		●						●		●		●		
1533	**Liant Software Corporation**								●								●												
1066	**Lightscape Graphics Software**				●																								
1770	**Lightwave Communications, Inc.**				●		●													●					●			●	
1553	**Lyon Lamb Video Animation Systems, Inc.**	●											●																
	M																												
1926	**Management Graphics, Inc.**	●		●										●				●					●			●	●		
342	**Mathematica, Inc.**									●					●							●	●		●		●		
953	**Maximum Strategy Inc.**																												
350	**Meckler**																												
1522	**MediaShare Corporation**																												
562	**META Corporation USA**	●				●																							
1253	**Microfield Graphics, Inc.**			●	●					●						●					●		●			●			
1834	**Microtime, Inc.**	●													●								●						
1246	**Midwest Litho Arts, Inc.**	●			●		●			●	●	●		●	●			●	●										
2431	**Minolta Corporation⋆**																												
2216	**MIT Press**																												
533	**Mitsubishi Electronics American Inc., Information Systems**				●														●			●							●
2319	**Mitsubishi International Corporations**									●									●										●
320	**Mitsubishi-Professional Electronics**																	●											●
1531	**ModaCAD**														●														
1361	**Morgan Kaufmann Publishers, Inc.**																												
429	**Motorola, Inc.**																	●					●						
2424	**MULTIPOINT Technology Corporation**	●			●																			●				●	
	N																												
237	**NASA Tech Briefs**		●																										
1347	**National Computer Graphics Association**	●		●	●					●																			
961	**Network Computing Devices, Inc.**																												
327	**Nippon Computer Graphics Association⋆**																												
149	**Northwestern University/Evanston Research Park**																												
866	**NPES⋆**																												
651	**Nth Graphics, Ltd.**																●												
	O																												
965	**O'Reilly & Associates, Inc.**																												
345	**Origin Instruments Corporation**				●			●																●					
1353	**Oxberry, Division of Cybermetrics Products Inc.**	●									●							●						●					
	P																												
113	**Panasonic Communications & Systems Company⋆**																												
313	**Panasonic Industrial Company**																												●
1144	**Parallax Graphics, Inc.**						●																						
1067	**Parsytec Inc.**					●	●	●													●	●	●						
1425	**Peritek Corporation**	●														●	●				●	●	●	●	●	●		●	
1561	**Philips Semiconductors-Signetics**						●						●										●						
1365	**Photron Limited**	●					●													●									
2315	**Pinnacle Systems, Inc.⋆**																												
1449	**Pioneer Communications of America, Inc.⋆**																												
1244	**Pixar**	●								●				●	●		●								●				
561	**PIXEL Magazine/PIXEL VISION**																												
1156	**Pixsys Inc.**	●			●						●													●			●		

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				●																									Kingston Technology Corporation
											●																		Knowledge Industry Publication/Montage Publishing, Inc.
																●													Kozmo
																													L
																													Lasertechnics, Inc.
																													LAZERUS
●		●		●	●			●															●						LEAD Technologies, Inc.
								●				●			●														Liant Software Corporation
					●							●												●					Lightscape Graphics Software
●	●																			●			●						Lightwave Communications, Inc.
				●	●									●								●	●						Lyon Lamb Video Animation Systems, Inc.
																													M
															●								●						Management Graphics, Inc.
●			●																										Mathematica, Inc.
																	●												Maximum Strategy Inc.
											●																		Meckler
																													MediaShare Corporation
												●				●													META Corporation USA
		●		●		●																				●			Microfield Graphics, Inc.
																													Microtime, Inc.
												●											●		●				Midwest Litho Arts, Inc.
																													Minolta Corporation
											●																		MIT Press
●		●															●												Mitsubishi Electronics American Inc., Information Systems
		●												●															Mitsubishi International Corporations
										●													●						Mitsubishi-Professional Electronics
●												●																	ModaCAD
											●																		Morgan Kaufmann Publishers, Inc.
●		●			●											●													Motorola, Inc.
●				●				●				●			●									●		●			MULTIPOINT Technology Corporation
																													N
											●																		NASA Tech Briefs
●																									●		●		National Computer Graphics Association
	●																				●				●				Network Computing Devices, Inc.
																													Nippon Computer Graphics Association
				●												●									●				Northwestern University/Evanston Research Park
																													NPES
															●														Nth Graphics, Ltd.
																													O
											●																		O'Reilly & Associates, Inc.
		●											●											●					Origin Instruments Corporation
		●																				●							Oxberry, Division of Cybermetrics Products Inc.
																													P
																													Panasonic Communications & Systems Company,
																													Panasonic Industrial Company
●																							●						Parallax Graphics, Inc.
													●					●											Parsytec Inc.
		●																								●	●	●	Peritek Corporation
		●																					●						Philips Semiconductors-Signetics
														●									●						Photron Limited
																													Pinnacle Systems, Inc.
																													Pioneer Communications of America, Inc.
	●											●																	Pixar
											●																		PIXEL Magazine/PIXEL VISION
		●		●				●																●					Pixsys Inc.

		Animation	Artificial Intelligence	Business and Financial Graphics	CAD/CAM/CAE/CIM/Robotics	Collaborative Products	Computer-Video Interfacing	Consulting	Data Analysis Software	Desktop Publishing	Digitizing Cameras and Scanners	Electronic Publishing Software/Systems	Encoders/Decoders	Graphic Art Systems	Graphic Design Systems	Graphics Accelerator Boards	Graphics Standards Software	Hardcopy Devices; Photographs/Slides	Hardcopy Devices; Printers/Plotters	HDTV	High Performance Graphics Processors	High Resolution Graphic Display Systems	Image Processing	Input Devices; Digitizers, Light Pens, Mice	Low Cost Graphics Systems	Mapping and Cartography	Medical Imaging Software	Molecular Modeling Software	Monitors and Displays
144	Plustek USA, Inc.																												
1146	Polhemus				●																			●					
143	Post Magazine																												
559	PRE-																												
120	Prentice Hall																												
140	Presentation Products Magazine																												
966	Primary Image, Inc.*																												
349	PRIOR Data Sciences Product Sales Inc.																●												
147	Programs Plus and Video	●														●									●				
135	Publications and Communications									●																			
	Q R																												
122	QMS, Inc.																	●											
2322	Quarterdeck Office Systems																												
430	Rainbow Technologies																												
2317	Raytheon Company Submarine Signal Division																	●				●							
346	RCM Data Corporation																												
145	Redlake Corporation						●																						
1754	ReproCAD, Inc.			●																			●						
758	RFX, Inc.	●																					●						
2336	RGB Spectrum						●																						
1556	Roche Image Analysis Systems, Inc.*																												
2215	Ron Scott, Inc.																						●						
351	RunTime Technologies*																												
	S																												
2136	Sampo Corporation of America				●					●												●			●				●
1456	San Diego Supercomputer Center							●																					
2415	Santos Technology Inc.									●	●			●	●								●						
1167	Science Accessories Corporation																							●					
119	Scientific Computing & Automation Magazine																												
1519	Seiko Instruments USA, Inc.			●	●					●	●								●										●
1565	Sharp Electronics Corporation									●									●										
510	Shima Seiki U.S.A., Inc.													●	●					●									
756	SHOgraphics															●					●								●
SHOW	Showcase																												
207	Side Effects Software Inc.	●																											
REG	SIGGRAPH 93*																												
REG	SIGGRAPH Education Committee*																												
REG	SIGGRAPH Last Chance Booth*																												
REG	SIGGRAPH Local Groups*																												
REG	SIGGRAPH Video Review*																												
139	SIGMA Electronics, Inc.						●						●							●									
915	Silicon Graphics Computer Systems																●						●						
1441	Sixty Eight Thousand Inc.	●								●				●	●	●					●	●	●						
515	SOFTIMAGE Inc.	●																											
1363	Software Security, Inc.																												
522	Sony Corporation	●					●												●			●							●
1369	Specular International	●			●									●	●														
1249	Springer-Verlag New York, Inc.	●	●		●																		●						
558	Star Case Manufacturing Company, Inc.																												
1344	StereoGraphics Corporation				●		●								●							●							●
334	Strata Inc.	●								●				●	●														
1322	Sun Microsystems, Inc.				●	●	●			●	●	●				●	●		●	●	●		●		●		●	●	
1633	Supercomputing '92*																												
239	Supercomputing Review																												
933	Symbolics, Inc.	●	●			●								●	●	●				●	●						●		

Multimedia/Hypermedia	Networking; Hardware/Software/Services	OEM Components	Paint Systems	PC Add-on Products	PC-Based Systems	Personal Computer Graphics Cards	Portable Products	Productivity Products	Projectors; HDTV	Projectors; Video	Publications	Rendering and Image Synthesis Software	Research Systems	Scanners; Scan Converters	Scientific Visualization Software	Software (other)	Storage Devices; Tape/Disk	Supercomputers	Systems Integrators	Telecommunications and Networking	terminals	Turnkey Systems	Video Technology	Virtual Reality	Visual Arts	Windowing Systems	Workstations	Workstations; High Performance	
●														●														●	Plustek USA, Inc.
											●																		Polhemus
											●																		Post Magazine
											●																		PRE-
											●																		Prentice Hall
																													Presentation Products Magazine
																													Primary Image, Inc.
																													PRIOR Data Sciences Product Sales Inc.
																													Programs Plus and Video
																													Publications and Communications
																													Q R
																													QMS, Inc.
	●			●				●								●										●			Quarterdeck Office Systems
																													Rainbow Technologies
		●																											Raytheon Company Submarine Signal Division
																													RCM Data Corporation
●				●																			●						Redlake Corporation
																						●							ReproCAD, Inc.
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																													Roche Image Analysis Systems, Inc.
																●													Ron Scott, Inc
																													RunTime Technologies
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																													Sampo Corporation of America
															●			●											San Diego Supercomputer Center
														●															Santos Technology Inc.
											●																		Science Accessories Corporation
																													Scientific Computing & Automation Magazine
																													Seiko Instruments USA, Inc.
														●			●												Sharp Electronics Corporation
			●																			●						●	Shima Seiki U.S.A., Inc.
																					●								SHOgraphics
																													Showcase
			●									●			●							●			●				Side Effects Software Inc.
																													SIGGRAPH 93
																													SIGGRAPH Education Committee
																													SIGGRAPH Last Chance Booth
																													SIGGRAPH Local Groups
																													SIGGRAPH Video Review
																													SIGMA Electronics, Inc.
●															●								●			●	●	●	Silicon Graphics Computer Systems
	●	●																●								●	●		Sixty Eight Thousand Inc.
												●										●			●				SOFTIMAGE Inc.
	●															●													Software Security, Inc.
																							●						Sony Corporation
●												●					●								●				Specular International
											●									●									Springer-Verlag New York, Inc.
										●																			Star Case Manufacturing Company, Inc.
				●																			●	●					StereoGraphics Corporation
●												●												●	●				Strata Inc.
●	●												●		●									●		●	●	●	Sun Microsystems, Inc.
																													Supercomputing 92
											●																		Supercomputing Review
			●									●										●							Symbolics, Inc.

		Animation	Artificial Intelligence	Business and Financial Graphics	CAD/CAM/CAE/CIM/Robotics	Collaborative Products	Computer-Video Interfacing	Consulting	Data Analysis Software	Desktop Publishing	Digitizing Cameras and Scanners	Electronic Publishing Software/Systems	Encoders/Decoders	Graphic Art Systems	Graphic Design Systems	Graphics Accelerator Boards	Graphics Standards Software	Hardcopy Devices; Photographs/Slides	Hardcopy Devices; Printers/Plotters	HDTV	High Performance Graphics Processors	High Resolution Graphic Display Systems	Image Processing	Input Devices; Digitizers, Light Pens, Mice	Low Cost Graphics Systems	Mapping and Cartography	Medical Imaging Software	Molecular Modeling Software	Monitors and Displays	
	T																													
2426	**TaraVisual Corporation**	●		●					●														●				●			
307	**Tech Images International**																													
1736	**Tech-Source, Inc.**															●									●					
2435	**Techexport, Inc.**	●			●						●			●		●								●						
1336	**Tektronix, Inc.**						●			●									●	●			●	●					●		
1422	**Texas Memory Systems, Inc.**																			●				●							
2329	**Thomson Digital Image**	●													●																
1265	**Time Arts, Inc.**													●									●							
326	**Trident Microsystems, Inc.**						●									●					●	●			●					
2217	**Trix Company, Ltd.**																													
1139	**Truevision Inc.**	●					●		●	●			●	●	●	●	●				●	●	●		●	●	●			
	U																													
1356	**University of Illinois/NCSA***																													
1269	**UNIX Review Magazine**																													
2429	**UNIXWorld Magazine**																													
	V																													
1358	**Vertigo Technology Inc.**	●					●			●				●	●								●		●		●			
124	**Video Systems Magazine**																													
446	**VideoLogic, Inc.**															●					●	●								
129	**Videomedia, Inc.**	●					●													●										
1539	**VIDI**																													
1558	**Viewpoint Animation Engineering**	●		●	●					●				●	●		●							●	●	●	●			
1367	**Will Vinton's Playmation**	●																												
1670	**Virtual Reality Group**																					●								
1458	**Visionetics International Corporation**	●		●			●														●		●							
1929	**Visual Software**			●	●					●		●		●	●															
1737	**Vivid Group**	●		●			●				●													●						
118	**Volumetric Imaging, Inc.**	●			●										●					●		●	●				●	●	●	
142	**VREAM, Inc.**																													
	W																													
2122	**Wacom Technology Corporation**																							●						
537	**Wasatch Computer Technology, Inc.***																													
944	**Wavefront Technologies, Inc.**	●					●		●					●	●															
553	**Wavetracer, Inc.**																				●		●				●	●		
1362	**John Wiley and Sons, Inc.**																													
536	**Winsted Corporation***																													
649	**Wolfram Research, Inc.**								●																					
	X Y Z																													
2326	**XAOS Tools Inc.**	●					●			●				●	●								●		●					
763	**Xceed technology**				●											●					●	●			●				●	
1529	**Yamashita Engineering Manufacture, Inc.**	●					●						●							●			●							
1056	**Yarc Systems Corporation**	●			●	●										●					●		●				●			

REG **Registration Area**
SHOW **Showcase**
* **Categories not available at press time.**

Multimedia/Hypermedia	Networking; Hardware/Software/Services	OEM Components	Paint Systems	PC Add-on Products	PC-Based Systems	Personal Computer Graphics Cards	Portable Products	Productivity Products	Projectors; HDTV	Projectors; Video	Publications	Rendering and Image Synthesis Software	Research Systems	Scanners; Scan Converters	Scientific Visualization Software	Software (other)	Storage Devices; Tape/Disk	Supercomputers	Systems Integrators	Telecommunications and Networking	terminals	Turnkey Systems	Video Technology	Virtual Reality	Visual Arts	Windowing Systems	Workstations	Workstations; High Performance	
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																														Wacom Technology Corporation
																														Wasatch Computer Technology, Inc.
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													●		●															Wavetracer, Inc.
											●																			John Wiley and Sons, Inc.
																														Winsted Corporation
															●	●								●						Wolfram Research, Inc.
																														X Y Z
●			●									●											●		●					XAOS Tools Inc.
		●		●		●																	●			●				Xcead technology
									●	●				●									●							Yamashita Engineering Manufacture, Inc.
		●		●		●						●			●			●						●						Yarc Systems Corporation

Miscellaneous

- ADA Software

1636 Advanced Technology Center

- AEC

2339 Alias Research Inc.

- Amiga Animation

147 Programs Plus & Video

- Bus-to-Bus Adaptors

1654 Bit 3 Computer Corporation

- CAD Industrial and Apparel Design Software

315 Computer Design, Inc.

- CEL Automation

1544 AXA Corporation

- Color Correction System; Separation Halftone System

2334 FSI (F and S, Inc.)

- Conferences and Exhibitions

308 Eurographics
339 IEEE Visualization '92
121 Imagina -INA
347 National Computer Graphics Association
327 Nippon Computer Graphics Association
866 NPES-The Association for Suppliers of Printing and Publishing Technologies
1633 Supercomputing '92

- CRT Testing/Tubes

2431 Minolta Corporation
313 Panasonic Industrial Company

- Data Acquisition; Solid State Disk

1422 Texas Memory Systems, Inc.

- Data/Image Compression; Graphic File Format Conversion

667 LEAD Technologies, Inc.

- Dataware; 3D Objects (Datasets)

1558 Viewpoint Animation Engineering

- Desktop Video Production Software

1915 AT&T Graphics Software Labs

- Desktop Video Production; Programmable Video Sub-System

337 Intelligent Resources Integrated Systems, Inc.

- Digital Disk Recorders

1515 ABEKAS

- DSP I.C.s; DSP Development Tools

429 Motorola Inc.

- Education

308 Eurographics

- Education/Training; Computational Science

1456 San Diego Supercomputer Center

- Electronic Imaging

749 FOR.A Corporation of America

- Fiber Optic Video Link; RGB Video Transport System

1770 Lightwave Communciations, Inc.

- Film Recorder Cameras

954 Double M Industries

- Furniture

536 Winsted Corporation

- Geology; Petroleum

236 Geobyte Magazine

- GIS; Film Recorders

1926 Management Graphics, Inc.

- GUI

1715 Hewlett-Packard Company

- Hardware/RAM Memory

1523 Helios Systems

- High Performance Mass Storage Systems

953 Maximum Strategy, Inc.

- High Performance Processors

1316 Digital Equipment Corporation

- Image Generators; Computer Aided Industrial Design

1729 Evans & Sutherland

- Industrial/Package Design; Photorealistic 3D Modeling

2332 Byte by Byte Corporation

- International Professional Association for the Communications Industry

663 International Interactive Communications Society

- Industrial and Architectural Visualization

2329 Thomson Digital Image

- Integrated Circuits

1561 Philips Semiconductors-Signetics

- Job Search Services; Resume Exchange and Matching

105 Business People Inc.

- Landscape Design and Rendering; Plant Growth Simulation and Visualization

2417 CIRAD

- Mathematical and/or Statistical Software

436 IMSL
649 Wolfram Research, Inc.

- Medical Instrumentation

2234 Ascension Technology Corporation

- Memory Products

761 Enhance Memory Products, Inc.

- Morphing

1369 Specular International

- Multitasking Software

2322 Quarterdeck Office Systems

- Optical Radar; Head Tracking Systems

345 Origin Instruments Corporation

- Pin Registered Plastic Slide Mounting Machines

1569 Kaiser Corporation

- PC Simulation/Games

149 Northwestern University/Evanston Research Park

- Pre-Press and Printing Technology

1246 Midwest Litho Arts

- RAMCADs

1939 Brooktree Corporation

- Real-Time Digital Disk Recorder

141 Accom, Inc.

- Reusable Shipping/Carrying Cases; Custom Packaging

558 Star Case Manufacturing Company, Inc.

- Reusable Software

633 Integrated Computer Solutions, Inc. (ICS)

- Scientific Visualization Production

1753 Intelligent Light

- Software Protection Device; Security

430 Rainbow Technologies
1363 Software Security, Inc.

- Shape Manipulation in Real Time

1834 Microtime, Inc.

- Stereo Viewing Hardware for Workstations and Video

1344 StereoGraphics Corporation

- TBC/Frame Synchronizer

765 Hotronic, Inc.

- Teleconferencing

661 Image Manipulation Systems

- 3D Modeling Software

666 autodessys, Inc.
936 ElectroGIG USA

- 3D Scientific Visualization; 3D Sound

1061 Division

- Video Editing; Title Generator

2115 Digital F/X

- TIP (Transputer Image Processing); Perspective View Generator Simulator

1067 Parsytec Inc.

- Transcoders RBG to Component; Switcher for Graphics Systems

139 Sigma Electronics, Inc.

- True 3D Imaging Systems; True Volume Imaging Systems

118 Volumetric Imaging, Inc.

- Unified Graphics Systems–Combined Paint, 2D and 3D Software

933 Symbolics, Inc.

- User Interface Systems; Picture Databases

1829 Fraunhofer Computer Graphics Research Group

- VCRs; Computer Controllable

320 Mitsubishi-Professional Electronics

- Video Controllers; Desktop Video Production

1549 Diaquest Inc.

- Video Editing Systems

1340 Avid Technology, Inc.

- Videographics Board; Compressed Digital Video

1144 Parallax Graphics, Inc.

- Video Test and Measurement Products

958 Extron Electronics

- Visualization

1531 ModaCAD

- Work at Home Products and Services

1637 Ameritech

- X Terminals running PEX

961 Network Computing Devices, Inc.

Exhibitor Relocations

Accom Inc.
New Booth No. - 1632

ISTR, Inc.
New Booth No. - 2135

Northwestern University/Evanston Research Park
New Booth No. - 2133

Plustek USA, Inc.
New Booth No. - 110

Post Magazine/Testa Communications
New Booth No. - 340

Presentation Products Magazine
New Booth No. - 2034

Programs Plus and Video
New Booth No. - 133

Redlake Corporation
New Booth No. - 446

RFX, Inc.
New Booth No. - 1733

SIGMA Electronics, Inc.
New Booth No. - 2033

VideoLogic, Inc.
New Booth No. - 545

VREAM, Inc.
New Booth No. - 2035

New Exhibitors Not Listed in the Final Program

2423
Digital Photographic Imaging, Inc.
1021 Hall Street S.E.
Grand Rapids, MI 49507
(616) 243-3325
(616) 243-0962 fax
David Jackson

767
Glenco Engineering
270 Lexington Drive
Buffalo Grove, IL 60089
(708) 808-0300
(708) 808-0313 fax
Laura Waas
Marketing

1444
GW Hannaway & Associates, Inc.
839 Pearl Street
Boulder, CO 80302
(303) 440-9631
(303) 440-4421 fax
Wyndham Hannaway
President

1267
Nutek Inc.
3182 MacArthur Blvd.
Northbrook, IL 60062
(708) 564-3070
(708) 564-7725 fax
Barry Ades
Vice President, Sales

1634
School of Communication Arts
2526 27th Avenue South
Minneapolis, MN 55406
(612) 721-5357
(612) 942-5560 fax
Roger Klietz
President

1635
Spyglass, Inc.
701 Devonshire Drive
Champaign, IL 61820
(217) 355-6000
(217) 355-8925 fax
Roberta Hewerdine
Marketing Coordinator

344
Texnai Inc.
No. 1008 2-1, Udagawa-cho,
Shibya-ku
Tokyo 150
Japan
(81) 33-464-6927
(81) 33-476-2372 fax
Norie Hiraide
General Manager

1065
Viewgraphics Inc.
1185 Terra Bella Avenue
Mountain View, CA 94043
(415) 903-4900
(415) 969-6388 fax
John Krooss
President

Often, the best presentations of products and services at SIGGRAPH require a team effort between our exhibitors and their third-party vendors. To assist you in locating third-party vendors on the exhibit floor, please refer to this directory. Look for their products and services in the booths listed below.

Third-Party Vendor	Exhibiting With	Booth Number
Nascent Systems Development Inc. 158 East Carmel Valley Road Carmel Valley, CA 93924 (408) 659-0432 (408) 384-2702 fax Wolfgang Baer President	**Parsytec Inc.**	1067
North Central Peripherals Corporation 10640 Lyndale Avenue South Bloomington, MN 55420 (612) 881-2302 (612) 881-0357 fax Glen Nickell Sales	**Kingston Technology Corporation**	1426
Passport Designs, Inc. 100 Stone Pine Road Half Moon Bay, CA 94019 (415) 726-0280 (415) 726-2254 fax Anastasia Lanier Vice President, Communications	**Apple Computer, Inc.**	1722
Set Technology Corporation 6595 Odell Place, Suite G Boulder, CO 80301 (303) 530-4009 (303) 530-2808 fax kevin@settech.com Kevin P. Meagher Vice President of Marketing	**Advanced Visual Systems Inc.** **International AVS Center**	1739 1761
Torque Systems, Inc. 700 High Street Palo Alto, CA 94301 (415) 321-1200 (415) 321-1298 fax Torque@world.std.com Scott Rafer Director of Marketing	**Pixar** **Sixty Eight Thousand Inc.** **Strata Inc.**	1244 1441 334
The VALIS Group P.O. Box 422 Point Richmond, CA 94807-0422 (510) 236-4124 (510) 236-0388 fax kolo@pixar.com Bill Kolomyjec Senior Partner	**Pixar**	1244

SIGGRAPH 93

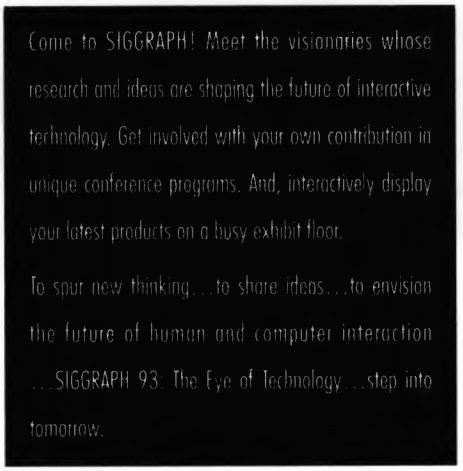
SIGGRAPH'S STATURE as a leading-edge, high-technology conference offers a program that leaves participants filled with ideas and innovation that can open doors for new growth and development back in our own worlds.

BE A PART OF THE VISION

SIGGRAPH 93! Welcome to a celebration of two decades of exciting innovations as the ACM's Special Interest Group on Computer Graphics (SIGGRAPH) holds its 20th Annual International Conference on Computer Graphics and Interactive Techniques. This year's theme, The Eye of Technology, represents SIGGRAPH's unique position at the global center of emerging visual technologies in such diverse fields as medicine, weather, graphic design, fine art, engineering, and many others.

For 20 years SIGGRAPH has served as a catalyst, creating fast-paced industry momentum. Researchers push to complete papers in time for SIGGRAPH, companies to introduce products, animators to complete films, artists to finish pieces–all to unveil at the next SIGGRAPH. This intense level of participation creates an environment rich with stimulating discoveries and promotes interaction between vastly different fields of interest.

SIGGRAPH's commitment to providing the forum for discovery and interaction is the reason nearly 30,000 people are expected at the Anaheim Convention



Center in Southern California for SIGGRAPH 93. Scientists, artists, designers, business people, researchers, and many others will travel from all parts of the world to share, show, and learn about the latest innovations in visual processing.

SIGGRAPH 93 transforms into a global village, offering a variety of ongoing conference programs as well as an exhibition with over 250 designers and manufacturers of hardware and software products and services. When you enter SIGGRAPH 93, you will emerge onto the main street of a global village which houses special spaces created to meet and exchange ideas with others, a dynamic exhibit neighborhood, electronic resource centers, and exciting conference programs designed to showcase the state of the art in computer graphics.

Conference
1 to 6 August 1993
Exhibition
3 to 5 August 1993
Anaheim Convention Center
Anaheim, California

In keeping with The Eye of Technology theme, SIGGRAPH 93 will have a special focus on the human side of technology: proposals for conference programs are encouraged to explore the cultural, social, and political implications of computer graphics-related developments and technologies.

Papers

Learn about new ideas as they become the basis for future applications. Leaders from academia and industry present unpublished research and scholarly papers concerning the latest, far-reaching ideas in computer graphics and interactive techniques.

Machine Culture: The Virtual Frontier

This new, specially curated exhibition opens at SIGGRAPH 93 and will present artworks which explore contemporary cultural issues. Machine culture takes art and media technology beyond static, 2D works by featuring only interactive and virtual media pieces.

Tomorrow's Realities

This specially designed, non-traditional gallery demonstrates the latest in new and emerging technologies, including virtual reality and hypermedia. Participants enter alternate space realities and explore displays that feature applications of these advanced techniques.

Exhibition

SIGGRAPH's bustling exhibit floor is charged with excitement as each year companies rush to debut their newest products to the mover and shaker crowd of SIGGRAPH attendees. Companies representing a broad spectrum of cutting edge visual technologies gather at the SIGGRAPH exhibition marketplace.

Panels

Join colleagues for lively exchanges and provocative discussions which offer insight and understanding within the computer graphics industry. Conference attendees participate as an interactive audience by posing questions and offering viewpoints to be discussed by the panels.

Designing Technology

SIGGRAPH's inaugural designing technology program features works which focus on the influence of design in the development of technology. This exciting new exhibition highlights the process of collaborative work in engineering, art, architecture, and design.

Special Interest Groups

A SIGGRAPH tradition, special interest group meetings are an opportunity for individuals with similar interests to meet in informal gatherings. These meetings are a great way to gather with people who share your interests—there is no cost, and anyone may reserve a meeting space.

Courses

Experts lead your investigation into the world of computer graphics. Whether you want the basics or to explore the next generation, SIGGRAPH courses offer intensive instruction on a myriad of technical subjects.

Electronic Theater

Experience computer graphics on the big screen with highlights of this year's film and video as well as other exciting new media. The program pieces demonstrate inventive uses of computer graphics in performance, animation, and interactive techniques. Share the excitement of one of SIGGRAPH's dramatic special events.

Student Volunteers

SIGGRAPH calls on students from around the world and from any academic field to participate behind the scenes in making the conference a success. "Fun, hard work, and lasting friendships" sum up the experience of the student volunteer.

Eye on Southern California

After touring SIGGRAPH's global village, allow time to unwind at the famous attractions of Southern California. From the Golden State's renowned sandy beaches to Hollywood, the world's entertainment capital, SIGGRAPH 93 puts you into the eye of some of America's most popular visitor destinations. Variety defines the California lifestyle where family attractions, multicultural experiences, active night life, international cuisine, and recreational fun abounds ■

Be a Part of the Vision

SIGGRAPH 93 offers unique opportunities for you to participate in the conference. Join in and present your ideas and projects, or work as a student volunteer, or arrange a special interest group meeting. The 1993 *Call for Participation* explains how you can become involved. To receive a copy of the *Call for Participation*, please contact the conference management office listed below.

Registration materials will be available in April 1993 in the *SIGGRAPH 93 Advance Program*, also available from the conference management office. Remember to register early, as substantial discounts apply to registrations received by 25 June 1993. On-site registration at the Anaheim Convention Center begins Sunday, 1 August 1993.

For conference information, please contact:

SIGGRAPH 93 Conference Management
Smith, Bucklin & Associates, Inc.
401 North Michigan Avenue
Chicago, IL 60611 USA

(312) 321-6830
(312) 321-6876 fax
info93@siggraph.org

For information about exhibition space, please contact:

SIGGRAPH 93 Exhibition Management
Hall-Erickson, Inc.
150 Burlington Avenue
Clarendon Hills, IL 60514 USA

(708) 850-7779
(708) 850-7843 fax
exhibits93@siggraph.org

SIGGRAPH 93 Committee Members

Co-Chair
Robert L. Judd
Los Alamos National Laboratory

Co-Chair
Mark Resch
CRSS Architects, Inc.

Conference Coordinator
Molly Morgan Kuhns

Deputy Conference Coordinator
Debbie Buuck

Strategic Planning
Branko J. Gerovac
MIT Media Lab/Digital Equipment Corporation

Papers
James T. Kajiya
California Institute of Technology

Panels
Donna J. Cox
NCSA

Courses
Rich Ehlers
Evans and Sutherland

Designing Technology
Alyce Kaprow
The New Studio

Electronic Theater
Jamie Thompson
TIVOLI Systems, Inc.

Machine Culture
Simon Penny
University of Florida

Tomorrow"s Realities
Garry Beirne
University of Toronto

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Marketing
Carolyn Williams
Williams/Keeler, Inc.

Operations
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GeoQuest Systems, Inc.

Computer Operations
David R. Nadeau
San Diego Supercomputer Center

Materials Operations
James M. Kuhns
City of San Diego

Registration Operations
Jeff Jortner
Sandia National Laboratories

Speaker Materials Operations
Mark Leon
Forward Edge Technologies

Special Interest Group Operations
Phillip Getto
Rasna Corporation

Student Volunteer Operations
Lyn Bartram
Simon Fraser University

SIGGRAPH Director for Conferences
Adele Newton
Alias Research, Inc.

ACM SIGGRAPH Program Director
Lois A. Blankstein

Accounting
Smith, Bucklin & Associates, Inc.

Audio/Visual Support
Audio Visual Headquarters Corporation

Communications
Pacific Visions Communications

Conference Management
Smith, Bucklin & Associates, Inc.

Copy Coordination
Smith, Bucklin & Associates, Inc.

Exhibition Management
Hall-Erickson, Inc.

Graphic Design
Mo Viele

Graphic Design/Editing
Ann Redelfs

Organization Development Consultant
Jeanette Overgard

Service Contractor
Andrews-Bartlett Exposition Services

Travel Agent
ATI Travel Management, Inc.

English is the official language of the conference.

ACKNOWLEDGMENTS

AND SPECIAL
THANKS . . . we wish to thank all participants—attendees and contributors—for being part of SIGGRAPH '92.

OFFICE OF THE MAYOR

PROCLAMATION

CITY OF CHICAGO

WHEREAS, the Association for Computing Machinery's Special Interest Group on Computer Graphics (ACM SIGGRAPH) is holding its 19th Annual International Conference on Computer Graphics and Interactive Techniques, SIGGRAPH '92, at McCormick Place in Chicago; and

WHEREAS, approximately 25,000 individuals in the computer graphics industry from the United States, Europe and the Pacific Rim will participate in SIGGRAPH '92 during the week of July 26-31, 1992; and

WHEREAS, SIGGRAPH '92 is a forum for computer graphics education and is offering technical paper and panel presentations; 27 educational courses; 225 industry exhibitors; showcase, high-performance computing and communications demonstrations; electronic theater; art show; G-Tech, interactive stand-alone, research works in progress; HDTV and virtual reality demonstrations; and SIGKids, a learning lab for junior and senior high school students; and

WHEREAS, in 1991, the computer graphics industry grossed $37 billion, and with computer graphics being used to advance science, technology, medicine and countless other industries throughout the world, it is estimated that the computer graphics industry will increase to $65.4 billion by 1996; and

WHEREAS, computer graphics professionals are to be commended for their innovative and highly technical work, which enhances research and development activities, and has increased industry productivity and competitiveness throughout the world; and

WHEREAS, Chicago has the second largest concentration of Fortune 500 firms and the second largest concentration of multiuser computer systems in the country, accounting for 15 percent of the computers in the top 10 U.S. cities; and

NOW, THEREFORE, I, RICHARD M. DALEY, MAYOR OF THE CITY OF CHICAGO, do hereby proclaim July 26–31, 1992, to be COMPUTER GRAPHICS WEEK, and urge all citizens to recognize the tremendous influence the computer graphics industry has had on business and education worldwide.

Dated this 10th day of June, 1992

Richard M Daley

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