

SIGGRAPH 93

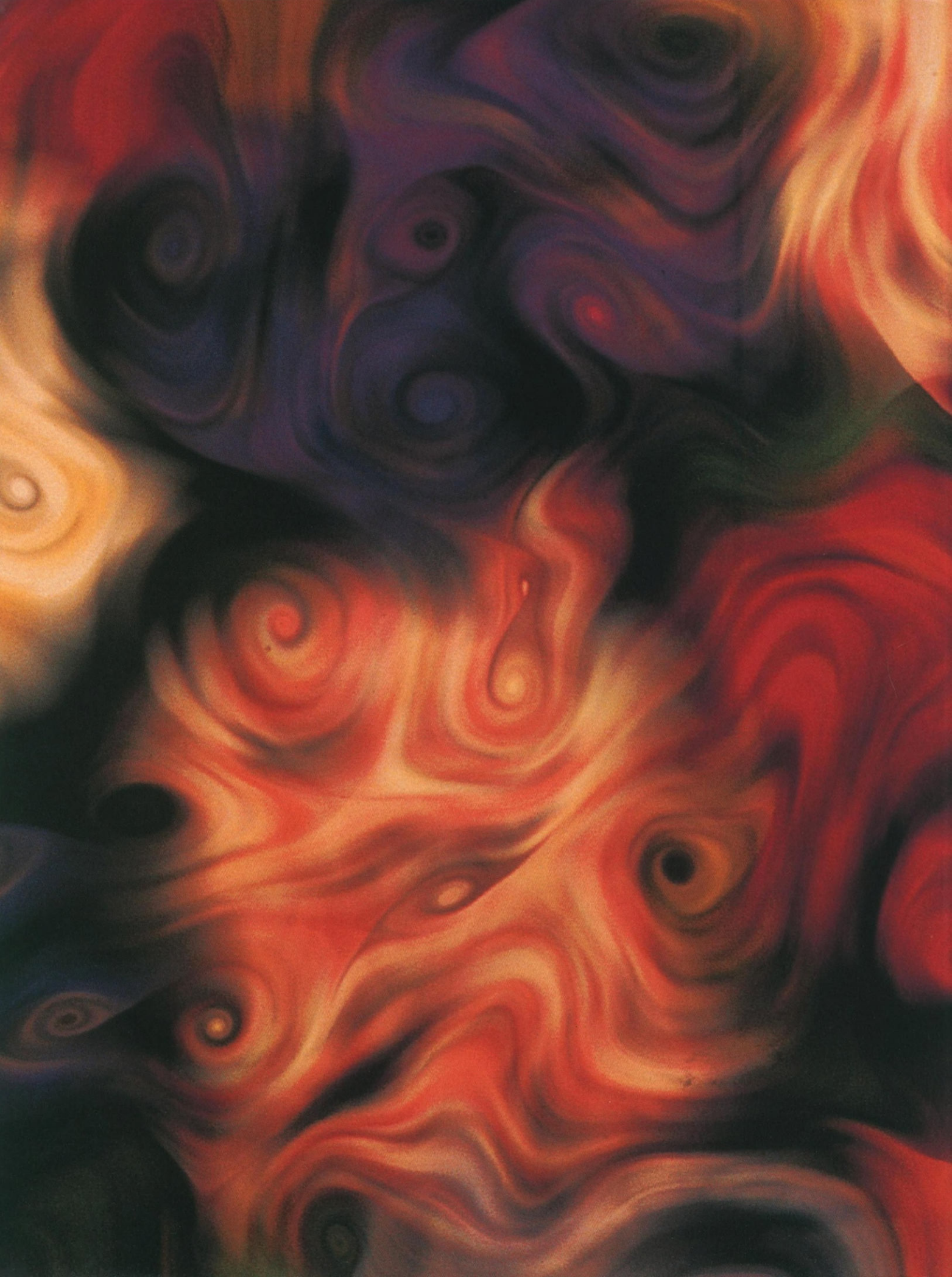
CONFERENCE 1 TO 6 AUGUST 1993



EXHIBITION 3 TO 5 AUGUST 1993

FINAL PROGRAM
Introducing Multimedia 93

ANAHEIM, CALIFORNIA



SIGGRAPH 93

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WELCOME!

WELCOME TO SIGGRAPH 93! ○ IMAGES HAVE ALWAYS BEEN A SIGNIFICANT COMPONENT OF SOCIETY, AND TECHNOLOGICAL DEVELOPMENTS THROUGHOUT HISTORY HAVE CONTINUALLY MATURED THEIR FORM. DURING THE LAST 20 YEARS IN PARTICULAR, COMPUTER GRAPHIC TECHNOLOGIES HAVE CATAPULTED US INTO A NEW AGE, AND TODAY, TECHNICAL MEDIA ALMOST COMPLETELY DETERMINE OUR VISUAL ENVIRONMENT. SIGGRAPH HAS PIONEERED THE EFFORT TO BRING ALL OF THESE IMAGES TOGETHER UNDER ONE ROOF AND IS THE FORUM IN WHICH WE CAN INVESTIGATE THEIR IMPACT ON THE WORLD. ○

TO CELEBRATE SIGGRAPH'S 20TH ANNIVERSARY AT THE GLOBAL CENTER OF EMERGING VISUAL TECHNOLOGIES AND TO COMMUNICATE THE NICHE THAT SIGGRAPH OCCUPIES IN A SOCIETY FILLED WITH EXTRAORDINARY ADVANCEMENTS, THIS YEAR'S THEME IS "THE EYE OF TECHNOLOGY." WITH THE DEBUT OF ACM'S MULTIMEDIA CONFERENCE, CO-LOCATED WITH

SIGGRAPH 93, WE MIGHT ALSO CALL THE EVENT "THE EARS AND NEURAL SYSTEM OF TECHNOLOGY." TOGETHER, SIGGRAPH 93 AND MULTIMEDIA 93 WILL PROVIDE ATTENDEES WITH AN EXTRAORDINARY OPPORTUNITY TO EXPERIENCE STATE-OF-THE-ART ADVANCEMENTS IN COMPUTER GRAPHICS, MULTIMEDIA, AND INTER-

ACTIVITY—ON WHICH WE HAVE PLACED A SPECIAL EMPHASIS THIS YEAR. ○ AT THE HEART OF BOTH SIGGRAPH 93 AND MULTIMEDIA 93, THERE IS ONE UNITING ELEMENT: PEOPLE. YOU MIGHT BE SITTING NEXT TO AN INVESTMENT BANKER, A BIO-ENGINEER WORKING AS A LEGAL EXPERT, AN ACADEMY AWARD-WINNING ANIMATOR, AN OLD FRIEND, AN 18-YEAR-OLD

CEO, OR AN ARTIST FROM PALO ALTO, HELSINKI, OR KOBE. PRODUCTIVE INTERACTION WITH OTHERS IS THE PRIMARY REASON MANY ATTEND SIGGRAPH AND KEEP RETURNING YEAR AFTER YEAR. ○ CONFERENCE PROGRAMS PRESENT A SERIOUS AND SIGNIFICANT LOOK AT THE LEADING EDGE OF VISUAL AND INTERACTIVE WORK. THE PRESENTATIONS GO WELL BEYOND THE APPLICATION OF TRADITIONAL TECHNIQUES TO NEW MEDIA; RATHER, THEY EXPLORE WHAT IS POSSIBLE. IN ADDITION, THEY ASK IMPORTANT QUESTIONS ABOUT THE ROLE OF TECHNOLOGY AND COMPUTING IN A RAPIDLY EVOLVING SOCIETY. ○ THROUGH IMAGINATION AND DESIRE, THE INTERNATIONAL SIGGRAPH COMMUNITY INVENTED COMPUTER GRAPHICS, AND OUR CULTURE HAS CHANGED. THIS CHANGE, CAUSED BY OUR OWN HANDS AND MINDS, AFFECTS ALL OF US. LET US CELEBRATE OUR ACHIEVEMENTS, AND TOGETHER IMAGINE AND CREATE OUR FUTURE. ○

THE EYE



TECHNOLOGY

ROBERT L. JUDD

Conference Co-chair

MARK RESCH

Conference Co-chair

CELEBRATE 20 YEARS OF REVOLUTION

SIGGRAPH 93 CELEBRATES TWO DECADES AT THE GLOBAL CENTER OF EMERGING VISUAL TECHNOLOGIES WITH AN EXCITING LINE-UP OF EVENTS. IN ADDITION TO COURSES, TECHNICAL PAPER PRESENTATIONS, ROUND-TABLE PANEL DISCUSSIONS, THE ELECTRONIC THEATER, TOMORROW'S REALITIES, AND THE EXHIBITION, SEVERAL NEW PROGRAMS PREMIERE. BE SURE TO EXPLORE IT ALL ON THE STREETS OF SIGGRAPH'S GLOBAL VILLAGE. WELCOME TO THE EYE OF TECHNOLOGY!

WHAT'S NEW IN 1993?

Multimedia 93

SIGGRAPH is excited to have the first international ACM conference on multimedia share the SIGGRAPH conference setting. Multimedia 93 addresses a wide range of topics on processing and communicating information in multiple media forms. In addition to the technical program, multimedia products and services are displayed throughout the exhibit floor.

Machine Culture: The Virtual Frontier

SIGGRAPH 93 features the debut of a curated, interactive art exhibit that combines artistic expression and machine technology. Machine culture artists present their work in 3D forms that poignantly address the theme of technology in culture.

Designing Technology

SIGGRAPH's inaugural designing technology program features works that explore the role of design in the development of technology. The program focuses on the collaborative process between designer and engineer, resulting in improved product functionality.

Behind the Scenes:

Computer Graphics in Film

In a special general session for anyone with a badge, see and hear the experts who create the spectacular visual effects that have reshaped Hollywood. Learn their secrets and discover how the images we see on the screen are created.

Child Care

SIGGRAPH 93 offers supervised care for children ages six months to 16 years at the Anaheim Hilton and Towers. KiddieCorp provides fun and interesting age-appropriate activities for your children. For more information, please go to the general information booth or, if you wish to see the facility, go to the mezzanine level of the Anaheim Hilton Hotel.

Expocards and Prize Drawing

SIGGRAPH 93 attendees will be given Expocards—scannable cards containing the attendee's name and address—for use in obtaining information from exhibitors. Attendees are urged to return their Expocard on their final departure from the conference. All returned Expocards will automatically be entered into a drawing for one of 14 electronic and other prizes valued at more than \$250 each. Winners will be contacted by 13 August 1993. A \$5 replacement fee will be charged for lost Expocards.

SIGGRAPH 93 Browsing Library

SIGGRAPH 93 offers a browsing library within the bookstore area that will have all course notes, proceedings, and other printed pieces available for review before purchase. The library was created in response to suggestions from past conference attendees.

Schedule Changes

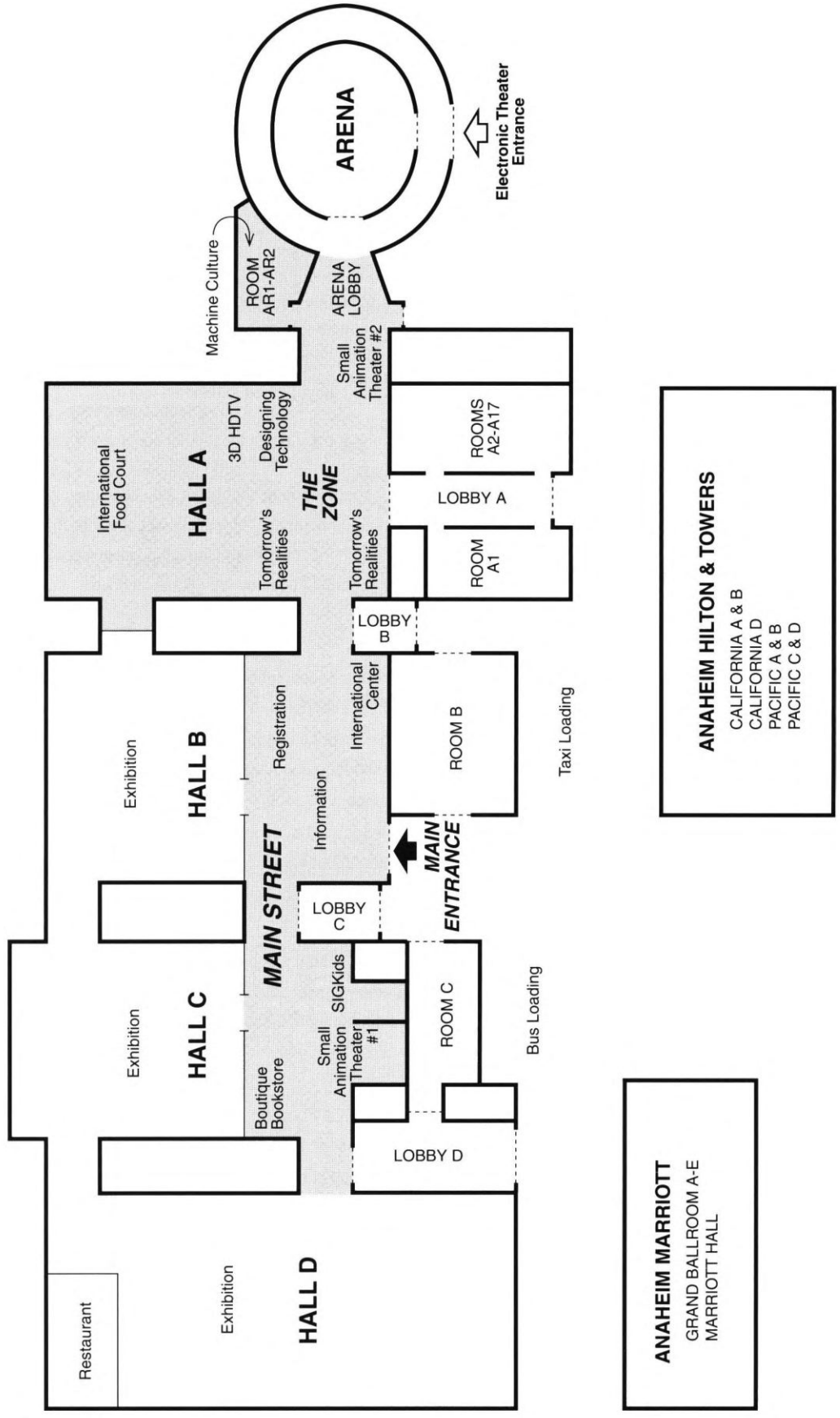
Registration is open on Saturday 6:00 pm–10:00 pm and on Sunday beginning at 7:30 am to accommodate those who wish to pick up their registration materials before the events begin on Sunday.

Courses are held Sunday through Thursday and papers/panels are held Tuesday through Friday.

The fundamentals seminar will be offered twice—on Sunday and Tuesday afternoons. There will be a welcome reception on Sunday evening, a SIGGRAPH 93 awards ceremony on Tuesday morning, and a Multimedia 93 keynote address on Wednesday morning.

CONFERENCE AT A GLANCE

	SAT July 31	SUN August 1	MON August 2	TUE August 3	WED August 4	THU August 5	FRI August 6
REGISTRATION/ MERCHANDISE HALL B	6 pm to 10 pm	7:30 am to 8 pm	7:30 am to 7 pm	7:30 am to 7 pm	8 am to 6 pm	8 am to 6 pm	9 am to 1 pm
Open Events For anyone with the following badges: Exhibits Plus Exhibitor Guest Exhibitor Badge Passport Courses SIGGRAPH Papers/panels Multimedia Papers/panels Multimedia Plus				10 am to 6 pm	10 am to 6 pm	10 am to 3:30 pm	
EXHIBITION HALLS B-D							
DESIGNING TECHNOLOGY HALL A		5 pm to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 1 pm
MACHINE CULTURE ROOM AR1 & AR2		5 pm to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 1 pm
TOMORROW'S REALITIES HALL A		5 pm to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 1 pm
SMALL ANIMATION THEATERS #1 & #2 HALL C AND HALL A		10 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 1 pm
SIGKIDS HALL C			9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 7 pm	9 am to 1 pm
FUNDAMENTALS SEMINAR PACIFIC A & B, HILTON		2 pm to 5 pm		2:30 pm to 5:30 pm			
AWARDS/KEYNOTE ARENA				8:30 am to 10 am SIGGRAPH Awards	10:15 am to 12 noon Multimedia Keynote		
WELCOME RECEPTION HALL A		5 pm to 7 pm					
BEHIND THE SCENES ARENA				12 noon to 1:30 pm	12 noon to 1:30 pm		
Registered Events These events require special registration (and the appropriate technical program badge) or tickets.							
COURSES (full- and half-day) SEE PAGES 28-49		8:30 am to 12 noon & 1:30 pm to 5 pm	8:30 am to 12 noon & 1:30 pm to 5 pm	8:30 am to 12 noon & 1:30 pm to 5 pm	8:30 am to 12 noon & 1:30 pm to 5 pm	8:30 am to 12 noon & 1:30 pm to 5 pm	
SIGGRAPH PAPERS/PANELS SEE PAGES 50-57				1:30 pm to 5 pm	8:30 am to 5 pm	8:30 am to 5 pm	8:30 am to 5 pm
MULTIMEDIA PAPERS/PANELS SEE PAGES 59-63					1:30 pm to 5 pm	8:30 am to 5 pm	8:30 am to 5 pm
RECEPTIONS			7 to 10 pm Courses KELLOGG MANSION			7 to 10 pm Papers/panels GRAND BALLROOM MARRIOTT	
ELECTRONIC THEATER ARENA				7:30 pm to 9:30 pm	7:30 pm to 9:30 pm	7:30 pm to 9:30 pm	



Conference Map

ANAHEIM MARRIOTT
 GRAND BALLROOM A-E
 MARRIOTT HALL

ANAHEIM HILTON & TOWERS
 CALIFORNIA A & B
 CALIFORNIA D
 PACIFIC A & B
 PACIFIC C & D

Behind the Scenes: Computer Graphics in Film—General Session

ARENA, CONVENTION CENTER

Tuesday & Wednesday
12 noon–1:30 pm

Come behind the scenes and see how extinct dinosaurs come alive for "Jurassic Park" and how other exciting effects are created for such films as "Batman Returns," "Toys," and "Cliffhanger." In an event for all attendees, top creators of computer-generated visual effects are brought together for an inside look at how the images that are changing Hollywood film-making are made.

These creative professionals will share their latest techniques for developing computer effects, show film and video from recent projects, and discuss how computer graphics are used in, and are radically changing, motion picture film production.

You'll have a great time and go away with a new appreciation for the wonders of digital technology and for the thousands of hours that go into the few, beautiful minutes of computer graphics in film.

The program begins with a special introduction from Douglas Kay, a pioneer in computer graphics effects at Industrial Light & Magic, followed by a 15-minute presentation from each company.

GENERAL SESSION ORGANIZER

Carolyn Williams

Williams/Keeler Inc.

SPECIAL INTRODUCTION

Douglas Kay

Senior Manager

Computer Graphics/Digital Department

Industrial Light & Magic

PRESENTING COMPANIES

Industrial Light & Magic

P.O. Box 2459
San Rafael, CA 94912

Mark Dippé
Visual Effects
Supervisor

Mark Dippé, the co-effects supervisor for Steven Spielberg's latest motion picture, "Jurassic Park," will take a look at how the computer-generated, full-motion dinosaurs were created using newly devised techniques. Film clips from "Jurassic Park" will be shown.

Pacific Data Images

650 North Bronson
#400W
Los Angeles, CA
90004

Jamie Dixon
Digital Effects
Supervisor

Techniques behind digital visual effects shots will be the focus of this presentation. Film and video demonstrations of breakthrough techniques will be selected from recent projects such as "Terminator 2," "Toys," and "Batman Returns."

Pixar

1001 W. Cutting Blvd.
Richmond, CA 94804

Ralph J. Guggenheim
Vice President &
General Manager,
Pixar Animation

Pixar Animation specializes in character animation using 3D computer graphics. This presentation includes a step-by-step description of the production of a recent project from storyboard through animation to the final product. Current projects and plans will also be shared.

Rhythm & Hues Studios

910 N. Sycamore Ave.
Hollywood, CA 90038

Pauline Ts'o
Vice President of
Development/
Technical Director

The multimedia revolution has impacted visual effects in commercials and films. The talents and techniques of the animator and the lighting specialist are key to blending multiple media elements into a single visual effects shot. Film and video clips will be shown.

Sony Pictures ImageWorks

Tri-Star Building
Room 372
10202 W. Washington
Blvd.

Culver City, CA 90232
Tim McGovern
Senior VP Creative &
Technical Affairs/
Visual Effects
Supervisor

In a presentation on how computer graphics are improving motion picture production, Sony Pictures will discuss and show examples of: pre-visualizing scenes and effects; assisting production during shooting; generating characters, effects, props, sets, or whole shots; and producing clean film composites through digital post production.

Video Image Associates

5333 McConnell Ave.
Los Angeles, CA
90066

Richard Hollander
Vice President

Video Image will present the making of a visual effects shot specially produced for SIGGRAPH, using the latest digital techniques created for "Batman Returns" and other film projects.

Fundamentals Seminar

FUNDAMENTALS SEMINAR

PACIFIC A & B, HILTON

Sunday 2:00–5:00 pm, Tuesday 2:30–5:30 pm

THE TERMINOLOGY OF COMPUTER GRAPHICS

The language spoken at SIGGRAPH can seem foreign 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 non-technical as possible. The speakers relate the terms to examples and presentations seen at SIGGRAPH. All attendees and exhibitors are encouraged to attend.

SEMINAR CHAIR

Wayne E. Carlson *The Ohio State University*

SPEAKERS

Michael Bailey *San Diego Supercomputer Center*

Judith R. Brown *University of Iowa*

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 the past vice chair of the SIGGRAPH Executive Committee and has taught courses, presented technical papers, and contributed to the electronic theater at previous 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

WELCOME RECEPTION

HALL A, CONVENTION CENTER

Sunday 5:00 pm–7:00 pm

Open to all badged attendees.

COURSES RECEPTION

KELLOGG MANSION

Monday 7:00 pm–10:00 pm

Open to all badged courses registrants and presenters with wristbands.

PAPERS / PANELS RECEPTION

GRAND BALLROOM, MARRIOTT

Thursday 7:00 pm–10:00 pm

Open to all badged SIGGRAPH and Multimedia papers/panels registrants and presenters with wristbands. The annual t-shirt contest award will be presented.

HAPPY HOUR RECEPTIONS

HALL A, CONVENTION CENTER

Monday–Thursday 5:00 pm–7:00 pm

All badged attendees are invited to the happy hour receptions (cash bar) for designing technology, the electronic theater, machine culture, and tomorrow's realities. See "Shuttle Services" on page 111 for information on transportation.

SIGGRAPH LATE NIGHT PARTIES

SALON 3, ORANGE COUNTY BALLROOM, MARRIOTT

Monday–Thursday 9:00 pm–4:00 am

Do you come to life after dark? Can't sleep until the wee hours of the morning? Or want to meet some more of the really great people at SIGGRAPH? Then stop by the SIGGRAPH Late Night Parties at the Marriott. Everyone is invited.

See "Social Functions" on page 108 for additional information, and "Shuttle Services" on page 111 for information on transportation.

SIGGRAPH Awards

SIGGRAPH AWARDS

ARENA, CONVENTION CENTER

Tuesday 8:30 am–10:00 am

WELCOME

SIGGRAPH 93 co-chairs Robert L. Judd and Mark Resch welcome all SIGGRAPH and Multimedia attendees, followed by these presentations:

STATE OF SIGGRAPH

Words from ACM SIGGRAPH's new chair, Mary Whitton.

AWARDS

Presented by Bertram Herzog, SIGGRAPH Awards Chair

The 1993 Computer Graphics Achievement Award

Annual award for significant recent contributions in computer graphics, to be given to Pat Hanrahan.

The 1993 Steven A. Coons Award

Award presented biannually to an individual whose work has had long-term creative impact on the computer graphics field. To be given to Ed Catmull.

Designing Technology

HALL A, CONVENTION CENTER

Sunday 5:00 pm–7:00 pm

Monday–Thursday 9:00 am–7:00 pm

Friday 9:00 am–1:00 pm

SIGGRAPH 93's inaugural designing technology program showcases the convergence of design and technology and explores how these disciplines have advanced product functionality, communication, and usability. Emphasizing the designer's role in the development process, the program demonstrates how design has become an important consideration in the development of technology and communication/interactivity. The show highlights not only the product of this effort, but the process of collaborative work in engineering and design.

Designing technology presents work in the major areas of design and communication, including video (screen) graphics, interface design, and industrial design. It also features design solutions for tool-making as well as tool use and communication, displaying examples that demonstrate design of software and hardware and applications of these tools.

DESIGNING TECHNOLOGY COMMITTEE

Alyce Kaprow, Chair
The New Studio

Robin Baker
Royal College of Art

Rob Haines
Workflow

Masa Inakage
The Media Studio, Inc.

Lauretta Jones
IBM T. J. Watson Research Center

Tom Linehan
CRSS Architects, Inc.

Peter Lowe
CIMulate

Kristee Rosendahl
Rosendahl Arts & Design, Inc.

Elizabeth Rosenzweig
Eastman Kodak Company

Ken Sprick
*Exhibit Designer
i.e. Design*

Dawn Truelsen
True Media

DESIGNING TECHNOLOGY ESSAY (in the SIGGRAPH 93 Visual Proceedings)

Aaron Marcus
Aaron Marcus and Associates, Inc.
The Design Process for Information Products

DESIGNING TECHNOLOGY INTERVIEWS (in the SIGGRAPH 93 Visual Proceedings)

RitaSue Siegel
RitaSue Siegel Associates

Bill Moggridge
IDEO

Kristina Hooper Woolsey
Apple Computer, Inc.

Norm Cox
Cox & Hall

Earl Powell
Design Management Institute

Katherine McCoy
McCoy & McCoy Associates

DESIGNING TECHNOLOGY EXHIBITS

Against All Odds Productions
From Alice to Ocean: Alone Across the Outback
Rick Smolan
Against All Odds Productions
P.O. Box 1189
Sausalito, CA 94966-1189
415.383.8880

The newly published *From Alice to Ocean*, an illustrated book packaged with an interactive photo CD disk, is used to demonstrate the power of combining new and traditional publishing technologies and design.

Alben+Farris and Apple Computer, Inc.
Making It Macintosh: The Macintosh Human Interface Guidelines Companion

Lauralee Alben
Alben+Farris
317 Arroyo Seco
Santa Cruz, CA 95060-3142
408.426.5526
408.426.6634 fax
Harry J. Saddler
Apple Computer, Inc.
20400 Stevens Creek Boulevard
MS 75-SA
Cupertino, CA 95014
408.974.2215
408.974.0872 fax
saddler@applelink.apple.com

This installation traces the development of the "Making It Macintosh" interactive instructional product to illustrate the intersection of design and technology. It shows how the early commitment to design, putting designers and technologists together at the start, produced a high-quality result through day-to-day collaboration.

Design EDGE
Collaborative Design and Development for Surgery Equipment

Bill Schaaf
Design EDGE
1105 Taylorsville Road, #2
Washington Crossing, PA 18977-1139
215.321.6840
215.321.6845 fax

An interactive multimedia display describes the processes, steps, and tools used by Design EDGE, highlighting the skills and roles of the team members and the tools used to produce new surgery equipment, instructional videos, and manuals.

Designworks /USA

CompositAir Mountain Bike Project

Steven John Ivie and John Cook
Designworks/USA
2201 Corporate Center Drive
Newbury Park, CA 91320
805.449.9590
805.449.9650 fax

Designers and engineers collaborated on the design and creation of a prototype mountain bike using surface-rendering and 3D design software in order to meet an ambitious deadline, with a critically acclaimed result.

Doblin Group

Design | ing | Technology

Rick Robinson and John Cain
Doblin Group
35 E. Wacker Drive, Suite 2400
Chicago, IL 60622
312.443.0800
312.443.0567 fax
dkms@applelink.apple.com

The Doblin Group illustrates in-house software tools that provide a common language for communication between designers and technologists through the phases of the design process.

IBM

Dick's World

Richard Oakley
Graphic Design, CHQ
IBM Corporation
208-262 Harbor Drive
Stamford, CT 06904-2501
203.973.7670
407.982.1119 fax
oakley@rhqvm20.vnet.ibm.com

A demonstration of a multimedia interface shows the value that graphic design brings to the interface design process. By following basic design principles, a wealth of information can be displayed and arranged so that the viewer does not get confused and can navigate through data without menus, dialog boxes, or other guides.

IBM T.J. Watson Research Center
The IBM Guest Services System at EXPO '92

Lauretta Jones
 IBM T.J. Watson Research Center
 P.O. Box 704
 Yorktown Heights, NY 10598
 914.784.7622
 914.784.6324 fax
 ljones@watson.ibm.com

An interactive kiosk from the EXPO '92 World's Fair in Seville, Spain demonstrates the highly successful system designed by a team of graphic designers, programmers, psychologists, and others at the IBM T.J. Watson Research Center.

IDEO

Dancall Logic Mobile Telephone Design Project

Peter Spreenberg
 IDEO
 1527 Stockton Street
 San Francisco, CA 94133
 415.397.1236
 415.397.0823 fax
 ideosf@applelink.apple.com

A multidisciplinary team uses a six-step, user-centered design process to design a family of portable telephones. By developing representative user characters, the team designs the abstractions of events, processes, and actions as well as the tangible products.

Imageworks

Evolution of the NeXTstep Interface Design

Keith Ohlfs
 Imageworks
 1154 Bentoak Lane
 San Jose, CA 95129-3104
 408.252.5327
 408.252.9021 fax
 keith@imageworks.com

This presentation outlines the evolution of the NeXTstep graphical user interface through mockups of early designs, animations, sounds, and text displays. They are presented in an interactive environment on a NeXTstep-based computer system.

IN CONTEXT

Designers' Tales

Kristee Rosendahl
 Rosendahl Arts & Design
 1169 Green Street #1
 San Francisco, CA 94109
 415.673.1090
 415.346.5541 fax
 kristeel@applelink.apple.com
 Abbe Don

IN CONTEXT

Kaleida Labs, Inc.
 1945 Charlestown Road
 Mountain View, CA 94043
 415.966.0400
 abbe@well.sf.ca.us

An on-site kiosk provides a video bulletin board for conference participants to record video stories about the design process, tricks of the trade, or other insights. Sample questions are the catalyst for this dialog among users in a public setting.

IN CONTEXT

Voices of the '30s: A Case Study in Interface Design

Abbe Don
 IN CONTEXT
 Kaleida Labs, Inc.
 1945 Charlestown Road
 Mountain View, CA 94043
 415.966.0400
 abbe@well.sf.ca.us
 Nathan Shedroff
 Vivid Publishing
 220 Sansome Street, 5th Floor
 San Francisco, CA 94104
 415.949.4933
 415.949.5450 fax
 vivid@applelink.apple.com
 nathan@vivid.com

This presentation provides hands-on access to a HyperCard/video-disk system for teaching about John Steinbeck's *The Grapes of Wrath*. A custom interface describes the design process from the first prototype to the finished product.

MIT Media Lab

Sketching Layouts over Time

Karen Donoghue
 MIT Media Lab
 Visible Language Workshop
 Room E15-443
 20 Ames Street
 Cambridge, MA 02139
 617.253.4406
 617.258.6264 fax
 karen@media-lab.mit.edu

An electronic sketching system allows designers to visualize ideas by creating objects on a "page" that are managed by software that recognizes the implications of the designer's strokes.

NICOGRAPH

Computer Designics

Tomohiro Ohira
 Nippon Computer Graphics Association
 Ogawa Building 1-2-2 Uchikanda
 Chiyoda-ku, Tokyo 101
 Japan
 81.3.3233.3475
 81.3.3233.3450 fax

Design systems from IDEC, Shiseido, and Sony illustrate the importance of having members of product design teams have visual design experience, as shown by the design and development of products such as video camcorders, cosmetic bottles, and digital videotape decks.

Royal College of Art: London

Computers for the Rest of Us

Robin Baker
 Royal College of Art
 Kensington Gore
 London SW7 2EU
 Great Britain
 44.71.584.5020
 44.71.225.1487 fax
 rca.baker@applelink.apple.com

Interdisciplinary student groups describe designs for computer products that represent three levels of power and complexity in a scalable computing system, including networks and software agents.

Royal College of Art: London

Designing a Visual Database for Fashion Designers

Robin Baker
 Royal College of Art
 Kensington Gore
 London SW7 2EU
 Great Britain
 44.71.584.5020
 44.71.225.1487 fax
 rca.baker@applelink.apple.com

This project addresses the need for large garment manufacturing and retailing companies to reduce the time to develop new garments within tight cost and quality constraints, through research and the creation of a prototype system.

Vent Design

Apple Adjustable Keyboard

Stephen Peart
 Vent Design
 1436 White Oaks Road, Unit 15
 Campbell, CA 95008
 408.559.4015
 408.559.4036 fax
 vent@applelink.apple.com

The evolution of the Apple adjustable keyboard illustrates the stages that a concept passes through, from early sketches to the finished product. The exhibit stresses the need for involvement of designers throughout the process and the value of patience and respect for all skills in a collaborative effort.

Virtual Space Exploration Lab

DesignSpace

William Chapin
 Virtual Space Exploration Lab
 Center for Design Research
 Stanford University
 Building 530, Duena Street
 Stanford, CA 94305-4026
 415.723.7908
 415.725.8475 fax
 vspace@cdr.stanford.edu

DesignSpace exhibits an interpretation of future design media that facilitates collaborative design between remote stations through a shared virtual 3D space. Talking Glove, Cut Plane, Virtual Hand, and TeleSign are some of the projects that form the basis for DesignSpace.

The Voyager Company

A Brief History of the Expanded Book Toolkit

Bob Stein
 The Voyager Company
 1351 Pacific Coast Highway
 Santa Monica, CA 90401
 310.451.1383
 310.384.2156 fax
 voyager@applelink

Expanded Books are meant to exemplify the standard features computer-based books should have. These books, designed by a team that includes a programmer, text specialist, programmer/writer, technical support staff member, and designers, went from inception to commercial introduction in less than five months.

Electronic Theater

Evening Show

ARENA, CONVENTION CENTER

Tuesday–Thursday
7:30 pm–9:30 pm

Small Animation Theaters

(Includes International Animation Theater)

THEATER #1: HALL C, CONVENTION CENTER

THEATER #2: HALL A, CONVENTION CENTER

Sunday 10:00 am–7:00 pm
Monday–Thursday 9:00 am–7:00 pm
Friday 9:00 am–1:00 pm

Stereoscopic HDTV Room

HALL A, CONVENTION CENTER

Sunday 5:00 pm–7:00 pm
Monday–Thursday 9:00 am–7:00 pm
Friday 9:00 am–1:00 pm

The electronic theater's evening show presents the most exciting and innovative computer-generated animations created during the previous year. The small animation theaters and other settings provide outlets for pieces that are longer, appealing to more specific audiences, and/or invited from other computer graphics conferences. A 20-year retrospective of animations from previous SIGGRAPHs will be highlighted in the electronic theater evening show. The stereoscopic HDTV room is an intimate debut of 3D HDTV at SIGGRAPH. Approximately 35 people at a time can experience several minutes of stereoscopic HDTV animations, which are longer versions of some of the monoscopically projected animations in the electronic theater evening show.

ELECTRONIC THEATER COMMITTEE

**Jamie Thompson,
Chair**

TIVOLI Systems, Inc.

Brent Heustess
Administrative Assistant

Joe Corcoran
Administrative Assistant

Linda Branagan
*CONVEX Computer
Corporation*

Huguette Chesnais
Consultant

Gina Coniglio
Consultant

John Hart
Washington State University

Jim Hillin
Digital Domain

Johnie Hugh Horn
Independent

Jean Kim
Magic Box Productions, Inc.

Gray Lorig
Barking Trout Productions

Jonathan Luskin
Industrial Light & Magic

Ladd McPartland
Sony Pictures Imageworks

Lucy Petrovich
*Savannah College of Art and
Design*

**Lynn Pocock-
Williams**
Pratt Institute

Sally Rosenthal
Magic Box Productions, Inc.

Steve Sarafian
*Sony Advanced Systems,
Business and Professional
Group, Sony Corporation of
America*

Joel Welling
*Pittsburgh Supercomputer
Center*

ELECTRONIC THEATER JURY

Char Davies
SOFTIMAGE Inc.

John Grimes
*Institute of Design, Illinois
Institute of Technology*

Nelson L. Max
*Lawrence Livermore National
Laboratory*

EVENING SHOW

Evening Show Opening— SIGGRAPH 93 Anijam

Jim Hillin
6137 W. 6th Street
Los Angeles, CA. 90048-4801
213.932.0400

ABCSystem
Hiroyuki Ota
Center of Information Systems
OBAYASHI Corporation
2-3, Kanda Tsukasa-cho
Chiyoda-ku
Tokyo 101
Japan
81.3.2392.1111 (ex 7084)

Air on the Dirac Strings
Daniel Sandin
Electronic Visualization Laboratory
(M/C 154)
University of Illinois at Chicago
851 S. Morgan, Room 1120 SEO
Chicago, IL 60607-7053
312.996.3002

Artificial Life Metropolis "Cell"
Yoichiro Kawaguchi
University of Tsukuba
Institute of Art
1-1-1 Tennodai
Tsukuba-Science City 305
Japan
81.298.53.2832

CAA-Coca-Cola Polar Bears
Suzanne Datz
Rhythm & Hues Studios
910 N. Sycamore Avenue
Hollywood, CA 90038
213.851.6500

CGI Work in "Aladdin"
Dan Philips, Manager, CGI
Walt Disney Feature Animation
1420 Flower Street
Glendale, CA 91221
818.544.2504

**The Dangers of Glitziness and
Other Visualization Faux Pas**
Wayne Lytle
Cornell Theory Center
621 Theory Center Bldg.
Cornell University
Ithaca, NY 14853
607.254.8793

Data Driven: The Story of Franz K.
Christopher Landreth
North Carolina Supercomputing
Center
3021 Cornwallis Road
Research Triangle Park,
NC 27709-2889
919.248.1141

Deus ex Machina

Wayne Wooten
Georgia Institute of Technology
425 Calhoun Street
Atlanta, GA 30318
404.875.9650

Devil's Mine
Jean-Pierre Dauzun
Little Big One s.a.
Avenue Ariane 12
1200 Brussels
Belgium
322.773.4820

Dino-Morph—Super Mario Bros
Jean H. Kim
Magic Box Productions, Inc.
345 N. Maple, #222
Beverly Hills, CA 90210
310.550.0243

Doom and the Dog
Wright Dagget
403 B Cross
College Station, TX 77840
409.846.5943

Dr. Scratch
Chris Walker
Mr. Film
228 Main Street, Suite 12
Venice, CA 90291
310.396.0146

Enertopia
Lisa Sontag
Angel Studios
5962 La Place Court, Suite 100
Carlsbad, CA 92008
619.929.0700

Flow
Gavin Miller
Apple Computer, Inc.
MS 301-3J
1 Infinite Loop
Cupertino, CA 95014
408.974.0186

Fruit Tracing
John Snyder
Caltech
350-74
Pasadena, CA 91125
818.397.2820

Gas Planet
Monica Corbin
Pacific Data Images
650 North Bronson Avenue
Suite 400W
Los Angeles, CA 90004
213.960.4042

Go Fish!

Demetri Terzopoulos
Computer Science
University of Toronto
10 King's College Road
Toronto, Ontario M5S 1A4
Canada
416.978.7777

GOKU

Jean H. Kim
Magic Box Productions, Inc.
345 N. Maple Drive
Beverly Hills, CA 90210
310.550.0243

Heart Beat

Tsuyoshi Yamamoto
Hokkaido University Computing
Center
N-11, W-5
Sapporo 060
Japan
81.11.716.2111, ext. 2969

IGI (Intergalactic Interface)

Katsuyuki Sugimura
LINKS Corporation
2-14-1 Higashi-Gotanda
Shinagawa-Ku, Tokyo 141
Japan
813.5420.5310

JORAM

Irit Rosen
Prof. Bosschastraat 40
2628 HN
Delft, Pays Bas
Holland
31.20.623.3493

JuJu Shampoo

Dobbie G. Schiff
MetroLight Studios
5724 West 3rd Street, Suite 400
Los Angeles, CA 90036
213.932.0400

"Jurassic Park" Visual Effects

Douglas Kay
Industrial Light & Magic
P.O. Box 2459
San Rafael, CA 94912
415.258.2000

Kelloggs—"Reloj"

Ralph J. Guggenheim
Pixar
1001 W. Cutting Boulevard
Richmond, CA 94804
510.215.3413

Lakme

Roulin Pascal
PascaVision
4 Place du 18 Juin 1940
Paris 75006
France
33.1.42932627

Last Word

Alison Brown
Blue Sky Productions, Inc.
100 Executive Boulevard
Ossining, NY 10562
914.941.5260

Legacy

Darrin Butts
6200 Franklin, Apt. 403
Hollywood, CA 90028
213.851.6500

Luxor Dream Sequence

Jeff Kleiser
Kleiser-Walczak Construction Co.
8105 Mulholland Highway
Hollywood, CA 90088
213.467.3563

Luxor Excerpts

Jeff Kleiser
Kleiser-Walczak Construction Co.
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Hollywood, CA 90088
213.467.3563

Manatees: The Last Generation?

Kevin Biles
KBD Innovative Arts
13360 Beach Avenue
Marina del Rey, CA 90292
310.578.5452

MEGALOPOLICE

Tokyo City Battle
Tetsuya Mizuguchi
Sega Enterprises, Ltd.
1-2-12 Haneda
Ohta-ku
Tokyo 144
Japan
011.81.3.3743.7574

Mercury

Bela L. Brozsek
6470 Deep Dell Place
Hollywood, CA 90068
213.462.7080

Michelob Golden Draft

"Evolution"
Suzanne Datz
Rhythm & Hues Studios
910 N. Sycamore Avenue
Hollywood, CA 90038
213.851.6500

MINDBLENDER—Peter Gabriel

Lisa Sontag
Angel Studios
5962 La Place Court, Suite 100
Carlsbad, CA 92008
619.929.0700

ODORO ODORO

(The Mysterious Dance)
Jun Watanabe
LINKS Corporation
System Sales Division
2-14-1 Higashi-Gotanda
Shinagawa-Ku, Tokyo 141
Japan
813.5420.5311
813.5420.5312

Oreo: Word Play

Chris Wallace
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Animation, Inc.
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Other Worlds

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Suite 300
Santa Barbara, CA 93103
805.568.1902

Pacific Data Images Montage

Monica Corbin
Pacific Data Images
650 North Bronson Avenue
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Los Angeles, CA 90004
213.960.4042

PDI "Toys" Visual Effects

Monica Corbin
Pacific Data Images
650 North Bronson Avenue
Suite 400W
Los Angeles, CA 90004
213.960.4042

**Project MATHEMATICS!
Polynomials & Sines & Cosines**

Jim Blinn
Project MATHEMATICS!
305 S. Hill
Pasadena, CA 91106
818.356.3758

Rhapsody in Light & Blue

Hideo Yamashita
Hiroshima University
1-4-1 Kagamiyama
Higashi-hiroshima 724
Japan

Sendai Castle

Yoshiyuki Hamano
CAD Center Corporation
1-7-16 Sendagaya
Shibuya-ku
Tokyo 151
Japan
81.3.3470.8701

Sister of Pain—Vince Neil

Peter Conn
Homer & Associates
1420 N. Beachwood Drive
Hollywood, CA 90028
213.462.4710

StarQuest Adventure

Dobbie G. Schiff
MetroLight Studios
5724 West 3rd Street, Suite 400
Los Angeles, CA 90036
213.932.0400

Steam—Peter Gabriel

Brad deGraf
Colossal Pictures
2800 Third Street
San Francisco, CA 94107
415.550.8772

Stripe Box

Kazuma Morino
Taiyo Kikaku Co., Ltd.
2-26-3 Nishishimbashi
Minato-ku
Tokyo T105
Japan
03.3436.4540

Studies for The Garden

Tamás Waliczky
ZKM, Institut Für Bildmedien
Gartenstrasse 71
Karlsruhe 1
Germany 76135
49.721.9340.405

**"Thumbelina" Computer
Animation Excerpts**

Jan L. Carle
Don Bluth Ireland Ltd.
Phoenix House
Conyngham Road
Dublin 8
Ireland
353.679.5099

Tyrannosaurus Rex:

Reconstructed
Noriaki Kaneko
HD/CG New York
34-12 36th Street
Astoria, NY 11106
718.361.1118

**Visualizing DNA Crystal Packing
Interactions**

Teresa Larsen
The Scripps Research Institute
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La Jolla, CA 92037
619.554.2526

Walking Figure in Sight

Yuji Furuta
Taiyo Kikaku Corporation
2-26-3, Nishishinbashi
Minato-ku
Tokyo 105
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03.3436.4540

West of Eden (Excerpt)

Visual Research
SOFTIMAGE Inc.
3510, boulevard St-Laurent
Suite 500
Montréal, Québec H2X 2V2
Canada
514.845.1636

The World of Materials (Excerpt)

Anna-Karin Quinto
Ex Machina
22 Rue Hegesippe Moreau
Paris 75018
France
42.93.2627

**Young Indiana Jones and the
Scandal of 1920**

Andi Merrim
Industrial Light & Magic
P.O. Box 2459
San Rafael, CA 94912
415.258.2276

SMALL ANIMATION THEATER

ABCSystem

Hiroyuki Ota
Center of Information Systems
OBAYASHI Corporation
2-3, Kanda Tsukasa-cho
Chiyoda-ku
Tokyo 101
Japan
81.3.2392.1111, ext. 7084

Advanced Visualization for Transportation Engineering

Ken Seaverns
4D Imaging
1660 Lincoln Street
Suite 2000
Denver, CO 80264
303.832.9097

The Adventures of Korky, the Corkscrew

Carlos Saldanha
School of Visual Arts
115 W. 11th Street, Apt. 4R
New York, NY 10011
212.633.1387

Air on the Dirac Strings

Dan Sandin
Electronic Visualization Laboratory
(M/C 154)
University of Illinois at Chicago
851 S. Morgan, Room 1120 SEO
Chicago, IL 60607-7053
312.996.3002

air, water part 2

John Tonkin
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Adelaide 5000 SA
Australia
618.224.0265

The Allegory of the Cave

Kirk. L. Kelley
Lamb & Company
650 3rd Avenue South, 17th Floor
Minneapolis, MN 55402
612.333.8666

Animated Electronic Wiring Buck

Tom Capizzi
Creative Industries
14661 Rotunda Drive
Dearborn, MI 48120
313.248.2865

Arcelik

D. Pourcel
Gribouille
5 Boulevard E. Zola
Aix en Provence 13100
France
42.969200

The Art of Talking Pictures

Peter Carl Litwinowicz
Apple Computer, Inc.
1 Infinite Loop, M.S. 301-3J
Cupertino, CA 95014
408.974.1752

Barry's Trip

Joseph Shingelo
TELEZIGN
460 West 42nd Street
New York, NY 10036
212.564.8888

Biomechanics: Dynamics and Playback

Gorka Alvarez
CEIT (Centro de Estudios e Invest.
Técnicas de Guipuzcoa)
Manuel de Lardizabal, 15
San Sebastian E-20009
Spain
34.43.212800

Brilliant Days

Sherry Hsieh
Pratt Institute
35-04 28 Street
Astoria, NY 11106
212.239.6767, ext. 164

Bunn Coffeemaker "In the Mood"

Ralph J. Guggenheim
Pixar
1001 W. Cutting Boulevard
Richmond, CA 94804
510.215.3413

Carpet Stains

Jennifer Steinkamp
Art Center College of Design
1700 Lida Street
Pasadena, CA 91103
818.584.5102

Center for Ecology Research and Training Flyby

Theresa Marie Rhyne
Martin Marietta Technical Services
U.S. EPA Scientific Visualization
Center
US EPA Mail Drop 34C
Research Triangle Park, NC 27709
919.541.0207

Climatology of Global Stratospheric Ozone (1979-1991)

Lloyd A. Treinish
IBM T. J. Watson Research Center
P.O. Box 704
Yorktown Heights, NY 10548
914.784.5038

Cluny

Jean-Pierre Brindeau
IBM France
Tour Septentrion
La Défense 4
20, av. André Prothin
Paris La Défense 92081
France
011.331.4905.5581

Colorado Interstate Gas Campaign

Mike Ludlam
Windstar Studios
525 Communications Circle
Colorado Springs, CO 80905
719.635.0422

Computer Puppetry Demo Reel

Jean-Frédéric Samie
Medialab
104 Av. du President Kennedy
Paris 70016
France
011.331.4430.4430

Countdown Contraption

Bud Myrick
Henninger Video, Inc.
2601-A Wilson Boulevard
Arlington, VA 22201
703.243.3444

Coup de Théâtre

Pascale Padeloup, Pascale
Cazenave
AII/ ENSAD
31 Rue D'ulm
Paris 75005
France
43.26.36.35

Cybercrazed

Otto von Ruggins
Virtual Reality
6618 Ovington Court
Brooklyn, NY 11204
718.259.8495

De Karnak A Louqsor: La Machine a Remonter le Temps

Anna-Karin Quinto
Ex Machina
22, rue Hegesippe Moreau
Paris 75018
France
42.93.26.27

Dimension "Intro"

Daniel Benaim
Canal Uno Producciones
Av. principal Boleita Norte
edf. Vicson II, piso 3
Caracas
Miranda
Venezuela
582.35.5220

The Donor Party

Arcadias Laurence
Apple Computer, Inc.
1 Infinite Loop
MS: 301/3J
Cupertino, CA 95014
408.974.9490

Fantastic Dreams

Masa Inakage
The Media Studio, Inc.
2-24-7 Shichirigahama-Higashi
Kamakura
Kanagawa 248
Japan
81.467.32.7941

The First Political Speech

Sang Mah
Computer Graphics Research Lab
School of Computing Science
Simon Fraser University
Burnaby, British Columbia V5A 1S6
Canada
604.291.3610

From Ruins to Reality

Brian Collins
IBM UK Scientific Centre
Hursley Park
Winchester
Hampshire S021 2JN
United Kingdom
44.962.844.191

Gasping for Air

Leslie Bishko
Computer Graphics Research Lab
School of Computing Science
Simon Fraser University
Burnaby, BC V5A 1S6
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604.291.3610

Ginza Walk Through

Michio Iwaki
Shiseido Co., Ltd.
7-5-5 Ginza
Chuo-ku, Tokyo 104-10
Japan
03.3289.0106

Grateful Dead—Infrared Roses Revisited

Linda Jones
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415.558.9267

IGI (Intergaractic Interface)

Katsuyuki Sugimura
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2-14-1 Higashi-Gotanda
Shinagawa-Ku, Tokyo 141
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813.5420.5310

The Incredible Crash Dummies

Larry Lamb
Lamb and Company
650 3rd Avenue South, 17th Floor
Minneapolis, MN 55402
612.333.8666

JASON IV Real-Time Visualization

Dave Pape
NASA/GSFC
Code 932
Greenbelt, MD 20771
301.286.7980

Journey to Technopia

Charlotte Huggins
Boss Film Studios
13335 Maxella Avenue
Marina del Rey, CA 90292
310.823.0433

knot^4

Andrew J. Hanson
Indiana University
Computer Science Dept.
Bloomington, IN 47405
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La Goutte

Angus MacKay
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514.489.8989

Merck Corporate ID

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Minute Georgienne / Georgian Minute

Alain Mongeau
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Montréal, Québec H2W 1W9
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Moonwalk

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Mr. Hops

Dobbie G. Schiff
MetroLight Studios
5724 West 3rd Street, Suite 400
Los Angeles, CA 90036
213.932.0400

NBC Sports '92 Barcelona Olympics

Dobbie G. Schiff
MetroLight Studios
5724 West 3rd Street, Suite 400
Los Angeles, CA 90036
213.932.0400

Nestlé—Milky Bar

Siry Chantharasy
Animal Logic Pty Ltd.
123 Willoughby Road
Crows Nest, NSW 2065
Australia
02.9061232

New Life Forms Sighted in Toronto

Michiel van de Panne
Dept. of Electrical Engineering,
University of Toronto
10 King's College Road
Toronto, Ontario M5S 1A4
Canada
416.978.5274

Night Moves

Nancy Klimley
School of Visual Arts
205 Yardley Commons
Yardley, PA 19067
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Oreo: Word Play

Chris Wallace
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Other Worlds

John H. Grower
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Santa Barbara, CA 93103
805.568.1902

Power of Dreams

Dave Kaul
30 Simpaug Turnpike
Redding, CT 06895
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Reconstruction and Visualization of a Human Embryo Heart

William Hsu
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Cambridge, MA 02139
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ROBERT MALLARY—Pioneer in Computer Art

Copper Giloth
University of Massachusetts
Department of Art
364 Fine Arts Center
Amherst, MA 01003
413.545.6943

Robo Jr.

Dale K. Myers
Microtech Graphics & Animation, Inc.
9602 Hartel
Livonia, MI 48150
313.525.3203

Ruby's Dream

Enrico Leoni
SAS Institute Inc.
SAS Campus Drive
Cary, NC 27513
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Sci-Fi Channel Open—"Big Bang"

Linda Jones
Xaos
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San Francisco, CA 94103
415.558.9267

Scottish Road Safety

Christian Hogue
Rushes
66 Old Compton Street
London W1V 5PA
United Kingdom
071.437.8676

Sendai Castle

Yoshiyuki Hamano
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The Silver Surfer

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Sintu

Elena Popa
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Smart Drive

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Power and Vision
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Sony "Bajo"

Daniel Benaim
Canal Uno Producciones
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edf. Vicson II, piso 3
Caracas, Miranda
Venezuela
582.35.5220

Stabbur Makrell

Charlie Fremantle
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United Kingdom
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StarQuest Adventure

Dobbie G. Schiff
MetroLight Studios
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Los Angeles, CA 90036
213.932.0400

Timbre Trees

James K. Hahn
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EE and CS Dept.
Washington, D.C. 20052
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TISEA Opening Animation

Jon McCormack
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Victoria
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613.862.2056

Tokyo International Forum

Wayne Herman
Rafael Viñoly Architects
50 Van Dam Street
New York, NY 10013
212.924.5060

Transformers

Larry Lamb
Lamb and Company
650 3rd Avenue South, 17th Floor
Minneapolis, MN 55402
612.333.8666

Triangle Eat Triangle

Margaret Hallam
Electronic Visualization Lab at U.I.C
851 S. Morgan Street, Room 1121
SEO
Chicago, IL 60607
712.996.3002

Visualizing Seafloor Structures with Satellite Altimetry

James J. McLeod
San Diego Supercomputer Center
P.O. Box 85608
San Diego, CA 92186-9784
619.534.5158

Wacky Races

Yoichi Sugiyama
DAIKO Advertising Inc.
Shuwa Shiba Park Bldg. B-8, 4-1
Shiba Koen 2-chome
Minato-ku, Tokyo 105
Japan
03.3437.8082

Warts and All

Bruce Pukema
Ronin Animation
12036 Mississippi Drive
Champlin, MN 55316
612.421.7479

When I Was Six

Michelle Robinson
712 Eagle Pass
Bryan, TX 77802
409.845.3465

INTERNATIONAL ANIMATION THEATER

The following computer graphics conferences have been invited to show a short video at SIGGRAPH 93. The purpose is to make SIGGRAPH attendees aware of the other excellent international computer graphics and art conferences. Each video will be seen at a special day and time in the small animation theater.

Ars Electronica

Deadline for Prix Ars Electronica submissions: 28 February 1994
Conference: 21-25 June 1994
Conference Location: Linz, Austria
CONTACTS

Ars Electronica
Katharina Gsöllpointner
Untere Donaulände 7
A-4010 Linz, Austria
732.7612.0

Prix Ars Electronica
Christine Schöpf
Franckstrasse 2a
A-4010 Linz, Austria
732.6900.267

IMAGINA

Conference: 16-18 February 1994
Conference Location: Monte Carlo
CONTACT
Pierre Henon
Philippe Queau
INA, 4, Avenue de l'Europe
94366 Bry-sur-Marne Cedex
France
33.1.49.83.26.84
33.1.48.83.26.93

MEDIATECH and Premio Imagine (Image Award)

Conference: 14-18 October 1993
Conference Location: Milan, Italy
Image Award: 16 October 1993
CONTACT

Maria Grazia Mattei
Head MEDIATECH/PREMIO
IMMAGINE
Via Domenichino 11
Milano, Italy
001.39.2.4815541

Machine Culture: The Virtual Frontier

ROOM AR1 & AR2, CONVENTION CENTER

Sunday 5:00 pm–7:00 pm

Monday–Thursday 9:00 am–7:00 pm

Friday 9:00 am–1:00 pm

The goal of this exhibition is to offer a survey of the current state of interactive and virtual art practice around the world. Many people are unaware that the full name of SIGGRAPH is “special interest group on computer graphics and interactive techniques.” In this spirit, machine culture takes a wide view of interactive techniques. Not only will you find screen-based and interactive laserdisk artworks, but interactive environments, robotic artworks, and immersive systems. Artists in this exhibition are gathered from many countries, including Australia, Canada, Holland, Japan, Germany, and the U.S.

1993 is perhaps the first time that an exhibition of such scale has been possible. This is due in part to the availability of sophisticated technology to artists, and simultaneously, the cultural interest in these technologies as culture machines. SIGGRAPH is perhaps the only place that such an exhibition could occur, as it gathers both the technology and the goodwill of the makers of these technologies.

Artistic use of interactivity is a new field. For the artists included here, the nature of interaction and the interactive interface is a prime concern. The definition and use of that interface in this exhibition is diverse, and quite at odds with the increasingly narrow usage in interactive consumer electronics. The interface is the place where the machine meets culture; it is the place where the machine meets the body. These

artists question which parts of the body the machine might converse with, and in what ways. Most of the artists represented in this exhibition are newcomers to SIGGRAPH, younger artists, many from outside the U.S., with novel approaches to interactive technologies. These artists have gone to considerable effort to bring and install their complex works for the consideration of the SIGGRAPH audience.

The catalog to this exhibition, the machine culture section of the *SIGGRAPH 93 Visual Proceedings*, has offered these artists the opportunity to speak about their complex works and the ideas behind them. The catalog also includes a specially commissioned set of essays that is the first collection to address interactive and virtual art practice. Though some of the essayists are familiar to the SIGGRAPH membership, many are unfamiliar and offer dynamic critiques. It is hoped that machine culture will bring the SIGGRAPH community together with active artists and thinkers in interactive technologies from the art world in an exchange of ideas and in the hope that a more sophisticated discussion of the cultural dimension of interactivity will result.

We are witnessing the construction of a new professional identity—the interactive media artist, an interdisciplinarian as comfortable with cultural coding as with computer code, and as familiar with the jargon of the art studio as the computer lab. There are those who have crossed over, in one direction or the other, but the generation at home in both places is just arriving. Some of them are in this exhibition. It is they who will invent interactive art.

MACHINE CULTURE COMMITTEE

Simon Penny, Chair
Carnegie Mellon University

Harry Fozzard
Machine Culture Amanuensis
University of Florida

Erkki Huhtamo
Independent Critic and Curator, Video and Electronic Media—
Finland

Machiko Kusahara
Independent Curator and Consultant—Japan

Jeffrey Shaw
Zentrum für Kunst und Medientechnologie, Karlsruhe—Germany

Gary Warner
Australian Film Commission

Richard Wright
London Guildhall University—U.K.

MACHINE CULTURE ESSAYISTS (in the *SIGGRAPH 93 Visual Proceedings*)

Timothy Druckrey
Curator and Theorist, International Center for Photography,
New York

Feedback to Immersion/Machine Culture to
Neuromachines/Modernity to Post Modernity

Erkki Huhtamo
Independent Critic and Curator, Video and Electronic Media—
Finland
“It is Interactive—but is it Art?”

Myron W. Krueger
President, VideoPlace
The Artistic Origins of Virtual Reality

Lev Manovich
Assistant Professor, Computer Graphics, Department of Art and
Media Studies, College of Visual and Performing Arts, Syracuse
University

The Mapping of Space: Perspective, Radar
and Computer Graphics

Simon Penny
Carnegie Mellon University
Old Ideas in New Boxes

Florian Rötzer
Media and Art Theorist—Munich, Germany
Interaction and Play

Jeffrey Schultz
Graduate Program, Mason Gross School of the Arts, Rutgers
University
Virtu-Real Space: Information Technologies
and the Politics of Consciousness

Stephen Wilson
Professor, Conceptual Design and Computer Arts, San Francisco
State University
Light and Dark Visions: The Relationship of
Cultural Theory to Art that Uses Emerging
Technologies

Richard Wright
Digital Imaging Group, London Guildhall University—U.K.
Soft Future

ART WORKS AND ARTISTS

Adelbrecht

Martin Spanjaard
Montevideo Time-Based Arts
c/o Miriam Coelho
Singel 137
Amsterdam 1012 VL
The Netherlands
31.0.20.623.71.01

Adelbrecht is a charming ball-shaped robot. As he rolls about his environment he negotiates obstacles, apologizes for bumping into things, falls asleep, and chatters to himself. He likes to be stroked.

Animatrix

Akke Wagenaar and Nasahiro Miwa
Kunsthochschule fuer Medien
Krefelderstrasse 48
5000 Köln 1
Germany
49.221.732.55.25 tel/fax

Animatrix generates a dancer in real-time 3D animation with musical accompaniment. Complex behavior, emergent from the interaction between software entities and user input, generates sound and image.

Another Day in Paradise

Victoria Vesna
424 Emerald Bay
Laguna Beach, CA 92651
714.497.8611

Another Day in Paradise is an interactive installation with integrated touch-screen monitors and a surveillance camera, installed within three palm trees.

Bentlow Stairs: An Electronic Artist's Book

Ed Cunniss, Elnor Kinsella,
Susan Kirchman, Jeff Raymond,
and Alan Stacell
Visualization Laboratory
Texas A&M University
College Station, TX 77843-3137
409.845.3465

Bentlow Stairs: An Electronic Artist's Book is an illustrated hypertext within a sculptural installation. Direction and flow of the story of a seagoing city called Bentlow Stairs is controlled by the viewer using a mouse within the installation.

Blind Date

Hillary Kapan
Department of Visual Arts
University of Maryland
Baltimore County
5401 Wilkens Avenue
Baltimore, MD 21228
410.455.2150

In Blind Date the machine seduces the user. Encouraged to rub, tickle, or caress the moving image of a hand while listening to the hand's responses, the viewer experiences increasing confusion over human/machine sexuality.

Catholic Turing Test

Gregory P. Garvey
Department of Design Art
Concordia University
1455 de Maisonneuve Boulevard W.
Montréal, Québec H36 1M8
Canada
514.484.2946

The Catholic Turing Test is an automatic, hypertextual, confession kiosk.

Data Mitt

Ken Goldberg
Department of Computer Science
204 Powell Hall
University Park
University of Southern California
Los Angeles, CA 90089-0273
213.740.9080

Richard S. Wallace
NYU Robotics Research Lab
715 Broadway, 12th floor
New York, NY 10003
212.998.3465

Data Mitt is a manual telecommunications peripheral, complementing the telephone and videophone. Using Data Mitt, people can hold hands and exchange squeezes over long distances.

Edge of Intention

Joseph Bates, James Altucher,
Alexander Hauptman,
Mark Kantrowitz, A. Bryan Loyall,
Koichi Murakami, Paul Olbrich,
Zoran Popovic, W. Scott Reilly,
Phoebe Sengers, William Welch,
Paul Weyhrauch, and
Andrew Witkin
School of Computer Science
Carnegie Mellon University
5000 Forbes Avenue
Pittsburgh, PA 15213-3891
412.268.3725

Edge of Intention is a screen-based project in interactive fiction. The team applies artificial intelligence techniques to characters (woggles) on the screen. The users may interact with the woggles.

Espace Vectoriel

Louis-Philippe Demers
6585 Jeanne-Mance, unit 301
Montréal, Québec H2V 4L1
Canada
514.495.7673
Bill Vorn
534 Cherrier Apt. 3
Montréal, Québec H2L 1H3
Canada
514.849.4427

Espace Vectoriel paraphrases the mathematical term, vector space, in which information or behavior is expressed in terms of vectors. It is an environment populated with robotic machines that direct and project shafts of sound and light in response to the location of visitors.

Family Portrait

Luc Courchesne
Ecole de Design Industriel
Université de Montréal
3484 Laval Street
Montréal, Québec H2X 3C8
Canada
514.343.7495

Family Portrait is a development from Courchesne's previous interactive laserdisk portrait series (Portrait 1 was shown at tomorrow's realities at SIGGRAPH '91). In Family Portrait, several virtual characters interact with the users and with each other.

Faraday's Garden

Perry Hoberman
Cooper Union School of Art
7 East Seventh Street
New York, NY 10003
212.353.4266

Faraday's Garden is an articulated interactive orchestra of outdated domestic and media appliances.

The Fence

Coactive Aesthetics
P.O. Box 425967
San Francisco, CA 94142
415.626.5152

The Fence is a robotic picket fence that moves in reaction to its environment.

The Flock

Kenneth E. Rinaldo and
Mark S. Grossman
Interactive Emergent Systems
1342 11th Avenue
San Francisco, CA 94122
415.775.2212

The Flock is a series of autonomous robotic arms constructed of structures made from grapevines. They selectively respond to sound and human presence, talk to their neighbors, and display complex adaptive flocking behaviors determined by their interaction with the participants.

Fun House

Carl Eugene Loeffler
STUDIO for Creative Inquiry
College of Fine Arts
Carnegie Mellon University
Pittsburgh, PA 15213-3890
412.268.3452

Fun House is a project in multiple-user networked virtual reality, interfaced through a head-mounted display and data glove.

The Garden of Earthly Delights

Agata Bolska
Advanced Computing Center for
the Arts and Design
Ohio State University
1054 Sunny Hill Drive
Columbus, OH 43221
614.292.0330

This screen-based, interactive installation uses the 15th century paintings by Hieronymus Bosch, "The Garden of Earthly (Delights)" as its central metaphor to discuss television and its place in modern Western culture. Like TV, the work inconspicuously controls the users' choices. Seduced by the "delights," the users become victims of the mediamatic illusion of reality.

Hack

Ian Haig
P.O. Box 1049
Collingwood VIC
Australia 3066
61.03.486.2224

Hack is an art work modeled on arcade games in which the viewer works through the combinations and permutations of goofy faces, hacking away to deconstruct the code of the graphic interface and locate the brain within.

Handsight

Agnes Hegedüs
Zentrum für Kunst und
Medientechnologie, Karlsruhe
Martin Luther Street 1
Lagensteinbach 7516
Germany
49.7202.7837 phone/fax

Handsight inverts the conventional paradigm of navigation in virtual space. The user discovers a jewel-like virtual world in the process of leading a helpless eye through a physical environment.

Hyper Scratch

Haruo Ishii
Trident School of Design
Midori-ku Narumi-cho Ishihata 30-1
Nagoya, Aichi 458
Japan
052.451.1171

Hyper Scratch is a rapid-fire touch screen interactive in which the user triggers media-sampled images and sounds to speakers and to a projection screen.

Interactive Plant Growing

Christa Sommerer and
Laurent Mignonneau
Institut für Neu Medien, Städelschule
Hanauer Landstrasse 204-206
6000 Frankfurt 1
Germany
69.43.63.83

Interactive Plant Growing generates a fractal forest on a large projection screen. Fractal plant growth algorithms vary in response to the changing electrical characteristics of five potted plants. The potted plants are the interface device, and their electrical characteristics vary due to the proximity and behavior of viewers.

The Labyrinth

Fred Truck
Electric Bank
4225 University
Des Moines, IA 50311
515.255.3552

The Labyrinth is the setting for virtual participation in the myth of Daedalus, builder of the maze and the original flyer. Here, Leonardo's improvement over wax wings—an ornithopter—is the vehicle to freedom. Interaction takes place through a Data Glove and a head-mounted display.

The Machine in the Garden

Nancy Paterson
475 The West Mall, #1513
Etobicoke, Ontario M9C 4Z3
Canada
416.365.0564

The Machine in the Garden is an interactive videodisk installation based on a casino slot machine. The viewer pulls the lever, conjuring imagery from three thematic areas (media, politics, and advertising) up on to three monitors.

Neuro Baby

Naoko Tosa
Musashino Art University
2-33-9-3A Ogikubo Suginami-Ku
Tokyo 167
Japan
81.427.44.9711

Neuro Baby changes its mood depending upon the viewer's tone of voice. Using neural networks, it has been "taught" the relationship between inflections in human voices and emotional patterns contained within those inflections, and responds with giggling, gurgling, smiling, screaming, or other baby behaviors.

Onyrisk

Alain Mongeau, Éric Mattson,
and Suzie Dumont
Centre JA de Sève
4072 Clark
Montréal, Québec H2W 1W9
Canada
514.845.4638

Onyrisk stimulates "dream logic" by intercutting and overlaying imagery from cinematic sequences on two laser disks. The system is entirely controlled by a HyperCard stack configured as a kind of expert system. The texture of the visual and the soundtrack are constantly readjusted by the "intelligence" at work in the expert system.

Public Domain Kiosk Project

Jim Demmers, Robert R. Cheatham,
Robert Hamilton, Jr., and
Chea Prince
Public Domain, Inc.
1299 Oakdale Road
Atlanta, GA 30307
404.894.8717

The Public Domain Kiosk Project attempts to design effective metaphors that simultaneously describe, illustrate, and demonstrate a model of interpretation of virtuality. The recognition of the centrality of the phenomenon of collapse to the never-ending reconstruction of meaning is taken as license for the use of a collaged fluxus of poetic images, texts, and sounds that eschew conclusiveness. Implicit in this approach is a high valuation of noise, chaos, anarchy, improvisation, conflict, discontinuity, experimentation, invention, and wild speculation uninhibited by any need to make sense.

Rigid Waves—Liquid Views

Monika Fleishmann,
Christain A. Bohn, and
Wolfgang Strauss
German National Research Center
for Computer Science
Department of Scientific
Visualization and Virtual Reality
Postfach 1316
Schloss Birlinghoven
D-5205 Sankt Augustin 1
Germany
49.2241.14.2366

Rigid Waves—Liquid Views is based on the myth of Narcissus, where modern media technology is the reflecting pond in which the viewer interacts with his/her virtual image. Using real-time image processing to treat video images, the viewer is placed within a mirror in a painting, or as a reflection in a virtual pond.

A Room of One's Own

Lynn Hershman
Hotwire Productions
1935 Filbert Street
San Francisco, CA 94123
415.567.6180

A Room of One's Own comments on the voyeuristic nature of electronic media. While the viewer peers into a specially constructed bedroom scene, his/her eye movements are tracked, triggering videodisk imagery within the scene.

Small Planet

Myron Krueger
VideoPlace
P.O. Box 786
Vernon, CT 06066
203.871.1375

Small Planet is an "artificial reality" installation in which two users can move through a projected image of a planet, covered with realistic 3D terrain. Each user's direction of travel is controlled by pretending to fly as a child would, holding their hands out to their sides and leaning in the direction they want to fly. Participants can interact in a game of hide-and-seek, herd animated creatures, shape the planetary landscape, or spread graphic vegetation.

Typhoid Mary

Linda Dement
Photography Department
College of Fine Arts
University of New South Wales
Box 259 Paddington
2021 Sydney
Australia
02.339.9662

Typhoid Mary is a pictorially rich hypertext that explores issues of sexuality, gender, and identity. Dement uses a "blood and clutter aesthetic" to oppose the slick, impersonal quality often associated with computer graphics.

The Virtual Cage

Christian Möller
Lersnerstrasse 13
6000 Frankfurt 1
Hessen, Germany
69.20.45.2

The Virtual Cage acoustically describes an architectonic space by means of a computer-controlled multi-channel audio system. A glass platform on which the viewer can walk is mounted on a mobile, hydraulically cushioned steel structure. This virtual cage is filled with a swarm-like virtual being that moves around in space according to the titled angle of the platform. The generated sound is the sound of the movement of this being.

The Vorkapitchulator

Sheldon Brown
University of California, San Diego
Visual Arts-0327
La Jolla, CA 92093-0327
619.534.2423

The Vorkapitchulator is a computer-controlled video installation that is concerned with the construction of cultural conceptions of time and space that have resulted from a century's immersion in cinematic forms. The primary element of the piece is a multi-axial, robotic sensing machine (panopticon) consisting of five black and white video cameras that travel along various axes, creating a constructed view of spatial events that corresponds to techniques in cinematic narrative montage.

Tomorrow's Realities

HALL A, CONVENTION CENTER

Sunday 5:00 pm–7:00 pm

Monday–Thursday 9:00 am–7:00 pm

Friday 9:00 am–1:00 pm

Tomorrow's realities is a specially designed, non-traditional gallery that demonstrates the latest in new and emerging technologies and establishes a framework in which to consider the social, economic, cultural, and political implications of computer graphics. The exhibits not only recognize achievements in the computer graphics industry, but also raise awareness of the impact of these technologies. Attendees explore demonstrations in hypermedia and virtual reality as these media address such issues as computers in education and the mass media, cultural dissemination, changes in language and communication, and the emerging new media literacy.

TOMORROW'S REALITIES COMMITTEE

Enrique Godreau III—Chair

Aldus Corporation

Garry Beirne

University of Toronto

Priscella Bell

*Administrative Assistant
Aldus Corporation*

David Fox

Electric Eggplant Entertainment

Colin Griffiths

Consultant

Ranjit Makkuni

Xerox PARC

Mike Sipusic

Educational Testing Service

TOMORROW'S REALITIES EXHIBITS

ALIVE: An Artificial Life Interactive Video Environment

Pattie Maes

MIT Media Lab

20 Ames Street, Room 401

Cambridge, MA 02139

617.253.7442

The ALIVE interactive installation brings together the latest technological breakthroughs in vision-based gesture recognition, physical modeling, and behavior-based computer animation.

B*rbie's Virtual Playhouse

Henry See

4371 Christophe Colomb

Montréal, Québec H2J 3G4

Canada

514.525.7810

B*rbie's Virtual Playhouse is a multi-user, low-tech virtual reality, designed to emphasize and demonstrate the importance of content over technique in the construction of coherent virtual worlds.

Books of Change: Mediations on Metamorphosis

Timothy Binkley

Institute of Computers in the Arts

School of Visual Arts

209 East 23rd Street

New York, NY 10010

212.645.0852

Books of Change is an interactive installation that invites participants to create animation flip books, presenting metamorphoses that include images of themselves.

DesignSpace

William Chapin

Center for Design Research

560 Panama Street

Stanford University

Building 530, Duena Street

Stanford, CA 94305-4026

415.723.7908

DesignSpace, a design media interpretation for a future generation, facilitates collaborative design between remote stations through a shared virtual environment medium.

Electro-Healing

JoAnn Gillerman

California College of Arts and Crafts

950 61st Street

Oakland, CA 94608

510.654.2880

Electro-Healing is a collaborative interdisciplinary interactive installation and virtual healing environment that deals with communication and new technologies.

The Exquisite Mechanism of Shivers

Bill Seaman

The College of Fine Arts

University of NSW

39 Regent Street

Paddington, NSW 2021

Australia

61.2.360.2870

The Exquisite Mechanism of Shivers is an interactive videodisk installation that combines poetic text fragments, modular music segments, and image sequences to facilitate the combination and recombination of a set of specific word/image/sound modules.

Formal Elegance and Multimodal Command Objects

Danielle Eubank

Department of Design, UCLA

1200 Dickson Art Center

Los Angeles, CA 90024

310.208.5600

This series of six posters graphically describes the role of interactive objects in Western culture. The translucent substrate of the posters serves as a transition between 3D interactive objects and their representation on light-emitting video and computer monitors.

Hands on Hawaii

Carrie Heeter

Comm Tech Lab

Michigan State University

400 Computer Center

East Lansing, MI 48824

517.353.5497

Hands on Hawaii lets users see their photo-realistic hands appear inside a photo-realistic virtual Hawaii. Users move their hands to learn about Hawaii as they touch video graphic objects and travel the islands.

An Interactive Exploration of Computer Music Research

David Waxman
IRCAM
1, Place Igor-Stravinsky
75004 Paris
France
33.1.44.78.48.20
In this exhibit the visitor participates in a series of interactive situations based on work realized at IRCAM. The system generates complex musical results from simple and intuitive interactions that shed light on compositional processes.

ITeN—Egypt Prototype Program

Lynn Holden
College of Fine Arts
Carnegie Mellon University
922 Ivy Street
Pittsburgh, PA 15232
412.268.3862
The ITeN-Egypt Prototype Program develops new interactive learning environments based on using interdisciplinary knowledge sources to provide unified and integrated learning experiences about human culture, its meaning, and evolution.

KA-O-RI

Ken Anjyo
System Engineering Division
Hitachi Ltd.
4-6 Kansa-Surugadai Chiyoda
Tokyo 101
Japan
81.3.3258.1111 x5565

This interactive computer graphics theater offers a challenging trial for making a future play or drama more exciting and interactive through real-time 3D computer graphics. The innovative effects of interactive computer graphics are displayed through a drama using actors.

Mandala—Virtual Village

Vincent John Vincent
The Vivid Group
317 Adelaide Street W, #302
Toronto, Ontario, M5V 1P9
Canada
416.340.9290

This urban design application allows two locations to mutually plan the development of a 360° panoramic virtual environment. In this exhibit users will see the social and cultural implications of interacting in a shared virtual world populated not only with intelligent users but also autonomous agents—all while using multiple interaction paradigms.

Matrix: Woman Networking

Anna Couey
Arts Wire
1077 Treat Avenue
San Francisco, CA 94110
415.826.6743
Matrix is an on-line cultural event utilizing computer networks to involve participants in interactive works by women artists who use network technologies for culturally specific and socio/economic empowerment.

Menagerie

Scott S. Fisher
Telepresence Research, Inc.
320 Gabarda Way
Portola Valley, CA 94028
415.854.4420
Menagerie allows users to become visually and aurally immersed in a 3D computer-generated environment that is inhabited by many virtual animals.

The Mohawk: A New Concept in Architectural Representation

Aurea de Souza
ACME Design
Rua Barao Da Torre
645 Apt. # 301
Rio de Janeiro, 22411
Brazil
011.55.21.239.6430
The Mohawk project makes use of hypermedia to display different kinds of information that, when put together, assume a complex result, impossible to be achieved by any media other than the computer.

NPSNET and AFIT-HOTAS: Interconnecting Heterogeneously Developed Virtual Environments

David R. Pratt
Naval Postgraduate School
Department of Computer Science
Code CS/Zk
Monterey, CA 93943-5100
408.656.2305
This joint Naval Postgraduate School/Air Force Institute of Technology demonstration shows two separately developed virtual environments interoperating using a common communications protocol, a common terrain/model/agent database, and multiple user interaction paradigms.

Plasm: A Country Walk

Peter Broadwell
The 3DO Company
1820 Gateway Drive
San Mateo, CA 94404
415.572.5297
Plasm: A Country Walk is an interactive art piece incorporating force feedback and generative imagery. Users get to take a dog for a walk through a constantly evolving landscape.

Portraits of People Living with AIDS

Hazen Reed
Hazen B. Reed Productions
65 South Sixth Street
Brooklyn, NY 11211
718.782.4084
Portraits of People Living with AIDS seeks to involve users in an active understanding of the AIDS condition. This interactive documentary introduces participants to three people living with AIDS via audio, video clips, and photography, all digitally stored.

Projecto ESE (Electronically Simulated Environment)

Gregorio Rivera and Michael Joly
LEEP Systems, Inc.
791 Tremont Street #405
Boston, MA 02118
617.859.5727
Projecto ESE is an electronically simulated architectural/landscape walk-through space—a virtual reality world of ancient Aztec temples and a contemporary museum of Mexican and Chicano art, design, and culture.

Surface Tension

Rafael Lozano-Hemmer
Transition State Theory
Modesto Lafuente 28, 3#188#A
Madrid 28003
Spain
3408.702005
341.442.1717
Surface Tension is an active and responsive environment designed to investigate the boundary between the virtual and the real. Using custom-made technology, the piece consists of interactive animation and music, triggered by dance.

Vactor Animation Creation System

Steve Glenn
Entertainment Group
SimGraphics Engineering Corporation
1137 Huntington Drive
South Pasadena, CA 91030
213.255.0900
VActors are “virtual actors,” computer-generated characters or objects whose movements are controlled by actors in real time. VActors can be used as a part of interactive attractions at live performance venues and as a more cost-effective means of producing computer animation.

Virtual Environments for Public Exhibitions

Mark Bolas
Fakespace, Inc.
4085 Campbell Avenue
Menlo Park, CA 94025
415.688.1940
This exhibit investigates the relationship between the design process and virtual environment systems. The relationship is explored in three separate categories: design with virtual environments, design for virtual environments, and design of virtual environments.

Virtual Table with Lamp

Ellen Sandor
(Art)n Laboratory/Illinois Institute of Technology
319 Wishnick Hall
3255 S. Dearborn Avenue
Chicago, IL 60616
312.567.3762
PHSColograms, shown at this exhibit, are 3D back-lit images that are created directly from digital data, and can be viewed without glasses or other 3D viewing devices.

WaveMaker: A Computer Simulation for the Classroom of Tomorrow

Freeman Deutsch
Harvard-Smithsonian Center for Astrophysics
Science Education Department
60 Garden Street MS 71
Cambridge, MA 02138
617.496.4788
WaveMaker is a highly graphical and interactive computer simulation that is used to teach about waves and oscillations. It shows the connection between waves and the sophisticated equations that describe them.

SIGKids

HALL C, CONVENTION CENTER

Monday–Thursday 9:00 am–7:00 pm

Friday 9:00 am–1:00 pm

At most education conferences, there is a lot of talk about what does, could, or should take place in the classroom. SIGGRAPH goes a step further in offering the future to a group of young students by inviting them to participate in SIGKids. Students work collaboratively in a non-hierarchical setting, exploring powerful new tools to express themselves with digital sounds and images. In an environment that stimulates and supports creativity and interactive learning, Apple, Amiga, IBM, Intel, and Silicon Graphics computers will be used with cameras, drawing pads, scanners, modems, and output through video, video-phones, modems, and videotape. Half of the projects are mentoring programs implemented specifically to be presented as models at SIGKids.

—Coco Conn, Chair

SPECIAL THANKS

Nick De Martino, Tom Earnist, Steve Luksic, Richard M. Mueller, Peter Norton, Jacquelyn E. Siminitus, Rick Smith, U.S. Department of the Interior, Pierre Zoville, ZZYX

SIGKIDS PROJECTS

Alta High School, Salt Lake City

Students from the Alta computer graphics program submitted advanced computer graphic animations to SIGKids in 1992, and join us at the conference this year.

Teacher: Wayne Tyler,
wayne.tyler@m.cc.utah.edu

Students: Tom Burton, Gary Moore, Matt Radon, Clayton Tyckson, Anthony Walker

Amazing Animation Workshop

Animation workshop for SIGKids.

Teacher: Gary Schwartz

Autodesk Mentoring Program

Students from Alta High School work with multimedia products and explore virtual reality connections with the Journey Interactive group.

Manager: Laura London, Autodesk, Inc.

Education Teacher: Will Fowler

Software: Multimedia Explorer and 3DStudio

Brave Young Artists

Young artists link up via ISDN and work on a music video using PING! (Project International Network Gateway) software.

Coordinator: Rachel Jackson

California Museum of Photography

Network exhibitions for direct museum-to-classroom delivery, visual images on the Internet to bridge higher education and the curriculum with K-12 schools, computerized image databases, and photo CD projects are demonstrated.

Senior Curator: Edward W. Earle,
edearle@ucracl.ucr.edu

Education Coordinator: Lori Fiacco

Director: Johathan Green

Designer: Kevin Boyle

Teacher: Wendy Brown

Computer Access Center

Students with and without disabilities worked together to design a mockup of a computer game that explores disabled access issues with an interactive twist.

Sponsors: Peter Norton; City of Santa Monica

Coordinator: Maryann Glicksman

Mentors: Alex Albin, Penrose Baldwin,

John Duganne, Hal Glicksman,

Amanda Goodenough, Mark Hendrix, Eileen

McMahon, Robert Ornstein, Melody Ram,

Johathon Reff

Students: Michael Baily, Jabe Cochran,

David Glicksman, Nick Feldman, Jordan Lance,

Journey Ludwig, Robert Ybarra

Designing Video Games

Eric Herot will design interactive games on site.

Mentor: Christopher Herot

Everett High School

Students at this Washington high school used Superpaint, Swivelman, and the Macintosh LC to create images for this video and art exhibit.

Teacher: Rick Wigre

Students: Lukas Allenbaugh, Gared Betty,

Gerard Lewis, Mark Mayer, Kelly Parks,

Jacob Schillinger

Explorer Post #25

This group of area high school students meets weekly with advisors from IBM. Projects include: 2D and 3D wireframe transformations and animation, wireframe morphing, fractals, and ray tracing.

Sponsors: IBM and the Boy Scouts of America

Advisor: David Zareski, IBM Kingston,

74116.2071@CompuServe.COM

Students: Paul Atzberger, Ken Post,

Saugerties High School, Woodstock NY

Good Shepherd Teen Learning Center, Washington, D.C.

A series of animation stories focuses on teens' fears and aspirations as they struggle with inner-city life.

Co-director: Ron del Sesto, rondelses@aol.com

Students: Khidar Abdul, Antonio Bell,

Frank Boney, Antoine Brown, Alfred Caulker,

Benrice Hendricks, Mike Hendricks,

Alimamy Sankoh, Michael Scott, Preston Scott

Hands-on HookUp and Bounce

This is a workshop using HookUp! with a MIDI synthesizer, modules, lighting controllers, and other devices to show how graphical programming enhances accessibility to computers and reduces "technophobia" in teachers, and how "multimedia" means more than video and audio on a computer screen.

Mentor: Gohsuke Takama,
76300.1752@CompuServe.COM

Hoffer Elementary School in Banning

Visions and words were created for this art exhibit and video with early motion devices and modern technology from the exploring minds of third-grade students.

Teacher: Robert Price

Homewood-Flossmoor High School

Students at this Illinois high school used many art programs for the Macintosh IICI.

Teacher: Lorelei Jones,
gsu0039@uxa.ecn.bgu.edu

Internet Tours: CitySpace Project

Students create an interactive cityspace, exploring the network, collecting multimedia fragments of distant neighborhoods, and assembling them as they see fit. These SIGKids are also encouraged to mock up and present their own visions of future Internet interactions.

Sponsor: Four Oaks Foundation

Mentors: Fred Gilde, Four Oaks,

freddyg@mindvox.phantom.com;

Zane Vella, zane@media.mit.edu

Journey Interactive

The Virtual Graffiti, Mandala system, and the Virtual Funhouse use a network of custom software and computers, allowing fluid expression with digital sounds and images. Input devices range from cameras to drawing pads, from scanners to modems, and output is projected via video, videophone, modems, and videotape.

Sponsor: Digital RealityLab

Directors: Claudia Lameraux, Dan Mapes,

dmedia@aol.com

Mentors: Mike Agnew, Mark Buchanan,

Craig Halpern, Claudia L'Amoreaux, Dan Mapes,

Lucia Morales, Jim Schlietett, dmedia@aol.com

Students: Kyle Ellison, Melia Hinsen-Stevens,

Danny Jansen, Zoe Mapes, Aran Meuser,

Chris Tuohig

K.Y.D.S. and The Creative Ladies

These young women artists have participated in animation classes through the Jeopardy Program supported by the Los Angeles Arts Recovery Fund. After introduction to cartoons and animation, they were given access to Amiga computers and software by Rick Smith at the Advanced Learning Center.

Mentor: Sherry Niedelman

Students: Doris Carpio, Sandra Carpio, Angela

Laspada, Toni Laspada, Brenda Panameno

Lab School of Washington

Elementary students with learning disabilities have been designing interactive stories and environments at the school for the past four years. Computer Education Consultant: Paul Kaiser, pkaiser@aol.com

Me Inside & Out

Fifth and sixth grade students make self portraits using multimedia software, photography, journal entries, drawings, music, and poetry.

Sponsor: Plugged In
Directors: Albert Green, Hope Hall

Multimedia Collaboration

Mentor: Steve Jones, Gargoyle Mechanique Lab, New York, NY, gargoyle@echo.panix.com
Student: Chloe Jones

My Place and My Sense of Space

An art picnic game invented at Hanson Place school with the Sunday outreach group.

Sponsor: Hanson Place School, Brooklyn College
Director: Richard Navin, Image and Communications Project

Native American Share Art Gallery

Using NAPLPS (North American Presentation Level Protocol Syntax) to electronically communicate words and pictures, Native American artists share their culture with the global community by connecting to the Russell County BBS.

Mentors: Cynthia Denton, cynthia@oldcolo.com; Patric Hedland, cfpvideo@well.sf.ca.us; John Ornelas, johnnyo@rhythm.com

Pacific Bell's ISDN Service Showcase

ISDN is providing SIGKids with high-speed digital access to voice, video, and screen sharing using twisted pairs.

Sponsor: Pacific Bell Public Sector
Mentors: Ignacio De La Torre, ixdelat@PacBell.com; Anna Rodriguez Sansom

Rowland High School Animation Open House

Using story-telling and collaboration, the students of Rowland High School combine traditional animation, computer graphics, and claymation.

Teachers: Don Garman, Dave Master
Students: Chris Clements, Kim Dunning, Jenett Fu, Sharan Garcia, Jeff Ho, John Kubo, Trisha Rodriguez, Raqi Syed

Rowland High School Mathematics Animated

Collaborating with their high school animation department, these students show work inspired by Jim Blinn's work on Project Mathematics.

Teachers: Ronald Woggon, Mathematics; Dave Master, Animation
Students: Roger Chung, Edison Han, Justin Min, Steve Wu, Anthony Yang

Shoes of Rage, The Battle of Gettysburg

An animation by Alex Harvill.
Mentor: Young Harvill, Macromedia

SigKids on-site Photo CD

SIGKids will be documented for a photo CD that will include images and narration.
Coordinator: Kenneth Rehor, AT&T, krehor@research.att.com

SIGKids Research Showcase

Diane Schwartz
Chair, SIGKids 93 Research Showcase
Pushing the edge in education, computer graphics, and high-impact technology, the SIGKids 93 Research Showcase is where learning is engagingly hip.

"Girls Can Do Anything"—Our young explorer enters a mirror world of imagery—the scientist, artist, mother, leader—where she learns of Career Options, meets successful women in the Hall of Fame, and jumps through the Future Mirror.

Trish Russo and Lyn Mowafy,
University of Dayton Research Institute,
russo%hrlot1.decnet@hqhsd.brooks.afb.mil

"Endangered Species"—First-grade students are shown in QuickTime MooVs giving reports on endangered species.

Organizer: Rob Wolff, Apple Computer, rswolff@apple.com
Participants: Diane Jimenez, her first-grade class at Paradise Canyon, and Quicktime videos of several first-grade students.

"Visualization and Analysis of Smog in the Los Angeles Basin"—Students from La Canada High School took basin photographs over several months, scanned them, processed them, and correlated the histograms of the images with in-situ nephelometer data and theories about photochemical smog extinction.

Organizer: Rob Wolff, Apple Computer, rswolff@apple.com
Teacher: Dave Clausen
Students: Brian Colins, Aras Mattis

"Quest for Independence"—Youths ready to leave alternate care (not parental home care) generally have not had a chance to observe and acquire independent living skills. This game provides a safe, motivating environment to explore and discover those skills.

Organizer: Clark N. Quinn, The University of New South Wales
Participants: Dana A. Kedzier and the Association of Child Welfare Agencies

"Multimedia in the Foreign-language Classroom"—Project FLAME has developed four pedagogical models for use with multimedia in the foreign-language classroom. The models provide contexts in which to use multimedia in the classroom, as well as different levels of interactivity.

Organizer: Stacie Hibino, University of Michigan, hibino@quip.eecs.umich.edu
Participants: Edna Coffin, Pamela Colquitt, Stacie Hibino, Joanna Porvin, Gonzalo Silverio

"Woggles"—This interactive animated world contains several "woggles"—autonomous creatures that blend goal-directed behavior, reactivity, emotion, perception, and smooth multi-channel motor control in a single real-time architecture.

Organizer: Professor Joseph Bates, Carnegie Mellon University
Participants: Oz And Animation Groups at Carnegie Mellon University

South Eugene High School

Sean O'Connell of Eugene, OR will bring the school's yearbook on CD-ROM, along with other projects.

Mentor: Ken O'Connell

Technologies for Youth, Inc.

This group provides multidisciplinary art education programs that focus on environmental awareness through fine art and media (including computer art) for homeless and underserved youth throughout San Diego County.

Executive Director: Meredythe Dee Winter

The TeleCommunity Project

Telecommunications technologies are used to create a virtual studio experience where art, ideas, and impressions are shared by kids at different locations.

Director: Robert Dunn, Carnegie Mellon University, rd1s+@andrew.cmu.edu
Pittsburgh participants: Melanie Carr, Project Co-director, Carnegie Museum of Art; Chris Cox, Consultant, Carnegie Mellon University; Duquesne University's MultiCultural Junior Computing Academy; The STUDIO for Creative Inquiry, Carnegie Mellon University
Software: Drew Olbrich, Carnegie Mellon University

Video Bits Render Farm

Flash Tracer software is used on a Silicon Graphics Indigo for remote rendering and retrieval of animations designed on a Macintosh.

Representative: Derek Woolverton, woolstar@gumby.cs.caltech.edu

Virtual Pets

Kealing Jr. High School, Austin, TX

This project looks at animated virtual pets and the construction of behaviors.

Mentor: Judy Sachter
Student: Ariel Sachter-Zeltzer

Vivarium Project

Student work will be available for browsing on three computers. The work chronicles the seven years of Alan Kay's Vivarium Project at the Open School in Los Angeles.

Sponsors: Los Angeles Open School, Apple Computer
Coordinator: Jane Craford, craford@applelink.apple.com
Assistants: Noah Magram, Mona Sheppard

Walt Disney Imagineering and Walt Disney Feature Animation Mentoring Program

Glendale High students create 2D and 3D animations, with guidance and expertise provided by Disney mentors.

Coordinator: Katie Poole
Teachers: Jo Blucher, Paul Diffley, Duane Hagen, Jan McCreery, Pierre Odier, Christine Rose, Sue Saul
Mentors: Linda Bel, John Beilock, Ken Copenose, David Durham, Jim Houston, Marlo Lee, Tom Mulally, Dan Philips
Students: Nick Aja, Ben Holling, Yoon-Hee Hwang, Garen Khodaverdian, Hyung Sun Kim, Lisa Kim, Daniel Lee, Rochelle Lu, James Martin, Jesus Nenu, Matt Russell, Blake Williams, Chris Yeganian

Special Interest Groups

BIRDS-OF-A-FEATHER

SIGN-UP: REGISTRATION AREA,
HALL B, CONVENTION CENTER

MEETINGS: ROOM A16, CONVENTION CENTER

Special interest groups are organized around particular products, topics, or problems. They are excellent forums for SIGGRAPH 93 attendees who share common interests and concerns to get to know each other and exchange ideas.

Special interest group meetings are usually informal, and are open to all attendees. At some, general subjects are discussed; others convene around topics related to specific product vendors. During the conference, the list of special interest groups grows larger and larger as attendees take advantage of the birds-of-a-feather program—an opportunity to call meetings that focus on last-minute ideas. To organize your own impromptu meeting, simply use the sign-up board in the registration area, Hall B, Anaheim Convention Center, where late additions and revisions to the special interest groups schedule are posted.

The following special interest groups are convening during SIGGRAPH 93. For each, the person listed can provide you with additional information after the conference.

SATURDAY, 31 JULY

SIG Local Groups
Steering Committee
3:00 pm—7:00 pm
SALON 3 & 4,
ORANGE COUNTY
BALLROOM, MARRIOTT
lgsc@siggraph.org

SUNDAY, 1 AUGUST

WAVE 93 —Wavefront
Users Conference
11:00 am —7:00 pm
VERANDA ROOM, MARRIOTT
Rhonda Sanders Olson
602.263.3939

SPEED: Technology,
Representation,
Politics
1:00 pm—4:00 pm
CARMEL ROOM, HILTON
Benjamin Bratton
805.899.4361

Interactive Computer
Graphics Technical
Committee
1:00 pm—4:30 pm
SALON 3, ORANGE COUNTY
BALLROOM, MARRIOTT
R. Belie
818.847.0800

SIGGRAPH 93 Late
Night Party
9:00 pm—4:00 am
SALON 3, ORANGE COUNTY
BALLROOM, MARRIOTT

MONDAY, 2 AUGUST

IMA Board of Directors
8:00 am—6:00 pm
SALON 5, ORANGE COUNTY
BALLROOM, MARRIOTT
Susan Dodds
410.626.1380

An Agenda for
Education in
Visualization
9:00 am—5:00 pm
CONFERENCE ROOM 9,
HILTON
Gitta Domik
49.5251.60.2605

Digital Fountain:
An Interactive
Meditation
9:00 am—5:00 pm
OCEANSIDE ROOM, HILTON
Brett Spivey
310.450.8697

Works on Paper
1:00 pm—5:00 pm
SAN SIMEON, HILTON
Pat Johnson

Interactions Magazine
Participatory Design
2:00 pm—4:00 pm
AVILA ROOM, HILTON
James Maurer
212.626.0675

3D Art Forum
International and 3D
Artist Magazine
6:00 pm—9:30 pm
GARDEN ROOM,
DISNEYLAND HOTEL
Victor Osaka
310.398.2649

SIGGRAPH 93 Late
Night Party
9:00 pm—4:00 am
SALON 3,
ORANGE COUNTY
BALLROOM, MARRIOTT

TUESDAY, 3 AUGUST

Digital Fountain: An
Interactive Meditation
9:00 am—5:00 pm
OCEANSIDE ROOM, HILTON
Brett Spivey
310.450.8697

Computer-Aided Art
and Design Educators
Network
10:30 am—12 noon
SALON 5, ORANGE COUNTY
BALLROOM, MARRIOTT
Karin Schminke
818.715.9716

YLEM/Artists Using
Science & Technology
12 noon—1:15 pm
AVILA ROOM, HILTON
Beverly Reiser
510.482.2483

Works on Paper
1:00 pm—5:00 pm
SAN SIMEON, HILTON
Pat Johnson

SIGGRAPH 93 Late
Night Party
9:00 pm—4:00 am
SALON 3, ORANGE COUNTY
BALLROOM, MARRIOTT

WEDNESDAY, 4 AUGUST

Pioneer Reception
6:00 pm—9:00 pm
VERANDA ROOM, MARRIOTT
Sherri Keowen
314.984.2392

Digital Fountain:
An Interactive
Meditation
9:00 am—5:00 pm
OCEANSIDE ROOM, HILTON
Brett Spivey
310.450.8697

International Activities
in Electronic Arts
12 noon—2:00 pm
HUNTINGTON A/B ROOM,
HILTON
Roger Molina
510.643.5636

SIGGRAPH Arts,
Design and Media
Committee
12 noon—1:30 pm
VERANDA ROOM, MARRIOTT
Jane Veeder
415.469.5474

Works on Paper
1:00 pm—5:00 pm
SAN SIMEON, HILTON
Pat Johnson

ACM SIGGRAPH
Education Committee
1:30 pm—2:30 pm
LIDO A-C ROOM, HILTON
G. Scott Owen
404.651.2245

Height Field/Terrain
Rendering
1:30 pm—3:15 pm
CONFERENCE ROOM 9/10,
HILTON
Matt Pharr
415.344.9119

Graphics Performance
Characterization
Committee
2:00 pm—3:00 pm
AVILA ROOM, HILTON
Bob Cramblitt
919.481.4599

Molecular Graphics
2:00 pm—3:30 pm
SALON 5, ORANGE COUNTY
BALLROOM, MARRIOTT
Michael Pique
619.554.9775

Arts Curriculum
Committee
2:30 pm—3:30 pm
CAPISTRANO A&B, HILTON
G. Scott Owen
404.651.2245

Computer Graphics in
Computer Science
Education
2:30 pm—3:30 pm
SALON 4, ORANGE COUNTY
BALLROOM, MARRIOTT
Jeffrey J. McConnell
716.888.2434

Open GL
3:00 pm—4:00 pm
PALOS VERDES A/B, HILTON
Mason Woo
415.390.4205

AVS Users Group
3:00 pm—5:00 pm
MANHATTAN ROOM, HILTON
Marsha Gordon
617.890.4300

University of North
Carolina at Chapel
Hill, Department of
Computer Science—
Graphics Reunion
5:30 pm—7:30 pm
SALON 1, ORANGE COUNTY
BALLROOM, MARRIOTT
Sherry Palmer
919.962.1740

NW Computer
Graphics, Art and
Design
6:00 pm—8:00 pm
MALIBU ROOM, HILTON
Ken O'Connell
503.346.3610

SIGGRAPH 93 Late
Night Party
9:00 pm—4:00 am
SALON 3, ORANGE COUNTY
BALLROOM, MARRIOTT

THURSDAY, 5 AUGUST

Digital Fountain: An
Interactive Meditation
9:00 am—5:00 pm
OCEANSIDE ROOM, HILTON
Brett Spivey
310.450.8697

PHIGS User Group
10:00 am—11:00 am
SALINAS, HILTON
Griff Hamlin
714.952.6234

SIGGRAPH T-shirt
Contest
12 noon—1:00 pm
ROOM A9 & A10,
CONVENTION CENTER
Jock Mackinlay
415.812.4335

Works on Paper
1:00 pm—5:00 pm
SAN SIMEON, HILTON
Pat Johnson

SIGGRAPH 93 Late
Night Party
9:00 pm—4:00 am
SALON 3, ORANGE COUNTY
BALLROOM, MARRIOTT

FRIDAY, 6 AUGUST

Digital Fountain: An
Interactive Meditation
9:00 am—5:00 pm
OCEANSIDE ROOM, HILTON
Brett Spivey
310.450.8697

Works on Paper
1:00 pm—5:00 pm
SAN SIMEON, HILTON
Pat Johnson

SUNDAY, 1 AUGUST

A M 7:30 8:30 9 10 12 noon 1:30 pm 2 5 7 8 P M

REGISTRATION / MERCHANDISE

7:30 am to 8:00 pm
HALL B, CONVENTION CENTER

FUNDAMENTALS SEMINAR

2:00 pm to 5:00 pm
PACIFIC A & B, HILTON

COURSES—FULL DAY 8:30 am to 5:00 pm

- 01** Character Motion Systems / ROOM A1, CONVENTION CENTER
- 02** Introduction to Scientific Visualization Tools and Techniques / ROOM A9 & A10, CONVENTION CENTER
- 03** Developing Large-scale Graphics Software Toolkits / ROOM B, WEST, CONVENTION CENTER

COURSES—HALF DAY 8:30 am to 12 noon

- 10** LAB: Programming PEX with PEXlib
ROOM A6 & A7, CONVENTION CENTER
- 11** Introduction to Volume Visualization: Imaging
Multidimensional Scientific Data
ROOM C, EAST, CONVENTION CENTER

COURSES—HALF DAY 1:30 pm to 5:00 pm

- 15** LAB: Programming PEX with PEXlib
ROOM A6 & A7, CONVENTION CENTER
- 16** Stereo Computer Graphics with Applications
to Virtual Reality
ROOM C, EAST, CONVENTION CENTER

WELCOME RECEPTION

5:00 pm to 7:00 pm
HALL A, CONVENTION CENTER

DESIGNING TECHNOLOGY

5:00 pm to 7:00 pm
HALL A, CONVENTION CENTER

MACHINE CULTURE

5:00 pm to 7:00 pm
ROOM AR1 & AR2, CONVENTION CENTER

TOMORROW'S REALITIES

5:00 pm to 7:00 pm
HALL A, CONVENTION CENTER

SMALL ANIMATION THEATER #1

10:00 am to 7:00 pm
HALL C, CONVENTION CENTER

SMALL ANIMATION THEATER #2

5:00 pm to 7:00 pm
HALL A, CONVENTION CENTER

REGISTRATION / MERCHANDISE

7:30 am to 7:00 pm
HALL B, CONVENTION CENTER

COURSES—FULL DAY 8:30 am to 5:00 pm

- 20** Computer Graphics in Visual Effects / MARRIOTT HALL, MARRIOTT
- 21** Three-dimensional Visualization Using Medical Data / ROOM C, EAST, CONVENTION CENTER
- 22** Making Radiosity Practical / ROOM B, WEST, CONVENTION CENTER
- 23** Applied Virtual Reality / PACIFIC C & D, HILTON
- 24** Graphic Design for User Interfaces / CALIFORNIA D, HILTON
- 25** Modeling, Visualizing, and Animating Implicit Surfaces / GRAND BALLROOM A–E, MARRIOTT
- 26** The OpenGL Graphics Interface / CALIFORNIA A & B, HILTON
- 27** MM: Designing Multimedia Environments for Children / ROOM B, SOUTHEAST, CONVENTION CENTER
- 28** MM: Multimedia Systems: A Guided Tour / ROOM A1, CONVENTION CENTER
- 29** MM: Concepts of Color, Video, and Compression / ROOM A9 & A10, CONVENTION CENTER

COURSES

RECEPTION

7:00 pm to 10:00 pm
KELLOGG MANSION

COURSES—HALF DAY 8:30 am to 12 noon

- 30** LAB: Programming PEX with HOOPS
ROOM A6 & A7, CONVENTION CENTER

COURSES—HALF DAY 1:30 pm to 5:00 pm

- 35** LAB: Programming PEX with PHIGS
ROOM A6 & A7, CONVENTION CENTER

DESIGNING TECHNOLOGY

9:00 am to 7:00 pm
HALL A, CONVENTION CENTER

MACHINE CULTURE

9:00 am to 7:00 pm
ROOM AR1 & AR2, CONVENTION CENTER

TOMORROW'S REALITIES

9:00 am to 7:00 pm
HALL A, CONVENTION CENTER

SMALL ANIMATION THEATERS #1 & #2

9:00 am to 7:00 pm
HALL C & HALL A, CONVENTION CENTER

SIGKIDS

9:00 am to 7:00 pm
HALL C, CONVENTION CENTER

REGISTRATION / MERCHANDISE 7:30 am to 7:00 pm
HALL B, CONVENTION CENTER

EXHIBITION 10:00 am to 6:00 pm
HALLS B-D, CONVENTION CENTER

SIGGRAPH AWARDS
8:30 am to 10:00 am
ARENA, CONVENTION CENTER

BEHIND THE SCENES
12 noon to 1:30 pm
ARENA, CONVENTION CENTER

FUNDAMENTALS SEMINAR
2:30 pm to 5:30 pm
PACIFIC A & B, HILTON

COURSES—FULL DAY 8:30 am to 5:00 pm

- 40 Modeling in Computer Graphics / GRAND BALLROOM A-E, MARRIOTT
- 41 Volume Visualization / ROOM A9 & A10, CONVENTION CENTER
- 42 Global Illumination / CALIFORNIA A & B, HILTON
- 43 Implementing Virtual Reality / ROOM A1, CONVENTION CENTER
- 44 Procedural Modeling and Rendering Techniques / CALIFORNIA D, HILTON
- 45 MM: Survey of Formal Standards for Multimedia Systems / ROOM B, WEST, CONVENTION CENTER

COURSES—HALF DAY 8:30 am to 12 noon

- 50 LAB: Programming PEX with PEXlib
ROOM A6 & A7, CONVENTION CENTER
- 51 MM: Copyright Protection for Software, Graphics, and Multimedia
ROOM B, SOUTHEAST, CONVENTION CENTER
- 52 MM: Multimedia and Multimodal Parsing
ROOM C, EAST, CONVENTION CENTER

COURSES—HALF DAY 1:30 pm to 5:00 pm

- 55 LAB: Programming PEX with PEXtk, a GL-like API
ROOM A6 & A7, CONVENTION CENTER
- 56 MM: Structured Design of Hypermedia Applications
ROOM C, EAST, CONVENTION CENTER
- 57 MM: Large Multimedia Databases
ROOM B, SOUTHEAST, CONVENTION CENTER

SIGGRAPH PAPERS

1:30 pm to 3:15 pm Surfaces PACIFIC C & D, HILTON	3:30 pm to 5:00 pm Hardware PACIFIC C&D, HILTON
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SIGGRAPH PANELS

1:30 pm to 3:15 pm Real Virtuality MARRIOTT HALL, MARRIOTT	3:30 pm to 5:00 pm Visual Thinkers in an Age of Computer Visualization: Problems and Possibilities MARRIOTT HALL, MARRIOTT
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DESIGNING TECHNOLOGY 9:00 am to 7:00 pm
HALL A, CONVENTION CENTER

MACHINE CULTURE 9:00 am to 7:00 pm
ROOM AR1 & AR2, CONVENTION CENTER

TOMORROW'S REALITIES 9:00 am to 7:00 pm
HALL A, CONVENTION CENTER

SMALL ANIMATION THEATERS #1 & #2 9:00 am to 7:00 pm
HALL C & HALL A, CONVENTION CENTER

SIGKIDS 9:00 am to 7:00 pm
HALL C, CONVENTION CENTER

ELECTRONIC THEATER
7:30 pm to 9:30 pm
ARENA, CONVENTION CENTER

REGISTRATION / MERCHANDISE 8:00 am to 6:00 pm
HALL B, CONVENTION CENTER

EXHIBITION 10:00 am to 6:00 pm
HALLS B-D, CONVENTION CENTER

COURSES—FULL DAY 8:30 am to 5:00 pm

- 60** An Introduction to Physically Based Modeling / ROOM B, WEST, CONVENTION CENTER
- 61** Film Craft in User Interface Design / CALIFORNIA A & B, HILTON
- 62** Fundamentals and Overview of Computer Graphics / CALIFORNIA D, HILTON

COURSES—HALF DAY 8:30 am to 12 noon

- 70** LAB: Programming PEX with PEXlib
ROOM A6 & A7, CONVENTION CENTER
- 71** Visualizing Planet Earth
ROOM C, EAST, CONVENTION CENTER

COURSES—HALF DAY 1:30 pm to 5:00 pm

- 75** LAB: Programming PEX with PHIGS
ROOM A6 & A7, CONVENTION CENTER
- 76** The Fundamentals of Color Desktop Publishing in Print Production
ROOM C, EAST, CONVENTION CENTER

SIGGRAPH PAPERS

8:30 am to 10:00 am
Interaction
PACIFIC C & D, HILTON

SIGGRAPH PANELS

8:30 am to 10:00 am
Updating Computer Animation: An Interdisciplinary Approach
MARRIOTT HALL, MARRIOTT
Facilitating Learning with Computer Graphics and Multimedia
ROOM A9 & A10, CONVENTION CENTER

BEHIND THE SCENES

12 noon to 1:30 pm
ARENA, CONVENTION CENTER

SIGGRAPH PAPERS

1:30 pm to 3:15 pm
Rendering Architectures
PACIFIC C & D, HILTON

3:30 pm to 5:00 pm
Virtual Reality
PACIFIC C & D, HILTON

SIGGRAPH PANELS

1:30 pm to 3:15 pm
Visualizing Environmental Data Sets
MARRIOTT HALL, MARRIOTT

3:30 pm to 5:00 pm
How to Lie and Confuse with Visualization
MARRIOTT HALL, MARRIOTT
The Application of Evolutionary and Biological Processes to Computer Art and Animation
ARENA, CONVENTION CENTER

MULTIMEDIA KEYNOTE ADDRESS

10:15 am to 12 noon
ARENA, CONVENTION CENTER

MULTIMEDIA PAPERS

1:30 pm to 3:15 pm
Communication Protocols
ROOM A9 & A10, CONVENTION CENTER

3:30 pm to 5:00 pm
Compression and Coding
ROOM A9 & A10, CONVENTION CENTER

MULTIMEDIA TOWN HALL MEETING

5:15 pm to 7:00 pm
ROOM A9 & A10, CONVENTION CENTER

MULTIMEDIA PANEL

1:30 pm to 3:15 pm
Digital Libraries of the Future
ROOM A1, CONVENTION CENTER

A Multimedia Mineral Retrieval System
ROOM A1, CONVENTION CENTER

DESIGNING TECHNOLOGY 9:00 am to 7:00 pm
HALL A, CONVENTION CENTER

MACHINE CULTURE 9:00 am to 7:00 pm
ROOM AR1 & AR2, CONVENTION CENTER

TOMORROW'S REALITIES 9:00 am to 7:00 pm
HALL A, CONVENTION CENTER

SMALL ANIMATION THEATERS #1 & #2 9:00 am to 7:00 pm
HALL C & HALL A, CONVENTION CENTER

SIGKIDS 9:00 am to 7:00 pm
HALL C, CONVENTION CENTER

ELECTRONIC THEATER

7:30 pm to 9:30 pm
ARENA, CONVENTION CENTER

REGISTRATION / MERCHANDISE 8:00 am to 6:00 pm HALL B, CONVENTION CENTER				
EXHIBITION 10:00 am to 3:30 pm HALLS B-D, CONVENTION CENTER				
COURSES—FULL DAY 8:30 am to 5:00 pm				
80 Recent Techniques in Human Modeling, Animation, and Rendering / CALIFORNIA D, HILTON				
81 An Introduction to Data Sonification / CALIFORNIA A & B, HILTON				
82 Curve and Surface Design: From Geometry to Applications / ROOM B, WEST, CONVENTION CENTER				
SIGGRAPH PAPERS				
8:30 am to 10:00 am Global Illumination PACIFIC C & D, HILTON	10:15 am to 12 noon Light and Color PACIFIC C & D, HILTON	1:30 pm to 3:15 pm Numerical Methods for Radiosity PACIFIC C & D, HILTON	3:30 pm to 5:00 pm Visibility PACIFIC C & D, HILTON	PAPERS/PANELS RECEPTION 7:00 pm to 10:00 pm GRAND BALLROOM MARRIOTT
SIGGRAPH PANELS				
8:30 am to 10:00 am Urban Tech-gap: Museum and University Liaisons— A New Electronic Bridge MARRIOTT HALL, MARRIOTT	10:15 am to 12 noon Ubiquitous Computing and Augmented Reality ARENA, CONVENTION CENTER	1:30 pm to 3:15 pm Merging 3D Graphics and Imaging— Applications and Issues MARRIOTT HALL, MARRIOTT	3:30 pm to 5:00 pm Critical Art/Interactive Art/Virtual Art: Rethinking "Computer Art" MARRIOTT HALL, MARRIOTT	SIGGRAPH TOWN HALL MEETING 5:15 pm to 7:00 pm ROOM A1, CONVENTION CENTER
Virtual Reality and Computer Graphics Programming ARENA, CONVENTION CENTER		Nan-o-sex and Virtual Seduction ARENA, CONVENTION CENTER		
MULTIMEDIA PAPERS				
8:30 am to 10:00 am Communication Systems ROOM A9 & A10, CONVENTION CENTER	10:15 am to 12 noon Media Synchronization ROOM A9 & A10, CONVENTION CENTER	1:30 pm to 3:15 pm Delay-sensitive Retrieval ROOM A9 & A10, CONVENTION CENTER	3:30 pm to 5:00 pm Video Processing ROOM A9 & A10, CONVENTION CENTER	
Hypermedia ROOM A1, CONVENTION CENTER	Multimedia Toolkits ROOM A1, CONVENTION CENTER	Using Video in Group Collaboration ROOM A1, CONVENTION CENTER		
MULTIMEDIA PANELS				
	10:15 am to 12 noon Networked Multimedia Emerging Software Architectures MARRIOTT HALL, MARRIOTT		3:30 pm to 5:00 pm Multimedia Publishing: Your Conference CD-ROM ROOM A1, CONVENTION CENTER	
DESIGNING TECHNOLOGY 9:00 am to 7:00 pm HALL A, CONVENTION CENTER				
MACHINE CULTURE 9:00 am to 7:00 pm ROOM AR1 & AR2, CONVENTION CENTER				
TOMORROW'S REALITIES 9:00 am to 7:00 pm HALL A, CONVENTION CENTER				
SMALL ANIMATION THEATERS #1 & #2 9:00 am to 7:00 pm HALL C & HALL A, CONVENTION CENTER				
SIGKIDS 9:00 am to 7:00 pm HALL C, CONVENTION CENTER				
ELECTRONIC THEATER 7:30 pm to 9:30 pm ARENA, CONVENTION CENTER				

FRIDAY, 6 AUGUST

A M 8:30 9 10 10:15 12 noon 1 1:30 pm 3:15 3:30 5 P M

OVERVIEW

REGISTRATION / MERCHANDISE 9:00 am to 1:00 pm
HALL B, CONVENTION CENTER

SIGGRAPH PAPERS

8:30 am to 10:00 am
Visualization
PACIFIC C & D, HILTON

10:15 am to 12 noon
Processing Synthetic Images
PACIFIC C & D, HILTON

1:30 pm to 3:15 pm
Techniques for Animation
PACIFIC C & D, HILTON

3:30 pm to 5:00 pm
Natural Phenomena
PACIFIC C & D, HILTON

SIGGRAPH PANELS

8:30 am to 10:00 am
Digital Illusion: Theme Park
Visualization—Part One
ARENA, CONVENTION CENTER

10:15 am to 12 noon
Digital Illusion: Theme Park
Visualization—Part Two
ARENA, CONVENTION CENTER

1:30 pm to 3:15 pm
Man vs. Mouse
ARENA, CONVENTION CENTER
Multimedia and
Interactivity in the
Antipodes
CALIFORNIA D, HILTON

3:30 pm to 5:00 pm
The Integrative Use of
Computer Graphics in a
Medical University
CALIFORNIA D, HILTON

MULTIMEDIA PAPERS

8:30 am to 10:00 am
Network Performance
ROOM A9 & A10,
CONVENTION CENTER
Authoring
ROOM A1, CONVENTION CENTER

10:15 am to 12 noon
Documents
ROOM A9 & A10,
CONVENTION CENTER

1:30 pm to 3:15 pm
Video Servers
ROOM A9 & A10,
CONVENTION CENTER
Information Access
ROOM A1, CONVENTION CENTER

3:30 pm to 5:00 pm
Collaboration Systems
ROOM A9 & A10,
CONVENTION CENTER
Support for Video
Applications
ROOM A1, CONVENTION CENTER

MULTIMEDIA PANEL
10:15 am to 12 noon
The Future of Video Dial Tone
ROOM A1, CONVENTION CENTER

DESIGNING TECHNOLOGY

9:00 am to 1:00 pm
HALL A, CONVENTION CENTER

MACHINE CULTURE

9:00 am to 1:00 pm
ROOM AR1 & AR2, CONVENTION CENTER

TOMORROW'S REALITIES

9:00 am to 1:00 pm
HALL A, CONVENTION CENTER

SMALL ANIMATION THEATERS #1 & #2

9:00 am to 1:00 pm
HALL C & HALL A, CONVENTION CENTER

SIGKIDS

9:00 am to 1:00 pm
HALL C, CONVENTION CENTER

Courses

Sunday–Thursday
8:30 am–12 noon and 1:30 pm–5:00 pm

Together, attendees and instructors investigate computer graphics and interactive technology. Whether teaching the basics or the latest in technologies and techniques, courses offer an in-depth view on a myriad of technical subjects. SIGGRAPH 93 presents full- and half-day lecture courses, and new for this year is a series of laboratory courses that provide attendees with hands-on experience. Courses are detailed beginning on page 29. Lunch is provided. Courses are documented in the SIGGRAPH93 course notes, and individual notes are included with course registration.

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. Lab courses are indicated by the word "LAB" in the title, and multimedia courses are indicated by the letters, "MM."

COURSE JURY

Rich Ehlers—Chair
Evans & Sutherland

Wendi DeHoop
Administrative Assistant

Michael Bailey
San Diego Supercomputer Center

Jeffrey J. McConnell
Canisius College

Alan Norton
IBM T.J. Watson Research Center

Scott Senften
Shell Development Company

Harry Smith
University of North Carolina

Lauretta Jones
IBM T.J. Watson Research Center

COURSE COMMITTEE

Michael Bailey
San Diego Supercomputer Center

Ed Council
Timberfield Systems

Michel Denber
Xerox Corporation

Nan Schaller
Rochester Institute of Technology

Scott Senften
Shell Development Company

LAB COURSES

A Hands-On Laboratory in Several Parts: Programming Distributed 3D Graphics with Various PEX-Capable Application Programming Interfaces (APIs)

LAB COURSES DESCRIPTION

These courses, listed throughout the courses section and indicated by the word "LAB" in the title, will provide hands-on programming experience intermixed with lecture-style instruction. Attendees experience more than just a test drive, allowing them to understand and use, not only by first-hand experience, but also by comparing and contrasting APIs on a wide range of graphics hardware systems.

OBJECTIVES

Introduce attendees to the use of PEX for distributed graphics. Compare and contrast programming methods of the various APIs and how they make use of PEX for distributed graphics. Provide first-hand familiarity with PEX in a heterogeneous network environment.

COURSES OVER-CHAIR

Marty Hess
*SunSoft, Inc., A Sun
Microsystems Business*

WHO SHOULD ATTEND

Developers of applications using 3D graphics should attend these courses to learn about programming distributed graphics via several possible APIs and the fundamentals of the rising PEXlib 3D graphics API.

PREREQUISITES

Prior C programming experience is required for all courses.

An operational understanding of the basic concepts of synthesized computer graphics images is desirable.

01 Character Motion Systems

ROOM A1, CONVENTION CENTER

SUNDAY — FULL DAY

COURSE DESCRIPTION

The goal of motion capture is to provide a low-encumbrance, highly interactive environment that will allow attendees to drive characters directly or to capture that motion information, modify it, and use it in more complex scenes. This course provides a basis for understanding the current status of divergent approaches. Capitalization of and divergences from virtual reality technologies are also discussed.

OBJECTIVES

To provide insight into current research and production techniques using motion capture systems for character animation. Motion capture systems incorporating performance, optical, magnetic, prosthetic, and mechanical technology are covered in concept and working application.

ORGANIZER

Matt Elson

LECTURERS

Brad DeGraf
Colossal Pictures

Jeff Kleiser
*Kleiser/Walczak Construction
Company*

Steve Tice
SimGraphics

Graham Walters
Pacific Data Images

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Anyone interested in motion capture techniques for use in character animation.

PREREQUISITES

Course content assumes no familiarity with motion capture systems. However, a working knowledge of computer graphics concepts and production techniques is essential.

02 Introduction to Scientific Visualization Tools and Techniques

ROOM A9 & A10, CONVENTION CENTER

SUNDAY — FULL DAY

COURSE DESCRIPTION

This course provides an introductory overview to the field of scientific visualization. Rather than describe particular visualization systems that might not be available to the attendees, the course is tailored toward useful information by approaching the subject from a data domain point of view. Actual tools and techniques for visualizing a variety of scientific data sets are presented and are also provided as part of the course notes.

OBJECTIVES

To provide a working knowledge of the concepts, techniques, and currently available tools for scientific visualization. The course is taught based on data domains rather than specific visualization systems.

ORGANIZERS

Michael Bailey
San Diego Supercomputer Center

Chuck Hansen
Los Alamos National Laboratory

LECTURERS

T. Todd Elvins
San Diego Supercomputer Center

Mike Krogh
Los Alamos National Laboratory

BEGINNING LEVEL

WHO SHOULD ATTEND

People who are looking for solutions to their particular visualization problems but who do not have sufficient knowledge of the field to guide them.

PREREQUISITES

Familiarity with scientific data sets and fundamental mathematics but no explicit previous graphics knowledge. Some previous introduction to computer graphics would be useful.

ORGANIZERS' BIOGRAPHIES

Michael Bailey is the manager of scientific visualization at the San Diego Supercomputer Center in San Diego, CA. Previously, Bailey served on the technical staff of Sandia National Laboratories and the faculty of Purdue University, and was the director of advanced development at Megatek. His areas of interest include high-performance computer graphics, scientific visualization, graphics hard copy, geometric modeling, and computer-aided mechanical design and analysis.

Chuck Hansen is project leader for visualization in the Advanced Computing Laboratory at Los Alamos National Laboratory, where he is responsible for the scientific visualization environment for the DOE High Performance Computing Research Center. His research interests include scientific visualization, computer vision, 3D shape representation, and geometry.

03 Developing Large-scale Graphics Software Toolkits

ROOM B, WEST, CONVENTION CENTER

SUNDAY — FULL DAY

COURSE DESCRIPTION

This course presents case studies in the development of large-scale software systems for computer graphics. For such large projects, there are many advantages to constructing toolkits and testbeds of frequently used software. However, designing such tools is itself a daunting task, with many consequences for the target graphics systems. Experience is given in the development of modeling, rendering, animation, and interaction systems. Design goals, successes, failures, and modifications are discussed.

OBJECTIVES

The attendee learns from the past successes and mistakes of leading researchers and software developers. Presentations make attendees aware of the "big picture" issues involved in graphics system design.

ORGANIZERS

Paul S. Strauss
Silicon Graphics Computer Systems

Ben Trumbore
Cornell University

LECTURERS

Andrew Glassner
Xerox PARC

Eben Ostby
Pixar

Robert Zeleznik
Brown University

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Software developers interested in the design and implementation of large-scale toolkits and testbeds for computer graphics.

PREREQUISITES

Familiarity with common rendering algorithms, interaction paradigms, and animation methods is recommended. Intermediate programming ability and competence in mathematics is assumed.

ORGANIZERS' BIOGRAPHIES

Paul S. Strauss is a member of the technical staff in the Visual Magic Division of Silicon Graphics. He is one of the principal architects of the IRIS Inventor 3D Graphics Toolkit. He received an ScB from Brown University, an MS from the University of California, Berkeley, and a PhD from Brown, all in computer science. His research interests include graphics application development environments, lighting models, and ray tracing.

Ben Trumbore is on the research staff of the Cornell University Program of Computer Graphics. His primary responsibility there is to coordinate the construction of a testbed for image synthesis that supports rendering research and image/animation production. His research interests include realistic image synthesis, efficient algorithms, and rendering extremely complex environments.

10 LAB: Programming PEX with PEXlib (also offered on Tuesday as course #50)

ROOM A6 & A7, CONVENTION CENTER

SUNDAY — HALF DAY — AM

COURSE DESCRIPTION

Attendees will receive introductory instruction on using the PEXlib 3D graphics API. Ample time will be allocated for working on simple programs that demonstrate the capabilities of PEX and PEXlib. Some time will be allocated for exploring other sample programs.

OBJECTIVES

To introduce attendees to the extensive benefits of PEXlib. To prepare attendees for other "Programming with PEX" courses, especially the intermediate PEXlib course number 15/70.

ORGANIZER

Marty Hess
SunSoft, Inc.

LECTURER

Jeff Stevenson
Hewlett-Packard Company

BEGINNING LEVEL

WHO SHOULD ATTEND

Developers of applications using 3D graphics should attend this course to learn about programming distributed graphics via several possible APIs and the fundamentals of the PEXlib 3D graphics API.

PREREQUISITES

Prior C programming experience is required. Familiarity with PEX, PHIGS, or other 3D graphics interface concepts is desirable, but not required.

LECTURER BIOGRAPHY

Jeff Stevenson has been at Hewlett-Packard (HP) since 1984 where nearly all of his work has been in the area of window and graphics subsystems. He has been a technical contributor at HP since 1989. He was a member of the original multi-vendor PEX architecture team formed in 1987 and has been involved with PEX throughout the past six years, both in industry definition and in HP implementation. Stevenson was a speaker in the SIGGRAPH '90 PEX tutorial and has been involved with SIGGRAPH PEX demonstrations in the vendor exhibits since 1988. In September of 1991, Stevenson accepted the position of chief architect and document editor for the standard PEXlib definition being developed by the MIT X Consortium. And, in June of 1992, he accepted the position of chief architect for the PEX standard. He has a BS in computer science from the University of Idaho.

11 Introduction to Volume Visualization: Imaging Multidimensional Scientific Data

ROOM C, EAST, CONVENTION CENTER

SUNDAY — HALF DAY — AM

COURSE DESCRIPTION

Volume visualization, which works equally well for both acquired and simulation-generated data, is a powerful computer graphics method used to gain insight into 3D data sets. This course introduces fundamental volume visualization concepts and algorithms.

OBJECTIVES

To enable attendees to immediately begin creating images from data. Through examples of volume visualization concepts, techniques, tools, and the latest advances in the field, attendees learn the various steps of the process of volume visualization, including data reconstruction, data exploration and classification, surface and direct-volume rendering, shading, and display. At the end of the course, attendees will be able to explain fundamental volume visualization methods and applications to others.

ORGANIZER/LECTURER

T. Todd Elvins
San Diego Supercomputer Center

BEGINNING LEVEL

WHO SHOULD ATTEND

Computer graphics programmers, scientists, physicians, researchers, engineers, and anyone who wants to learn about using volume visualization to gain insight into multidimensional data.

PREREQUISITES

The typical attendee will have had very little exposure to volume visualization techniques, but should be familiar with scientific data and fundamental mathematics. Some exposure to computer graphics would be useful.

ORGANIZER BIOGRAPHY

Todd Elvins is an associate staff visualization programmer at the San Diego Supercomputer Center (SDSC) in San Diego, CA. He works in a group of software engineers and animators who research new computer graphics techniques that allow scientists to gain greater insight into a broad variety of scientific problems. Elvins has also been involved in the design and implementation of the SDSC Advanced Scientific Visualization Laboratory and has participated in collaborative visualization projects with some of the 3,000 SDSC users.

15 LAB: Programming PEX with PEXlib (also offered on Wednesday as course #70)

ROOM A6 & A7, CONVENTION CENTER

SUNDAY — HALF DAY — PM

COURSE DESCRIPTION

To introduce the mechanisms PEX provides for modeling, lighting, and shading, and to discuss their uses and limitations. Attendees learn by use of programming examples how to model, light, and shade with PEXlib, and the effects that different controls have on the quality and composition of the final image.

OBJECTIVES

To introduce attendees to the use of the PEX advanced rendering features.

ORGANIZER

Marty Hess
SunSoft, Inc.

LECTURER

Tom Gaskins
Sound Software Development

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Graphics application programmers who desire an introduction to the advanced rendering features of modeling, lighting, and shading using the PEXlib API.

PREREQUISITES

Prior C programming experience is required. Familiarity with 3D graphics methods such as the use of modeling transforms will be helpful. Attendance in the beginning level "Programming PEX with PEXlib" course (number 10/50) or an existing familiarity with PEX and PEXlib is suggested.

LECTURER BIOGRAPHY

Tom Gaskins has been designing, writing, and using graphics software for more than 10 years. He is the author of *PEXlib Programming Manual*, published by O'Reilly & Associates, and the current document editor of the PEX Protocol Specification. Gaskins also serves as a SunSoft representative to the X Consortium's PEX Committee.

16 Stereo Computer Graphics with Application to Virtual Reality

ROOM C, EAST, CONVENTION CENTER

SUNDAY — HALF DAY — PM

COURSE DESCRIPTION

This course presents an introduction to depth perception and techniques for generation of stereoscopic interface issues. Topics include introduction to depth perception, computation of stereo images, and stereoscopic interface issues. Many examples of stereo images will be shown.

OBJECTIVES

To provide an introduction to the rapidly growing area of stereo computer graphics and to introduce the attendees to some of the issues in creating stereo computer graphics.

ORGANIZERS/LECTURERS

Lou Harrison
David F. McAllister
North Carolina State University

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

This course is aimed at computer graphics professionals and others who need a "true" 3D representation to disambiguate depth information and detail in complex models.

PREREQUISITES

Knowledge of the fundamentals of computer graphics.

ORGANIZERS' BIOGRAPHIES

Lou Harrison received his BS and MS in computer science from North Carolina State University (NCSU) in 1987 and 1990, respectively. He has taught courses in operating systems and computer graphics and is currently employed as a software systems manager for the department of computer science at NCSU while pursuing his PhD. He has done research in surface generation for computer-aided milling, autostereoscopic display technology, and lossy compression techniques applied to stereo images. His interests are in the stereoscopic aspects of multidimensional visualization.

David F. McAllister is a professor of computer science at North Carolina State University in Raleigh, NC. He received his BS in mathematics from the University of North Carolina (UNC) at Chapel Hill in 1963, his MS in mathematics from Purdue University in 1967, and his PhD in computer science from UNC-Chapel Hill in 1972. His interest in 3D technologies began in 1985 with a grant to study the state of the art of 3D for the Defense Mapping Agency. He has presented several tutorials in 3D technologies.

20 Computer Graphics in Visual Effects

MARRIOTT HALL, MARRIOTT

MONDAY — FULL DAY

COURSE DESCRIPTION

This course will introduce the audience to the visual effect process, discuss how computer graphics applications are used in feature films and commercials, and cover the impact of new digital technology in the visual effects industry. Speakers will use examples from "Terminator 2," "Death Becomes Her," "Stay Tuned," and "Batman Returns," as well as several commercials. The course also explores the extraordinary metamorphosis occurring in the industry driven by advances in computer graphics technology.

OBJECTIVES

Attendees learn about the techniques and methodology used to create high-end visual effects for motion picture and television applications.

ORGANIZERS

Lincoln Hu
Douglas S. Kay
Industrial Light & Magic

LECTURERS

Charlie Gibson
Rhythm & Hues

Richard Hollander
Video Image

Dennis Muren
Douglas B. Smythe
Industrial Light & Magic

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Anyone interested in the application of computer graphics in visual effects.

PREREQUISITES

A general knowledge of advanced graphics and animation techniques is recommended.

ORGANIZERS' BIOGRAPHIES

Lincoln Hu is a senior technical director at Industrial Light & Magic (ILM) and has been with ILM's Computer Graphics Department since its formation. His motion picture projects include "Star Trek IV: The Voyage Home," "Empire of the Sun," "Willow," "The Abyss," "Ghost," "Terminator 2: Judgment Day," and "Death Becomes Her." He is involved in development projects in modeling, animation, compositing, and film scanning and recording. Hu has a BS and MS in computer science from Columbia University.

Douglas S. Kay is the senior manager of the Computer Graphics/Digital Department at Industrial Light & Magic. Since joining ILM in 1985, he has been involved in the films, "Willow," "Young Sherlock Holmes," "Star Trek IV: The Voyage Home," "Indiana Jones and the Last Crusade," and the Academy Award-winning "The Abyss" and "Terminator 2," as well as the Star Tours and Body Wars rides for Disneyland and Epcot Center, and a number of award-winning television commercials. He has a BS in computer science and an MS in computer graphics from Cornell University.

21 Three-dimensional Visualization Using Medical Data (3D Medical Visualization from Acquisition to Application)

ROOM C, EAST, CONVENTION CENTER

MONDAY — FULL DAY

COURSE DESCRIPTION

This course will address current techniques for approaching the fundamental problem of visualization: extracting information from 3D volumetric data. The problem is treated as a pipeline from acquisition to display, pointing out inherent problems along the way. The course includes presentation, classification, and surface and volume rendering. Several examples of medical visualization in clinical studies are presented.

OBJECTIVES

Attendees learn about current techniques for overcoming inherent obstacles in generating visualizations of 3D data. These techniques will be studied using medical data to meet clinic objectives.

ORGANIZERS

Henry Fuchs
Terry S. Yoo
University of North Carolina at Chapel Hill

LECTURERS

Elliot Fishman
Derek Ney
The Johns Hopkins Medical Institutions

Pat Hanrahan
Princeton University

Ron Kikinis
Harvard Medical School

William Lorensen
General Electric Corporation

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Scientists interested in understanding current visualization techniques or graphics researchers interested in applying their expertise to questions in visualization.

PREREQUISITES

Familiarity with one of: image processing methods, basic computer graphics, or medical terminology. Several image analysis techniques, rendering algorithms, and clinical applications will be presented.

22 Making Radiosity Practical

ROOM B, WEST, CONVENTION CENTER

MONDAY — FULL DAY

COURSE DESCRIPTION

Formulations, implementations, and applications of radiosity methods are presented. Radiosity methods compute light interreflections to render physically accurate images. Rather than covering the complete research literature, practical implementation issues and applications are emphasized. The organization of solutions, meshing, inclusion of non-diffuse effects, perceptual mappings, and applications are highlighted.

OBJECTIVES

To communicate the basics of formulating and implementing radiosity methods. Attendees will come away with an understanding of the strengths, weaknesses, techniques for improving implementation and practical applications, and potential applications of radiosity methods.

ORGANIZER

Holly E. Rushmeier
*National Institute of Standards
and Technology*

LECTURERS

Christoph Borel
*Los Alamos National
Laboratory*

Michael F. Cohen
Pat Hanrahan
Princeton University

Julie Dorsey
Cornell University

Campbell McKeller
CRL, Ltd.

Rod Recker
*Lightscape Graphics Software,
Ltd.*

Francois X. Sillion
Ecole Normale Supérieure

John R. Wallace
3D/EYE, Inc.

Dieter Zembrot
Zumtobel Licht GmbH

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Anyone interested in implementing or applying the radiosity method for image synthesis. Potential application areas include illumination design, product design, remote sensing, and machine vision.

PREREQUISITES

Familiarity with elementary calculus is assumed. A general knowledge of computer graphics display algorithms is helpful.

ORGANIZER BIOGRAPHY

Holly E. Rushmeier is on the staff of the Computing and Applied Mathematics Laboratory at the National Institute of Standards and Technology. She received her BS (1977), MS (1986), and PhD (1988) degrees in mechanical engineering from Cornell University. Following receipt of her BS degree she worked as an engineer at the Boeing Commercial Airplane Company and at the Washington Natural Gas Company (both in Seattle, WA). Upon completion of her PhD, she served on the mechanical engineering faculty at the Georgia Institute of Technology, where she was the recipient of an NSF Presidential Young Investigator award. She is the author of articles in the fields of computer graphics and radiative heat transfer. Her research interests include computer graphics, synthetic image generation, scientific visualization, and radiant heat transfer.

23 Applied Virtual Reality

PACIFIC C & D, HILTON

MONDAY — FULL DAY

COURSE DESCRIPTION

This course surveys the field of virtual reality (VR); it provides an overview of systems, techniques, paradigms, and physio-psychological implications of VR from a designer's perspective. It describes current virtual reality interfaces, as well as multisensory immersive applications of VR and discussions of their design processes.

OBJECTIVES

The course provides an understanding of what is involved in the process of designing virtual experiences. It is oriented toward "what is it about," not "how is it done." The attendees learn about the integration of hardware, software, and design factors to create convincing virtual experiences.

ORGANIZER

Carolina Cruz-Neira
*University of Illinois at
Chicago*

LECTURERS

Robin Bargar
*National Center for
Supercomputing Applications*

**Frederick P. Brooks,
Jr.**
*University of North Carolina at
Chapel Hill*

Sumit Das
Daniel Sandin
*University of Illinois at
Chicago*

Scott Fisher
Telepresence Research Inc.

James Helman
*Silicon Graphics Computer
Systems*

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Designers, scientists, software engineers, product developers, artists, managers, and anyone interested in obtaining a general understanding of the concepts and the design methodologies for effective virtual reality environments.

PREREQUISITES

Basic knowledge of computer graphics and computer animation is assumed. Familiarity with interactive graphics, real-time concepts, and parallel programming is recommended.

ORGANIZER BIOGRAPHY

Carolina Cruz-Neira is a PhD student at the Electronic Visualization Laboratory (EVL) at the University of Illinois at Chicago. Her PhD research involves the design and implementation of the CAVE, a surround-screen projection-based virtual reality system. She is developing paradigms to integrate computationally intensive applications in the CAVE environment. She has had summer internships with IBM Wall Street and the Chicago Board of Trade. Prior to coming to EVL, Cruz-Neira worked as a researcher at Teleprovenca, a large Venezuelan computer systems company, coordinating several projects in computer graphics and computer interfaces. She received her master's degree in computer science at EVL at the University of Illinois at Chicago and her undergraduate degree in systems engineering at the Universidad Metropolitana in Caracas, Venezuela.

24 Graphic Design for User Interfaces

CALIFORNIA D, HILTON

MONDAY — FULL DAY

COURSE DESCRIPTION

Skillful graphic design for user interfaces is crucial to the success of innovative computer-based products, especially as computers become absorbed into consumer products intended for diverse, international user communities. The course introduces terminology, principles, guidelines, and heuristics for using information-oriented, systematic graphic design in user interfaces, especially for the design of metaphors, mental models, navigation schema, icons, and dialog boxes.

OBJECTIVES

To introduce participants to terminology, theory, case studies, and design process. To provide practical guidance for research and for commercial product development. To provide hands-on experience through simple pen-and-paper exercises.

ORGANIZER

Aaron Marcus
Aaron Marcus and Associates

LECTURERS

Wolfgang Heidrich
Grant Letz
Aaron Marcus and Associates

BEGINNING LEVEL

WHO SHOULD ATTEND

Product developers, software engineers, marketers, scientists, members of technical staff, application developers, human factor specialists, technical editors, and graphic or industrial designers.

PREREQUISITES

Some exposure to graphical user interfaces is helpful.

ORGANIZER BIOGRAPHY

Aaron Marcus is an internationally recognized authority on graphic design for computer graphics, especially chart, form, document, icon, and screen design. Marcus has given knowledge visualization, user interface design, and document design courses at SIGCHI, SIGGRAPH, and NCGA conferences in addition to courses at companies and conferences in the USA, Australia, Canada, Europe, Israel, Singapore, and Japan. He and his staff have designed and evaluated user interfaces, knowledge visualization, and electronic publishing/presentations for many major organizations.

25 Modeling, Visualizing, and Animating Implicit Surfaces

GRAND BALLROOM A–E, MARRIOTT

MONDAY — FULL DAY

COURSE DESCRIPTION

Implicit surfaces are useful in constructing complex models, blending surfaces, and visualizing volumetric data. They have increased in popularity these past few years, as evidenced by numerous publications and several commercial ventures. This course will summarize recent developments as well as review fundamental design and visualization techniques for implicit surfaces. The material will be presented by experienced researchers from academia and industry using extensive slide and video material as well as live demonstrations. A substantial set of course notes will accompany the course. This is a revised and updated version of the SIGGRAPH '90 course.

OBJECTIVES

To introduce scientists, designers, animators, and computer graphics programmers to the advantages and techniques of implicit surfaces.

ORGANIZERS

Jules Bloomenthal
Xerox PARC

Brian Wyvill
University of Calgary

LECTURERS

Chandrajit Bajaj
Purdue University

Thad Beier
Pacific Data Images

Jim Blinn
California Institute of Technology

John Hart
Washington State University

Geoff Wyvill
University of Otago

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Engineers and designers involved with computer-aided design, scientists involved with visualization, and animators and programmers who use or build computer animation or geometric modeling tools. Anyone who wishes to know more about this increasingly popular area of computer graphics.

PREREQUISITES

A knowledge of elementary algebra and interactive computer graphics is all that is required. The lectures will develop sophisticated techniques given relatively simple principles.

ORGANIZERS' BIOGRAPHIES

Jules Bloomenthal studied computer graphics at the University of Utah and subsequently conducted research at the New York Institute of Technology and Xerox PARC. He has published several papers on the use of implicit surfaces in modeling natural forms.

Brian Wyvill is a professor at the University of Calgary where he leads the Graphics Jungle research group. In addition to publishing several papers on modeling and animation, he has directed several animations (two shown at SIGGRAPH) that feature implicit surfaces.

26 The OpenGL Graphics Interface

CALIFORNIA A & B, HILTON

MONDAY — FULL DAY**COURSE DESCRIPTION**

The OpenGL graphics interface is a multi-vendor-supported, interactive 3D graphics procedural interface. By mid-1993, OpenGL implementations will be available from major workstation vendors and shortly thereafter in personal computer environments. OpenGL provides access to 3D graphics capabilities, including transformation, lighting, clipping, and z-buffering. This course provides information on the programming interface, the rendering model and rendering controls, and on how OpenGL fits within both the X Window System and the Microsoft Windows environments.

OBJECTIVES

To teach attendees how to write simple interactive 3D applications using OpenGL in either the X or Windows environment and how to begin writing OpenGL programs that take advantage of advanced features such as anti-aliasing and texture mapping.

ORGANIZER

Randi J. Rost
Kubota Pacific Computer, Inc.

LECTURERS

Kurt Akeley

Mark Segal

Mason Woo

Silicon Graphics Computer Systems

On Lee

Microsoft Corporation

INTERMEDIATE LEVEL**WHO SHOULD ATTEND**

This course is intended primarily for programmers who are interested in writing interactive 3D applications on graphics workstations or PCs. People interested in implementing OpenGL or porting it to another environment may also find the material helpful.

PREREQUISITES

Some experience programming in C and a working knowledge of 3D computer graphics. The course does not cover viewing, anti-aliasing, or texture mapping in any detail, other than to explain how they are supported by the OpenGL interface. Programming experience with another 3D graphics library is recommended, and experience with a previous version of GL is a bonus.

ORGANIZER BIOGRAPHY

Randi Rost is chief architect for graphics software at Kubota Pacific Computer, Inc. (KPC) and is responsible for leading the design and implementation of rich and flexible software environments for KPC's high-performance graphics and imaging systems. Rost is also responsible for participating in emerging graphics standards efforts and developing technology relationships with other organizations. Prior to joining KPC, Rost was a principal engineer in Digital Equipment Corporation's Palo Alto-based workstation engineering group. He was one of the chief architects for PEX and then served as the PEX document editor for four years. He participated in the design of both OpenGL and the Graphics Performance Characterization Committee's Picture Level Benchmark.

27 MM: Designing Multimedia Environments for Children

ROOM B, SOUTHEAST, CONVENTION CENTER

MONDAY — FULL DAY**COURSE DESCRIPTION**

Participants explore the special challenges and global implications of designing multimedia environments for children through lectures and hands-on design sessions. Elementary school children join participants in designing/prototyping new multimedia environments. Participants are given an historical perspective and actual design experience.

OBJECTIVES

To teach attendees about past, present, and emerging multimedia environments for children, and to allow them to use this knowledge in designing and prototyping new multimedia environments for children.

ORGANIZERS/LECTURERS

Allison Druin
Scitex America

Cynthia Solomon
Wheeling Jesuit College

BEGINNING LEVEL**WHO SHOULD ATTEND**

Educators and other professionals who are, or would like to be, actively engaged in designing multimedia environments for children.

PREREQUISITES

The course is easy to follow due to its survey lecture format. However, it includes some hands-on design sessions with elementary school children, so prior experience with children is helpful.

ORGANIZERS' BIOGRAPHIES

Allison Druin is recognized for her work in developing multimedia environments for children. She is best known for NOOBIE, a five-foot computer/Muppet creature that replaces the mouse and keyboard. This was developed while she was a master's student at the Massachusetts Institute of Technology Media Lab with support from Apple Computer's Vivarium Research Group. For the past three years she has taught elementary school children part time and consulted for various educational institutions.

Cynthia Solomon is known for her work in developing Logo, a language and computer culture for children, and Logo environments that include the integration of graphics, animation, and sound. She was formerly the head of Atari Research Labs, where the research included technologies such as force feedback, touch sensitivity, and gestural recognition. Today she is the director of educational technologies for the NASA Classroom of the Future, a research group developing multimedia computer classrooms.

28 MM: Multimedia Systems: A Guided Tour

ROOM A1, CONVENTION CENTER

MONDAY — FULL DAY

COURSE DESCRIPTION

This course provides an introductory overview of client (end user) workstation architecture, network and server architecture, synchronization, group ware and video conferencing, application and tools, and commercial systems for supporting multimedia.

OBJECTIVES

To provide an in-depth survey of the state of the art in multimedia systems, with special emphasis on system design issues and implications for clients, servers, and multimedia-enabled services.

ORGANIZERS/LECTURERS

Borko Furht
Florida Atlantic University

Milan Milenkovic
IBM Corporation

BEGINNING LEVEL

WHO SHOULD ATTEND

Anyone interested in receiving an overview of the state of the art in multimedia systems.

PREREQUISITES

This course assumes little or no familiarity with multimedia systems.

ORGANIZERS' BIOGRAPHIES

Borko Furht is a professor of computer science and engineering at Florida Atlantic University (FAU) and founder and director of its multimedia laboratory. Prior to joining FAU, he was a senior director of research and development at Modcomp. He was a key strategist and technical leader in developing a line of real-time supercomputers and the Real/Star family of real-time UNIX operating systems. He is co-author of the IEEE Tutorial on Computer Architecture and author of the book, *Real-Time UNIX Operating Systems: Design and Application Guide*.

Milan Milenkovic is a project leader in IBM's Multimedia Networking group in Boca Raton, FL. He is the architect and project leader of a multimedia prototype and testbed built to explore system design and high-speed conductivity issues in networked multimedia systems. Prior to joining IBM, Milenkovic was a faculty member at Southern Methodist University and at the University of Massachusetts. His research is on operating systems, computer architecture, and distributed computing. His books include a monograph on concurrence control in distributed databases and an advanced college text, *Operating Systems: Concepts and Design*.

29 MM: Concepts of Color, Video, and Compression

ROOM A9 & A10, CONVENTION CENTER

MONDAY — FULL DAY

COURSE DESCRIPTION

This course introduces the concepts of digital imaging that are central to multimedia: the capture of color imagery from real life, the digitization of images, the portrayal of motion, coding as video signals or data, and digital compression and decompression. Both naive and technical questions are encouraged.

OBJECTIVES

Attendees gain an understanding of the tradeoffs that must be made among image quality, performance, and media (storage) capacity when creating multimedia.

ORGANIZER

Charles A. Poynton
Sun Microsystems Computer Corporation

LECTURERS

Dave Farber
Sonrisa

Adriaan Lightenberg
Storm Technology

E. Fraser Morrison
Ampex Corporation

BEGINNING LEVEL

WHO SHOULD ATTEND

Systems designers, interface designers, video artists, programmers, and managers seeking to understand how color images (both still and moving) are represented, stored, and processed digitally.

PREREQUISITES

Attendees should have some hands-on experience with computers and images, and not be frightened by diagrams, graphs, or a few equations.

ORGANIZER BIOGRAPHY

Charles A. Poynton is a staff engineer at Sun Microsystems Computer Corporation, where he is working to integrate video technology, particularly high-definition television and accurate color reproduction, into computer workstations. Poynton was recently elected a Fellow of the Society of Motion Picture and Television Engineers (SMPTE), and is an active participant in a number of SMPTE standards committees. He organized the SIGGRAPH '91 course, "High-definition Television (HDTV) Technology," and contributed chapter 2, "The Current State of HDTV," to the recent book, *The New TV: A Comprehensive Survey of High-definition Television*.

30 LAB: Programming PEX with HOOPS

ROOM A6 & A7, CONVENTION CENTER

MONDAY — HALF DAY — AM

COURSE DESCRIPTION

Attendees will be introduced to the HOOPS high-level declarative graphics API. HOOPS will be contrasted with lower-level interfaces such as PEXlib, PHIGS, and GL. Programming examples will be used to illustrate the simplicity, structure, and functionality of the HOOPS declarative interface, as well as to show the use of HOOPS in a PEX distributed graphics environment.

OBJECTIVES

To demonstrate, through real code examples, use of the HOOPS declarative programming paradigm in a PEX distributed graphics environment. Additionally, attendees will learn how to use some of the added functionality of HOOPS, such as radiosity and ray tracing.

ORGANIZER

Marty Hess
SunSoft, Inc.

LECTURERS

Milt Capsimalis
Billy Hsu
Brian Mathews
Gary Wayne
Ithaca Software

BEGINNING LEVEL

WHO SHOULD ATTEND

Technical professionals who are 3D graphics application developers interested in using the high-level HOOPS graphics programming interface as their graphics API.

PREREQUISITES

Prior C programming experience is required, along with an operational understanding of basic concepts of synthesized computer graphics.

LECTURERS' BIOGRAPHIES

Milt Capsimalis, Billy Hsu, and Brian Mathews are members of the technical staff at Ithaca Software, involved in the design and development of the HOOPS graphics system.

Gary Wayne is a founder of Ithaca Software and is vice president of market development.

35 LAB: Programming PEX with PHIGS (also offered on Wednesday as course #75)

ROOM A6 & A7, CONVENTION CENTER

MONDAY — HALF DAY — PM

COURSE DESCRIPTION

After a review of the basics of the standard PHIGS API, 3D graphics application developers will be introduced to the advantages of distributed graphics via PEX through the PHIGS API. Program examples will make use of PEX through the PEX Sample Implementation (PEX-SI) PHIGS C language binding.

OBJECTIVES

Upon completion of the course, attendees should understand the capabilities of PHIGS well enough to compare and contrast it with other graphics APIs in order to decide which API is best suited for their application.

ORGANIZER

Marty Hess
SunSoft, Inc.

LECTURER

Michael M. Heck
Template Graphics Software

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Technical professionals who are 3D graphics application developers with an interest in utilizing PHIGS as their graphics API.

PREREQUISITES

Prior C programming experience is required, along with an operational understanding of the basic concepts of synthesized computer graphics.

LECTURER BIOGRAPHY

Michael M. Heck is vice president of Research and Development at Template Graphics Software Inc. (TGS). He has been involved in the design and implementation of computer graphics software since 1980, focusing on the problem of providing both device independence and performance. He was a member of the ANSI committee that defined the PHIGS standard, and was technical editor of *Understanding PHIGS*, the first book about the standard. Heck was also chief architect of FIGARO+, the first portable implementation of PHIGS. He is currently managing the development of a family of PHIGS/PEX-based productivity products that support X, PEX, GL, XGL, Starbase, and many other device interfaces. He continues to believe that the "P" in PEX stands for PHIGS.

40 Modeling in Computer Graphics

GRAND BALLROOM A-E, MARRIOTT

TUESDAY — FULL DAY

COURSE DESCRIPTION

This course gives a global overview of shape modeling in computer graphics. It presents a comprehensive framework that encompasses both algorithmic and geometric modeling in a unified and coherent way. The foundations of the area are revisited in an integrated form, with emphasis on the theory, the main problems, and their solutions.

OBJECTIVES

To introduce a new approach that unifies the problems of shape modeling, and to give the audience a solid, conceptual understanding of the area as a whole.

ORGANIZER

Jonas de Miranda Gomes

Institute of Pure and Applied Mathematics

LECTURERS

Christoph Hoffmann
Purdue University

Vadim Shapiro
General Motors Research Laboratories

Luiz Carlos Velho
Institute of Pure and Applied Mathematics/University of Toronto

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Researchers, educators, designers, users of modeling systems, and all those who want to gain a more conceptual view of the current state of shape modeling for computer graphics.

PREREQUISITES

The course revisits the problem of shape modeling from a conceptual point of view. It assumes prior knowledge of the main modeling techniques. Many examples provide a concrete view of the different modeling paradigms.

ORGANIZER BIOGRAPHY

Jonas de Miranda Gomes received a PhD in mathematics from the Institute of Pure and Applied Mathematics (IMPA), Rio de Janeiro in 1984. De Miranda Gomes worked as the research and development manager of the computer graphics group at Globo TV Network from 1984 to 1988. In 1989, he returned to academia and has since been involved in research and education. He is the co-author of three books and has published several papers in the areas of modeling and image processing. The computer graphics group he started at IMPA has given a noticeable contribution to the development of computer graphics in Brazil with original research, publication of books, and organization of scientific meetings.

41 Volume Visualization

ROOM A9 & A10, CONVENTION CENTER

TUESDAY — FULL DAY

COURSE DESCRIPTION

Volume visualization is a key technology for visualizing 3D-sampled, simulated, and synthetic data sets. This course provides an overview of nomenclature, technology, and techniques, with an emphasis on algorithms, software tools, and the associated applications. The course covers different approaches in object extraction, volume viewing, volume shading, volume synthesis, commercially available software, and applications. Slides, videos, and live demonstrations illustrate state-of-the-art techniques.

OBJECTIVES

In this course, attendees become familiar with the technology and several major applications, understand the available tools and techniques, and recognize the challenges confronting this emerging field. Attendees will leave the course with a broad knowledge in all major issues of volume visualization.

ORGANIZER

Arie Kaufman
State University of New York at Stony Brook

LECTURERS

Scott Dyer
Lamb & Company

William Lorensen
General Electric Corporation

Ulf Tiede
University Hospital Hamburg-Eppendorf

William L. van Zandt
Vital Images, Inc.

Roni Yagel
The Ohio State University

INTERMEDIATE LEVEL

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.

PREREQUISITES

Course material is moderately difficult, due to the level of detail of the algorithms and methodologies. Basic knowledge of hidden-surface methods, rendering models, and computer organization is recommended.

ORGANIZER BIOGRAPHY

Arie Kaufman is a professor of computer science and the director of the Cube project for volume visualization at the State University of New York at Stony Brook. He is currently the chair of the IEEE Computer Society Technical Committee on Computer Graphics. Kaufman has been the program/papers co-chair for Visualization 1990-93 Conferences and the ACM Volume Visualization '92 Workshops. He has worked in computer graphics for 19 years, specializing in volume visualization, computer graphics architectures, algorithms and languages, user interfaces, and multimedia. He has lectured widely, has received many grants and awards, holds several patents, and has published numerous technical papers and manuscripts in these areas (including the tutorial book, *Volume Visualization*).

42 Global Illumination

CALIFORNIA A & B, HILTON

TUESDAY — FULL DAY

COURSE DESCRIPTION

This course investigates global illumination (light scattering in 3D scenes) and current simulation algorithms, including both radiosity and ray tracing. Mathematical tools such as integral equations, finite element methods, and Monte Carlo techniques are explained, and algorithms such as importance-driven radiosity, discontinuity meshing, and luminaire sampling are described.

OBJECTIVES

To give attendees the ability to understand recent research in the area of global illumination and to extend recent methods.

ORGANIZER

Paul Heckbert
Carnegie Mellon University

LECTURERS

Jim Arvo
Cornell University

Tomoyuki Nishita
Fukuyama University

Peter Shirley
Indiana University

ADVANCED LEVEL

WHO SHOULD ATTEND

Researchers and programmers working in any area of science or engineering (not just graphics!) who are interested in understanding global illumination at an advanced level.

PREREQUISITES

Knowledge of calculus and an interest in advanced numerical techniques is essential. Some familiarity with radiosity and ray tracing algorithms would help.

ORGANIZER BIOGRAPHY

Paul Heckbert is an assistant professor of computer science at Carnegie Mellon University. For his BS degree in mathematics at MIT, he developed algorithms for color image quantization, and at the New York Institute of Technology and Pixar, he developed software for computer animation. Heckbert received Master's and PhD degrees in computer science from the University of California at Berkeley in the topics of texture mapping and global illumination, respectively. His research interests are computer graphics and image processing.

43 Implementing Virtual Reality

ROOM A1, CONVENTION CENTER

TUESDAY — FULL DAY

COURSE DESCRIPTION

An introduction to the development of fully immersive virtual reality systems. The integration of hardware, software, and program design resulting in the creation of the illusion of virtual worlds is covered. Issues ranging from human factors design through hardware integration to software and system architectures are also covered.

OBJECTIVES

To give attendees an understanding of how to develop a fully immersive interactive virtual reality system and the knowledge of how to select the hardware for a particular virtual environment, outline the appropriate software structure, and implement that structure in a way that will give the greatest possible performance.

ORGANIZER

Steve Bryson
Computer Sciences Corporation

LECTURERS

Randy Pausch
University of Virginia

Warren Robinett
Virtus, Inc.

Andries van Dam
Brown University

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Those who wish to know how to design and implement working high-performance immersive interactive virtual environments.

PREREQUISITES

Moderate maturity in 3D graphics programming, including transformation matrices, use of graphics libraries, and basic Cartesian geometry. No knowledge of virtual reality is required.

ORGANIZER BIOGRAPHY

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

44 Procedural Modeling and Rendering Techniques

CALIFORNIA D, HILTON

TUESDAY — FULL DAY**COURSE DESCRIPTION**

This course imparts a working knowledge of procedural approaches in modeling, shading, rendering, and animation. Procedural approaches include 2D and solid texturing, hyper-textures, volume density functions, fractals, and artificial evolution. The course provides participants with details often left out of technical papers and explores techniques for designing procedures.

OBJECTIVES

Attendees gain an insight into design approaches in developing procedures. The course offers a toolbox of specific procedures and basic primitive function (i.e., noise, turbulence) to produce realistic images, an understanding of solid texturing and several advanced procedural approaches for modeling object geometry (i.e., hypertextures, gases, fractals), and an introduction to animating these procedural objects and textures.

ORGANIZER

David S. Ebert
The Ohio State University

LECTURERS

F. Kenton Musgrave
Yale University

Darwyn Peachey
Pixar

Ken Perlin
New York University

ADVANCED LEVEL**WHO SHOULD ATTEND**

Individuals interested in procedural modeling, shading, and texturing techniques; in learning the procedural design approaches of several researchers; and in obtaining a toolbox of procedures for producing realistic images.

PREREQUISITES

The participants should have a working knowledge of rendering, shading, and solid texturing techniques. Some knowledge of fractals and volume rendering will be useful (not required).

ORGANIZER BIOGRAPHY

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.

45 MM: Survey of Formal Standards for Multimedia Systems

ROOM B, WEST, CONVENTION CENTER

TUESDAY — FULL DAY**COURSE DESCRIPTION**

Describes formal (ANSI and ISO) standards for all aspects of document-based and multi-participant communication-based multimedia applications. Includes document architecture, content specifications, compression algorithms, communications requirements, database access, presentation and feedback facilities, and authoring system support. Covers scope, status, schedules, and contact points for further information.

OBJECTIVES

As multimedia matures, successful commercial systems need to conform to formal standards, especially for government use and in Europe. This course provides the information necessary to develop acceptable multimedia products in a given time frame.

ORGANIZER

Barry J. Shepherd
IBM Corporation

LECTURERS

Philip Dodds
Interactive Multimedia Association

Steve Newcomb
Techno Teacher, Inc.

Charles Poynton
Sun Microsystems Computer Corporation

Roger Price
IBM, France

Richard F. Puk
Puk Consulting Services

Greg Wallace
The 3DO Company

BEGINNING LEVEL**WHO SHOULD ATTEND**

People developing or using systems (or components) that must comply with formal standards, or those wishing to understand the many formal multimedia system and document standards.

PREREQUISITES

This is an introductory course, but with extensive content, for anyone interested in multimedia systems. Requires general knowledge of the various parts of a multimedia system.

ORGANIZER BIOGRAPHY

Barry J. Shepherd is the chair of ISO/IEC JTC1 SC24, and leader of the SC18/WG1 multimedia/hypermedia model and framework group. He is the head of JTC1's delegation to the Joint Technical Advisory Group 2 on image related standards activities, and editor of ODA amendment 2, which added color capability to the text and image content architectures of ODA. Shepherd is a member of the executive board of the IEEE CS task force on multimedia computing. He is also responsible for coordinating IBM's position on graphic-related standards.

50 LAB: Programming PEX with PEXlib (also offered on Sunday as course #10)

ROOM A6 & A7, CONVENTION CENTER

TUESDAY — HALF DAY — AM

COURSE DESCRIPTION

Attendees will receive introductory instruction on using the PEXlib 3D graphics API. Ample time will be allocated for working on simple programs that demonstrate the capabilities of PEX and PEXlib. Some time will be allocated for exploring other sample programs.

OBJECTIVES

To introduce attendees to the extensive benefits of PEXlib. To prepare attendees for other "Programming with PEX" courses and especially the intermediate PEXlib course (number 15/70).

ORGANIZER

Marty Hess
SunSoft, Inc.

LECTURER

Jeff Stevenson
Hewlett-Packard Company

BEGINNING LEVEL

WHO SHOULD ATTEND

Developers of applications using 3D graphics should attend this course to learn about programming distributed graphics via several possible APIs and the fundamentals of the PEXlib 3D graphics API.

PREREQUISITES

Prior C programming experience is required. Familiarity with PEX, PHIGS, or other 3D graphics interface concepts is desirable, but not required.

LECTURER BIOGRAPHY

Jeff Stevenson has been at Hewlett-Packard (HP) since 1984 where nearly all of his work has been in the area of window and graphics subsystems. He has been a technical contributor at HP since 1989. He was a member of the original multi-vendor PEX architecture team formed in 1987, and has been involved with PEX throughout the past six years, both in industry definition and in HP implementation. Stevenson was a speaker in the SIGGRAPH '90 PEX tutorial and has been involved with SIGGRAPH PEX demonstrations in the vendor exhibits since 1988. In September of 1991, Stevenson accepted the position of chief architect and document editor for the standard PEXlib definition being developed by the MIT X Consortium. And, in June of 1992, he accepted the position of chief architect for the PEX standard. He has a BS in computer science from the University of Idaho.

51 MM: Copyright Protection for Software, Graphics, and Multimedia

ROOM B, SOUTHEAST, CONVENTION CENTER

TUESDAY — HALF DAY — AM

COURSE DESCRIPTION

This course begins with an overview of the intellectual property system and the basic principles of copyright law. The course also reviews and offers critiques of judicial decisions on copyright protection for software, graphics, and multimedia. Some attention is given to the current round of copyright "look and feel" lawsuits and to the arguments made, pro and con, about protection for the user interfaces in these lawsuits.

OBJECTIVES

This course is aimed at introducing participants to the basic issues of copyright law, in terms familiar to software and graphics designers. It summarizes the current laws in the U.S., Europe, and Japan and contrasts issues that are settled with those yet to be resolved. This course is not intended to provide specific legal advice, but to give information on how to seek and understand such advice.

ORGANIZER/LECTURER

Pamela Samuelson
*University of Pittsburgh
School of Law*

BEGINNING LEVEL

WHO SHOULD ATTEND

This course is broadly aimed at graphic designers, software developers, and their managers interested in or faced with the challenges raised by copyright questions.

PREREQUISITES

This course does not assume any previous experience with law.

ORGANIZER BIOGRAPHY

Pamela Samuelson is a professor of law at the University of Pittsburgh School of Law. Before becoming a professor of law, she worked in a New York law firm. She specializes in intellectual property law, with a particular emphasis on computer software protection. During 1985 and 1986, she was the principal investigator of the software licensing project at the Software Engineering Institute at Carnegie Mellon University. She is the author of numerous articles and reports on software intellectual property issues in both legal and computing journals and has spoken on these issues to software engineering as well as legal audiences. She is a contributing editor for the *Communications of the ACM* for which she writes a quarterly "Legally Speaking" column. She was a plenary speaker at ACM SIGCHI '89, serving as the moderator and organizer of the legal debate on the copyright "look and feel" lawsuits. She also organized and moderated a similar debate at CHI '91.

52 MM: Multimedia and Multimodal Parsing

ROOM C, EAST, CONVENTION CENTER

TUESDAY — HALF DAY — AM

COURSE DESCRIPTION

Parsing and interpreting interface languages are well understood as long as they are unambiguous and consist of a single linear channel of information. Use of context and multiple information sources to interpret locally ambiguous input such as speech is an ongoing research topic, and the possibilities for interface languages are increasing. Pen-based gestural input, handwriting, and drawing provide examples requiring extensions to string-based parsing methods. This course considers characterizing multimodal expressions as languages and then surveying techniques for parsing and interpretation.

OBJECTIVES

To introduce a framework for designing and characterizing multimodal interface languages, to survey nonlinear and mixed-media input modalities with an eye to applying grammar and parsing technologies, and to overview grammatical frameworks and parsing techniques.

ORGANIZER/LECTURER

Kent Wittenburg
Bellcore

BEGINNING LEVEL

WHO SHOULD ATTEND

Students, professional researchers, managers, and practitioners who are interested in learning about current research and opportunities for applying grammar-based techniques in multimedia domains.

PREREQUISITES

Some familiarity with notions of grammar, parsers, or rule-based systems would be helpful, but not essential, for the more technical portions of the course.

ORGANIZER BIOGRAPHY

Kent Wittenburg, currently a member of technical staff in the Computer Graphics and Interactive Media research group at Bellcore, received his PhD from the University of Texas at Austin in the area of computational linguistics. He was previously at the MCC Human Interface Lab in Austin, TX, where he was project leader of the Interface Languages group and also on the adjunct faculty of the University of Texas. His publications are in the areas of grammatical formalisms and parsing for natural languages, visual languages, and multimodal interfaces. Current interests include extensions to grammatical models and parsing techniques in order to interpret pen-based drawing and handwritten math expressions and to parse multidimensional data in support of design and visualization tasks. He is presently the coordinator of the Association for Computational Linguistics special interest group on Multimedia Language Processing.

55 LAB: Programming PEX with PEXtk, a GL-like API

ROOM A6 & A7, CONVENTION CENTER

TUESDAY — HALF DAY — PM

COURSE DESCRIPTION

PEXtk is an immediate mode API, similar to Silicon Graphics GL, which interfaces to PEX through PEXlib. PEX provides the application programmer with a familiar interface for writing or porting 3D graphics applications. The course discusses the basic primitives available for drawing, available lighting and shading modes, and using immediate and mixed modes. There will also be a brief discussion on porting existing programs to PEXtk.

OBJECTIVES

Attendees learn the basic concepts of creating PEXtk programs and how to adapt them to their specific application needs.

ORGANIZER

Marty Hess
SunSoft, Inc.

LECTURER

Robert Schulte
SHOgraphics

BEGINNING LEVEL

WHO SHOULD ATTEND

Developers of applications using existing 3D graphics immediate rendering interfaces, or those wishing to develop new PEX-based applications using an immediate mode API.

PREREQUISITES

Prior C programming experience is required. A working knowledge of 3D computer graphics is recommended, and a knowledge of existing immediate mode 3D graphics libraries is helpful.

LECTURER BIOGRAPHY

Robert Schulte is currently responsible for maintaining and developing PEX-based application and test programs. Prior to working for SHOgraphics, he ported Wavefront Technologies' Advanced Visualizer to PEX, the first major third-party application to run on PEX.

56 MM: Structured Design of Hypermedia Applications

ROOM C, EAST, CONVENTION CENTER

TUESDAY — HALF DAY — PM

COURSE DESCRIPTION

Often, hypermedia designers concentrate their efforts on the production of multimedia material and on visual effects of the application. However, there are other issues that are crucial to determining the success of a hypermedia application. How can designers master the complexity of organizing the heterogeneity of the various media involved, and of controlling the potential explosion of the number of connections? What are the criteria of good design? Can traditional design techniques be adapted to hypermedia applications, or must new methods be defined?

OBJECTIVES

This course covers the nature of the various media involved in hypermedia and the emphasis on interconnections and navigation-based retrieval. Differences in these applications from more traditional ones raise a number of new issues for designers and users.

ORGANIZERS/LECTURERS

Franca Garzotto**Paolo Paolini***Politecnico di Milano***BEGINNING LEVEL**

WHO SHOULD ATTEND

Researchers and application developers interested in problems of modeling and designing large multimedia and hypermedia applications, including hypermedia interfaces to information systems.

PREREQUISITES

Experience with multimedia and hypermedia applications is useful, but not strictly required.

ORGANIZERS' BIOGRAPHIES

Franca Garzotto is a senior researcher at the Department of Electronics and Information, Politecnico di Milano, where she received her PhD in computer science. She has been active and involved in ESPRIT research in the following research fields: database constraints, software specifications, conceptual modelings of documents, hypertext and hypermedia modeling, hypermedia authoring systems, and multimedia applications development tools.

Paolo Paolini is an associate professor in the Department of Electronics and Information, Politecnico di Milano, where he has the responsibility of managing the multimedia laboratory. He is active in the following research fields: database modeling and systems, programming languages, distributed databases, database views, hypertext and hypermedia modeling, hypermedia authoring systems, and multimedia application development tools. He has been technically responsible for several ESPRIT research projects and has been conference chair of ECHT '92, the ACM International Conference on Hypertext and Hypermedia.

57 MM: Large Multimedia Databases

ROOM B, SOUTHEAST, CONVENTION CENTER

TUESDAY — HALF DAY — PM

COURSE DESCRIPTION

This course discusses basic issues in designing multimedia information systems. Data models for representing multimedia information at several abstraction levels are introduced. Nature of queries and interfaces are explored and suitable architecture to acquire and process multimedia information are discussed.

OBJECTIVES

To familiarize attendees with a sense of the developments taking place in this fast-growing field.

ORGANIZER/LECTURER

Ramesh Jain*University of California, San Diego***BEGINNING LEVEL**

WHO SHOULD ATTEND

Those interested in finding out what is involved in designing multimedia information systems.

ORGANIZER BIOGRAPHY

Ramesh Jain is a professor of electrical and computer engineering at the University of California at San Diego (UCSD). Before joining UCSD, he was a professor of electrical engineering and computer science and the founding director of the Artificial Intelligence Laboratory at the University of Michigan, Ann Arbor. His current research interests are in multimedia information systems, image databases, machine vision, and intelligent systems. He has published numerous research papers addressing several aspects of the above areas.

60 An Introduction to Physically Based Modeling

ROOM B, WEST, CONVENTION CENTER

WEDNESDAY — FULL DAY

COURSE DESCRIPTION

This course provides a systematic introduction to physically based modeling, including 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, kinematic and dynamic constraints, and collisions and contact.

OBJECTIVES

Bolstered by extensive course notes, the attendees will be able to use the required techniques to implement physically based modeling confidently and with understanding.

ORGANIZERS

Michael Kass
*Apple Computer, Inc./
University of California,
Berkeley*

Andrew Witkin
Carnegie Mellon University

LECTURERS

David Baraff
Carnegie Mellon University

Alan Barr
*California Institute of
Technology*

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Computer graphics researchers and implementors who wish to develop an understanding of physical methods as applied to animation and modeling. Also, those who wish to implement physically based modeling techniques and/or read and critically appraise technical papers.

PREREQUISITES

Good basic implementation skills and a working familiarity with mainstream computer graphics modeling and animation. The ability to perform matrix and vector manipulations and an understanding of basic calculus is assumed. The presentation favors visual, spatial explanation over formal symbol manipulation.

ORGANIZERS' BIOGRAPHIES

Michael Kass is a staff research scientist with the Advanced Technology Group of Apple Computer. He received a BA in artificial intelligence from Princeton University, an MS in computer science from Massachusetts Institute of Technology, and a PhD in electrical engineering from Stanford University. Before joining Apple Computer in 1988, he worked at Schlumberger Palo Alto Research in the field of computer graphics and computer vision.

Andrew Witkin is a professor of computer science and robotics at Carnegie Mellon University. He received his BA from Columbia College and his PhD from Massachusetts Institute of Technology. Prior to joining the faculty at Carnegie Mellon, he headed the perception and graphics group at Schlumberger Palo Alto Research.

61 Film Craft in User Interface Design

CALIFORNIA A & B, HILTON

WEDNESDAY — FULL DAY

COURSE DESCRIPTION

This course looks to the entertainment industry for inspiration about user interfaces. With mere shadows seen through a narrow window, filmmakers engage us in a world of their creation without intruding technical apparatus. They use pictures and sounds to communicate, entertain, evoke feelings, and manipulate our sense of space and time. The rich store of knowledge created in 90 years of filmmaking and animation can contribute to the design of user interfaces of multimedia, graphics applications, and even character displays.

OBJECTIVES

Participants learn how to critically evaluate films and use that skill to see user interfaces in a new light.

ORGANIZER

Chuck Clanton
Aratar

LECTURER

Emilie Young
Em Vision

BEGINNING LEVEL

WHO SHOULD ATTEND

This course is intended for user interface designers, developers, and researchers.

PREREQUISITES

No specific background in film craft or human-computer interfaces is required.

ORGANIZER BIOGRAPHY

Chuck Clanton consults in the design of graphical user interfaces. His background includes research in perceptual and cognitive psychology at Harvard University; neuroscience at the University of California, San Francisco Medical School; and computers and psychology at Stanford University. For more than a decade, he has been studying film and animation for insights about user interface design that appear in the products he has designed. He is also a photographer and sculptor.

62 Fundamentals and Overview of Computer Graphics

CALIFORNIA D, HILTON

WEDNESDAY — FULL DAY

COURSE DESCRIPTION

This course starts with an historical perspective of computer graphics and an introduction to fundamental concepts, including a brief discussion of the current state of the industry and important trends. The remaining three-quarters of the course is a survey of graphics-related topics, with an emphasis on breadth of coverage rather than on teaching the technical details. The guiding principle is to give attendees an intuitive understanding of many concepts instead of the details of introductory issues. Detailed references can be found in the course notes, which are intended to be useful as a reference source.

OBJECTIVES

To familiarize attendees with the topics and buzzwords in computer graphics and to provide enough exposure to each so that new information can be readily absorbed.

ORGANIZER

Olin Lathrop
Cognivision, Inc.

LECTURERS

Richard M. Fichera
Consultant

Andrew Glassner
Xerox PARC

Carl Machover
Machover Associates

BEGINNING LEVEL

WHO SHOULD ATTEND

Technical professionals and managers who are unfamiliar with computer graphics and who desire a general understanding. It is also for those who have heard terms like "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.

PREREQUISITES

No background in computer graphics or mathematics is required. Some exposure to computers and programming would be helpful.

ORGANIZER BIOGRAPHY

Olin Lathrop is a founder and vice president of research of 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.

70 LAB: Programming PEX with PEXlib (also offered on Sunday as course #15)

ROOM A6 & A7, CONVENTION CENTER

WEDNESDAY — HALF DAY — AM

COURSE DESCRIPTION

To introduce the mechanisms PEX provides for modeling, lighting, and shading, and to discuss their uses and limitations. Attendees learn by use of programming examples how to model, light, and shade with PEXlib, and the effects that different controls have on the quality and composition of the final image.

OBJECTIVES

To introduce attendees to the use of the PEX advanced rendering features.

ORGANIZER

Marty Hess
SunSoft, Inc.

LECTURER

Tom Gaskins
Sound Software Development

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Graphics application programmers who desire an introduction to the advanced rendering features of modeling, lighting, and shading using the PEXlib API.

PREREQUISITES

Prior C programming experience is required. Familiarity with 3D graphics methods such as the use of modeling transforms will be helpful. Attendance in the beginning level "Programming PEX with PEXlib" course (number 10/50) or an existing familiarity with PEX and PEXlib is suggested.

LECTURER BIOGRAPHY

Tom Gaskins has been designing, writing, and using graphics software for more than 10 years. He is the author of *PEXlib Programming Manual*, published by O'Reilly & Associates, and the current document editor of the PEX Protocol Specification. Gaskins also serves as a SunSoft representative to the X Consortium's PEX Committee.

71 Visualizing Planet Earth

ROOM C, EAST, CONVENTION CENTER

WEDNESDAY — HALF DAY — AM

COURSE DESCRIPTION

Global visualization is one of the most demanding disciplines in computer systems engineering, placing enormous demands on the CPU and on memory, graphics, I/O, network, and data archival/retrieval subsystems. This course looks at the unique problems facing global visualization specialists, discusses how existing hardware and software systems are being used, and describes work in progress.

OBJECTIVES

To provide attendees with a grasp of how current computer technology is being used in this field and an understanding of where current technology falls well short of meeting the needs of global visualization specialists. Attendees learn about several different approaches for visualizing large and complex data sets and become familiar with the innovative visualization techniques that have been developed by the speakers.

ORGANIZER

Randi J. Rost
Kubota Pacific Computer, Inc.

LECTURERS

Jeff Dozier
University of California, Santa Barbara

Bill Hibbard
University of Wisconsin

Peter Kochevar
Digital Equipment Corporation

Lloyd Treinish
IBM T.J. Watson Research Center

Tom Van Sant
Geosphere Project

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Scientists using graphics/imaging systems to study global processes, hardware and software engineers interested in developing products to support global visualization efforts, and people who want to learn more about the field of global visualization.

PREREQUISITES

General knowledge of computer architecture, graphics concepts, and mathematics is required. Experience with a commercial visualization product (i.e., AVS or Data Explorer) and familiarity with visualization terminology is helpful.

ORGANIZER BIOGRAPHY

Randi Rost is chief architect for graphics software at Kubota Pacific Computer, Inc. (KPC) and is responsible for leading the design and implementation of rich and flexible software environments for KPC's high-performance graphics and imaging systems. Rost is also responsible for participating in emerging graphics standards efforts and developing technology relationships with other organizations. Prior to joining KPC, Rost was a principal engineer in Digital Equipment Corporation's Palo Alto-based workstation engineering group. He was one of the chief architects for PEX and then served as the PEX document editor for four years. He participated in the design of both OpenGL and the Graphics Performance Characterization Committee's Picture Level Benchmark.

75 LAB: Programming PEX with PHIGS (also offered on Monday as course #35)

ROOM A6 & A7, CONVENTION CENTER

WEDNESDAY — HALF DAY — PM

COURSE DESCRIPTION

After a review of the basics of the standard PHIGS API, 3D graphics application developers will be introduced to the advantages of distributed graphics via PEX through the PHIGS API. Program examples will make use of PEX through the PEX Sample Implementation (PEX-SI) PHIGS C language binding.

OBJECTIVES

Upon completion of the course, attendees should understand the capabilities of PHIGS well enough to compare and contrast it with other graphics APIs in order to decide which API is best suited for their application.

ORGANIZER

Marty Hess
SunSoft, Inc.

LECTURER

Michael M. Heck
Template Graphics Software

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

Technical professionals who are 3D graphics application developers with an interest in utilizing PHIGS as their graphics API.

PREREQUISITES

Prior C programming experience is required, along with an operational understanding of the basic concepts of synthesized computer graphics.

LECTURER BIOGRAPHY

Michael M. Heck is vice president of Research and Development at Template Graphics Software Inc. (TGS). He has been involved in the design and implementation of computer graphics software since 1980, focusing on the problem of providing both device independence and performance. He was a member of the ANSI committee that defined the PHIGS standard, and was technical editor of *Understanding PHIGS*, the first book about the standard. Heck was also chief architect of FIGARO+, the first portable implementation of PHIGS. He is currently managing the development of a family of PHIGS/PEX-based productivity products that support X, PEX, GL, XGL, Starbase, and many other device interfaces. He continues to believe that the "P" in PEX stands for PHIGS.

76 The Fundamentals of Color Desktop Publishing in Print Production

ROOM C, EAST, CONVENTION CENTER

WEDNESDAY—HALF DAY—PM

COURSE DESCRIPTION

This course introduces and defines the terminology of print production, traditional prepress, and desktop publishing. It includes a discussion of the color issues (i.e., differences between spot and process color, and why the color on the screen doesn't match the proof or the printed piece), equipment (entry level and high end), file formats, traditional roles in print production and how they are merging, and driving forces in the marketplace. Programs for software are described, and basic equipment configurations are given.

OBJECTIVES

Attendees gain an understanding of the basics in print production, from design to the printed piece. After the course, they will be able to discuss the advantages, disadvantages, and complexities of different preproduction techniques.

ORGANIZER/LECTURER

Howard Fenton
Pre-

BEGINNING LEVEL

WHO SHOULD ATTEND

Anyone considering, planning, or beginning to use desktop publishing, as well as anyone who has to work with printers, color separators, and service bureaus that use the technology.

PREREQUISITES

Attendees should understand basic computer terminology (i.e., floppy disk, monitor, printer) and print production terminology (i.e., designer, writer, ink, paper).

ORGANIZER BIOGRAPHY

Howard Fenton is the editor of *Pre-* magazine.

80 Recent Techniques in Human Modeling, Animation, and Rendering

CALIFORNIA D, HILTON

THURSDAY—FULL DAY

COURSE DESCRIPTION

More than a traditional human animation course, this course includes the techniques of motion control of articulated bodies (i.e., keyframe, inverse kinematics, dynamics), with an emphasis on recent developments and problems in human animation and appearance. Recent methods of improving the realism of human appearance in computer-generated films are explored.

OBJECTIVES

To bring attendees up to date on research in human modeling, animation, and rendering; to show how to generate realistic humans and well-known personalities; and to introduce several recent techniques, including hair modeling and animation, use of natural language in human animation, physics-based facial animation, autonomous synthetic actors based on perception systems, and interaction techniques using virtual reality.

ORGANIZER

Daniel Thalmann
*Swiss Federal Institute of
Technology*

LECTURERS

Norman Badler
University of Pennsylvania

**Nadia Magnenat-
Thalmann**
University of Geneva

Demetri Terzopoulos
University of Toronto

ADVANCED LEVEL

WHO SHOULD ATTEND

Artists and/or scientists who would like to know how to create an image of any human being.

PREREQUISITES

A solid background in animation and constraint-based methodologies is recommended. Attendees should be familiar with advanced mathematics used in physically based modeling.

ORGANIZER BIOGRAPHY

Daniel Thalmann is currently full professor, head of computer science, and director of the Computer Graphics Laboratory at the Swiss Federal Institute of Technology in Lausanne, Switzerland. He also is an adjunct professor at the University of Montreal. Since 1977, he has been professor at the University of Montreal and director of the Computer Graphics Laboratory. He received his diploma in nuclear physics and PhD in computer science from the University of Geneva. He was visiting professor at the University of Nebraska and invited researcher in the computer graphics group at CERN. He co-chairs the Eurographics Working Group on Computer Simulation and Animation.

81 An Introduction to Data Sonification

CALIFORNIA A & B, HILTON

THURSDAY — FULL DAY

COURSE DESCRIPTION

This course introduces and illustrates the use of sound to extract meaning from complex data. It begins by covering the basics of acoustics and sound perception, sound synthesis, MIDI (Musical Instrument Digital Interface), and fundamental music principles. From this basis several techniques of data sonification are discussed. Specific tools are shown and successful techniques are discussed. There is a focus on how sonification can be integrated into scientific visualization.

OBJECTIVES

Participants in this course should leave with a clear understanding of how sound, independently or in conjunction with visualization, can be used to extract meaning from complex data. They will know where to look for tools and resources and have informed ideas on how they might use these in their own work.

ORGANIZER

Brian Evans
Vanderbilt University

LECTURERS

Robin Bargar
*National Center for
Supercomputing Applications*

Carla Scaletti
University of Illinois

BEGINNING LEVEL

WHO SHOULD ATTEND

Anyone interested in extending the power and effectiveness of scientific visualization, including scientific researchers and hardware and software developers.

PREREQUISITES

This is an introductory course that assumes an understanding of computer graphics fundamentals. The material, while detailed, is straightforward. The sequence of material starts with basics and continues, building on the ideas covered in previous sections. There will be generous use of sonic and visual aids.

82 Curve and Surface Design: From Geometry to Applications

ROOM B, WEST, CONVENTION CENTER

THURSDAY — FULL DAY

COURSE DESCRIPTION

This course presents geometric foundations for curve and surface design: Bézier curves, B-spline curves, NURBS curves, curve interpolation, the blossoming approach, geometric continuity, tensor product surfaces, trimmed NURBS surfaces and demo, Coons patches and Gordon surfaces, triangular Bézier patches, surface interrogations and applications, and future research and development.

OBJECTIVES

To provide an understanding of the basic concepts of many curve and surface design techniques. Attendees are given instruction on programming most of these techniques and will obtain a background that will enable them to learn more advanced computer-aided geometric design (CAGD) techniques in the future. Representative examples of CAGD applications are shown.

ORGANIZERS

Thomas Foley
Alyn Rockwood
Arizona State University

LECTURERS

Gregory M. Nielson
Arizona State University

Hans Hagen
*Universität Kaiserslautern/FB
Informatik*

INTERMEDIATE LEVEL

WHO SHOULD ATTEND

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

PREREQUISITES

Vector calculus, linear algebra, and basic computer graphics are recommended. Basic numerical analysis is helpful. The course is considered intermediate because of the mathematics and interactive graphics used.

ORGANIZER BIOGRAPHY

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.

Papers/Panels

SIGGRAPH PAPERS

PACIFIC C & D, HILTON

Tuesday 1:30 pm–5:00 pm

Wednesday–Friday 8:30 am–5:00 pm

The technical papers program at SIGGRAPH is recognized as the premiere showcase for new research in graphics theory and algorithms, in graphics systems design, and for new ideas in graphics applications. The papers that appear in this conference have been carefully selected by the members of the SIGGRAPH 93 papers committee (listed below) from 227 manuscripts submitted in early January of this year. The papers are recorded in the *SIGGRAPH 93 Conference Proceedings*, which also includes a CD-ROM of the papers and images. Selected videos from paper presentations are available in the *SIGGRAPH 93 Video Review*. After each paper session, speakers and attendees are welcome to continue their discussions in the papers break-out rooms.

SIGGRAPH PANELS

ARENA, CONVENTION CENTER

MARRIOTT HALL, MARRIOTT

CALIFORNIA D, HILTON

Tuesday 1:30 pm–5:00 pm

Wednesday–Friday 8:30 am–5:00 pm

The SIGGRAPH population is evolving and embracing its rich heritage, pioneering and contributing to an important technical foundation. This initial work is now reaching beyond the computer graphics community to affect humans on a much broader and philosophical level. This year's panel sessions reflect the expansion toward critical thinking and will facilitate discussions that reflect the social implications of computer graphics. After each panel session, speakers and attendees are welcome to continue their discussions in the panels break-out rooms.

PAPERS COMMITTEE

James T. Kajiya—Chair
California Institute of Technology

Mk Haley
Administrative Assistant

Brian Barsky
University of California, Berkeley

Forest Baskett
Silicon Graphics Computer Systems

Ingrid Carlbom
Digital Equipment Corporation

Ed Catmull
Pixar

Frank Crow
Apple Computer, Inc.

Tony DeRose
University of Washington

Andrew Glassner
Xerox PARC

Paul Heckbert
Carnegie Mellon University

Christoph Hoffmann
Purdue University

John F. Hughes
Brown University

Michael Kass
*Apple Computer, Inc./
University of California, Berkeley*

Mike Keeler
Silicon Graphics Computer Systems

Marc Levoy
Stanford University

Jock Mackinlay
Xerox PARC

Nelson L. Max
Lawrence Livermore National Laboratory

Don P. Mitchell
AT&T Bell Labs

Bruce Naylor
AT&T Bell Labs

Tomoyuki Nishita
Fukuyama University

Darwyn Peachey
Pixar

Marc H. Raibert
Massachusetts Institute of Technology

David F. Rogers
U.S. Naval Academy

Jarek Rossignac
IBM Research

Tom Sederberg
Brigham Young University

Francois Sillion
École Normale Supérieure

Ken Torrance
Cornell University

Andries van Dam
Brown University

PANELS COMMITTEE

Donna Cox—Chair
*National Center for Supercomputing Applications/
University of Illinois*

Terri Haines
Administrative Assistant

Mark Bajuk
University of Illinois

Mike Keeler
Silicon Graphics Computer Systems

Bruce McCormick
Texas A&M University

Mike McNeill
*National Center for Supercomputing Applications/
University of Illinois*

Barbara Mones-Hattal
George Mason University

Jon Steinhart
Consultant

Pierre Van Cleave
Art Cellar Exchange

Jim Winget
Silicon Graphics Computer Systems

TUESDAY, 3 AUGUST

8:30–10:00 AM—ARENA, CONVENTION CENTER

1:30–3:15 PM—PACIFIC C & D, HILTON

1:30–3:15 PM—MARRIOTT HALL, MARRIOTT

SIGGRAPH Awards

Attend the SIGGRAPH 93 awards from 8:30 am–10:00 am on Tuesday, 3 August. Details on page 7.

Papers: Surfaces

CHAIR

David F. Rogers*U.S. Naval Academy*

2D Shape Blending: An Intrinsic Solution to the Vertex Path Problem

Thomas W. Sederberg, Peisheng Gao,**Guojin Wang, and Hong Mu***Brigham Young University*

Mesh Optimization

Hugues Hoppe, Tony DeRose, Tom Duchamp,**John McDonald, and Werner Stuetzle***University of Washington*

Interactive Texture Mapping

Jérôme Maillot, Hussein Yahia,**and Anne Verroust***Inria Rocquencourt*

Efficient, Fair Interpolation Using Catmull-Clark Surfaces

Mark Halstead*Apple Computer, Inc.***Michael Kass***Apple Computer, Inc./University of California, Berkeley***Tony DeRose***University of Washington***Panel: Real Virtuality**

Innovations in laser generation of 3D objects offer rapid prototyping from computer-synthesized graphics or scanned images to real solids in just minutes or a few hours. Photopolymers and thermoplastics offer new expectations for CAD, manufacturing, and medicine. Panelists from industry and academia discuss the state of the art and expectations for the future of instant 3D copies using new technologies such as stereo lithography, laser sintering, and fusing deposition.

CHAIR

Jack Bresenham *Winthrop University*

PANELISTS

Paul Jacobs *3D Systems Inc.***Lewis Sadler** *University of Illinois at Chicago***Peter Stucki** *University of Zurich*

3:30–5:00 PM—PACIFIC C & D, HILTON

3:30–5:00 PM—MARRIOTT HALL, MARRIOTT

Papers: Hardware

CHAIR

Ed Catmull*Pixar*

Implementing Rotation Matrix Constraints in Analog VLSI

David B. Kirk and Alan H. Barr*California Institute of Technology*

Correcting for Short-range Spatial Non-linearities of CRT-based Output Devices

R. Victor Klassen*Xerox Webster Research Center***Krishna Bharat***Georgia Institute of Technology*

Autocalibration for Virtual Environments Tracking Hardware

Stefan Gottschalk*University of North Carolina at Chapel Hill***John F. Hughes***Brown University***Panel: Visual Thinkers in an Age of Computer Visualization: Problems and Possibilities**

As computer graphics and visualization techniques become more widely used, there is a need to focus on differing visual-spatial abilities among individual users. Certain psychologists consider visual-spatial abilities a form of intelligence, while certain neurologists suggest that there is a good reason for the verbal and educational difficulties sometimes experienced by highly gifted visual thinkers. Historical and contemporary examples of creative visual thinkers are discussed in relation to these findings. Panel participants debate the validity of these perspectives based on their own personal experiences with computer graphics in scientific visualization, education, and entertainment. Each panelist provides visual, concrete examples during the discussion.

CHAIR

Kenneth R. O'Connell *University of Oregon, Eugene*

PANELISTS

Vincent Argiro *Vital Images***John Andrew Berton Jr.** *Industrial Light & Magic***Craig Hickman** *University of Oregon, Eugene***Thomas G. West** *Author of In the Mind's Eye*

8:30–10:00 AM—PACIFIC C & D, HILTON

8:30–10:00 AM—MARRIOTT HALL, MARRIOTT

8:30–10:00 AM—ROOM A9 & A10, CONVENTION CENTER

Papers: Interaction

CHAIR

Jock Mackinlay*Xerox PARC*Pad: An Alternative Approach to the
Computer Interface**Ken Perlin and David Fox***New York University*Toolglass and Magic Lenses: The
See-through Interface**Eric A. Bier, Maureen C. Stone, and Ken Pier***Xerox PARC***William Buxton***University of Toronto***Tony DeRose***University of Washington*An Interactive 3D Toolkit for Constructing
3D Widgets**Robert C. Zeleznik, Kenneth P. Herndon,
Daniel C. Robbins, Nate Huang, Noah Parker,
John F. Hughes, and Tom Meyer***Brown University***Panel: Updating Computer
Animation: An Interdisciplinary
Approach**

Computer animation is currently applied to a wide range of applications from children's entertainment to disaster simulation, and from esoteric mathematics to personal fine art statements. In order to develop useful technology and to train future professionals, the model of animation and animator needs to be updated into a pluralistic model that encompasses many types of applications. It may be that computer animation, along with computer graphics, is becoming a commodity—an enhancing technology applied to a myriad of application areas rather than a discrete field. This panel articulates and compares the conceptual framework, design gestalt, relation of design to content, and development process used by the very different animation application areas of entertainment, scientific and engineering visualization, and fine art as well as exploring the connection between current forms and historical animation.

CHAIR

Jane Veeder *San Francisco State University*

PANELISTS

Charlie Gunn *University of Minnesota***Scott Liedtka** *Forensic Technologies, Inc.***William Moritz** *California Institute of the Arts***Tina Price** *Walt Disney Pictures***Panel: Facilitating Learning with
Computer Graphics and Multimedia**

With the recent advent of inexpensive yet powerful computers, the use of high-quality computer graphics and multimedia systems to facilitate learning is rapidly increasing. This panel will give a review of leading-edge work by focusing on several areas, including computer science, mathematics, biology, and art and design. Each panelist will describe how they currently use computer graphics and/or multimedia and give their view of future applications. Emphasis will be placed on how using these techniques fosters interdisciplinary collaboration both for creating learning environments and for working in these career areas.

CHAIR

G. Scott Owen *Georgia State University*

PANELISTS

Robert V. Blystone *Trinity University***Valerie A. Miller** *Georgia State University***Barbara Mones-Hattal** *George Mason University***Jackie Morie** *University of Central Florida*

10:15 AM–12 NOON—ARENA, CONVENTION CENTER

Multimedia 93 Keynote Address

Note: There are no SIGGRAPH papers or panels from 10:15 am–1:30 pm on Wednesday, so that everyone may attend the Multimedia 93 keynote address from 10:15 am–12:00 noon. See page 58 for details.

WEDNESDAY, 4 AUGUST

1:30–3:15 PM—PACIFIC C & D, HILTON

1:30–3:15 PM—MARRIOTT HALL, MARRIOTT

Papers: Rendering Architectures

CHAIR

Forest Baskett*Silicon Graphics Computer Systems*

EXACT: Algorithm and Hardware Architecture for an Improved A-Buffer

Andreas Schilling and Wolfgang Strasser*Universität Tübingen*

Graphics Rendering Architecture for a High-performance Desktop Workstation

Chandlee B. Harrell and Farhad Fouladi*Silicon Graphics Computer Systems*

Leo: A System for Cost-effective 3D Shaded Graphics

Michael F. Deering and Scott R. Nelson*Sun Microsystems Computer Corporation*

Reality Engine Graphics

Kurt Akeley*Silicon Graphics Computer Systems***Panel: Visualizing Environmental Data Sets**

Researchers dealing with the display of environmental data sets compare and contrast specific visualization issues within a number of current projects. The panel discusses the process of developing highly effective visualization paradigms for communicating the large interrelated multidimensional data sets that are associated with environmental research. Toolkit development versus Renaissance team methodologies of data visualization are debated. Issues related to facilitating collaborative visualization efforts among different research centers are also presented.

CHAIR

Theresa Marie Rhyne *Martin Marietta/U.S. EPA*

PANELISTS

Kevin J. Hussey *Jet Propulsion Laboratory***Jim McLeod** *San Diego Supercomputing Center***Brian Orland** *University of Illinois***Mike Stephens** *Computer Sciences Corp./U. S. Army Corps of Engineers***Lloyd A. Treinish** *IBM T. J. Watson Research Center*

3:30–5:00 PM—PACIFIC C & D, HILTON

3:30–5:00 PM—MARRIOTT HALL, MARRIOTT

3:30–5:00 PM—ARENA, CONVENTION CENTER

Papers: Virtual Reality

CHAIR

Andries van Dam*Brown University*

VIEW: An Exploratory Molecular Visualization System with User-definable Interaction Sequences

Lawrence D. Bergman, Jane S. Richardson, David C. Richardson, and Frederick P. Brooks Jr.*University of North Carolina at Chapel Hill*

The Nanomanipulator: A Virtual Reality Interface for a Scanning Tunneling Microscope

Russell M. Taylor, Warren Robinett, Vernon L. Chi, Frederick P. Brooks Jr., and William V. Wright*University of North Carolina at Chapel Hill***R. Stanley Williams and Eric J. Snyder***University of California, Los Angeles*

Surround-screen Projection-based Virtual Reality: The Design and Implementation of the CAVE

Carolina Cruz-Neira, Daniel J. Sandin, and Thomas A. DeFanti*University of Illinois at Chicago***Panel: How to Lie and Confuse with Visualization**

As in other fields such as statistics and cartography, it is also possible to misrepresent data in visualization. Most of the time, it is done unintentionally and it goes unnoticed. But traps await the unwary. The panel discusses this issue and educates the visualization and computer graphics communities about these potential traps. Topics include the use of color, interpolation, smoothing, boundaries, and shading. The panel and audience also debate whether there are ways to judge the degree of "lying" in visualization, and how to prevent inadvertent misrepresentations.

The audience and the public are encouraged to submit samples of slides and video material illustrating visualization "lies." Contributions should be sent to Nahum Gershon, The MITRE Corporation, 7525 Colshire Dr., McLean, VA 22102, 703.883.7518 or gershon@mitre.org.

CHAIR

Nahum D. Gershon *The MITRE Corporation*

PANELISTS

James M. Coggins *University of North Carolina at Chapel Hill***Paul R. Edholm** *The University Hospital of Linköping***Al Globus** *NASA Ames Research Center***Vilayanur S. Ramachandran** *University of California, San Diego***Panel: The Application of Evolutionary and Biological Processes to Computer Art and Animation**

The panel discusses new techniques for evolving art designs that are based on evolution and biological processes from the natural world. In particular, techniques such as mutation, breeding, selection, marriage, and rules for artificial life animations are discussed. In addition to addressing the advantages and disadvantages of these techniques, the panel will also discuss their effectiveness as construction and user interface tools for the artist making images, designs, and animations.

CHAIR

George Joblove *Industrial Light & Magic*

PANELISTS

William Latham and Stephen Todd *IBM UKSC***Karl Sims** *Thinking Machines Corporation***Michael Tolson** *Xaos Inc.*

8:30–10:00 AM—PACIFIC C & D, HILTON

8:30–10:00 AM—MARRIOTT HALL, MARRIOTT

8:30–10:00 AM—ARENA, CONVENTION CENTER

Papers: Global Illumination

CHAIR

Francois Sillion*École Normale Supérieure*

Painting with Light

Chris Schoeneman, Julie Dorsey, Brian Smits, James Arvo, and Donald P. Greenberg*Cornell University*

Radiotimization: Goal-based Rendering

John K. Kawai and James S. Painter*University of Utah***Michael F. Cohen***Princeton University*

A Hierarchical Illumination Algorithm for Surfaces with Glossy Reflection

Larry Aupperle and Pat Hanrahan*Princeton University*

On the Form Factor between Two Polygons

Peter Schröder and Pat Hanrahan*Princeton University***Panel: Urban Tech-gap: Museum and University Liaisons—A New Electronic Bridge**

Universities and museums have begun to take the creative means of multimedia production into their own hands. Science and industry museums now offer more serious instructional visualizations, creating hands-on components that draw visitors into active participation. The differences are diminishing between high-caliber productions in museums and open electronic toolboxes in the individual classroom. Collaboration bridges the resources of these two methodologically different environments. This panel offers a glimpse at what is happening in these two professional worlds and develops a ladder for visual literacy as a common domain.

CHAIR

Richard Navin *Brooklyn University*

PANELISTS

Robert Carlson *Tech 2000: Gallery of Interactive Multimedia***Lynn Holder** *Carnegie Mellon University***Michael Getrick** *Brooklyn College***Edward Wagner** *Franklin Institute, Cutting Edge Gallery***Panel: Virtual Reality and Computer Graphics Programming**

In addition to simply interfacing with various input/output devices (e.g., tracker, glove, head-mounted display), virtual reality applications require a programming environment for building and interacting with the virtual world. This panel focuses on the software issues surrounding this environment as they relate to the construction of the virtual world and the management of its underlying data structure, the communication issues in cooperative virtual worlds, and programming for interaction in the virtual world.

CHAIR

Bob C. Liang *IBM T. J. Watson Research Center*

PANELISTS

William Bricken *University of Washington***Peter Cornwell** *Division, Inc.***Bryan Lewis** *IBM T. J. Watson Research Center***Ken Pimental** *Sense8 Corporation***Michael J. Zyda** *Naval Postgraduate School*

10:15 AM–12 NOON—PACIFIC C & D, HILTON

10:15 AM–12 NOON—ARENA, CONVENTION CENTER

Papers: Light and Color

CHAIR

Ken Torrance*Cornell University*

Reflection from Layered Surfaces Due to Subsurface Scattering

Pat Hanrahan*Princeton University***Wolfgang Krueger***German National Research Center for Computer Science*

Display of the Earth Taking into Account Atmospheric Scattering

Tomoyuki Nishita and Takao Sirai*Fukuyama University***Katsumi Tadamura and Eihachiro Nakamae***Hiroshima Prefectural University*

Smooth Transitions between Bump-rendering Algorithms

Barry G. Becker and Nelson L. Max*Lawrence Livermore National Laboratory*

Linear Color Representations for Full-spectral Rendering

Mark S. Peercy*Stanford University***Panel: Ubiquitous Computing and Augmented Reality**

Ubiquitous computing is a radical alternative to the desktop and virtual reality models of computing. It turns these models inside out: instead of using computers to simulate or replace common physical space, computers are embedded invisibly and directly into the real world. Everyday objects and normal activities become the input/output to this environment. Objects are aware of and can respond to the location, state, and activities of other objects in the world, both animate and inanimate. Computing becomes part of everyday existence rather than isolated (and isolating) on a desktop; of equal importance, computer-based systems can take advantage of, and be compatible with, the rich environments in which humans live. This panel will look at the technologies involved in ubiquitous computing, its social and technical implications, and its current status as it begins to move out from the research labs and into homes and offices.

CHAIR

Rich Gold *Xerox PARC*

PANELISTS

Bill Buxton *University of Toronto***Steve Feiner** *Columbia University***Chris Schmandt** *MIT Media Lab***Mark Weiser** *Xerox PARC***Pierre Wellner** *Cambridge University/Euro PARC*

THURSDAY, 5 AUGUST

1:30–3:15 PM—PACIFIC C & D, HILTON

1:30–3:15 PM—MARRIOTT HALL, MARRIOTT

1:30–3:15 PM—ARENA, CONVENTION CENTER

Papers: Numerical Methods for Radiosity

CHAIR

Paul Heckbert*Carnegie Mellon University*

Combining Hierarchical Radiosity and Discontinuity Meshing

Dani Lischinski, Filippo Tampieri, and Donald P. Greenberg*Cornell University*

Radiosity Algorithms Using Higher-order Finite Elements

Roy Troutman and Nelson L. Max*Lawrence Livermore National Laboratory*

Galerkin Radiosity: A Higher-order Solution Method for Global Illumination

Harold R. Zatz*Cornell University*

Wavelet Radiosity

Steven J. Gortler, Peter Schröder, Michael F. Cohen, and Pat Hanrahan*Princeton University***Panel: Merging 3D Graphics and Imaging—Applications and Issues**

Computer graphics and image processing were once two very distinct disciplines, with different hardware, software, and users. Now they are becoming increasingly intertwined. Applications are being developed that use both 3D graphics and imaging techniques for a broad spectrum of uses, including realistic scene simulations, interesting visual effects, and improved analysis and understanding of complex information. What should graphics users learn from their imaging counterparts, and vice versa? This panel brings together people from both disciplines who have been developing a variety of applications that merge graphics and imaging technologies. They will illustrate both the benefits and the current limitations.

CHAIR

William R. Pickering *Silicon Graphics Computer Systems*

PANELISTS

Paul Douglas *Earthwatch Communications***Kevin Hussey** *Jet Propulsion Laboratory***Michael Natkin** *Industrial Light & Magic***Panel: Nan-o-sex and Virtual Seduction**

Is virtual reality a challenge or an aid to the development of better understanding and relations between the genders? This panel focuses on the use of virtual reality as an erotic space and the ways in which it may or may not be simply replicating erotic patterns in current media. When speculation turns to the subject of virtual reality, erotic possibilities within virtual space are often discussed. Virtual reality seems poised to be marketed to the same public that has consumed the cafeteria of sexual fantasies. The questions are, "Can virtual reality offer an alternative erotic construction?" and "Will these possible alternatives simply be ignored in favor of the well-worn commercial paths of existing auto-eroticism?"

CO-CHAIRS

Joan I. Staveley and David Steiling*Ringling School of Art and Design*

PANELISTS

Paul Brown *Mississippi State University***Michael Heim** *California State University, Long Beach***Jill Hunt** *Angel Studios***Chitra Shiram** *The Ohio State University*

3:30–5:00 PM—PACIFIC C & D, HILTON

3:30–5:00 PM—MARRIOTT HALL, MARRIOTT

5:15–7:00 PM—ROOM A1, CONVENTION CENTER

Papers: Visibility

CHAIR

Frank Crow*Apple Computer, Inc.*

Hierarchical Z-buffer Visibility

Ned Greene*University of California, Santa Cruz/Apple Computer, Inc.***Michael Kass and Gavin Miller***Apple Computer, Inc.*

Global Visibility Algorithms for Illumination Computations

Seth J. Teller*Hebrew University***Pat Hanrahan***Princeton University*

Adaptive Display Algorithm for Interactive Frame Rates During Visualization of Complex Virtual Environments

Thomas A. Funkhouser and Carlo H. Séquin*University of California, Berkeley***Panel: Critical Art/Interactive Art/Virtual Art: Rethinking "Computer Art"**

This panel addresses the collapsing border between critical thinking about the arts and the demands for a serious consideration of art using the computer. Increasingly, the maturation of interactive and virtual environments is perceived as an important dimension of artistic expression. The convergence of interactivity, the development of high-speed broadband communication links, and the growing use of interactivity in the production of art points to the necessity for a reconsideration of the role of the artist, a refocusing of the discourses of critical thought, and a redefinition of the idea of aesthetic experience.

CHAIR

Timothy Druckrey *International Center of Photography*

PANELISTS

Regina Cornwell *Independent art critic***Kit Galloway and Sherrie Rabinowitz***Electronic Cafe International***Simon Penny** *Carnegie Mellon University***Richard Wright** *London Guildhall University***SIGGRAPH Town Hall Meeting**

Join the SIGGRAPH Executive Committee and other SIGGRAPH volunteers at a town hall meeting. This is your opportunity to learn more about all of the SIGGRAPH activities, such as the annual conference, education committee, local groups, and small conferences and workshops. Ask how and why these activities currently operate. Tell us what you would like to see SIGGRAPH do in the future. Tell us what you would like to see changed and how you would suggest that these changes take place. Find an area in which you would like to become more involved as a participant or volunteer. SIGGRAPH is a terrific organization, and it's YOUR organization. Participate in the town meeting and help make it even better.

8:30–10:00 AM—PACIFIC C & D, HILTON

8:30–10:00 AM—ARENA, CONVENTION CENTER

Papers: Visualization

CHAIR

Ingrid Carlbon*Digital Equipment Corporation*Discrete Groups and Visualization of
Three-dimensional Manifolds**Charlie Gunn***The University of Minnesota*Imaging Vector Fields Using Line Integral
Convolution**Brian Cabral and Leith Casey Leedom***Lawrence Livermore National Laboratory*

Volume Rendering Frequency Domain

Takashi Totsuka*SONY Corporation***Marc Levoy***Stanford University***Panel: Digital Illusion: Theme Park Visualization—Part One**

Interactive techniques and high-resolution visualization are being combined into new forms of location-based entertainment (LBE) attractions in theme parks. These installations typically are unique, expensive, and exciting in ways not previously possible. Many computer graphics professionals view the theme park-LBE facet of the entertainment industry as a new potential market for their products and services. It is a diverse array of converging technologies in computing, communications, and entertainment. Some of the attractions can accurately be considered user interfaces.

Panelists will represent the following viewpoints: the client, the producer, the designer/creative director, and the theorist (the future of multimodal interfaces). Special two-panel structure.

CHAIR

Clark Dodsworth *Rising Star Graphics*

PANELISTS

Kevin Biles *KBD Innovative Arts***Richard Edlund** *Boss Film Studios***Michael Harris** *NCR/AT&T Human Interface Technology Center***Phil Hettema** *MCA Recreation Services***Mario Kamberg** *MCA Recreation Services***Brenda Laurel** *Interval Research Corporation***Sherry McKenna** *Rhythm & Hues***Allen Yamashita** *Entertainment Design Production Group*

10:15 AM–12 NOON—PACIFIC C & D, HILTON

10:15 AM–12 NOON—ARENA, CONVENTION CENTER

Papers: Processing Synthetic Images

CHAIR

Don Mitchell*AT&T Bell Labs*

View Interpolation for Image Synthesis

Shenchang Eric Chen and Lance Williams*Apple Computer, Inc.*Spatial Anti-aliasing for Animation
Sequences with Spatio-temporal Filtering**Mikio Shinya***NTT Human Interface Laboratories*Motion-compensated Compression of
Computer Animation Frames**Brian K. Guenter, Hee Cheol Yun, and****Russell M. Mersereau***Georgia Institute of Technology*Space Diffusion: An Improved Parallel
Half-toning Technique Using Space-
filling Curves**Yuefeng Zhang and Robert E. Webber***University of Western Ontario***Panel: Digital Illusion: Theme Park Visualization—Part Two**

Continuation of panel described above.

FRIDAY, 6 AUGUST

1:30–3:15 PM—PACIFIC C & D, HILTON

1:30–3:15 PM—ARENA, CONVENTION CENTER

1:30–3:15 PM—CALIFORNIA D, HILTON

Papers: Techniques for Animation

CHAIR

Andrew Glassner*Xerox PARC*

An Implicit Formulation for Precise Contact Modeling Between Flexible Solids

Marie-Paule Gascuel*Ecole Normale Supérieure*

Interval Method for Multi-point Collision Between Time-dependent Curved Surfaces

John M. Snyder, Adam R. Woodbury, Kurt Fleischer, Bena Currin, and Alan H. Barr*California Institute of Technology*

Sensor-actuator Networks

Micheil van de Panne and Eugene Fiume*University of Toronto*

Spacetime Constraints Revisited

J. Thomas Ngo*Harvard University***Joe Marks***Digital Equipment Corporation***Panel: Man vs. Mouse**

In 1992, 185,000 office and factory workers suffered repetitive stress injuries. These types of injuries are now responsible for one-half of all occupational illnesses. This panel describes the types of repetitive stress injuries, other computer-related health risks, and how to avoid them. Topics include: healthy work habits, physical therapy, current problems, and prevention of problems. Panelists will focus on positive things that computer users can do to maintain health and happiness.

CHAIR

Jonathan Luskin *Industrial Light & Magic*

PANELISTS

Terri Hansford *Hand Therapy of San Francisco***Robert E. Markison** *San Francisco Hand Specialists***Joan Stigliani** *Author of The Computer Users' Guide to Health and Vitality***Panel: Multimedia and Interactivity in the Antipodes**

This panel maps out some of the more salient cultural, theoretical, and technological factors shaping the current interactive discourse in Australia and related patterns and practices paralleling these issues on a global scale. Issues pertaining to the critical reception, funding, and production of interactive art are highlighted. Emphasis is placed on issues that are not only specifically relevant to the Australian Antipodes at present, but issues that address the common perceptions and reception in global terms to interactivity and multimedia in an arts context.

CHAIR

Lynne Roberts-Goodwin *University of New South Wales*

PANELISTS

Chris Caines *University of Wollongong***Paula Dawson and Adam Lucas***University of New South Wales***Cameron McDonald-Stuart** *Apple Australia*

3:30–5:00 PM—PACIFIC C & D, HILTON

3:30–5:00 PM—CALIFORNIA D, HILTON

Papers: Natural Phenomena

CHAIR

Darwyn Peachey*Pixar*

Animation of Plant Development

Przemyslaw Prusinkiewicz and**Mark S. Hammel***University of Calgary***Eric Mjolsness***Yale University*

Modeling Soil: Real-time Dynamic Models for Soil Slippage and Manipulation

Xin Li and J. Michael Moshell*University of Central Florida*

Turbulent Wind Fields for Gaseous Phenomena

Jos Stam and Eugene Fiume*University of Toronto***Panel: The Integrative Use of Computer Graphics in a Medical University**

The problems in medicine represented at Loma Linda University Medical School are common to the field of medicine, and solutions found at Loma Linda generalize to the field of medicine. This panel will demonstrate a new and long-needed relationship between the medical community and many not well-known applications that have transformed the effectiveness of medicine and medical administration. The field of medicine has both the need and the resources to provide the computer graphics industry with new market areas for the future streamlining of the medical community. Examples will include innovative applications of virtual reality.

CHAIR

Dave Warner *Loma Linda University*

PANELISTS

Jodi Reed and Douglas Will *Loma Linda University*

WELCOME TO MULTIMEDIA 93, THE ASSOCIATION FOR COMPUTING MACHINERY'S FIRST INTERNATIONAL CONFERENCE ON MULTIMEDIA, ESTABLISHED BY MULTIPLE SPECIAL INTEREST GROUPS OF THE ACM—SIGBIO, SIGCHI, SIGCOMM, SIGGRAPH, SIGIR, SIGLINK, AND SIGOIS. THE CONFERENCE WILL BRING TOGETHER LEADING RESEARCHERS, ENGINEERS, AND PRACTITIONERS FROM ALL ASPECTS OF MULTIMEDIA COMPUTING, COMMUNICATION, STORAGE, AND APPLICATIONS, FOR A FEW INTENSE DAYS OF EXPLORING MULTIMEDIA DIRECTION AND TECHNOLOGY. ○ THE ORGANIZERS OF MULTIMEDIA 93 ARE

MULTI NINETY-THREE MEDIA

VERY PROUD OF THE ENTHUSIASTIC RESPONSE RECEIVED FOR OUR INAUGURAL CONFERENCE. P. VENKAT RANGAN, PROGRAM CHAIR, AND THE MEMBERS OF THE



J. J. GARCIA-LUNA
General Chair—Multimedia 93

TECHNICAL PROGRAM COMMITTEE HAVE DONE AN OUTSTANDING JOB IN SELECTING THE BEST CONTRIBUTIONS FROM MORE THAN 200 SUBMISSIONS RECEIVED FROM FOUR CONTINENTS. ○ THE ORGANIZERS OF MULTIMEDIA 93 HOPE THAT YOU ENJOY THIS UNIQUE NEW CONFERENCE. WE BELIEVE THAT FROM ITS INCEPTION, MULTIMEDIA WILL BE THE CATALYST FOR INDUSTRY GROWTH AND DISCOVERY. TAKE ADVANTAGE OF OUR CO-LOCATION WITH SIGGRAPH 93 BY ENJOYING THE MANY PROGRAMS AND ACTIVITIES OF THE CONFERENCES, AND WITNESS THE FUTURE OF MULTIMEDIA.

THE SYNERGY OF COMPUTING AND COMMUNICATION

Initiating a new conference of the scope and caliber of the Multimedia conference is a tremendous undertaking. The successful coordination of Multimedia 93 is the result of the hard work of the many individuals in its steering, organizing, and program committees.

Special thanks are extended to the following individuals for their extraordinary contributions to the organization and success of Multimedia 93: Edward Fox, steering committee chair; P. Venkat Rangan, for his contributions to the organization of the conference, in addition to his work in the technical program; Bob Judd and Mark Resch, SIGGRAPH 93 co-chairs, and Molly Morgan Kuhns, SIGGRAPH 93 conference coordinator, for all their efforts to support the co-location of SIGGRAPH 93 and Multimedia 93; Steve Cunningham, director for publications; and all of the members of the SIGGRAPH 93 conference committee for embracing our undertaking with enthusiasm and generosity.

Multimedia 93 Keynote Address

ARENA, CONVENTION CENTER
Wednesday 10:15 am–12 noon

KEYNOTE SPEAKER Trip Hawkins

President and Chief Executive Officer, The 3DO Company

Trip Hawkins is president and chief executive officer of The 3DO Company, a pioneering multimedia venture that is establishing a new standard for interactive multimedia in consumer electronics. 3DO, formed in October 1991, has forged strategic partnerships with a variety of industry leaders.

Hawkins is also the chair of Electronic Arts, which he founded in 1982. Electronic Arts rose in four years to become the largest supplier of computer entertainment software in the world.

Prior to 1982, Hawkins was one of the early managers at Apple Computer where, over a period of four years, he provided leadership for Apple's successful entry into the business market. Hawkins holds a degree in strategy and applied game theory from Harvard College and an MBA from Stanford University.

Multimedia 93 Town Hall Meeting

ROOM A9 & A10, CONVENTION CENTER
Wednesday 5:15 pm–7:00 pm

This is an open-forum meeting aimed at providing information about and soliciting your help with:

- the Multimedia 94 conference
—J. J. Garcia-Luna
- the new ACM journal on multimedia systems
—P. Venkat Rangan
- the new special interest group on multimedia
—J. J. Garcia-Luna

Everyone interested in volunteering for any of the above three activities, or simply in learning about future plans for them, is welcome to attend. You do not need to be registered for Multimedia 93 paper/panel sessions in order to attend this meeting.

WEDNESDAY, 4 AUGUST

10:15 AM–12 NOON—ARENA, CONVENTION CENTER

1:30–3:15 PM—ROOM A9 & A10, CONVENTION CENTER

1:30–3:15 PM—ROOM A1, CONVENTION CENTER

Multimedia 93 Keynote Address

Note: There are no Multimedia papers or panels from 10:15 am–1:30 pm on Wednesday, so that everyone may attend the Multimedia 93 keynote address from 10:15 am–12 noon. See page 58 for more information.

Papers: Communication Protocols

CHAIR

H. Terada*Osaka University*

Optimistic Strategies for Large-scale Dissemination of Multimedia Information

R. Yavatkar and L. Manoj*University of Kentucky*

MCAM: An Application Layer Protocol for Movie Control, Access, and Management

R. Keller and W. Effelsberg*University of Mannheim, Germany*

Synchronous Bandwidth Allocation in FDDI Networks

Q. Zheng and K.G. Shin*University of Michigan***Panel: Digital Libraries of the Future**

By the year 2000, a variety of national and international initiatives will lead to large-scale digital libraries that will include page images, compound documents, medical images, hypermedia educational materials, and interactive multimedia. Transmission over gigabit networks will allow ubiquitous access from kindergarten-12, colleges, businesses, and government.

Research on this grand challenge application is scaling up prototypes to the order of millions of users and petabytes of information while considering browsing, educational applications, intellectual property rights, interfaces, linking, natural language processing, navigation, networking, searching, systems, document analysis, conversion, and architectures. The panel will consider some current initiatives and prototypes, inclusion of multimedia information, and key areas of research.

CHAIR

Edward A. Fox *Virginia Tech*

PANELISTS

Zahid Ahmed *San Diego Supercomputer Center***Robert M. Akscyn** *Knowledge Systems***Christine L. Borgman** *UCLA***Michael Lesk** *Bellcore***John L. Schnase** *Washington University Medical School*

3:30–5:00 PM—ROOM A9 & A10, CONVENTION CENTER

3:30–5:00 PM—ROOM A1, CONVENTION CENTER

5:15–7:00 PM—ROOM A9 & A10, CONVENTION CENTER

Papers: Compression and Coding

CHAIR

G. Wallace*The 3DO Company*

Real-time Software-based Video Coder for Multimedia Communication Systems

H.C. Huang, J.H. Huang, and J.L. Wu*National Taiwan University, Taiwan, R.O.C.*

Performance of a Software MPEG Video Decoder

K. Patel, B.C. Smith, and L.A. Rowe*University of California, Berkeley*

Transform Coding of Arbitrarily-shaped Image Segments

S.F. Chang and D.G. Messerschmitt*University of California, Berkeley***Papers: A Multimedia Mineral Retrieval System**

CHAIR

P. Mantey*University of California, Santa Cruz*

Salient Video Stills: Content and Context Preserved

L. Teodosio and W. Bender*MIT Media Lab*

Facial Image Retrieval, Identification, and Inference System

J.K. Wu, Y.H. Ang, P. Lam, K. Moorthy, and**A.D. Narasimhalu***ISS, National University of Singapore, Singapore*

Experiments in Retrieval of Mineral Information

D. Cakmakov and D. Davcev*Kiril and Metodij University, Macedonia***Multimedia Town Hall Meeting**

This meeting, open to all attendees, is an opportunity to volunteer, make suggestions, and ask questions about the multimedia conference, special interest group, and journal. See page 58 for more information.

8:30-10:00 AM—ROOM A9 & A10, CONVENTION CENTER

8:30-10:00 AM—ROOM A1, CONVENTION CENTER

Papers: Communication Systems

CHAIR

J.R. Cox*Washington University*

High-quality Multimedia Conferencing through a Long-haul Packet Network

C. Elliott*BBN Systems and Technologies*

Media Scaling for Audiovisual Communication with the Heidelberg Transport System

L. Delgrossi, C. Halstrick, D. Hehmann, R.G. Herrtwich, O. Krone, J. Sandvoss, and C. Vogt*IBM European Networking Center, Germany*

A Multimedia Client to the IBM LAN Server

M. Baugher, S. French, A. Stephens, and I. Van Horn*IBM LAN Systems*

The Vidboard: A Video Capture and Processing Peripheral for a Distributed Multimedia System

J.F. Adam and D.L. Tennenhouse*Massachusetts Institute of Technology***Papers: Hypermedia**

CHAIR

I. Ritchie*OWL International, Inc.*

MHEG: An Introduction to the Future International Standard for Hypermedia Object Interchange

R. Price*CER IBM-France, France*

HyOctane: A HyTime Engine for an MMIS

J.F. Koegel, L.W. Rutledge, J.L. Rutledge, and C. Keskin*University of Massachusetts, Lowell*

Open Architecture Multimedia Documents

B.R. Gaines and M.L.G. Shaw*University of Calgary, Canada*

10:15 AM-12 NOON—ROOM A9 & A10, CONVENTION CENTER

10:15 AM-12 NOON—ROOM A1, CONVENTION CENTER

10:15 AM-12 NOON—MARRIOTT HALL, MARRIOTT

Papers: Media Synchronization

CHAIR

J.O. Limb*Hewlett-Packard Company*

A Synchronization and Communication Model for Distributed Multimedia Objects

N.U. Qazi, M. Woo, and A. Ghafoor*Purdue University*

Synchronization Models for Multimedia Presentation with User Participation

B. Prabhakaran and S.V. Raghavan*Indian Institute of Technology*

Specification of Multimedia Composition and a Visual Programming Environment

S. Eun, E.S. No, H.C. Kim, H. Yoon, and S.R. Maeng*Korea Advanced Institute of Science and Technology***Papers: Multimedia Toolkits**

CHAIR

M. Brown*DEC Systems Research Center*

Toolkit for Shared Hypermedia on a Distributed Object-oriented Architecture

R. Trehan, N. Sawashima, K. Yamaguchi, and K. Hasebe*Toshiba Research and Development Center, Japan*

CMIFed: A Presentation Environment for Portable Hypermedia Documents

G. van Rossum, J. Jansen, K.S. Mullender, and D.C.A. Butlerman*Centrum voor Wiskunde en Informatica, The Netherlands*

Programming the Multimodal Interface

E.P. Glinert*Rensselaer Polytechnic Institute***M.M. Blattner***University of California, Davis***Panel: Networked Multimedia Emerging Software Architectures**

Companies will see the most benefit from adopting multimedia technologies into their overall corporate information architectures. This panel discusses the solutions that networked multimedia will enable, the current technologies available, and the emerging technologies which will make these environments even more capable.

CO-CHAIRS

Bob Pearson *Sun Microsystems Computer Corporation*
Robert Aronoff *SunSoft, Inc.*

PANELISTS

To be determined

THURSDAY, 5 AUGUST

1:30-3:15 PM—ROOM A9 & A10, CONVENTION CENTER

1:30-3:15 PM—ROOM A1, CONVENTION CENTER

Papers: Delay-sensitive Retrieval

CHAIR

P.B. Berra*Syracuse University*

Multimedia Network File Servers: Multi-channel Delay Sensitive Data Retrieval

D.J. Gemmell*Simon Fraser University*

Optimization of the Grouped Sweeping Scheduling (GSS) with Heterogeneous Multimedia Streams

M.S. Cheng, P.S. Yu, and D.D. Kandlur*IBM T.J. Watson Research Center*

Disk Scheduling in a Multimedia I/O System

A.L. Narasimha Reddy and J. Wyllie*IBM Almaden Research Center***Papers: Using Video in Group Collaboration**

CHAIR

J. Rosenberg*Bellcore*

What Video Can and Can't Do for Collaboration

E.A. Isaacs and J.C. Tang*SunSoft, Inc.*

Where Were We: Making and Using Near-synchronous, Pre-narrative Video

S.L. Minneman and S.R. Harrison*Xerox PARC*

Architectures for Multi-source Multi-user Video Compositing

L.C. Yun and D.G. Messerschmitt*University of California, Berkeley*

3:30-5:00 PM—ROOM A9 & A10, CONVENTION CENTER

3:30-5:00 PM—ROOM A1, CONVENTION CENTER

Papers: Video Processing

CHAIR

D. DeGroot*Texas Instruments*

Projection Detecting Filter for Video Cut Detection

K. Otsuji and Y. Tonomura*NTT Human Interface Laboratories, Japan*

MPEGTool: An X Window-based MPEG Encoder and Statistics Tool

T. Urabe, H. Afzal, G. Ho, P. Pancha, and M. El Zarki*University of Pennsylvania*

Image Processing on Compressed Data for Large Video Databases

F. Arman, A. Hsu, and M.Y. Chiu*Siemens Corporate Research***Panel: Multimedia Publishing: Your Conference CD-ROM**

What teamwork and technology was needed to create your multimedia conference proceedings? What are the capabilities and limitations of current publication-level multimedia systems? What would make your CD proceedings more useful than your paper proceedings? Based on experience with the Multimedia 93 and SIGGRAPH 93 CD-ROM Conference Proceedings, the panel will explore key issues in multimedia publishing.

CHAIR

Roy Rada *University of Liverpool*

PANELISTS

Steve Cunningham *California State University, Stanislaus***Eric Hoffert** *Apple Computer, Inc.***Peter Pathe** *Microsoft Corporation***Richard L. Phillips** *Los Alamos National Laboratory***Ian Ritchie** *Heriot-Watt University*

8:30–10:00 AM—ROOM A9 & A10, CONVENTION CENTER

8:30–10:00 AM—ROOM A1, CONVENTION CENTER

Papers: Network Performance

CHAIR

A. Lazar*Columbia University*

Analysis of Video Conferencing on a Token Ring Local Area Network

S.M. Crimmins*IBM and Duke University*

Algorithms and Performance Evaluation of the Xphone Multimedia Communication System

A. Eleftheriadis, S. Pejhan, and**D. Anastassiou***Columbia University*

A Performance Analysis of the IBM Subsystem Control Block Architecture in a Video Conferencing Environment

K. Huynh*IBM Corporation***T. Khoshgoftaar***Florida Atlantic University***Papers: Authoring**

CHAIR

P. Dewan*Purdue University*

Object Composition and Playback Model for Handling Multimedia Data

R. Hamakawa and J. Rekimoto*NEC Corporation, Japan*

Structured Multimedia Authoring

L. Hardman, G. van Rossum, and**D.C.A. Bulterman***Centrum voor Wiskunde en Informatica, The Netherlands*

A Multimedia Testbed

V. de Mey and S. Gibbs*Universite de Geneve, Switzerland*

10:15 AM–12 NOON—ROOM A9 & A10, CONVENTION CENTER

10:15 AM–12 NOON—ROOM A1, CONVENTION CENTER

Papers: Documents

CHAIR

E. Hoffert*Apple Computer, Inc.*

Synchronization in the MAestro Multimedia Authoring Environment

G.D. Drapeau*Stanford University*

Automatic Temporal Layout Mechanisms

M.C. Buchanan and P.T. Zellweger*Xerox PARC*

CircusTalk: An Orchestration Service for Distributed Multimedia

Y.S. Gutfreund, J. Diaz-Gonzales, R. Sasnett, and V. Phuah*GTE Laboratories, Inc.***Panel: The Future of Video Dial Tone: Business and Public Policy Issues in the Creation of a Ubiquitous Information Infrastructure**

During the next decade, the arrival of a ubiquitous multimedia communications infrastructure is expected. This infrastructure will provide video dial tone much as the phone system today provides universal service, transform the communications landscape, and enable many new services for both businesses and consumers. No single industry is positioned to dominate this arena, and many different scenarios could simultaneously unfold as competing industries bring their vision to market. Technical, regulatory, and market factors are all under consideration, are changing rapidly, and vary across the international field.

This panel provides a forum for experts from representative industries to articulate their vision for the direction that this evolution will take and to address the major obstacles that can currently be identified. The discussion will focus on major directions and will include market, regulatory, and technical topics.

CHAIR

Gene Miller *NYNEX*

MODERATOR

John Koegel *University of Massachusetts, Lowell*

PANELISTS

Mike Connor *Dow Jones & Co.***Joe DeMauro** *NYNEX***Mike Libehold** *Apple Computer, Inc.*

FRIDAY, 6 AUGUST

1:30–3:15 PM—ROOM A9 & A10, CONVENTION CENTER

1:30–3:15 PM—ROOM A1, CONVENTION CENTER

Papers: Video Servers

CHAIR

S. Christodoulakis*Technical University of Crete*

News on Demand for Multimedia Networks

G. Miller*NYNEX***G. Baber and M. Gilliland***Dow Jones & Company*

Streaming RAID: A Disk Array Management System for Video Files

F.A. Tobagi, J. Pang, R. Baird, and M. Gang*Starlight Networks, Inc.*

Multi-resolution Video Representation for Parallel Disk Arrays

T. Chiueh and R.H. Katz*State University of New York***Papers: Information Access**

CHAIR

F. Golshani*Arizona State University*

Panoramic Overviews for Navigating Real-world Scenes

L. Teodosio*MIT Media Lab***M. Mills***Apple Computer, Inc.*

Design of an Information Skimming Space

M. Ohkubo, N. Kobayashi, and T. Nakagawa*NTT Human Interface Laboratories, Japan*

Phoneshell: The Telephone as a Computer Terminal

C. Schmandt*MIT Media Lab*

3:30–5:00 PM—ROOM A9 & A10, CONVENTION CENTER

3:30–5:00 PM—ROOM A1, CONVENTION CENTER

Papers: Collaboration Systems

CHAIR

S. Ahuja*AT&T Bell Laboratories*

CECED: A System for Informal Multimedia Collaboration

E.J. Craighill, R. Lang, K. Skinner, and M.**Fong***SRI International*

Collaborative Multimedia Scientific Design in SHASTRA

V. Anupam and C.L. Bajaj*Purdue University*

The BERKOM Multimedia Collaboration Service

M. Alternfofen, J. Dittrich,**R. Hammerschmidt, T. Käppner, C. Kruschel,****A. Kueckes, and T. Steinig***DEC CEC***Papers: Support for Video Applications**

CHAIR

G. Davenport*MIT Media Lab*

Integrating Video into an Application Framework

P. Schnorf*Canon Information Systems, Inc.*

VideoScheme: A Programmable Video Editing System for Automation and Media Recognition

J. Matthews and F. Makedon*Dartmouth College***P. Gloor***Massachusetts Institute of Technology*

A Digital on-demand Video Service Supporting Content-based Queries

T.D.C. Little, G. Ahanger, R.J. Folz,**J.F. Gibbon, F.W. Reeve, D.H. Schelleng, and****S.D. Venkatesh***Boston University*

Exhibition

HALLS B-D, CONVENTION CENTER

Tuesday & Wednesday 10:00 am-6:00 pm

Thursday 10:00 am-3:30 pm

SIGGRAPH 93 is the world's premiere showcase for computer graphics and provides exhibiting companies with direct access to buyers of cutting-edge computer graphics components, systems, software, and services. There is no better opportunity to talk with the people who are directly involved in the industry's conceptual advances, technological breakthroughs, new techniques, and leading-edge issues.

SIGGRAPH's commitment to providing the forum for discovery and interaction is the reason more than 275 exhibitors will occupy 105,000 square feet of the Anaheim Convention Center.

More than 30,000 people are expected to attend SIGGRAPH 93. Business people, designers, researchers, scientists, artists, and many others will travel from all parts of the world to share, show, and learn about the latest innovations in computer graphics. In addition, attendees will be able to purchase hardware and software on the exhibit floor.

PRODUCTS & SERVICES

ANIMATION ○ **ARTIFICIAL INTELLIGENCE** ○
BUSINESS AND FINANCIAL GRAPHICS ○ **CAD/
CAM/CAE/CIM/ROBOTICS** ○ **CAMERAS AND
SCANNERS; SCAN CONVERTERS** ○ **COM-
PUTER-VIDEO INTERFACING** ○ **DESKTOP
PUBLISHING** ○ **ELECTRONIC PUBLISHING** ○
ENCODERS/DECODERS ○ **GRAPHIC ART SYS-
TEMS** ○ **GRAPHIC DESIGN SYSTEMS** ○ **GRAPH-
ICS ACCELERATOR BOARDS** ○ **GRAPHICS
STANDARD SOFTWARE** ○ **HARDCOPY DE-
VICES; PHOTOGRAPHS/SLIDES** ○ **HDTV** ○

WHAT'S

on

DISPLAY

○ **HIGH-PERFORMANCE GRAPHICS PRO-
CESSORS** ○ **HIGH RESOLUTION GRAPHICS
DISPLAY SYSTEMS** ○ **IMAGE PROCESSING** ○
**INPUT DEVICES: DIGITIZERS, LIGHT PENS,
MICE** ○ **LOW-COST GRAPHICS SYSTEMS** ○
MAPPING AND CARTOGRAPHY ○ **MEDICAL
IMAGING SOFTWARE** ○ **MULTIMEDIA/HYPER-
MEDIA** ○ **NETWORKING: HARDWARE, SOFT-
WARE, SERVICES** ○ **OEM COMPONENTS** ○
PAINT SYSTEMS ○ **PC ADD-ON PRODUCTS** ○
PC-BASED SYSTEMS ○ **PERSONAL COMPU-
TER GRAPHICS CARDS** ○ **PRINTERS, PLOT-
TERS, AND OTHER HARDCOPY DEVICES** ○
PROJECTORS ○ **PUBLICATIONS** ○ **RENDER-
ING AND IMAGE SYNTHESIS SOFTWARE** ○
SCIENTIFIC VISUALIZATION ○ **SOFTWARE
(OTHER)** ○ **STORAGE DEVICES: TAPE/DISK** ○
SUPERCOMPUTERS ○ **TERMINALS, MONI-
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Advanced Imaging is the monthly magazine for the electronic imaging/image processing professional, covering all imaging forms and application areas, and the electronic imaging industry. *AVC Presentation* is the magazine for the professional visual communicator, covering products and techniques built on all presentation technologies.

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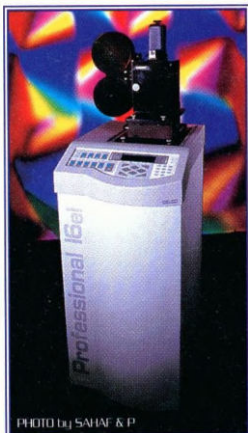


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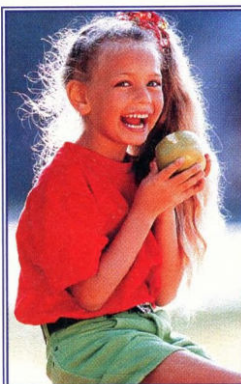


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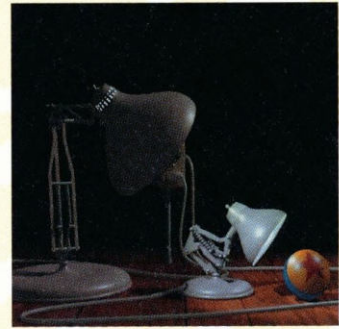
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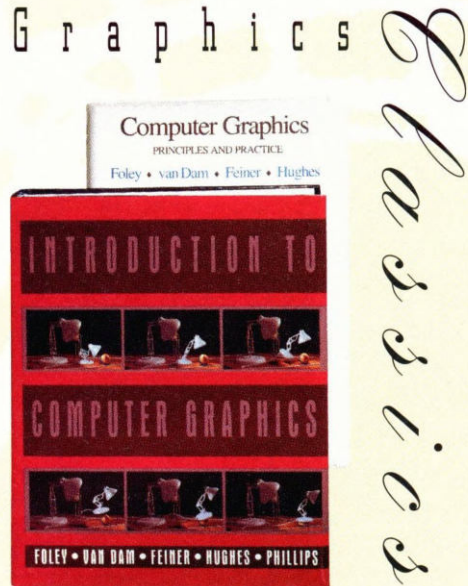
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AV Video magazine is edited for production and presentation technology professionals involved in the creation of presentations using video, audio, computer graphics, and multimedia.

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Centaur Development is demonstrating the new OpalVision 24-Bit Video and Graphics System, a complete PAL- and NTSC-compatible system for the Amiga series computers. It includes 24-bit painting software, frame grabbing, genlocking, character generation, video switching, and the OpalVision Roaster Chip video special effects unit.

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Los Angeles, CA 90067
310.785.3810
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Dale Rochon
Vice President, Sales and
Marketing

Chromatek's technology breakthrough: Models 8404 and 8406 high-resolution image splitters (accepts source material from 15-66Khz) for multi-screen presentations and exhibits. See Chromatek's scan converters such as low-cost model 9101 for VGA/MAC, model 9120 for workstations and model 9135 for HDTV applications as well as other HDTV products.

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Montpellier, 34032
France
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Alain Chauchard

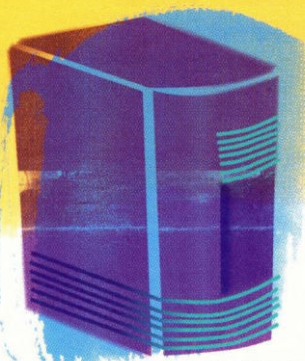
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A computer software developer for product design and marketing of industrial design, automotive, consumer goods, furniture, and apparel industries. Computer Design, Inc. is featuring real-world examples of customer on-site use of Design-Concept 3D, free-form, interactive modeling and visualization software, and U4ia, 2D high-resolution image processing software.

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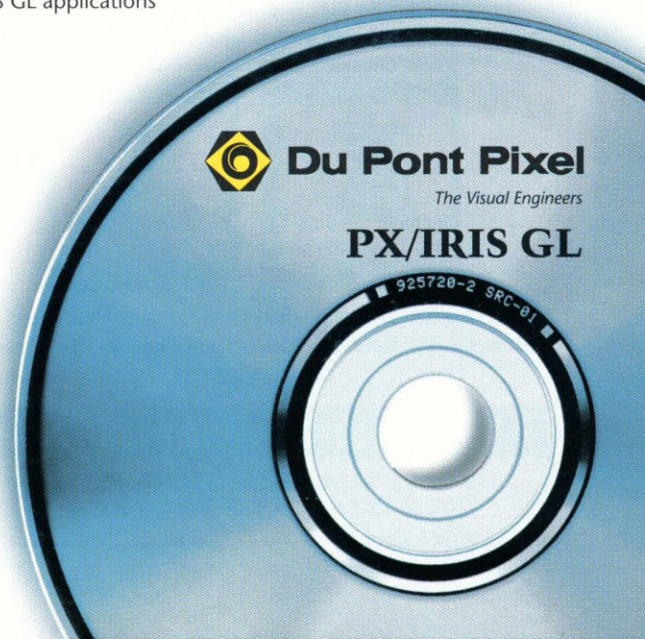
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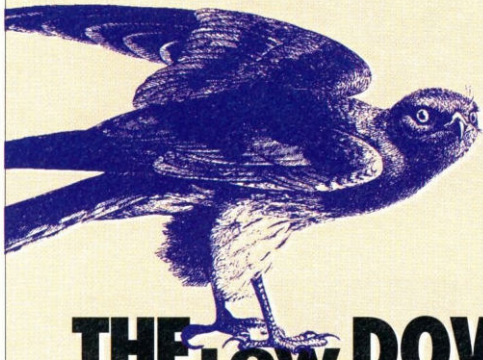


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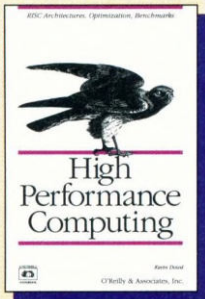
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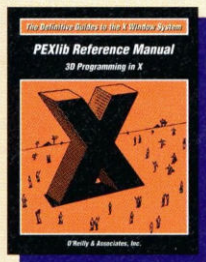
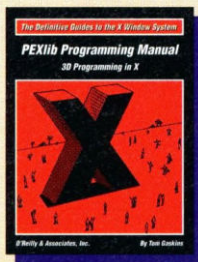
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By Kevin Dowd,
1st Ed. June 1993, 371 pages,
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Computer Pictures magazine is written for creators and producers of graphic and multimedia presentations, including classical presentation, advertising, package design, POP, and prepress imaging.

CORE Software Technology is featuring their baseline image manipulation, file management, and processing system, The CORE. The CORE is the leading UNIX imaging software product in 1992 and 1993. Conference attendees may take "The CORSE," a 20-minute introduction to low-cost, high-performance imaging and image archive management.

CoSA After Effects is a QuickTime application providing Macintosh users with video post-production tools currently found only in high-end production houses. Users can create complex layering, compositing, and animation; create time-based special effects; and apply plug-in filters. Key frame-based interface and compositing capabilities permit production of motion graphics and animation.

Covid manufactures high-resolution Computer Video Interfaces, RGB Distribution Amplifiers, RGB Switches, and RGB Umbilical Cable. Interfaces link workstations, terminals and PCs to multi-scan monitors and projectors for large-screen display of computer text and graphics. Distribution systems route multiple sources to multiple displays, and Covid's high-resolution Cactus Cable provides the necessary link to ensure signal integrity from source to display.

C CrystalGraphics, Inc.
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 3110 Patrick Henry Drive
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 408.496.6175
 408.496.6988 fax
 Marsha Adams
 Director of Marketing

CrystalGraphics offers a line of PC- and Mac-based 3D graphics software including Crystal Flying Fonts! (3D titling and animation), Crystal 3D Designer (3D modeling for illustrators), Crystal Desktop Animator (3D modeling and multimedia animation), and Crystal TOPAS Professional and TOPAS for the Mac (broadcast-oriented modeling and animation packages).

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 714.362.0500 fax
 Alex Holowko
 Manager Sales—Graphics

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

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 Marlboro, MA 01752
 508.460.1600
 508.481.8627 fax
 Cliff LaCoursiere
 Director of Sales

Data Translation's Multimedia Group is showing Media 100, an on-line, nonlinear video post-production system. Media 100 simplifies video production, giving communicators who aren't video professionals an easy way to create professional videos entirely on the Macintosh. Media 100 integrates the Adobe Premiere effects architecture and Macintosh graphics animation.

Desktop Video World
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 80 Elm Street
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 603.924.0100
 603.924.4066 fax
 Mary McCole
 Promotional Coordinator

Desktop Video World is the first and only publication specifically targeted at the merging computer and video markets. This multi-platform publication is written for professionals who use computers to manipulate and enhance video images: corporate videographers, cable and broadcast TV stations, multimedia developers, animators, and independent producers.

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 510.526.7167
 510.526.7073 fax
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 Director of Marketing

Diaquest, the leader in video control for animation recording, desktop video production, image processing, and scientific visualization, introduces new products including ANIMAQ/UX software animation controller for Silicon Graphics and other UNIX workstations. Diaquest demonstrates QuickPass recording and digitizing technology, as well as distributed animation and sequential frame digitizing with the enhanced ImageNode—VideoServer system.

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 Van Nuys, CA 91406
 818.787.9785
 818.787.9783 fax
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Digital Equipment Corporation
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 606.371.5533
 606.371.3729 fax
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 Vice President Sales/
 Marketing

New for SIGGRAPH is the DPS DR-3100 Personal Animation Recorder for IBM-compatible computers, which permits real-time recording and playback of video animations at a true 30 frames per second. Genlock, Composite, Component (Betacam/MII), and Y/C outputs are standard. Other products, including the DPS-210 Universal Transcoder, are also on display.

Dimension International
 BOOTH 2227
 Zephyr One, Calleva Park
 Aldermaston, Berkshire
 RG7 4QW
 United Kingdom
 44.734.810077
 44.734.816940 fax
 Ian Andrew
 President

Superscape virtual reality software. Interactive 3D visualization and virtual world building via graphical user interfaces. Superscape VRT3, an integrated development system for use typically by designers and artists in various application areas, is being launched at the exhibition. Minimum hardware required is 486-based personal computers.

Discreet Logic
 BOOTH 233
 5505, boul. St. Laurent
 Suite 5200
 Montreal, Quebec H2T 1S6
 Canada
 514.272.0525
 514.272.0585 fax
 Diana Shearwood
 Director, Communications

Discreet Logic presents its line of leading-edge, high-performance paint, compositing, and effects software tools for the broadcast, video, and film marketplace. Featured products include the latest release of FLAME, running on Silicon Graphics' new ONYX supercomputer with Reality-Engine2 graphics, and FLINT operating in Silicon Graphics' new IRIS Indigo2 with Extreme graphics.

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408.436.3458 fax
Joe DePaola
US General Manager

Du Pont Pixel brings Silicon Graphics' class visual processing to SPARC. PX/IRIS GL, a software implementation of Silicon Graphics IRIS GL 4.0, and the S-Bus GL Engines transform SPARCstations into Indigo-class 3D workstations. New products include PX/IRIS Explorer, SGI's visual application builder on SPARC and new-generation S-Bus graphics accelerators.

Dynamic Graphics, Inc.

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1015 Atlantic Avenue
Alameda, CA 94501
510.522.0700
510.522.5670 fax
dgi@dgi.com
Glenn Hansen
Manager, Marketing

Dynamic Graphics, Inc. develops spatial analysis and visualization software for applications in the earth sciences. The current software system, EarthVision, integrates dissimilar data (e.g., geology, hydrology, chemical concentrations) to provide a comprehensive understanding of property distribution and complex geologic relationships in 3D.

E Eastman Kodak Company, Motion Analysis Systems Division

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Electric.Img@applelink.apple.com
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Public Relations Manager

ElectricImage Animation System (EIAS) 1.5 is a Macintosh-based, 3D computer graphics/animation system. Includes ElectricImage—animation choreography interface; Transporter model converter utility; Projector—VTR control/IMAGE file conversion/digital compositing; Mr. Font—converting PostScript Type 1 laser fonts into 3D models and camera—rendering engine.

ElectroGIG USA, Inc.

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Eurographics is the European Association for Computer Graphics, which caters to professionals working in computer graphics and related fields. Events include an annual international conference and workshops in key areas of technology, such as scientific visualization, rendering, animation, graphics, and education. Members receive *Computer Graphics Journal* and *EG News*.

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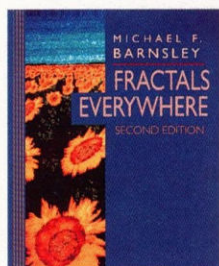
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Germantown, MD 20874
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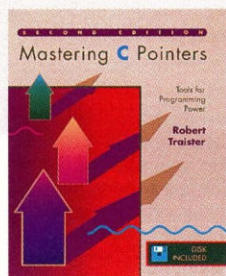
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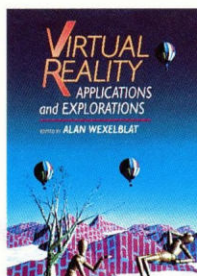
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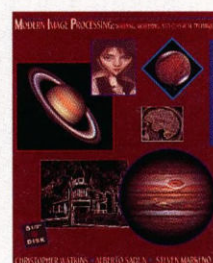
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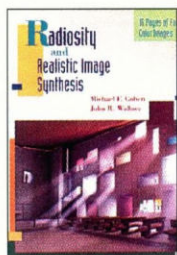
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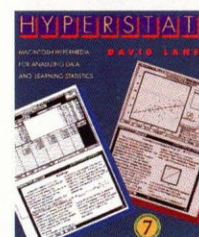
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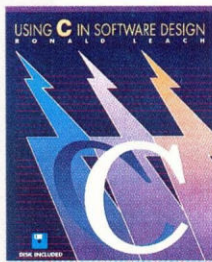
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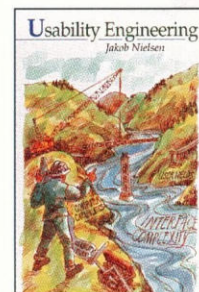
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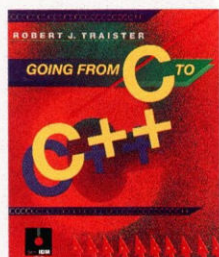
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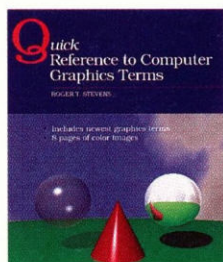
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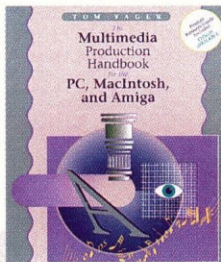
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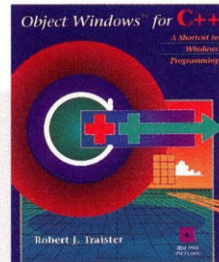
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Ed Hart
Manager of Sales and Market
Development

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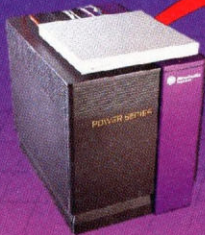
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BOOTH 2343
335 Spreckels Drive
Aptos, CA 95003
408.688.8800
408.688.8836 fax
fractal@applelink.apple.com
Corinne Tuck
Senior Marketing Coordinator

Fractal Design Corporation specializes in graphics painting, drawing, and image retouching software for the Macintosh and PC Windows. See the award-winning Fractal Design Painter 2.0 for Windows, a 24-bit color "natural" media painting program that allows the creation of artwork from scratch or from scanned images. Painter 2.0 includes photo design features and more natural media tools.

Fraunhofer Center for Research in Computer Graphics
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 Manager—Graphics Toolkits
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 Product Marketing Manager/
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The Grass Valley Group—Graphics Systems Division is based in Grass Valley, CA, and manufactures hardware and software for television and post-production markets worldwide. The product line includes the new video Designer PC-based paint system, the Graphics Factory systems with the exciting new HALO software for Dimensional Video Typography, and the Presto Family of CG's.

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High Color and the Center for Creative Imaging are your sources for graphics and multimedia training and information. *High Color* is dedicated to PC graphics, video technology, and applications. The Center for Creative Imaging is the leading training facility for hands-on courses in computer-based digital imaging, photography, 3D modeling, animation, prepress, multimedia, and video production.

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I.D. Magazine is about the art, business, and culture of design. The magazine covers graphics, products, furniture, and environmental projects. *I.D.* explores trends, focusing on current practice and future developments.

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

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IMAGEBase is a monthly, full-color newsletter written for the professional and serious non-professional who works in electronic imaging. Practical, industrial, and fine-art applications, as well as major operating systems, are reported by imaging professionals. *IMAGEBase* is a paid subscription newsletter.

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 Pixel-INA Award organizer

IMAGINA is a European event about computer graphics, virtual worlds, and special effects with conferences, an exhibition, and the Pixel-INA Award (a competition). IMAGINA is organized by INA and the Television Festival of Monaco with the collaboration of CNC. It will be held in Monte Carlo on 16-18 February 1994.

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Impediment Incorporated features memory and peripherals upgrades. Impediment is known worldwide across the Internet and is Kingston Technology's largest workstation distributor.

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IRIS Graphics, Inc.

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617.275.8777
617.275.8590 fax
Herman Boothe
Tradeshows Coordinator

IRIS Graphics is exhibiting two of its high-resolution, continuous ink jet color printers: the large-format IRIS 3024 and the highly automated SmartJet 4012, named editors' choice by *Macworld* magazine; also exhibiting new print server, Color Base, linked via network to Macintosh, SGI, Sun, and PC/Windows color workstations.

Ithaca Software

BOOTH 641
1301 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 graphics 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.

Itochu Technology, Inc. (C. Itoh)

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susaki@citoh.com
Terry Susaki
Director of Imaging Products

Itochu Technology, Inc. introduces a new high-resolution color printer, The Pictography 3000, which produces photographic-quality prints from digital image data such as computer graphics, scanned images, and photo CDs. Uses a new thermal development and transfer printing technology with a silver halide photographic process that requires no chemicals or toner.

J JVC Professional Products Company

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Manager Advertising Sales
Promotion

JVC displays its computer imaging cameras including the TK-F7300U high-resolution frame capture camera. The TK-F7300 is a single CCD camera with variable resolution, capable of producing resolution up to 4416 x 3456 pixels. The KY-F30BU is a 3-CCD camera with 668 x 485 resolution and 62dB S/N ratio. Also on display is a recordable CD-ROM.

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Circulation Manager

Knowledge Industry Publications, Inc. is the publisher of *AV Video*, *Computer Pictures*, *Tape/Disc Business*, *Smart Media Business*, and *Teleconferencing News*—several magazines and newsletters covering the visual presentation/communication marketplace.

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 602.276.9007 fax
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 Channel Marketing Manager

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 Rick Pickett
 President

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 Christine Lyon
 Vice President

Lyon Lamb animation controllers interface graphics sources (either computer or camera) to video recorders to create video animation. Converters and encoders convert RGB computer displays to broadcast-quality video in both PAL and NTSC. Products are stand-alone and plug-in boards.

M **Management Graphics, Inc.**

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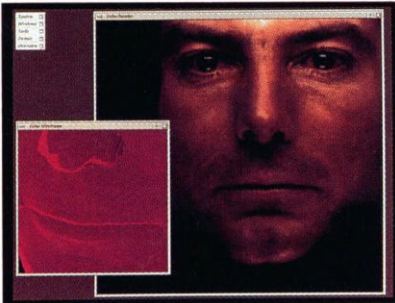
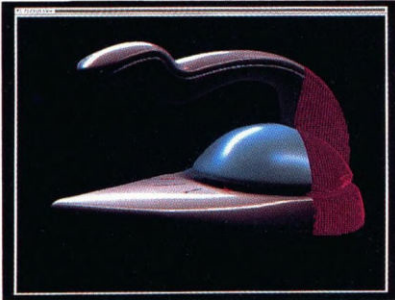
Management Graphics, Inc., exhibits its Solitaire Image Recorders for animation, special effects, remote sensing, business graphics, scientific visualization, and other fields requiring high-resolution color images on film. Solitaire supports more than 17 film formats, from 16mm, 35mm (slide and cine formats) up to 8"x10". Also showing color management software: ColorFit and the bulk-load 4"x5" CP.

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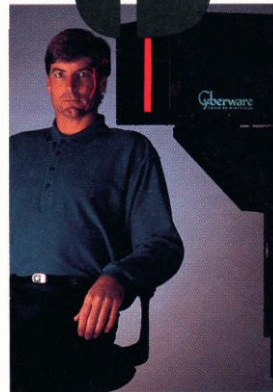
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Maximum Strategy is the leading manufacturer of high-performance storage solution technologies for the high-performance computing marketplace. The company's line of cost-effective mass storage solutions, based on industry standards, is available in configurations for supercomputer, mini-supercomputer, and high-performance workstation users who run storage-intensive applications.

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President

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Micro Publishing News

BOOTH 3025

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Nancy Whelan
Associate Publisher

Micro Publishing News (MPN) is California's monthly newspaper for computer graphics users and multimedia professionals. MPN is exhibiting the Southern and Northern California editions of the August issue, as well as new books on photo CD and digital photography.

Minicomputer Exchange

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The MIT Press publishes the journals *Leonardo* and *Presence*. Featured book titles include *The Leonardo Almanac: International Resources in Art, Science and Technology*, edited by Craig Harris; *The Visual Mind: Art and Mathematics*, edited by Michele Emmer; and *The Reconfigured Eye: Visual Truth in the Post-Photographic Era*, by William Mitchell.

Mitsubishi Electronics America, Inc.—Professional Electronics Division

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Music and Arts Editor

MONDO 2000 tracks the effect of high technology on popular culture. Recent issues have featured the computer art of William Latham, Yoichiro Kawaguchi, and David Em. Also available is the book, *Mondo 2000: A User's Guide to the New Edge* (Harper Perennial), which will introduce readers to the coming revolution in art, technology, media, chemistry, science, and music.

Monitor/Media Age

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Carlotta Pellizzari
Journalist

Monitor is an Italian trade magazine addressed to the audiovisual and professional video market. In existence since 1978, with an Italian circulation of 15,000. Distributed at all major world-wide exhibitions.

Moonlight Computer Products

BOOTH 2736

10211 Pacific Mesa
Boulevard, Suite 410
San Diego, CA 92121
619.625.0300
619.625.0199 fax
Jean Doig

SoftVTR, the 100 percent software animation controller, controls more than 60 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. Includes special drivers for 3D Studio, TOPAS and Animator Pro.

M Morgan Kaufmann Publishers
 BOOTH 1926
 2929 Campus Drive, Suite 260
 San Mateo, CA 94403
 415.578.9911
 415.578.0672 fax
 morgan@unix.sri.com
 Lisa Schneider
 Marketing Coordinator

Morph's Outpost on the Digital Frontier

BOOTH 953
 125 Lombardy Lane
 P.O. Box 578
 Orinda, CA 94563
 510.254.3145
 510.254.3416 fax
 Craig LaGrow
 Publisher

New Morgan Kaufmann books in computer graphics include: *Radiosity and Global Illumination* by Claude Puech and Francois Sillion, and *Graphics Interface '93*. Featured backlist titles include: *User Interface Management Systems* by Dan Olsen, *Making Them Move: Mechanics, Control, and Animation of Articulated Figures* by N. Badler, B. Barsky and D. Zeltzer; and *Geometric and Solid Modeling*.

Morph's Outpost on the Digital Frontier is the first technical magazine for multimedia developers on all platforms and covering all authoring tools. Published monthly for trade professionals who want to actually develop multimedia applications and titles. Subscriptions to *Morph's Outpost on the Digital Frontier* may be obtained by calling 510.254.3145.

N NASA Tech Briefs
 BOOTH 2927
 41 E. 42nd Street, Suite 921
 New York, NY 10017
 212.490.3999
 212.986.7864 fax
 Nipa Joshi
 Advertising Coordinator

NASA Tech Briefs magazine 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.

National Computer Graphics Association (NCGA)

BOOTH 744
 2722 Merrilee Drive, Suite 200
 Fairfax, VA 22031
 703.698.9600
 703.560.2752 fax
 Debi Baione
 Chapter Services Administrator

NCGA is dedicated to uniting the users and producers of computer graphics technology. Literature is available on the following NCGA affiliates: ADEPT, serving individuals using all facets of electronic publishing, graphic design, and visual communication technologies; and SPEC and GPC, who are developing benchmarks for CPU and graphics performance, respectively.

NewTek, Inc.
 BOOTH 1349
 215 S.E. 8th Avenue
 Topeka, KS 66603
 913.231.0100
 913.231.0101 fax
 Dawn Estes
 Trade Show Coordinator,
 Public Relations

NewTek features the Video Toaster 4000.

Nippon Computer Graphics Association (NICOGRAPH)

BOOTH 957
 Ogawa Building, 4th Floor
 1-2-2, Uchikanda
 Chiyoda-ku, Tokyo, 101
 Japan
 81.3.3233.3475
 81.3.3233.3450 fax
 Hiroyuki Hattori
 Manager, Project Planning
 Division

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 '93 in Tokyo, 15-19 November 1993. It should not be missed, especially by those who have an interest in the Japanese computer graphics industry and its related markets.

Numerical Algorithms Group
 BOOTH 2240
 1400 Opus Place, Suite 200
 Downers Grove, IL 60515
 708.971.2337
 708.971.2706 fax
 johnz@nag.com
 John Zurawski
 Manager, Sales and Marketing

IRIS Explorer: A complete object-oriented visual programming environment for developing scientific and engineering applications quickly and intuitively. Explorer provides "modules" that are self-contained operations for data input, data reduction, and rendering. The modules are point-and-click selected and the application is constructed with simple mouse movements.

ON Production & Post-Production Magazine

BOOTH 2141
 17337 Ventura Boulevard,
 Suite 226
 Encino, CA 91316
 818.907.6682
 Howard Kunin
 Publisher/Executive Editor

A trade magazine, published eight times a year, covering the production and post-production of feature films, television commercials, corporate communications, and computer graphics. The readership consists of producers, video facility managers, directors, production managers, editors, agency creatives, and post-production executives. Current issues on display.

Optgraphics
 BOOTH 2716
 924 Avenue J East
 Grand Prairie, TX 75050
 214.601.7000
 214.601.7093 fax
 Barbara Reynolds
 Trade Show Coordinator

Optgraphics features animated and 3D printing techniques.

O'Reilly & Associates, Inc.

BOOTH 1714
 103 Morris Street, Suite A
 Sebastopol, CA 95472
 707.829.0515
 707.829.0104 fax
 Lynn Powell
 Marketing

See a range of new titles, including *High Performance Computing*, *imake*, *Motif Programming and Reference Manuals*. In addition, see preview draft copies of *Understanding Japanese Information Processing*, *Graphics File Formats*, and *FORTTRAN 90*. Ask about the X Window System Series, including *PEXlib Programming and Reference Manuals*.

Oxberry, Division of Cybernetics Products, Inc.


BOOTH 804
 180 Broad Street
 Carlstadt, NJ 07072
 201.935.3000
 201.935.0104 fax
 James Aneshansley
 Director of Sales and
 Marketing

Oxberry is exhibiting the Cinescan motion-picture input scanning module, the Artscan scanning stand and camera for flat and 3D art, and various output devices that utilize Oxberry computer cameras.

The Pacific Data Group

BOOTH 2346
 48521 Warm Springs
 Boulevard, Suite 301
 Fremont, CA 94539-7765
 800.323.FLEX
 510.226.1785 fax
 Don F. McMahan
 President

The experts in digital imaging will be showing photographic quality color printers from Iris Graphics, Eastman Kodak, Mitsubishi, Tektronix, and Xerox. Specializing in color graphics since 1982, PDG offers complete solutions for all digital input and output applications. Color Peripherals, supplies, and maintenance.



WHAT'S EXCITING ABOUT KUBOTA CAN'T BE SEEN BY THE NAKED EYE.

Kubota Pacific Computer Inc. makes powerful workstations that allow people to see what is inside things and how they work. Our customers visualize and animate objects – engines, molecules, the earth. Combining volumetric and geometric rendering techniques they analyze the effects of radiation therapy and model oil reservoirs. The applications for our technology include mechanical design, imaging, visual simulation and scientific visualization.

Our next generation of high-performance graphic and imaging systems will be based on the latest RISC architectures, OSF/1, NT, and networking. Our graphics and imaging APIs include both industry standard interfaces (X, PEX, OpenGL), and emerging libraries (Volumetric Rendering and Imaging). There is more to be done. We're looking for people with vision, skill, and drive to help us do it.

- PEX Engineer
- AVS Engineer
- GL Engineer
- Imaging Engineer
- Systems Software Engineer
- Graphics Programmer
- Systems Engineer
- Sales Representatives

See what our technology can do and what Kubota can do for you. Meet with us while you're at SIGGRAPH and talk to our technical and human resources representatives. You can arrange an interview by leaving a message at 1-800-755-KPCI. A Kubota representative will call you right back. You may also fax your resume to (408) 727-9301, e-mail it to mgilliam@kpc.com or mail it to Kubota Pacific Computer Inc., Attn: SIGGRAPH '93/HR, 2630 Walsh Avenue, Santa Clara, CA 95051. EOE/AA Employer. Principals only, please.

Kubota
The Mind's Eye

P Panasonic Communications & Systems Company

BOOTH 717

2 Panasonic Way
Secaucus, NJ 07094
201.348.7000Chris DeVries
Product Line Manager,
Monitors

Panasonic Communications & Systems Company is showcasing its line of variable-frequency multi-scanning color monitors for CAD, workstation, presentation graphics, and desktop publishing applications. These high-resolution monitors operate under a variety of computer platforms and offer exceptional value and performance.

Parallax Graphics, Inc.

BOOTH 815

2500 Condensa Street
Santa Clara, CA 95051
408.727.2220408.980.5139 fax
info@parallax.com,
uunet!parallax!infoJohn Glazzy
Inside Sales

Parallax is the high-end provider of real-time video engines for Sun workstations. Powerful hardware (JPEG compression, 2nd video-in, video-out) and software (OW3 and X11R5 support, developers' toolkit) enables third-party software applications such as desktop video teleconferencing and training. Parallax introduces an innovative board that reduces slot requirements and auto-adjusts display rate.

Parallax Software Inc.

BOOTH 433

237 Park Avenue, 21st Floor
New York, NY 10017
212.551.1748
212.572.6447 faxCliff Pumer
Vice President Sales North
America

Parallax Software Inc. is launching Advance, the powerful new compositing and sequence-editing software for Silicon Graphics workstations. Advance will be shown alongside the new parallel version of Matador, the world-renowned paint, rotoscoping, and 2D animation software, on both Onyx and Indigo2 workstations. Also see Digital Ink and Paint software and the Newsroom Graphics suite.

Parity Systems Inc.

BOOTH 2633

110 Knowles Drive
Los Gatos, CA 95030
408.378.1000
408.378.1022 fax
inquire@parity.comSue Nichols
Marketing Communications
Manager

Parity gives you power to perform with SCSI subsystems featuring Winchester, floppy, optical, 1/4" tape, 4mm DAT, 8mm Exabyte, or CD-ROM. Subsystems are UL, CSA, TUV, IEC-950 approved and FCC certified. Memory upgrades from Parity include: SGI's Challenge, Power Challenge, and Onyx systems and Sun's Sparc 10, Classic, and LX.

Philips Semiconductors

BOOTH 543

811 E. Arques Avenue
P.O. Box 3409
Sunnyvale, CA 94088-3409
408.991.2141
408.991.2311 faxCarol Paul
Sales Communications
Specialist

Philips Semiconductors leads the industry with a comprehensive line-up of audio, video and multimedia solutions in silicon. Integrated circuit products include digital audio data conversion, audio processing, digital video encoders and decoders, and video processing. The SAA7196 PAL/NTSC/SECAM digital video decoder has everything needed to merge video into graphics.

Photometrics, Ltd.

BOOTH 1939

3440 E. Britannia Drive
Suite 100
Tucson, AZ 85706
602.889.9933
602.573.1944 faxPaula Harcarik
Marketing Specialist

Photometrics features high-resolution, high-precision, 12-bit digital camera systems. Ideal for film, digitization, special effects, animation, and scientific applications. dsp/os advanced image capture and processing software from Inovision Corporation will be shown for high-performance UNIX workstations.

Pioneer New Media Technologies, Inc.

BOOTH 549

600 E. Crescent Avenue
Upper Saddle River, NJ 07458
201.327.6400201.327.9379 fax
Dallas Parcels
Marketing Coordinator

Pioneer's VDR-V1000 Rewritable Videodisc Recorder is a dual-head broadcast-quality component recording system with true instant-start, real-time non-linear playback and instant access to any cue point on a 32-minute disk. Non-contact media can be recorded/erased over more than one million times. Facilitates unlimited playback capability without signal degradation.

Pixar

BOOTH 105

1001 W. Cutting Boulevard
Richmond, CA 94804
510.236.4000510.236.0388 fax
Diane Phillips
Marketing Communications

Featuring Pixar Showplace 2.0, Pixar Typestry, and Pixar One Twenty Eight. Pixar Showplace 2.0 is Pixar's stunning 3D picture composition software. Pixar Typestry is exciting software that turns fonts into extraordinary 3D images. Pixar's newest product, Pixar One Twenty Eight, is Pixar's private collection of 128 unique, high-quality, photographic textures.

**PIXEL Magazine/
PIXEL VISION**

BOOTH 2616

71 Rue De Maubeuge
Paris 75010
France331.48786090
331.48781535 fax

Joel Laroche

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 portfolios and reportages, columns, and tests, it covers computer graphics in advertising, publishing, television, art, graphic arts and design, medical and scientific imaging, and architecture.

Polhemus Incorporated

BOOTH 1243

One Hercules Drive
Colchester, VT 05446
802.655.3159
802.655.1439 faxKim Jennings
Marketing Assistant

Polhemus, the pioneer in six degree-of-freedom position/orientation sensing devices, introduces InsideTRAK, a revolutionary new 3D tracking system that plugs directly into PCs. Other products include FASTRAK, which recently received two Product of the Year awards, and the new ISOTRAK II, offering a lower-cost solution while maintaining Polhemus' proven technology and reliability.

Portable Graphics, Inc.

BOOTH 1830

One Technology Center
2201 Donley Drive, Suite 365
Austin, TX 78758-4538512.908.4707
512.832.0752 fax
npgl@portable.comJohn Zuhosky
Technical Marketing

The NPGL library provides a fast, cost-effective way to port 3D graphics and visualization applications from SGI to Sun, HP, DEC, and Kubota workstations. NPGL is IRIS GL 4.0 compatible, yet completely hardware independent. With NPGL, a GL application can be ported within days by recompiling the source code.

Post and Producer Magazines

BOOTH 2013

25 Willowdale Avenue
Port Washington, NY 11050
516.767.2500

516.767.9335 fax

Nancy Davis
Director of Sales and
Marketing

Post magazine is dedicated to post-production, covering the latest information on editing, graphics, animation, and special effects. *Producer* magazine covers all front-line production with an emphasis on the creative aspects of producing corporate, non-broadcast, motion picture, television, commercial, and documentary projects.

P **Pre-**
BOOTH 145
8340 Mission Road #106
Prairie Village, KS 66206
913.642.6611
Maureen Waters
Managing Editor

Pre- is exhibiting the magazine and other ancillary products and services.

**Precision Equipment
Photon**

BOOTH 1315
1324 S. Winchester
Boulevard, Suite 103
San Jose, CA 95128
408.370.1364
408.370.3161 fax
Yuki Fujikawa
Manager

OSCONIND/24 switcher and video frame capture board for the Silicon Graphics Entry Graphics Indigo. VideoGenesis/24 the only 24-bit professional-quality video output frame buffer adapter for IBM RISC System/6000. FSC-64000, and 32000VZ Flame Scan Converters for anything from PCs and Macintosh computers to high-resolution workstations.

**Professional Marketing
Services**

BOOTH 1936
4802 E. Ray Road, Suite 2328
Phoenix, AZ 85044
602.460.2325
602.460.0348 fax
Ted Williams
President

New and used graphics equipment brokers. Drum scanners, slide and flatbed scanners, high-resolution 4/8/16 000 line film recorders, color laser copiers/printers, optical/duping cameras, slide mounters, laser image setters, photo retouch workstations, and related software/hardware from leading manufacturers.

Proxima Corporation

BOOTH 2246
6610 Nancy Ridge Drive
San Diego, CA 92121
619.457.5500
619.457.9647 fax
Customer Service

Proxima's theme this year is "Desktop projection: bringing the power of your computer into the meeting room." Proxima is rolling out two million color versions of its Proxima Ovation family of LCD projection panels as well as displaying the ColorWorks family. Proxima also introduces version 4.0 of its Cyclops interactive pointer system.

Psychic Lab

BOOTH 2341
249 E. 48th Street, Suite 15D
New York, NY 10017
212.754.4282
212.759.5080 fax
Drew DeVito
Sales and Marketing Director

The IBVA is a state-of-the-art electroencephalograph and biofeedback system, with hardware consisting of a headband transmitter and a receiver. The brainwave data is sent to the software and displayed in 3D. These brain signals are also used to communicate with other software, computers, or external equipment.

PTR Prentice Hall

BOOTH 1741
113 Sylvan Avenue
Route 9W
Englewood Cliffs, NJ 07087
201.816.4155
201.816.4146 fax
Corporate Sales

PTR Prentice Hall, the number-one source for UNIX books and documentation, is also a premier source for information on X-window system and graphics programming. Some recently released titles include: *Graphics Programming & Animation* by Peder Jungck and *Windows Custom Controls* by William Smith.

**The Pyros Partnership,
Inc.**

BOOTH 1824
1201 Dove Street, Suite 550
Newport Beach, CA 92660
714.833.0334
714.833.8655 fax
Tamra Kay
Director of Marketing

The Pyros Partnership, Inc., established in 1981, produces full broadcast-quality animated productions integrating computer animation and live video. Custom programming, hardware, software, and training in animation technology is available. An authorized 3D studio developer, Pyros has authored 30 Ipas routines creating special effects for use within Autodesk's 3D Studio.

**Quarterdeck Office
Systems**

BOOTH 1049
150 Pico Boulevard
Santa Monica, CA 90405
310.392.9851
310.314.3218 fax
Ray Gallardo
Trade Show Manager

Quarterdeck is featuring new versions of DESQview and DESQview 386, its multitasking, windowing DOS operating environments. Quarterdeck will also feature its newest versions of memory managers QEMM and QRAM and will present its new dazzling graphics environment, DESQview/X.

R Squared

BOOTH 1746
11211 E. Arapahoe Road
Englewood, CO 80112
303.777.3478
303.799.9297 fax
tdepaul@r2.com
Theresa De Paul
Marketing Communications
Manager

Systems integrator R Squared is offering a complete display of add-in and add-on computer peripheral devices compatible in the UNIX distributed computing environment. Specializing in SGI-compatible peripherals, R Squared will have live, networked demonstrations and product displays. R Squared also provides service and technical support for SGI workstations.

**Rainbow Technologies,
Inc.**

BOOTH 1425
9292 Jeronimo Road
Irvine, CA 92718
714.454.2100
714.454.8557 fax
Karen Tacy
Marketing Manager

Rainbow is showcasing its Sentinel Family of protection devices that protect the revenues of software developers by preventing the unauthorized distribution and use of their software. Also being exhibited is the Vendor System CD-ROM technology. This new industry standard allows multiple packages to be placed on a CD-ROM while access to the data is remotely controlled.

Raster Graphics Inc.

BOOTH 3017
285 N. Wolfe Road
Sunnyvale, CA 94086
800.441.4788
408.749.0544 fax
Kelli Ramirez
Marketing Services Manager

Raster Graphics showcases ColorStation 836GX - 800 dpi high definition color printing. Raster Graphics' ColorStation 836GX is a high-performance, large format, electrostatic printer that provides outstanding graphic image quality. Up to 800 dpi is available for finer color detail. A turbo controller delivers full-color prints in as little as 10 minutes.

**Raytheon Company,
Submarine Signal
Division**

BOOTH 1642
1847 W. Main Road
Portsmouth, RI 02871-1087
401.842.2055
401.842.5200 fax
John A. Lorea
Marketing Manager,
Production Components

Raytheon is displaying their line of hardcopy printers/recorders. These units print up to 256 grey levels and are available in free-fall, flatbed, and fanfold models. Print sizes are 8.5", 12", and 20" units and they print on paper, plastic, and transparency mediums.

R Realsoft International
 BOOTH 2627
 544 Queen Street
 Chatham, Ontario N7M 2J6
 Canada
 519.436.0988
 519.351.1334 fax
 Adam Godfrey
 President

Particle animation, collision detection, skeletal control, inverse kinematics—on a desktop PC or Amiga. Real 3D V2 is a full-featured 3D modeling, rendering, and animation program bringing unbelievable high-end features to desktop platforms. Also stand-alone render engines will be available for PC (486+), Amiga, Sun, HP, DEC ALHA, SGI, and others.

Research Triangle Institute
 BOOTH 2345
 P.O. Box 12194, Research Triangle Park, NC 27709
 919.541.6951
 919.541.6965 fax
 jbc@rti.rti.org
 James B. Clary
 Vice President, Electronics and Systems

Research Triangle Institute (RTI) provides virtual environments for clients in application domains such as behavioral sciences, biomedical engineering, building architecture/furnishings, industrial manufacturing, and transportation. RTI is a 1,500-person contract R&D organization located in North Carolina's Research Triangle Park and is owned by UNC, Duke, and NCSU.

RFX, Inc.
 BOOTH 1225
 910 N. Sycamore Avenue
 Hollywood, CA 90038
 213.962.7400
 213.962.7444 fax
 Ray Feeney
 President

RFX is the leading distributor of hardware and software products for the motion picture visual effects industry. Products include: Silicon Graphics workstations, Wavefront's Advanced Visualizer, Ultimatte's CineFusion, Side Effects' Prisms, Viewgraphics' HDTV systems, Parallax's Matador, and Pixar's Renderman. RFX also supplies film recorders and provides film recording services.

RGB Spectrum
 BOOTH 2018
 950 Marina Village Parkway
 Alameda, CA 94501
 510.814.7000
 510.814.7026 fax
 Michael Miller
 Sales Manager, Western Region

See the RGB/Videolink line of scan converters, which transform high-resolution computer graphics to broadcast video; the RGB/View 2050 video windowing system, which integrates real-time video on a workstation; and the MediaWall for displaying digital imagery from a computer on up to 144 monitors or projectors. Demo of a new capability to switch between the MediaWall and a videowall processor.

Roche Image Analysis Systems, Inc.
 BOOTH 1431
 112 Orange Drive
 Elon College, NC 27244
 919.584.0250
 919.584.9141 fax
 Susan Cobb
 Marketing Coordinator

Digital images in photographic quality. Discover the world of ultra-high-resolution digital image capture, archiving, and telecommunications. Experience the ProgRes 3012 ultra High Resolution Digital Color Camera and the Image/Manager Workstation for easy storage, management, and transmission of photographic quality digital images. Interface for IBM, Apple, Sun, and SGI available.

Ron Scott Inc.
 BOOTH 949
 1000 Jackson Boulevard
 Houston, TX 77006
 713.529.5868
 713.529.9370 fax

HiRes QFX is an image-editing and special effects program for PC-based graphics systems. It allows editing of multiple high-resolution images and includes custom brushes, a dodge and burn tool, simplified masking and image composition, and the ability to manipulate bitmaps as objects. HiRes QFX supports the Truevision line of graphics adapters, as well as TIGA and Super VGA boards.

S San Diego Supercomputer Center
 BOOTH 130
 P.O. Box 85608
 San Diego, CA 92186-9784
 619.534.5024
 619.534.5113 fax
 caroleen@sdsc.edu
 Caroleen Williams
 Manager, Public and Government Relations

The San Diego Supercomputer Center (SDSC) is a national laboratory for computational science and engineering. SDSC helps its user community to adapt this enabling technology to address advances in science, as well as strengthening the global competitiveness of U.S. industry. SDSC welcomes partnerships with academia, industry, and federal and state agencies.

Santos Technology Inc.
 BOOTH 1409
 383 Van Ness Avenue, #1604
 Torrance, CA 90501
 310.320.8888
 310.212.6688 fax
 Santos@applelink.apple.com
 Jonathan Lewis
 Director of Sales and Marketing

Santos Technology Inc. is demonstrating its mira 35-color film scanner, an entry-level prepress scanner that captures positive or negative 35mm film at 2,700 dpi maximum resolution. It features 30 bits per pixel for increased dynamic range and one-pass color capture. Included with the scanner is Adobe PhotoShop LE and Photone Prepress Lite.

Sanyo Fisher (USA) Corporation
 BOOTH 705
 1200 W. Artesia Boulevard
 Compton, CA 90220
 310.605.6527
 310.605.6529 fax
 Eric MacRae
 Product Manager

Sanyo is introducing the GVR-S950 animation system. The GVR-S950 is the first video recorder specifically designed for animation and graphic applications. The unit features built-ins that are not available on other recording systems, and comes complete with no expensive add-ons needed. Sanyo will be demonstrating the animation and editing capabilities.

SAS Institute Inc.
 BOOTH 2412
 SAS Campus Drive
 Cary, NC 27513
 919.677.8000
 919.677.8123 fax
 Miriam Leyda
 Promotions Specialist

The SAS System—an integrated suite of software products for enterprise-wide information delivery—provides organizations with tools to access, manage, analyze, and present data within an applications development environment.

School of Communication Arts
 BOOTH 1742
 2526 27th Avenue South
 Minneapolis, MN 55406
 612.721.5357
 612.721.6642 fax
 Roger Klietz
 President

3D computer animation, computer graphics, and multimedia training in intense, shorter programs. Apple, PC and Silicon Graphics courses featuring SOFTIMAGE, Alias, and 3D Studio. Broadcast quality video demo reels for students. Financial assistance available. Foreign student advisor program, placement service. Locations in Minneapolis and Raleigh.

Science Accessories Corporation
 BOOTH 2115
 200 Watson Boulevard
 Stratford, CT 06497
 203.386.9978
 203.381.9270 fax
 Skip Cleveland
 Vice President Sales

The GP-12 is the latest in a long line of proven 3D digitizers. The GP-12 is designed to do for solid objects what a tablet does for drawings and with the same ease. Simply put the tip of the probe on the surface point(s) you want and pull the trigger.

S Scientific Computing & Automation Magazine

BOOTH 1411
301 Gibraltar Drive
Morris Plains, NJ 07950
201.292.5100
201.539.3476 fax
Internet
74250.400@Compuserve.com
Calvin Carr,
Publisher

Scientific Computing & Automation serves scientists and engineers in industrial, academic, and government laboratories. Articles demonstrate the growing use of computer technology in lab settings and a cross-section of research projects and information management environments. Topics: visualization, graphics for scientists, hardware, software, image processing and analysis, and chemometrics.

Seiko Instruments

BOOTH 933
1130 Ringwood Court
San Jose, CA 95131
408.922.5950
408.922.5835 fax
Cheryl Landman
Manager, Marcom

Seiko Instruments, a pioneer in color output devices, offers the industry standard in both thermal wax transfer and dye sublimation printers. These fast, rugged, workhorse printers are available in full-bleed letter and tabloid sizes, and are designed for high-volume work groups on UNIX, Macintosh, PC, and mixed networks.

Sense8

BOOTH 2427
4000 Bridgeway, Suite 101
Sausalito, CA 94965
415.331.6318
415.331.9148 fax
Tom Coull
President

Sense8 is the leading producer of virtual reality software. Their products, Mercury and the award-winning WorldToolKit, are virtual reality development tools used for interactive, real-time 3D graphics and virtual reality applications. Sense8's product design allows for easy and rapid prototyping of applications while still providing the functionality required to build complex systems.

Sharp Electronics Corporation

BOOTH 1341
Sharp Plaza
Mahwah, NJ 07430
201.529.8200
201.529.9637 fax
Kathy Vinci
Assistant Product Manager—
Color Products

Sharp Electronics Corporation is displaying color scanning, printing, and mass storage solutions featuring products for the commercial and professional user. Included are a true 600 dpi, 11"x17", flatbed scanner capable of scanning both reflective and transparent originals, and a dye sublimation printer. See the new additions to Sharp's Color Imaging Line.

Shooting Star Technology

BOOTH 2615
1921 Holdom Avenue
Burnaby, British Columbia
V5B 3W4
Canada
604.298.8574
604.298.8580 fax
chernoff@cs.ubc.ca
Bill Chernoff
President

The ADL-1 6DOF tracker provides fast, reliable tracking. Its low latency of 0.35 to 1.9 milliseconds (depending on the mode) makes the ADL-1 the fastest commercially available tracker. The ADL-1's speed and smooth output makes it ideal for the real-time tracking necessary for virtual reality and in off-line path/orientation planning for animation sequences.

Side Effects Software

BOOTH 1332
20 Maud Street, Suite 300
Toronto, Ontario M5V 2M5
Canada
416.366.4607
416.366.6648 fax
Greg Hermanovic
President

PRISMS is an open and versatile animation system. Side Effects is showing recent innovations in PRISMS, including skeletal animation, raytraced material editing, performance animation, and graphical compositing, and is unveiling a new class of visual effects: The Time Machine—bizarre combinations of past, present, and future.

Sierra Video Systems, Inc.

BOOTH 1740
13046 Loma Rica Drive
P.O. Box 2462
Grass Valley, CA 95945-2462
916.273.9331
916.273.9390 fax
Dennis Brunnenmeyer
Director of Marketing

Sierra Video Systems manufactures wideband RGB video matrix routing switchers, video distribution amplifiers, and RGB/Betacam video converters. Featured at SIGGRAPH 93: Model 44CW (4 x 4) wideband matrix switcher, Model 88CW (8 x 8) wideband matrix switcher, Delta Series video format converters, and Delta Series RGB video distribution amplifiers.

SIGGRAPH 94

REGISTRATION AREA
Conference Management
401 N. Michigan Avenue
Chicago, IL 60611
312.321.6830
312.321.6876 fax
siggraph94@siggraph.org
For exhibition information
708.850.7779
exhibits94@siggraph.org

Experience SIGGRAPH 94! Here's your best source of information on next year's conference and exhibition, 24-29 July 1994 at the Orange County Convention Center, Orlando, FL. Pick up a poster and pin, and don't forget to ask for a Call for Participation, which contains complete details on how you can create the SIGGRAPH 94 experience!

SIGGRAPH Education Committee

HALL A
ACM SIGGRAPH
1515 Broadway
New York, NY 10036
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owen@siggraph.org
Scott Owen
Director for Education

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.

SIGGRAPH Local Groups

HALL A
ACM SIGGRAPH
1515 Broadway
New York, NY 10036
212.869.7440
212.764.5537 fax
Scott Lang
SIGGRAPH Local Groups
Booth Chair

The SIGGRAPH Local Groups are where SIGGRAPH happens the other 51 weeks of the year. Stop by the booth to find out if one is currently operating in your region. If there isn't one yet, you can pick up all the necessary information concerning how to start one.

SIGGRAPH "One More Time" Booth

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ACM SIGGRAPH
1515 Broadway
New York, NY 10036
212.869.7440
212.764.5537 fax
cunningham@siggraph.org
Steve Cunningham

Because of last year's strong interest in back issues of SIGGRAPH's publications, including slide sets, proceedings of the SIGGRAPH conference, and other conference proceedings, these will again be available to the SIGGRAPH 93 audience. Come early—materials from before 1991 are in very short supply.

SIGGRAPH Video Review

REGISTRATION AREA
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c/o First Priority
P.O. Box 576
Itasca, IL 60143-0567
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svr@siggraph.org

SIGGRAPH Video Review is the premiere videotape publication illustrating the latest concepts in computer graphics and interactive techniques. More than 90 issues, including issues on electronic theater and animation screening room material from recent SIGGRAPH conferences, are available. Special issues include "Volume Visualization" and "HDTV and the Quest for Virtual Reality."

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Sigma features wideband switching and distribution for graphics systems. Encoding, decoding, and transcoding for multi-format applications. Assistance in integrating systems.

Silicon Graphics, Inc.
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 P.O. Box 7311
 Mountain View, CA 94039
 415.960.1980
 415.961.0595 fax
 rosanne@corp.sgi.com
 Rosanne Siino
 Product P.R. Manager

Silicon Graphics is the leading manufacturer of visual computing systems. The company delivers interactive 3D graphics, color, digital media, and symmetric multiprocessing technologies. See Silicon Graphics' full line of workstations and servers, including its new desktop and deskside graphics systems and video servers.

SMPTE
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 595 W. Hartsdale Avenue
 White Plains, NY 10607
 914.761.1100
 914.761.3115 fax
 Lynette Robinson
 Executive Director

The world's leading technical association for professionals in motion pictures, television, electronic imaging, and related arts and sciences, the Society of Motion Picture and Television Engineers (SMPTE) disseminates information through seminars, conferences, *Sections*, and the *SMPTE Journal*, and provides a forum for standardization of equipment, materials, and practices used in the industry.

SOFTIMAGE Inc.
 BOOTH 519
 3510 Boulevard St. Laurent,
 Suite 500
 Montreal, Quebec H2X 2V2
 Canada
 514.845.1636
 Carolyn Archambault
 Public Relations Manager

SOFTIMAGE, Inc. is exhibiting its Digital Studio, a breakthrough 2D/3D software environment offering a complete line of professional digital editing products for video editing, sound editing, compositing, titling, paint, image processing, and 2D/3D animation. SOFTIMAGE is a leading vendor of high-end 2D/3D software for the communications and entertainment markets.

Software Security, Inc.
 BOOTH 244
 1011 High Ridge Road
 Stamford, CT 06905
 203.329.8870
 203.329.7428 fax
 Jan Norman
 Director Marketing Services

Software Security, Inc. is exhibiting its hardware-based software protection devices that prevent the piracy of DOS, UNIX, OS/2, Windows, and Macintosh applications, both single-user and network versions. Protected software can be copied but will not run unless the device is connected to the computer. Network versions limit concurrent users.

Software Systems
 BOOTH 2641
 1884 The Alameda
 San Jose, CA 95126
 408.247.4326
 408.247.4329 fax
 multigen!tom@uunet.uu.net
 Tom Dowgiallo
 Sales Representative

MultiGen is the leading 3D visual scene modeling tool used in the simulation industry. Users can easily create and edit objects, hierarchy, and attributes by graphical manipulation, or can create scenes automatically from a variety of sources. ModelGen, developed for price-sensitive applications, and a virtual reality option have recently been introduced.

Sony Corporation
 BOOTH 1026
 16550 Via Esprillo
 San Diego, CA 92127
 619.673.2860
 619.451.0412 fax
 John Wykcoff
 Precision Graphics
 Product Marketing Manager

Precision Graphics is showing a 16:9 aspect ratio, 1920 x 1080 (Prototype), and 20" x 20", 2048 x 2048 super high color monitor. Also showing Graphic Display new 17" multi-mode GDM-17E01 and GDM-2039 multi-mode fully micro-processor controlled and GDM-1634 16" high refresh color monitors. Advanced Systems will be showing the HDL-5800.

Specular International
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 Amherst, MA 01002
 413.253.3100
 413.253.0540 fax
 David Trescott
 Director of Sales and Marketing

Winner of the 1992 Mac User Eddy for Best 3D Package! Infini-D 2.5 combines a friendly interface with 3D power, instant conversion of EPS files into 3D objects, awesome animation capabilities, and QuickTime support. Infini-D is the 3D package of choice for graphics and multimedia professionals.

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 212.460.1500
 212.473.6272 fax
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 Jacqueline Jeng
 Product Manager

Springer-Verlag is a leading publisher of books and journals in computer graphics and computer science, serving the graphics community in areas as diverse as graphic design, animation, medical imaging, scientific visualization, image processing, simulation and modeling. Stop by and browse through the collection.

StereoGraphics Corporation
 BOOTH 2036
 2171 E. Francisco Boulevard
 San Rafael, CA 94901
 415.459.4500
 415.459.3020 fax
 stereo@well.sf.ca.us
 Nancy Clemens
 Marketing Communications

StereoGraphics manufactures hardware producing flickerless computer- or video-generated 3D images. CrystalEyes stereo eyewear and infrared emitter enable viewing on computer monitors or with StereoGraphics' 3D projection system. Head-tracking capability also available. CrystalEyes 3D stereo Video System includes view, record, and playback capabilities.

Strata Inc.
 BOOTH 2146
 2 W. St. George Boulevard
 Ancestor Square, Suite 2100
 St. George, UT 84770
 801.628.5218
 801.628.9756 fax
 Scott Taylor
 Extensions Product Manager

Strata Inc. is a leading developer of powerful yet easy-to-use visualization, illustration, and animation software for the Macintosh and PC platforms. Strata Inc. is exhibiting StrataVision 3d, StrataType 3d, StrataClip 3d and their greatest creation to date . . . StudioPro! For outstanding photorealism, you must see the Strata product line.

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Sun Microsystems Computer Corporation is exhibiting its new line of graphics workstations. From the SPARCstation LX TGX to the powerful, multiprocessing SPARCstation 10 ZX, SMCC offers graphics workstations for the business, technical, and scientific marketplace. See accelerated 2D graphics, fully texture-mapped 3D solids, and imaging and visualization.

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 7000 East Avenue, L-414
 Livermore, CA 94551
 800.462.7293 phone/fax
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 SC93-info.llnl.gov
 Robert R. Borchers
 Conference Chair

SuperFluo Incorporated
 BOOTH 2732
 2017 Vestal Avenue, Suite 4
 Los Angeles, CA 90026
 213.666.2547
 213.666.2547 fax
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Syndesis Corporation
 BOOTH 2244
 235 S. Main Street
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 76004.1763@compuserve.com
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T Tamron Industries, Inc.
 BOOTH 2832
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 Port Washington, NY 11050
 516.484.8880
 516.484.8906 fax
 Hank Nagashima
 President

**Tatung Science and
 Technology, Inc.**
 BOOTH 2230
 1840 McCarthy Boulevard
 Milpitas, CA 95035
 408.383.0988
 408.383.0886 fax
 Gail Forecki
 Marketing Communications
 Specialist

Techexport, Inc.
 BOOTH 834
 One North Avenue
 Burlington, MA 01803
 617.229.6900
 617.229.7706 fax
 Juliane Iannaco
 Marketing Coordinator

The sixth in a series of highly successful conferences bringing together scientists, engineers, designers, and managers from all areas of high-performance computing and communications, SUPERCOMPUTING '93 will take place 15-19 November 1993 at the Oregon Convention Center, Portland, OR. Includes technical and education programs, tutorials, workshops, and exhibition.

SuperFluo is the world's exclusive distributor of ELITE, the motion capture system for high-quality 3D computer animation. ELITE can drive the animation of facial expressions, patch surfaces, and body movements. ELITE was used in the production of "The Lawnmower Man," and in Peter Gabriel's "Steam" music video.

InterChange Plus is a system for translating between 3D formats such as Wavefront, SOFTIMAGE, AutoCAD, DXF, 3D Studio, Video Toaster LightWave, Imagine, and others. To demonstrate InterChange Plus, the Syndesis 3D-ROM contains more than 500 freely distributable 3D models in DXF, 3D Studio, Wavefront, Imagine, and LightWave formats.

Tamron Fotovix II-XS is being previewed first in the U.S. The unit outputs an S-Video signal incorporating a 410,000-pixel CCD. Excellent analog scanner suited for capturing transparent and translucent materials for various image processing needs. 6X zoom and negative-positive conversion gives you the image you prefer.

Tatung Science and Technology, Inc., a \$2.5-billion multi-national corporation with U.S.-based R&D, marketing, and support, offers the broadest range of client/server computing solutions available. Using SPARC technology, key products include the Super COMPserver 10 Series, Super COMPstation 7 & 10 Series and micro COMPstation LC/LX Series.

Techexport, Inc. provides international distribution and support for a comprehensive range of computer graphics and video products, serving the videographics, 3D modeling and animation, presentation graphics, pre-press, video editing, and industrial display markets with hardware, application software, and peripherals. Offices in Europe, Spain, and Argentina.

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 Altamonte Springs, FL 32701
 407.830.8301
 407.339.2554 fax
 techsr!mike@uunet.uu.net
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Tektronix, Inc.
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 Tektronix Industrial Park
 Beaverton, OR 97077
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 Library of Science/
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**Template Graphics
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 BOOTH 1043
 9920 Pacific Heights
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 San Diego, CA 92121
 619.457.5359
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 robert@tgs.com
 Robert J. Weideman
 Director of Marketing

**Texas Memory Systems,
 Inc.**
 BOOTH 1233
 11200 Westheimer Road
 Suite 1000
 Houston, TX 77042
 713.266.3200
 713.266.0332 fax
 Holly Frost
 CEO

Tech Images International, the digital computer images magazine, uses the latest in digital image technology in design image printing for computer graphics and professionals in film and broadcast.

The GXTRA helps eliminate network traffic and maintain system performance by adding extra X Window users to the workstation rather than the ethernet. The GXTRA card connects directly to the SPARCstation S-Bus providing a 20 MB/sec communications path; greatly increasing total system performance while maintaining 100 percent software compatibility with traditional SPARC software.

Tektronix is featuring new 17" stereo and 1" NuColor monitors, desktop color printers featuring 300 dpi Adobe Level-2 PostScript, providing realistic prints on paper or overheads, and video signal generation and measurement instruments.

TELOS, The Electronic Library of Science, is an imprint of Springer-Verlag New York. Its publishing program spans the natural and physical sciences, computer science, mathematics, and engineering. TELOS' primary publishing strategy is to merge traditional print media with the emerging new electronic media to provide the reader with a truly interactive multimedia information environment.

Template Graphics Software (TGS) is the leading provider of PHIGS+ 2D/3D development tools. TGS's FIGARO+ family includes tools for PHIGS+ development, data visualization, and photo-realism. TGS offers ANSI/ISO standard graphics tools on PCs (NT, SCO, DOS), UNIX workstations and supercomputers, and IBM mainframes. New: FIGARO+ NT and FIGARO+ Photo-Realistic Option.

The multi-ported SAM-2000 memory system with optional SSP-160 array processors is aimed at high-end image and signal processing applications. The solid-state SAM-2000 supports 500 Mbytes/second I/O through fast, intelligent interfaces to supercomputers, workstations, display and data acquisition devices. Multiple SSP-160s boast Gflop processing power.

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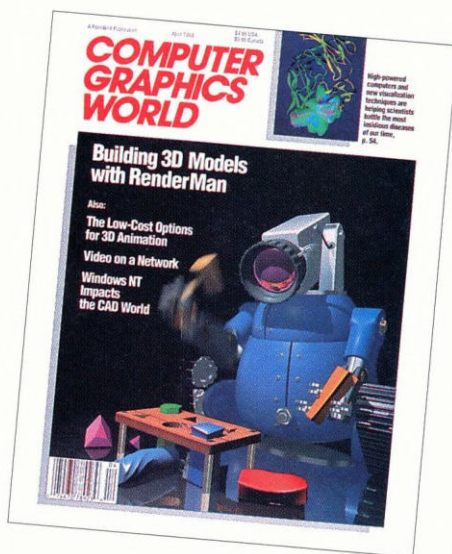
For years, survey results show that *Computer Graphics World* is the best read publication among SIGGRAPH attendees.

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TDI delivers the power to excel with V3.02 of TDI Explore and TDI Image 3-D animation software. V3.02 features advanced character animation with inverse and forward kinematics, improved modeling capabilities including metaballs, increased integration, and up to a 40 percent boost in rendering speed.

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 317.841.0332
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 Kathy Arnett
 Exhibit Manager

Truevision DVR technology will be unveiled to highlight the latest in digital video technology for EISA and Nubus platforms. Truevision will also demonstrate new cards including AT Vista Digital (a D1 compatible AT Vista), Truevision VID/O ANalyst, and VID/O Pattern Generator (a complete video test and measurement system on the desktop).

U UNIRAS, Inc.
 BOOTH 2730
 5429 LBJ Freeway, Suite 650
 Dallas, TX 75240
 214.980.1600
 214.991.1860 fax
 Lara Howard
 Sales Coordinator

UNIRAS introduces DirectInsight, a next-generation 3D data visualization turnkey software based on a revolutionary, highly interactive concept called STEERING. DirectInsight allows for real-time input, display, analysis, and animation of 2D, 3D, and 4D data sets, and redefines the way data is processed to create visual representations.

UNIX Review Magazine

BOOTH 701
 600 Harrison Street
 San Francisco, CA 94107
 415.905.2200
 415.905.2234 fax
 Kerry Gates
 Trade Show Manager

UNIX Review serves the informational needs of systems integrators, VARs, OEM 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 the booth for complimentary issues and free subscriptions.

UnixWorld Magazine

BOOTH 1430
 1900 O'Farrell Street
 Suite 200
 San Mateo, CA 94403
 415.513.6800
 415.513.6985 fax
 Emily O'Connor
 Tradeshow Coordinator

UnixWorld is a monthly magazine written for people who manage corporate IS, UNIX networks and systems, and develop UNIX software. Topics include features about the use of UNIX and other open systems to downsize and distribute applications. It also provides product reviews, case studies, industry news, profiles of people and companies, and technical tutorials.

V Vertigo Technology
 BOOTH 441
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 Suite 1010
 Vancouver, British Columbia
 V6E 2Y3 Canada
 604.684.2113
 604.684.2108 fax
 Linda Fawcus
 Vice President Marketing and Sales

Vertigo is an easy-to-use, interactive 3D visualization software for those in the broadcast, post-production, animation, architectural, and engineering markets. Vertigo Version 9.5 features Integrated Metaballs, Integrated RenderMan support, effectors, chyon graphics support on SGI Indigo, and background image. T-Morph 2: a complete pixel motion toolkit for image manipulation.

VIC Hi-Tech Corporation

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PC-based products and services for video-document imaging, compression, storage. Videopacker single slot PC-AT card performs real-time 30 frame/second video capture, display, jpeg compression, storage at 320x240 resolution. Aim data management systems perform document scanning, OCR, data compression-storage, data indexing for retrieval, and Windows-based accelerated laser printing.

Videomedia, Inc.

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 Marketing Communications
 Manager

V-LAN compatible products for single-frame animation, rotoscoping, and video editing applications. V-LAN control products include ANIMAX board-level controllers for IBM PC and Amiga/Toaster; ALIX desktop and VLX rack mount external controllers for IBMPC, Macintosh, Amiga, Indigo, all Silicon Graphics workstations; OZ desktop video editing software for Windows and Macintosh.

Video Systems Magazine

BOOTH 943
 9800 Metcalf Avenue
 Overland Park, KS 66212
 913.967.1834
 913.967.1898 fax
 Tom Brick
 Marketing Director

The magazine for video professionals provides practical solutions for managers responsible for producing and distributing professional video programs, and covers all aspects of the production process, from concept to completion, news and information on effective techniques, and how to use the latest technology. Official publication of the International Television Association.

VIDI

BOOTH 2233
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 818.918.8834
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 (formerly Viewpoint
 Animation Engineering)**

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 801.224.2272 fax
 Ron Brough
 Marketing Director

Viewpoint is a full service modeling/digitizing company that creates and markets technically accurate 3D datasets (wireframe-object data). Datasets are available in formats crossing all hardware platforms. Categories include vehicles, airplanes, ships, animals, dinosaurs, geography, anatomy, landmarks, and more. The company also provides custom 3D digitizing and modeling services.

Vision Quest

BOOTH 146
 1925 E. Bennett
 Suite J
 Springfield, MO 65804
 800.284.4140
 417.886.6535 fax
 Amy Schoolfield
 Marketing Manager

Ultra-high resolution image capturing reaches new levels with the development of the Imago system. Available in two DOS system configurations for Windows and one for Macintosh, Imago uses the new JVC TK-F7300U color video camera and Q 1.0 software.

V Visionetics International Corporation
 BOOTH 748
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 Suite 300
 Torrance, CA 90503
 310.316.7940
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 Jay Gedanken
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Visionetics is a leading manufacturer of video input/output products. Products include: VIGA+—the only Targa+ compatible, imaging and capture board with next-generation advanced functions. VIGA Window MRP—our new motion capture board, and PortaShow—low-cost VGA to video converter. Come by and see "multimedia at its best."

Visual Numerics, Inc.
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 713.784.3131
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 Senior Marcom Coordinator

Visual Numerics, Inc. provides Visual Data Analysis (VDA) software (PV-WAVE CL, GUI Builders, GTGRID, Point and Click); and application development tools (mathematical, statistical, and graphical libraries) for FORTRAN and C applications.

Visual Software, Inc.
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 21731 Ventura Boulevard
 Suite 310
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 818.883.7900
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Visual Software introduces 3D World, the first comprehensive 3D package that's easy enough for a beginner, but powerful enough for the professional. This complete suite of modules includes everything necessary to create stunning 3D images and animations: a modeler, a photorealistic renderer, animation, an object-oriented image designer, and over 1000 2D and 3D clip art files.

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 Suite 302
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 Vincent John Vincent
 Co-Director

Vivid's Mandala VR System integrates your live camera-based image with computer graphics and uses a real-time video digitizer to provide unencumbered interactive control of multi-state worlds. The PC-based system incorporates real-time image shrinking and movement, 24-bit or laserdisk-based backgrounds with 24-bit foreground imagery.

VRontier Worlds of Stoughton, Inc.
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 Stoughton, WI 53589
 608.873.8523
 608.877.0575 fax
 Tom Hayward
 Director of Marketing

Manufacturing and developing head-mounted displays (e.g. the tier 1 visor) and virtual reality software for the PC platform. VRontier Worlds' focus is on making virtual reality as accessible as possible.

W Wacom Technology Corporation
 BOOTH 823
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 Vancouver, WA 98661
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 Dona M. Ternai
 Marketing Supervisor

Wacom introduces their latest edition to the UD-Series family. Their leading technology in graphics tablets and pressure-sensitive pens is now even better—offering more precise, delicate, real-time control over graphic input. Wacom's solid and dependable performance continues to provide the tools for artistic creation.

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 Marketing Coordinator

VR DRAW is a 3D drawing program and virtual reality world construction set. Stretch, spin, warp, go inside of 3D objects of all kinds in virtual worlds of your own creation. Comes with LCD glasses. Books on virtual reality, multimedia, graphics, imaging, and exotic sciences will also be on display.

Wasatch Computer Technology, Inc.
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 Salt Lake City, UT 84111
 801.575.8043
 801.575.8075 fax
 Peggy Martinez

Wasatch manufactures Portfolio, a fully integrated photo retouch/composite, graphic design and illustration software package which enables the user to quickly and economically produce high-resolution, high-quality images. With Portfolio you can merge a variety of graphics and output hardcopy, 35mm slides or video.

Wavefront
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 Santa Barbara, CA 93101
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 rebecca@wti.com
 Rebecca Groose
 Communications Manager

Demonstrating "The Complete Animation Suite," including new physically-based animation solutions: Dynamation and Kinemation, Version 4.0 of The Advanced Visualizer, Rotomation, real-time 3D rotoscoping and CineSuite; a multi-processor environment for film-resolution image layering, painting, and special effects. Data Visualizer, Version 3.0 will also be demonstrated.

John Wiley & Sons
 BOOTH 1924
 605 Third Avenue
 New York, NY 10158
 212.850.6000
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 bipsen@jwiley.com
 Susan Straub
 Senior Marketing Assistant

John Wiley & Sons features publications in the areas of documentation, computer graphics, and programming. Wiley publishes computer books for the beginning to advanced programmer. Recent publications include *Object-Oriented Ray Tracing in C++* by Nicholas Wilt, *Advanced Graphics Programming Using C/C++* by Loren Heiny, and *Practical Computer Vision Using C* by James Parker.

Winsted Corporation
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 612.944.8556
 612.944.1546 fax
 Randy Smith
 Marketing Manager

Winsted offers the largest line of computer-video-graphics furniture anywhere. Winsted furniture features modular construction to allow you to build a custom system from their stock. New for SIGGRAPH will be a new series of ergonomically designed furniture featuring a recessed monitor well for easy viewing of your monitors.

Wired Magazine
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 San Francisco, CA 94107
 415.904.0660
 415.904.0669 fax
 Michelle@Wired.com
 Michelle Scileppi
 Director of Marketing and
 Publicity

Wired magazine is a technology and lifestyle magazine that examines the political, economic, and social impact of the emerging digital revolution. Created by top writers, photographers, and illustrators in the United States, Europe, and Japan, *Wired* is global in perspective and carries a strong commitment to literary and journalistic integrity. Contact *Wired* magazine at 1.800.SO.WIRED or info@wired.com.

X **Xaos Tools**
 BOOTH 341
 600 Townsend Street
 Suite 270 East
 San Francisco, CA 94103
 415.487.7000
 415.558.9886 fax
 Paul Schmidman
 Senior Vice President

Xaos Tools is showing breakthrough animated image processing and text animation software for desktop video, multimedia, post-production, and broadcast television. Pandemonium and nTITLE run on SGI workstations, allowing artists to quickly create professional-quality animations. Paint Alchemy allows you to create and apply original painterly effects to any image.

Y **Yamashita Engineering Manufacture Inc.**
 BOOTH 637
 1-3-33 Okata
 Atsugi-shi, Kanagawa 243
 Japan
 81.462.28.8883
 81.462.29.1944 fax
 Minoru Ohkubo
 Vice President

YEM is introducing three new products: CVS-970B High Resolution Auto Scan Converter converts high-resolution CG and PC outputs to High Definition TV format with Multi-Sync and Multi-Scan modes; 980H model converts analog RGB non-interlaced computer output to NTSC or PAL TV standard format; and an up-graded version of EDEC 2000.

YARC Systems Corporation
 BOOTH 337
 975 Business Center Circle
 Newbury Park, CA 91320
 805.499.9444
 805.499.4048 fax
 AppleLink:YARC
 Brad Nizdil
 Vice President Sales and Marketing

YARC Systems Corporation will introduce a new line of high-performance coprocessor systems based on the PowerPC. YARC's RISC-based coprocessors are used worldwide by leading professional graphic designers. Performance demonstrations will be presented by: Byte by Byte, DanRip, Gryphon Software, PIXAR, Specular International, VideoFusion, and VIDi.

Z **Zeh Graphic Systems, Inc.**
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 - 1342 Chromatek Scan Process Inc.
 - 1626 Computer Design, Inc.
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BOOTH Networking; Hardware/Software/Services

3023 Andromeda Systems Inc.
 918 AZTEK, Inc.
 709 Bit 3 Computer Corporation

- 648 Diaquest, Inc.
- 505 Digital Equipment Corporation
- 1814 Fraunhofer Center for Research in Computer Graphics
- 2521 The Grass Valley Group, Inc.
- 1019 Hewlett-Packard Company
- 819 LAZERUS
- 2842 Legacy Systems International, Inc.
- 2350 Lightwave Communications, Inc.
- 1824 The Pyros Partnership, Inc.
- 1049 Quarterdeck Office Systems
- 1746 R Squared
- 1425 Rainbow Technologies, Inc.
- 1005 Sun Microsystems Computer Corporation
- 240 Videomedia, Inc.

BOOTH OEM Components

- 2630 5D Solutions
- 138 Advanced Digital Imaging
- 3023 Andromeda Systems Inc.
- 918 AZTEK, Inc.
- 2236 Canon U.S.A., Inc.
- 648 Diaquest, Inc.
- 142 Enhance Memory Products
- 2142 Gossett Graphics
- 2632 Integrix, Inc.
- 819 LAZERUS
- 923 Megatek Corporation
- 804 Oxbery
- 2633 Parity Systems Inc.
- 543 Philips Semiconductors
- 1243 Polhemus Incorporated
- 1431 Roche Image Analysis
- 2615 Shooting Star Technology
- 1740 Sierra Video Systems, Inc.
- 834 Techexport, Inc.
- 1043 Template Graphics Software, Inc.
- 2827 VIC Hi-Tech Corporation
- 240 Videomedia, Inc.

BOOTH Paint Systems

- 1630 Adobe Systems
- 2033 Aurora Systems
- 1621 Autodesk, Inc.
- 133 AXA Corporation
- 918 AZTEK, Inc.
- 2533 Cambridge Animation Systems Limited
- 2024 Centaur Development
- 648 Diaquest, Inc.
- 233 Discreet Logic, Inc.
- 2343 Fractal Design Corporation
- 2521 The Grass Valley Group, Inc.
- 1039 IBM Corporation
- 1249 Information International Inc. (Triple-I)
- 3027 Interactive Effects
- 1845 MetroLight Studios
- 953 Morph's Outpost on the Digital Frontier
- 433 Parallax Software Inc.
- 519 SOFTIMAGE Inc.
- 834 Techexport, Inc.
- 533 Thomson Digital Image
- 805 Truevision Inc., A RasterOps Company
- 2248 Waite Group Press
- 113 Wavefront
- 341 Xaos Tools

BOOTH PC Add-on Products

- 138 Advanced Digital Imaging
- 1205 Apple Computer, Inc.

- 133 AXA Corporation
- 709 Bit 3 Computer Corporation
- 721 Byte by Byte Corporation
- 648 Diaquest, Inc.
- 3018 Digital Processing Systems
- 142 Enhance Memory Products
- 1434 FSI (F and S, Inc.)
- 2521 The Grass Valley Group, Inc.
- 2740 Hyperspeed Technologies, Inc.
- 2741 Impediment Incorporated
- 2041 INLINE, Inc.
- 248 JVC Professional Products Company
- 2040 Kingston Technology Corporation
- 2030 Lasergraphics, Inc.
- 819 LAZERUS
- 2350 Lightwave Communications, Inc.
- 2833 Lyon Lamb Video Animation Inc.
- 2736 Moonlight Computer Products
- 1824 The Pyros Partnership, Inc.
- 1049 Quarterdeck Office Systems
- 1431 Roche Image Analysis
- 1740 Sierra Video Systems, Inc.
- 2036 StereoGraphics Corporation
- 834 Techexport, Inc.
- 805 Truevision Inc., A RasterOps Company
- 2827 VIC Hi-Tech Corporation
- 240 Videomedia, Inc.
- 748 Visionetics International Corporation
- 2348 VRontier Worlds of Stoughton, Inc.
- 337 YARC Systems Corporation

BOOTH PC-based Systems

- 1712 Acuris, Inc.
- 1749 Alpha Systems Lab, Inc.
- 2821 AT&T
- 1621 Autodesk, Inc.
- 133 AXA Corporation
- 918 AZTEK, Inc.
- 721 Byte by Byte Corporation
- 2533 Cambridge Animation Systems Limited
- 1744 Data Translation, Multimedia Group
- 648 Diaquest, Inc.
- 505 Digital Equipment Corporation
- 122 Focus Graphics, Inc.
- 737 FOR.A Corporation
- 2521 The Grass Valley Group, Inc.
- 1844 Hotronic, Inc.
- 2740 Hyperspeed Technologies, Inc.
- 819 LAZERUS
- 2833 Lyon Lamb Video Animation, Inc.
- 1845 MetroLight Studios
- 2346 The Pacific Data Group
- 1243 Polhemus Incorporated
- 1824 The Pyros Partnership, Inc.
- 1049 Quarterdeck Office Systems
- 1431 Roche Image Analysis
- 2115 Science Accessories Corporation
- 2732 SuperFluo Incorporated
- 834 Techexport, Inc.
- 1043 Template Graphics Software, Inc.
- 805 Truevision Inc., A RasterOps Company
- 240 Videomedia, Inc.
- 146 Vision Quest
- 2114 The Vivid Group
- 2248 Waite Group Press
- 830 Wasatch Computer Technology

BOOTH Portable Products

- 1205 Apple Computer, Inc.
- 505 Digital Equipment Corporation

- 1842 FARO Technologies
- 641 Ithaca Software
- 2341 Psychic Lab
- 2115 Science Accessories Corporation
- 1043 Template Graphics Software, Inc.
- 748 Visionetics International Corporation
- 749 Winsted Corporation

BOOTH Projectors; Video; HDTV

- 913 AmPro Corporation
- 633 Barco, Inc.
- 1342 Chromatek Scan Process Inc.
- 1305 Mitsubishi Electronics America, Inc.
- 2246 Proxima Corporation
- 2018 RGB Spectrum
- 2036 StereoGraphics Corporation
- 2827 VIC Hi-Tech Corporation

BOOTH Publications

- 1422 Academic Press
- 731 Addison-Wesley Publishing Company
- 1256 Advanced Imaging/AVC Presentation
- 128 AK Peters, Ltd.
- 2617 American Showcase
- 1205 Apple Computer, Inc.
- 1323 AV Video
- 1837 CADalyst magazine
- 701 Cadence Magazine
- 232 Computer Graphics World/Computer Artist/Color Publishing/Electronic Publishing
- 1323 Computer Pictures
- 2830 Desktop Video World
- 1255 Eurographics
- 1434 FSI (F and S, Inc.)
- 2718 High Color Magazine
- 137 I.D. Magazine
- 1319 IEEE Computer Society
- 2714 IMAGEBase/Preston Publications
- 1323 Knowledge Industry Publications, Inc.
- 1937 Meckler
- 3025 Micro Publishing News
- 723 The MIT Press
- 2433 MONDO 2000
- 3021 Monitor/Media Age
- 1926 Morgan Kaufmann Publishers
- 953 Morph's Outpost on the Digital Frontier
- 2927 NASA Tech Briefs
- 1714 O'Reilly & Associates, Inc.
- 2141 On Production & Post-Production Magazine
- 2346 The Pacific Data Group
- 2616 PIXEL Magazine/PIXEL VISION
- 2013 Post and Producers Magazines
- 145 Pre-
- 1741 PTR Prentice Hall
- 1411 Scientific Computing & Automation Magazine
- 3016 SMPTE
- 800 Springer-Verlag New York, Inc.
- 1405 TELOS, The Electronic Library of Science/Springer-Verlag
- 701 UNIX Review Magazine
- 1430 UnixWorld Magazine
- 943 Video Systems Magazine
- 2248 Waite Group Press
- 1924 John Wiley and Sons
- 1836 Wired Magazine

BOOTH Rendering Software

- 2630 5D Solutions
- 1712 Acuris, Inc.
- 841 Advanced Visual Systems Inc.
- 123 Alias
- 2640 aniMedia
- 1205 Apple Computer Inc.
- 2821 AT&T
- 1621 Autodesk, Inc.
- 1439 auto.des.sys, Inc.
- 133 AXA Corporation
- 721 Byte by Byte Corporation
- 2533 Cambridge Animation Systems Limited
- 2014 CIRAD
- 1626 Computer Design, Inc.
- 2245 CoSA
- 1827 CrystalGraphics, Inc.
- 505 Digital Equipment Corporation
- 2227 Dimension International
- 849 Electric Image, Inc.
- 243 ElectroGIG USA, Inc.
- 2021 Engineering Animation, Inc.
- 1213 Evans & Sutherland
- 1814 Fraunhofer Center for Research in Computer Graphics
- 2521 The Grass Valley Group, Inc.
- 1019 Hewlett-Packard Company
- 1039 IBM Corporation
- 641 Ithaca Software
- 819 LAZERUS
- 953 Morph's Outpost on the Digital Frontier
- 105 Pixar
- 1830 Portable Graphics, Inc.
- 1824 The Pyros Partnership, Inc.
- 2627 Realsoft International
- 130 San Diego Supercomputer Center
- 2412 SAS Institute Inc.
- 2427 Sense8
- 1332 Side Effects Software
- 519 SOFTIMAGE Inc.
- 1413 Specular International
- 1043 Template Graphics Software, Inc.
- 533 Thomson Digital Image
- 441 Vertigo Technology
- 240 Videomedia, Inc.
- 2233 VID1
- 1231 Visual Software, Inc.
- 2248 Waite Group Press
- 113 Wavefront
- 337 YARC Systems Corporation
- 2618 Zeh Graphic Systems, Inc.

BOOTH Scanners/Digitizing Cameras; Scan Converters

- 1712 Acuris, Inc.
- 2027 Agfa, Division of Miles
- 1205 Apple Computer, Inc.
- 1232 Apunix Computer Services
- 918 AZTEK, Inc.
- 1342 Chromatek Scan Process Inc.
- 1636 CORE Software Technology
- 1818 Cyberware
- 333 Eastman Kodak Company, Motion Analysis Systems Division
- 1226 Extron Electronics
- 1821 Folsom Research Inc.
- 737 FOR.A Corporation
- 1434 FSI (F and S, Inc.)
- 2521 The Grass Valley Group, Inc.
- 1435 GW Hannaway & Associates, Inc.

1019 Hewlett-Packard Company	1213 Evans & Sutherland	1435 GW Hannaway & Associates, Inc.	1039 IBM Corporation
2714 IMAGEBase/Preston Publications	2343 Fractal Design Corporation	2741 Impediment Incorporated	1249 Information International Inc. (Triple-I)
248 JVC Professional Products Company	1814 Fraunhofer Center for Research in Computer Graphics	1249 Information International Inc. (Triple-I)	2041 INLINE, Inc.
1305 Mitsubishi Electronics America, Inc.	1434 FSI (F and S, Inc.)	2842 Legacy Systems International, Inc.	248 JVC Professional Products Company
804 Oxberry	1435 GW Hannaway & Associates, Inc.	2346 The Pacific Data Group	2350 Lightwave Communications, Inc.
2346 The Pacific Data Group	1019 Hewlett-Packard Company	1824 The Pyros Partnership, Inc.	2833 Lyon Lamb Video Animation Inc.
1225 RFX Inc.	2714 IMAGEBase/Preston Publications	1049 Quarterdeck Office Systems	1305 Mitsubishi Electronics America, Inc.
2018 RGB Spectrum	641 Ithaca Software	1746 R Squared	953 Morph's Outpost on the Digital Frontier
1431 Roche Image Analysis	819 LAZERUS	1431 Roche Image Analysis	815 Parallax Graphics, Inc.
1409 Santos Technology Inc.	917 Management Graphics, Inc.	2827 VIC Hi-Tech Corporation	543 Philips Semiconductors
1341 Sharp Electronics Corporation	1845 MetroLight Studios	240 Videomedia, Inc.	1225 RFX Inc.
2832 Tamron Industries, Inc.	953 Morph's Outpost on the Digital Frontier	800TH Teleconferencing/ Collaborative Products	1431 Roche Image Analysis
2827 VIC Hi-Tech Corporation	2240 Numerical Algorithms Group	1232 Apunix Computer Services	130 San Diego Supercomputer Center
146 Vision Quest	2633 Parity Systems Inc.	1342 Chromatek Scan Process Inc.	705 Sanyo Fisher (USA) Corporation
748 Visionetics International Corporation	105 Pixar	505 Digital Equipment Corporation	1740 Sierra Video Systems, Inc.
637 Yamashita Engineering Manufacture Inc.	1830 Portable Graphics, Inc.	1814 Fraunhofer Center for Research in Computer Graphics	519 SOFTIMAGE Inc.
800TH Simulation	1049 Quarterdeck Office Systems	1019 Hewlett-Packard Company	2036 StereoGraphics Corporation
1712 Acuris, Inc.	949 Ron Scott Inc.	248 JVC Professional Products Company	834 Techexport, Inc.
841 Advanced Visual Systems Inc.	130 San Diego Supercomputer Center	2350 Lightwave Communications, Inc.	905 Tektronix, Inc.
3023 Andromeda Systems Inc.	2412 SAS Institute Inc.	815 Parallax Graphics, Inc.	805 Truevision Inc., A RasterOps Company
1419 Ascension Technology Corporation	2427 Sense8	1431 Roche Image Analysis	2827 VIC Hi-Tech Corporation
2242 Byron Preiss Multimedia Company, Inc.	519 SOFTIMAGE Inc.	305/319 Silicon Graphics, Inc.	240 Videomedia, Inc.
721 Byte by Byte Corporation	2244 Syndesis Corporation	1005 Sun Microsystems Computer Corporation	146 Vision Quest
2014 CIRAD	1043 Template Graphics Software, Inc.	2832 Tamron Industries, Inc.	748 Visionetics International Corporation
2227 Dimension International	533 Thomson Digital Image	2827 VIC Hi-Tech Corporation	2114 The Vivid Group
831 Division	441 Vertigo Technology	748 Visionetics International Corporation	113 Wavefront
1401 Du Pont Pixel	2827 VIC Hi-Tech Corporation	2114 The Vivid Group	341 Xaos Tools
2021 Engineering Animation, Inc.	240 Videomedia, Inc.	800TH Terminals	637 Yamashita Engineering Manufacture Inc.
1213 Evans & Sutherland	1833 Visual Numerics, Inc.	1019 Hewlett-Packard Company	800TH Virtual Reality
1814 Fraunhofer Center for Research in Computer Graphics	2348 VRontier Worlds of Stoughton, Inc.	1421 Tech-Source Inc.	1712 Acuris, Inc.
1019 Hewlett-Packard Company	2248 Waite Group Press	800TH Turnkey Systems	731 Addison-Wesley Publishing Company
2740 Hyperspeed Technologies, Inc.	113 Wavefront	918 AZTEK, Inc.	841 Advanced Visual Systems Inc.
2741 Impediment Incorporated	800TH Storage Devices; Tape/Disk/CD-ROM	648 Diaquest, Inc.	1419 Ascension Technology Corporation
1248 Kubota Pacific Computer Inc.	205 Abekas Video Systems	1845 MetroLight Studios	2524 ASDG, Incorporated
819 LAZERUS	138 Advanced Digital Imaging	2346 The Pacific Data Group	1621 Autodesk, Inc.
953 Morph's Outpost on the Digital Frontier	3023 Andromeda Systems Inc.	433 Parallax Software Inc.	2227 Dimension International
1830 Portable Graphics, Inc.	1205 Apple Computer, Inc.	1824 The Pyros Partnership, Inc.	831 Division
2627 Realsoft International	1232 Apunix Computer Services	1431 Roche Image Analysis	1401 Du Pont Pixel
2345 Research Triangle Institute	2142 Gossett Graphics	519 SOFTIMAGE Inc.	2021 Engineering Animation, Inc.
2018 RGB Spectrum	735 Herstal Automation Ltd.	533 Thomson Digital Image	1213 Evans & Sutherland
130 San Diego Supercomputer Center	1019 Hewlett-Packard Company	2827 VIC Hi-Tech Corporation	1839 Fairchild/TRU-D
2412 SAS Institute Inc.	2741 Impediment Incorporated	2114 The Vivid Group	1814 Fraunhofer Center for Research in Computer Graphics
2427 Sense8	248 JVC Professional Products Company	113 Wavefront	1019 Hewlett-Packard Company
1332 Side Effects Software	2842 Legacy Systems International, Inc.	800TH Video Technology	2740 Hyperspeed Technologies, Inc.
305/319 Silicon Graphics, Inc.	713 Maximum Strategy, Inc.	205 Abekas Video Systems	819 LAZERUS
2641 Software Systems	2633 Parity Systems Inc.	1327 Accom, Inc.	1937 Meckler
1043 Template Graphics Software, Inc.	549 Pioneer New Media Technologies, Inc.	138 Advanced Digital Imaging	953 Morph's Outpost on the Digital Frontier
533 Thomson Digital Image	1746 R Squared	1749 Alpha Systems Lab, Inc.	1243 Polhemus Incorporated
725 Viewpoint Datalabs	1233 Texas Memory Systems, Inc.	1205 Apple Computer, Inc.	2341 Psychic Lab
1833 Visual Numerics, Inc.	2827 VIC Hi-Tech Corporation	2033 Aurora Systems	2345 Research Triangle Institute
2248 Waite Group Press	800TH Supercomputers	918 AZTEK, Inc.	2427 Sense8
337 YARC Systems Corporation	2740 Hyperspeed Technologies, Inc.	721 Byte by Byte Corporation	2615 Shooting Star Technology
800TH Software (Other)	1039 IBM Corporation	2024 Centaur Development	1332 Side Effects Software
138 Advanced Digital Imaging	819 LAZERUS	1342 Chromatek Scan Process Inc.	305/319 Silicon Graphics, Inc.
2821 AT&T	130 San Diego Supercomputer Center	2245 CoSA	519 SOFTIMAGE Inc.
133 AXA Corporation	1233 Texas Memory Systems, Inc.	1744 Data Translation, Multimedia Group	2641 Software Systems
918 AZTEK, Inc.	113 Wavefront	648 Diaquest, Inc.	2036 StereoGraphics Corporation
709 Bit 3 Computer Corporation	800TH Systems Integrators	3018 Digital Processing Systems	1005 Sun Microsystems Computer Corporation
721 Byte by Byte Corporation	138 Advanced Digital Imaging	849 Electric Image, Inc.	2244 Syndesis Corporation
2014 CIRAD	918 AZTEK, Inc.	1821 Folsom Research Inc.	533 Thomson Digital Image
1626 Computer Design, Inc.	648 Diaquest, Inc.	2142 Gossett Graphics	725 Viewpoint Datalabs
1636 CORE Software Technology	1401 Du Pont Pixel	2521 The Grass Valley Group, Inc.	2114 The Vivid Group
2227 Dimension International	737 FOR.A Corporation	1435 GW Hannaway & Associates, Inc.	2348 VRontier Worlds of Stoughton, Inc.
1401 Du Pont Pixel	1814 Fraunhofer Center for Research in Computer Graphics		2248 Waite Group Press
740 Dynamic Graphics, Inc.			
849 Electric Image, Inc.			

BOOTH Visualization Software
 2630 5D Solutions
 1712 Acuris, Inc.
 841 Advanced Visual Systems Inc.
 123 Alias
 2821 AT&T
 1621 Autodesk, Inc.
 1439 auto.des.sys, Inc.
 918 AZTEK, Inc.
 721 Byte by Byte Corporation
 2014 CIRAD
 1626 Computer Design, Inc.
 1636 CORE Software Technology
 1827 CrystalGraphics, Inc.
 648 Diaquest, Inc.
 505 Digital Equipment Corporation
 2227 Dimension International
 831 Division
 1401 Du Pont Pixel
 740 Dynamic Graphics, Inc.
 243 ElectroGIG USA, Inc.
 2021 Engineering Animation, Inc.
 1814 Fraunhofer Center for Research in Computer Graphics
 2521 The Grass Valley Group, Inc.
 1019 Hewlett-Packard Company
 1039 IBM Corporation
 1248 Kubota Pacific Computer Inc.
 819 LAZERUS
 953 Morph's Outpost on the Digital Frontier
 2240 Numerical Algorithms Group
 1830 Portable Graphics, Inc.
 2341 Psychic Lab
 1824 The Pyros Partnership, Inc.
 2345 Research Triangle Institute
 130 San Diego Supercomputer Center
 2412 SAS Institute Inc.
 2427 Sense8
 1332 Side Effects Software
 519 SOFTIMAGE Inc.
 1413 Specular International
 1005 Sun Microsystems Computer Corporation
 2244 Syndesis Corporation
 834 Techexport, Inc.
 1043 Template Graphics Software, Inc.
 533 Thomson Digital Image
 2730 UNIRAS, Inc.
 441 Vertigo Technology
 2827 VIC Hi-Tech Corporation
 2233 VIDI
 146 Vision Quest
 1833 Visual Numerics, Inc.
 1231 Visual Software, Inc.
 2248 Waite Group Press
 113 Wavefront

BOOTH Workstations
 1232 Apunix Computer Services
 2524 ASDG, Incorporated
 918 AZTEK, Inc.
 721 Byte by Byte Corporation
 505 Digital Equipment Corporation
 1401 Du Pont Pixel
 1839 Fairchild/TRU-D
 122 Focus Graphics, Inc.
 1435 GW Hannaway & Associates, Inc.
 1417 Helios Systems
 1019 Hewlett-Packard Company

2740 Hyperspeed Technologies, Inc.
 1039 IBM Corporation
 2741 Impediment Incorporated
 1249 Information International Inc. (Triple-I)
 1248 Kubota Pacific Computer Inc.
 819 LAZERUS
 2836 Minicomputer Exchange
 2633 Parity Systems Inc.
 1824 The Pyros Partnership, Inc.
 1431 Roche Image Analysis
 130 San Diego Supercomputer Center
 305/319 Silicon Graphics, Inc.
 519 SOFTIMAGE Inc.
 1005 Sun Microsystems Computer Corporation
 2230 Tatung Science & Technology, Inc.
 146 Vision Quest
 113 Wavefront
 749 Winsted Corporation

BOOTH Miscellaneous
3D Animation Software
 441 Vertigo Technology
3D Data
 725 Viewpoint Datalabs
3D Design and Rendering
 2233 VIDI
3D Graphics Porting Software
 1830 Portable Graphics, Inc.
3D Modeling
 1439 auto.des.sys, Inc.
 721 Byte by Byte Corporation
Ada Software
 1335 Advanced Technology Center
Authoring Software
 953 Morph's Outpost on the Digital Frontier
Biomedical Engineering
 2345 Research Triangle Institute
Brain Wave Controls
 2341 Psychic Lab
Bus to Bus Adaptors
 709 Bit 3 Computer Corporation
Caching Devices (SCSI Bus)
 3023 Andromeda Systems Inc.
Cartooning
 2640 aniMedia
Cluster Computing
 1019 Hewlett-Packard Company
Color Copiers
 2236 Canon U.S.A., Inc.
Compression/Decompression Systems
 819 LAZERUS
Computer Aided Industrial Design Software
 1626 Computer Design, Inc.
Computer Games Authoring
 2533 Cambridge Animation Systems Limited
Computer to HDTV Converters
 1342 Chromatek Scan Process Inc.
CRT Color Analyzers/Convergence Meters
 1427 Minolta Corporation

Custom Programming
 1824 The Pyros Partnership, Inc.
Desktop Computer Accessories
 2636 Computer Expressions, Inc.
Development Tools
 841 Advanced Visual Systems Inc.
Digital Color Film Recorders
 1057 CELCO, Pacific Division
Digital Disk Recorders
 205 Abekas Video Systems
 3018 Digital Processing Systems
Digital Film Recorders
 2030 Lasergraphics, Inc.
Digital Imaging
 2631 Advance Reproductions Corporation
Digital Ink and Paint
 1845 MetroLight Studios
Digitizers—3D
 1842 FARO Technologies Inc.
Entertainment and Performance Technology
 2114 The Vivid Group
Film Recorders
 917 Management Graphics, Inc.
Financing and Leasing
 3024 Balboa Capital Corporation
Frame Capture Boards
 748 Visionetics International Corporation
Geologic Modeling Software
 740 Dynamic Graphics, Inc.
Graphics Array Processors
 2740 Hyperspeed Technologies, Inc.
Image Generators
 1213 Evans & Sutherland
Interactive Video
 705 Sanyo Fisher (USA) Corporation
Landscape Design and Rendering
 2014 CIRAD
Mac-Based Systems
 146 Vision Quest
Macintosh Accelerators
 337 YARC Systems Corporation
Maintenance For Color Printers
 2346 The Pacific Data Group
Mechanical Computer Aided Design
 1248 Kubota Pacific Computer Inc.
Medical Product Design
 2615 Shooting Star Technology
Memory Upgrades
 142 Enhance Memory Products
Motion Capture
 2732 SuperFluo Incorporated
Multiprocessing Servers
 1005 Sun Microsystems Computer Corporation
Multitasking
 1049 Quarterdeck Office Systems
Network Plotting Software
 2618 Zeh Graphic Systems, Inc.
PC-Based Full Motion Captive Compression Board
 2827 VIC Hi-Tech Corporation

PHIGS+ and PEX Standards
 1043 Template Graphics Software, Inc.
Professional Trade Association
 Reg. Association for Computing Machinery (ACM)
 1255 Eurographics
 744 National Computer Graphics Association
Real-time Disk Recorders
 1327 Accom, Inc.
Recordable CD-ROM
 248 JVC Professional Products Company
Refurbished Computers
 2836 Minicomputer Exchange
Remote Video System
 2350 Lightwave Communications, Inc.
Research and Development
 1814 Fraunhofer Center for Research in Computer Graphics
S-Bus Expansion Chassis
 2632 Integrix, Inc.
Security Devices
 244 Software Security, Inc.
SGI Raid 3 Disk Arrays
 2842 Legacy Systems International, Inc.
Signal Routing and Distribution
 1740 Sierra Video Systems, Inc.
Six Degree-of-Freedom Measurement Systems
 1243 Polhemus Incorporated
Software Protection Device
 1425 Rainbow Technologies, Inc.
Sound, Voice Recognition
 1749 Alpha Systems Lab, Inc.
Special Effects
 2524 ASDG, Inc.
 233 Discreet Logic, Inc.
Standards
 3016 SMPTE
Stereoscopic Display Systems
 2036 StereoGraphics Corporation
Storage Solutions (High-Performance)
 713 Maximum Strategy, Inc.
Training
 1742 School of Communication Arts
Transcoders RGB to Component
 1640 Sigma Electronics, Inc.
VGA to NTSC Scan Converters
 2041 INLINE, Inc.
Video Controllers
 648 Diaquest, Inc.
Workstation Add-on Products
 2040 Kingston Technology Corporation
Workstation Memory
 2633 Parity Systems Inc.
Workstation Memory and Fax/Modem
 1417 Helios Systems
Workstation Peripherals
 735 Herstal Automation Ltd.

On-site Services and Information

Accessibility

The Convention Center is wheel-chair accessible. SIGGRAPH 93 provides free shuttle service between many of the conference hotels and the Convention Center. For assistance with handicap access, call 714.755.1500. The handicap-equipped shuttle will run during SIGGRAPH 93 shuttle hours. Look for the signs indicating pick-up times and locations at your hotel, and refer to "Shuttle Services," page 111. The hotels that do not have service: Marriott, Hilton, Convention Center Inn, Inn at the Park, Jolly Roger Inn, Quality Hotel, Travelodge Convention Side.

Audio/Visual Services

ROOM A11 & A12, CONVENTION CENTER
714.490.2131

Sunday 9:00 am—9:00 pm
Monday—Friday 8:30 am—5:00 pm
Direct all questions about audio/visual needs to this office during these hours.

For information on audio/visual services for speakers, see "Speaker Services," page 108.

Busing

See "Shuttle Services," page 111.

Child Care

SIGGRAPH 93 offers supervised care for children ages six months to 16 years at the Hilton. KiddieCorp provides fun and interesting age-appropriate activities for your children. For more information, please go to the general information booth or, if you wish to see the facility, go to the mezzanine level of the Hilton. At press time, the following times have been planned for child care—please go to the mezzanine of the Hilton to verify exact times:

Monday 8:30 am—6:00 pm
Tuesday—Thursday 8:30 am—10:00 pm
Friday 8:30 am—6:00 pm

Conference Management Office

ROOM C, NORTHWEST, CONVENTION CENTER
714.490.2132

If you have questions regarding SIGGRAPH 93, staff are on hand to assist you. You may either visit the office or call.

Conference Policies

Smoking is not permitted at any of the conference locations. No cameras or recording devices of any kind are allowed. Children under 16 are not permitted on the exhibition floor.

Electronic Theater Tickets

See "Tickets (extra)," page 109.

Exhibition Management Office

HALL B, MEZZANINE, CONVENTION CENTER
714.490.2134

If you have questions regarding the exhibition, staff are on hand to assist you. You may either visit the office or call.

Exhibitor Registration

LOBBY D, CONVENTION CENTER

Exhibitors should pick up their badges at the exhibitor registration counter, which is open during the same time as other registration counters (see "Registration," page 108).

Expocards and Prize Drawing

SIGGRAPH 93 attendees will be given Expocards—scannable cards containing the attendee's name and address—for use in obtaining information from exhibitors. Attendees are urged to return their Expocard on their final departure from the conference. All returned Expocards will automatically be entered into a drawing for one of 14 electronic and other prizes valued at more than \$250 each. Winners will be contacted by 13 August 1993. A \$5 replacement fee will be charged for lost Expocards.

First Aid

LOBBY B & LOBBY C, CONVENTION CENTER
ext. 8062

A registered nurse or paramedic is on duty at the first aid areas during registration hours.

Information Booth

HALL B, CONVENTION CENTER

During registration hours, staff in the information booth can answer questions about SIGGRAPH 93, help you locate your conference destinations, and provide information on Southern California.

International Services

HALL B, CONVENTION CENTER
714.490.2136

714.490.2135 fax

SIGGRAPH provides an international center, located next to the registration area. There will be coffee, telephones, and a fax machine, and a multi-lingual staff that is available to assist attendees with registration inquiries and to help locate translators. Several SIGGRAPH 93 student volunteers are bi- or trilingual. Look for the student volunteers

wearing vests that indicate the country of origin for the language in which you'd like to obtain assistance.

Also at the international center, you will be able to meet other international attendees, as well as exhibitors who are interested in international trade.

The international center is open:

Saturday 6:00 pm—10:00 pm
Sunday 7:30 am—8:00 pm
Monday 7:30 am—7:00 pm
Tuesday 7:30 am—7:00 pm
Wednesday 8:00 am—6:00 pm
Thursday 8:00 am—6:00 pm
Friday 9:00 am—1:00 pm

Internet Access Centers

HALL A & HALL C, CONVENTION CENTER

SIGGRAPH 93 Internet access centers provide computer terminals and telnet access to the world Internet. From the conference, attendees can access their home Internet sites to read email and keep in touch with their offices.

Job Board

HALL C, CONVENTION CENTER

The job board is centrally located and provides a place both for attendees to post resumes and employers to post job openings.

Library (browsing)

HALL C, CONVENTION CENTER

To give attendees the opportunity to examine all SIGGRAPH and Multimedia printed materials before purchasing them, a browsing library is located in the SIGGRAPH bookstore.

Lost and Found

ext. 8050

Items may be turned in or claimed with the receptionist in the Convention Center administrative office near the arena.

Luggage Check/Check Room

LOBBY D, CONVENTION CENTER

SIGGRAPH 93 provides complimentary luggage check for briefcases, backpacks, and other small items during conference hours. Items cannot be checked overnight.

Media Activities

MEDIA HEADQUARTERS

ROOM B, NORTHEAST, CONVENTION CENTER
714.490.2137

Registered media are encouraged to attend the media briefing and tour, and to use media headquarters. The facility includes a registration/information room, a media library, interview offices, and a work room.

MEDIA HEADQUARTERS HOURS

Saturday 6:00 pm—8:00 pm
Sunday 7:30 am—8:00 pm
Monday and Tuesday 7:30 am—7:00 pm
Wednesday and Thursday 8:00 am—6:00 pm
Friday 9:00 am—1:00 pm

MEDIA TOUR

Meet at Small Animation Theater #2, Hall A, Convention Center

Tuesday, 3 August 9:00 am—10:00 am
SIGGRAPH leadership will provide registered media with a tour of the exhibit floor and of selected conference programs. Additional media tours will be available upon request throughout the conference.

MEDIA BRIEFING

Meet at Small Animation Theater #2, Hall A, Convention Center

Tuesday, 3 August 10:30 am
SIGGRAPH 93 co-chairs will meet with media representatives to highlight some of this year's exciting conference programs and events, including a preview of the electronic theater.

Merchandise

SIGGRAPH merchandise will be available for sale. Supplies are limited! See page 109 for descriptions.

Message Center

HALL C, CONVENTION CENTER
714.490.2101

Messages will be posted on a bulletin board.

Office Support Services

RECEPTION AREA, CONVENTION CENTER

Facilities Communication International offers copying, faxing, and secretarial services for a fee.

Press Activities

See "Media Activities," above.

Prize Drawing

See "Expocards and Prize Drawing," page 107.

Registration

HALL B, CONVENTION CENTER
714.490.2138

Registration counters are open:

Saturday 6:00 pm—10:00 pm
Sunday 7:30 am—8:00 pm
Monday and Tuesday 7:30 am—7:00 pm
Wednesday and Thursday 8:00 am—6:00 pm
Friday 9:00 am—1:00 pm

Restaurant Information Desks

HALL B, CONVENTION CENTER

Restaurant information desks provide SIGGRAPH 93 attendees with menus from local restaurants. Staff can assist conference participants with restaurant selection and reservations. This desk is open during registration hours.

Shipping Desk

HALL C, CONVENTION CENTER

For your convenience, the shipping desk is open during registration hours. Several shipping options are available, including next-day and second-day air and regular ground services to the U.S., Canada, and other countries.

Shuttle Services

See "Shuttle Services," page 111.

Social Functions

The welcome reception on Sunday night is open to all badged attendees. 5:00 pm—7:00 pm, Hall A, Convention Center.

The courses reception on Monday night is open to all badged courses registrants and presenters with wristbands. 7:00 pm—10:00 pm, Kellogg Mansion. See "Shuttle Services," page 111, for information on transportation. Extra tickets are available for purchase at the on-site registration counters.

The papers/panels reception on Thursday night is open to all badged SIGGRAPH and Multimedia papers/panels registrants and presenters with wristbands. The annual t-shirt contest award will be presented. 7:00 pm—10:00 pm, Grand Ballroom, Marriott. See "Shuttle Services," page 111, for information on transportation. Extra tickets are available for purchase at the on-site registration counters.

All badged attendees are invited to the happy hour receptions (cash bar) for designing technology, the electronic theater, machine culture, and tomorrow's realities. Monday—Thursday nights, 5:00 pm—7:00 pm, Hall A, Convention Center. See "Shuttle Services," page 111, for information on transportation.

Everyone is invited to the SIGGRAPH Late Night Parties, Sunday—Thursday nights, 9:00 pm—4:00 am, Salon 3, Orange County Ballroom, Marriott.

Speaker Services

Speakers and contributors should use the speaker registration desk in the main registration area to resolve registration problems or obtain conference information. All speakers must check in at the speaker prep room at least 24 hours before their presentation.

Speakers are encouraged to use the speaker prep room to prepare for their presentations, preview slides and videotapes, sort slides, and obtain slide carousels. Speakers who need to create slides at the conference may do so at their own expense.

SPEAKER PREP ROOM

EL CAPITAN A&B, HILTON
714.490.2140

Sunday—Thursday 7:00 am—7:00 pm
Friday 7:00 am—2:00 pm

Changes in audio/equipment needs in presentation rooms should be directed to the audio/visual services office (see "Audio/Visual Service," page 107. Room A11 & A12, Convention Center).

An office is available for contributors to the electronic theater to exchange ideas, leave messages, or receive assistance (Room A8, Convention Center). 714.490.2133

An office is available for contributors to designing technology, machine culture, and tomorrow's realities to exchange ideas, leave messages, or receive assistance (Room A2 & A3, Convention Center). 714.490.2130

Special Assistance Desk

The special assistance desk helps attendees resolve a wide range of possible problems and concerns. This desk can provide assistance in the following situations:

- o Course changes
- o Credit card problems (validations, errors)
- o Lost badges
- o Misspelled names on conference materials
- o Payments submitted without registration forms
- o Refunds
- o Receipts not received in the mail
- o Registration forms submitted without payments
- o Speaker problems (changes, missing ribbons)
- o Substitute registration (only if authorized on company letterhead)

Telephone Numbers

Airline Assistance

American Airlines	714.490.2141
Continental Airlines.....	714.490.2270
Anaheim Visitor's Bureau	714.999.8999
ATI Travel Management.....	714.490.2249
Audio/Visual Services	714.490.2131
Conference Management Office	714.490.2132
Designing Technology Office	714.490.2130
Electronic Theater Office	714.490.2133
Emergencies (ambulance, fire, police)	ext. 8080
Exhibition Management Office	714.490.2134
First Aid Office	ext. 8062
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International Center	714.490.2136 714.490.2135 fax
Los Angeles Convention and Visitors Bureau	213.689.8822
Machine Culture Office	714.490.2130
Media Office	714.490.2137
Message Center	714.490.2101
Registration	714.490.2138
Speaker Slidemaking Room ...	714.490.2139
Speaker Prep Room	714.490.2140
Tomorrow's Realities Office	714.490.2130

Tickets (extra)*ELECTRONIC THEATER*

Registration for passport, a course, Multimedia plus, and/or SIGGRAPH papers/panels includes one electronic theater ticket per person, not per registration category. Every attempt is made to accommodate your requested performance. All performances contain the same material. Badged attendees may purchase additional electronic theater tickets, subject to availability, at the box office outside of Lobby C beginning Tuesday, 3 August at 10:00 am.

RECEPTIONS AND LUNCHESES

Badged attendees may purchase additional tickets for the courses reception, courses lunches, and the papers/panels reception at the on-site registration counters.

Travel

See pages 110—111.

Merchandise and Technical Materials**Advance Purchases**

New this year! If you purchased your merchandise in advance, present the merchandise receipt you received through the mail, at the advance registration desk in Hall B of the Convention Center. Your materials are pre-bagged and ready for you to pick up.

On-site Purchases

All merchandise and technical materials are available at the Boutique and Bookstore in Hall C of the Convention Center.

TO PURCHASE MERCHANDISE ON SITE:

Complete a merchandise form at the fill-in counters in the registration area and pay at the on-site registration counter. The receipt you receive can be redeemed at the Boutique or Bookstore for your merchandise.

OR

Purchases can be made at the Boutique or Bookstore using cash or credit cards.

ITEMS AVAILABLE AT THE BOUTIQUE:

- Technical slide set
- Designing technology slide set
- Educators' slide set
- Coffee cup
- Soda mug
- Mouse pad
- Wall calendar
- Watch
- SIGGRAPH 93 bag
- SIGGRAPH 93 t-shirt
- SIGGRAPH 93 polo shirt
- Multimedia 93 t-shirt

ITEMS AVAILABLE AT THE BOOKSTORE:

- Full set and individual course notes
- SIGGRAPH 93 Conference Proceedings
- Multimedia 93 Conference Proceedings
- SIGGRAPH 93 Visual Proceedings
- SIGGRAPH 93 Conference Proceedings CD-ROM
- Multimedia 93 Conference Proceedings CD-ROM

SIGGRAPH VIDEO REVIEWS

The SIGGRAPH Video Review is a videotape publication illustrating the latest concepts in computer graphics and interactive techniques. More than 95 individual issues of SIGGRAPH Video Review computer animation tapes are available in NTSC and PAL standards, VHS and U-matic formats. Stop by the SIGGRAPH Video Review booth in the registration area in Hall B of the Convention Center.

SIGGRAPH BACK ISSUES—BUILD YOUR LIBRARY!

SIGGRAPH 93 will have a "One More Time" booth in the registration area in Hall B of the Convention Center where you can buy conference proceedings from past SIGGRAPH annual conferences and other SIGGRAPH-sponsored conferences, as well as past SIGGRAPH technical, arts, and other slide sets. Much of the past material is available at a discount.

Post-conference Orders

SIGGRAPH 93 Conference Proceedings CD-ROM, Conference Proceedings, Visual Proceedings, and slide sets; and Multimedia 93 Conference Proceedings CD-ROM and Conference Proceedings are available after the conference by contacting:

ACM Order Department

P.O. Box 64145

Baltimore, MD 21264 USA

800.342.6626 toll free

410.528.8596 fax

410.528.4261 (Alaska, Maryland, and international locations)

acmpubs@acmvm.bitnet

SIGGRAPH Video Reviews are available for purchase by calling or writing:

SIGGRAPH Video Review

c/o First Priority

P.O. Box 576

Itasca, IL 60143-0576 USA

800.523.5503 USA toll free

708.250.0807 international

708.250.0038 fax

Travel/Hotels

Airline Information

HALL B, CONVENTION CENTER

American Airlines (714.490.2141) and Continental Airlines (714.490.2270) will be available to assist you with your travel plans at the following times:

Saturday 6:00 pm—10:00 pm
 Sunday 7:30 am—8:00 pm
 Monday 7:30 am—7:00 pm
 Tuesday 7:30 am—7:00 pm
 Wednesday 8:00 am—6:00 pm
 Thursday 8:00 am—6:00 pm
 Friday 9:00 am—1:00 pm

ATI Travel Management Assistance —Housing and Car Rental

HALL B, CONVENTION CENTER

714.490.2270

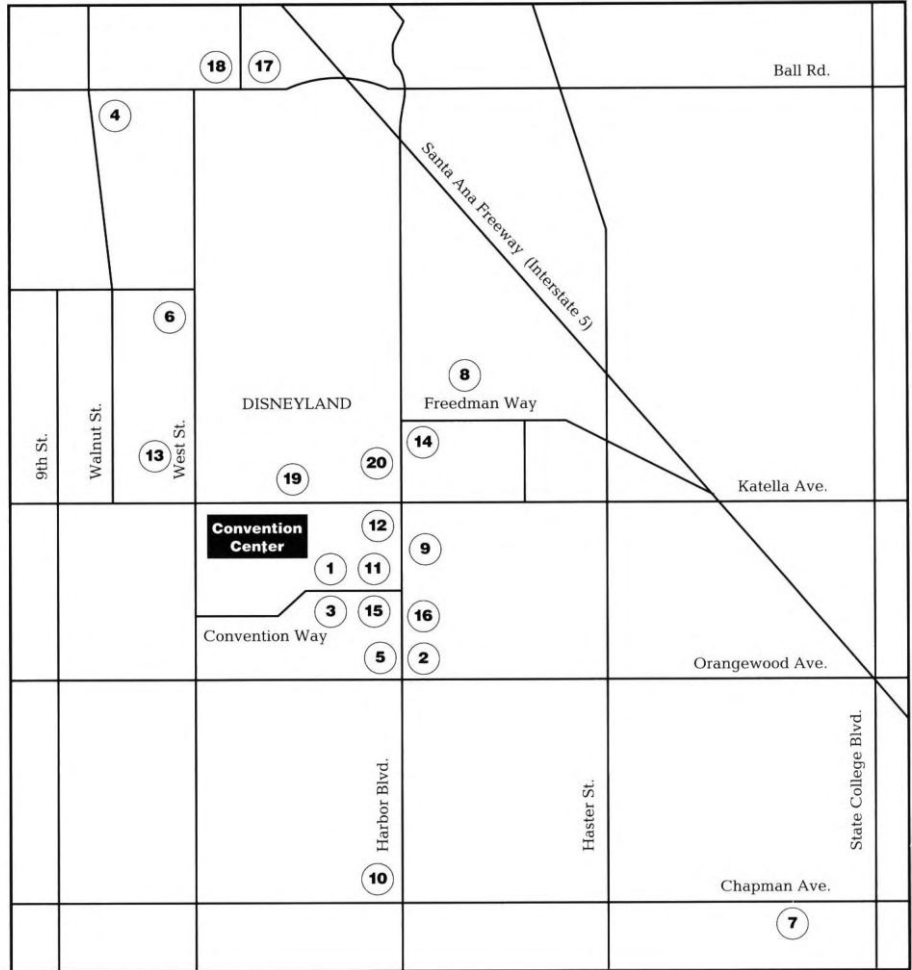
A representative from ATI Travel Management is available at the housing desk as follows:

Saturday 6:00 pm—10:00 pm
 Sunday 7:30 am—8:00 pm
 Monday 7:30 am—7:00 pm
 Tuesday 9:00 am—7:00 pm

Since sightseeing in Southern California could take you well beyond a walk or a bicycle ride, renting a car is recommended, but Los Angeles also has bus and rail systems. If you wish to rent a car, ATI offers discounts with Alamo Rent A Car. Rates are as low as \$26 daily and \$110 weekly with unlimited mileage. Your ATI agent can book a car reservation for you, or you can call Alamo directly at 800.732.3232 and mention SIGGRAPH ID #75148GR to receive a discount.

Busing

See "Shuttle Services," page 111.



Hotel Information

- | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>1 Anaheim Hilton and Towers
777 Convention Way
Anaheim, CA 92802-3497
714.750.4321</p> <p>2 Anaheim International Inn and Suites
2060 South Harbor Blvd.
Anaheim, CA 92802
714.971.9393</p> <p>3 Anaheim Marriott HEADQUARTERS HOTEL
700 Convention Way
Anaheim, CA 92802-3483
714.750.8000</p> <p>4 Conestoga Hotel
1240 South Walnut
Anaheim, CA 92802
714.535.0300</p> <p>5 Convention Center Inn
2017 South Harbor Blvd.
Anaheim, CA 92802
714.740.2500</p> | <p>6 Disneyland Hotel
1150 West Cerritos Ave.
Anaheim, CA 92802
714.778.6600</p> <p>7 Doubletree Hotel
100 The City Drive
Anaheim, CA 92688
714.634.4500</p> <p>8 The Grand Hotel
One Hotel Way
Anaheim, CA 92802
714.772.7777</p> <p>9 Holiday Inn Anaheim
1850 South Harbor Blvd.
Anaheim, CA 92802
714.750.2801</p> <p>10 Hyatt Regency Alicante
Harbor & Chapman
Anaheim, CA 92803
714.750.1234</p> | <p>11 Inn at the Park
1855 South Harbor Blvd.
Anaheim, CA 92802
714.750.1811</p> <p>12 Jolly Roger Inn
1640 West Katella
Anaheim, CA 92802
714.772.7621</p> <p>13 Pan Pacific Hotel
1717 South West St.
Anaheim, CA 92802
714.999.0990</p> <p>14 Plaza Hotel
1700 South Harbor Blvd.
Anaheim, CA 92802
714.772.5900</p> <p>15 Quality Hotel
616 Convention Way
Anaheim, CA 92802
714.750.3131</p> | <p>16 Raffles Inn & Suites
2040 South Harbor Blvd.
Anaheim, CA 92802
714.750.6100</p> <p>17 Sheraton Anaheim
1015 West Ball Road
Anaheim, CA 92802
714.778.1700</p> <p>18 Stardust Best Western
1057 West Ball Road
Anaheim, CA 92802
714.774.7600</p> <p>19 Travelodge Convention Side
1717 South Harbor Blvd.
Anaheim, CA 92802
714.774.8065</p> <p>20 Travelodge Maingate
1717 South Harbor Blvd.
Anaheim, CA 92802
714.635.6550</p> |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|



Car Rental

See "ATI Travel Management Assistance—Housing and Car Rental," page 110.

Parking

SIGGRAPH 93 attendees may park at the Convention Center for the rate of \$6 per day. Attendees should enter the parking area from the main Convention Center entrance off Katella Avenue and follow signs to available parking spaces.

Shuttle Services*LOCAL SHUTTLE SERVICE/BUSES*

SIGGRAPH 93 provides free shuttle service between many of the conference hotels and the Convention Center. Look for the signs indicating pick-up times and locations at your hotel. The hotels that do not have service: Marriott, Hilton, Convention Center Inn, Inn at the Park, Jolly Roger Inn, Quality Hotel, Travelodge Convention Side. For assistance with handicap access, call 714.755.1500. The handicap-equipped shuttle will run during SIGGRAPH 93 shuttle hours.

Route 1 serves: Doubletree Hotel, Hyatt Regency Alicante, Anaheim International Inn and Suites, and Raffles Inn & Suites.

Route 2 serves: Holiday Inn Anaheim (main gate), Plaza Hotel, The Grand Hotel, and Travelodge Maingate.

Route 3 serves: Conestoga Hotel, Sheraton Anaheim, Stardust Best Western, Disneyland Hotel, and Pan Pacific Hotel.

SHUTTLE SCHEDULE

Limited service = approximately every 15-20 minutes; Heavy service = approximately every five to 10 minutes

Saturday, 31 July	
5:30 pm—10:30 pm	Limited Service
Sunday, 1 August	
7:00 am—10:00 am	Heavy Service
10:00 am—4:30 pm	Limited Service
4:30 pm—8:30 pm	Heavy Service
Monday, 2 August	
7:00 am—10:00 am	Heavy Service
10:00 am—4:30 pm	Limited Service
4:30 pm—7:30 pm	Heavy Service
Tuesday, 3 August	
7:00 am—12 noon	Heavy Service
12 noon—4:30 pm	Limited Service
4:30 pm—7:30 pm	Heavy Service
7:30 pm—9:30 pm	Limited Service
9:30 pm—10:30 pm	Heavy Service
Wednesday, 4 August	
7:00 am—12 noon	Heavy Service
12 noon—4:30 pm	Limited Service
4:30 pm—7:30 pm	Heavy Service
7:30 pm—9:30 pm	Limited Service
9:30 pm—10:30 pm	Heavy Service
Thursday, 5 August	
7:30 am—10:00 am	Heavy Service
10:00 am—4:30 pm	Limited Service
4:30 pm—7:30 pm	Heavy Service
7:30 pm—9:30 pm	Limited Service
9:30 pm—10:30 pm	Heavy Service
Friday, 6 August	
8:00 am—6:00 pm	Limited Service

SHUTTLES TO RECEPTIONS

Monday—courses reception. Shuttles will leave the Convention Center from 6:30 pm—7:30 pm to take attendees to the courses reception at the Kellogg Mansion. From 7:30 pm—10:30 pm, the shuttle will travel from the Kellogg Mansion to all SIGGRAPH hotels, so guests may come and go as they wish.

Thursday—papers/panels reception at the Marriott. Regular shuttle services are available until 10:30 pm (see above).

*SUPER SHUTTLE***Rates**

Orange County Airport to/from hotels near the Convention Center: \$8 per person each way (with discount coupon). The rate to/from the Doubletree Hotel is \$10 per person each way (with discount coupon).

Los Angeles International Airport (LAX) to/from hotels near the Convention Center (including the Doubletree Hotel): \$11 per person each way (with discount coupon).

Staff

Super Shuttle will have staff available in Hall B to confirm return transportation to the airports as follows:

Wednesday 8:00 am—6:00 pm
 Thursday 8:00 am—6:00 pm
 Friday 9:00 am—5:00 pm

Transportation

See "ATI Travel Management Assistance—Housing and Car Rental," page 110, and "Shuttle Services," above.

SIGGRAPH: The Organization

SIGGRAPH is the Association for Computing Machinery's Special Interest Group on Computer Graphics. Started in 1967, SIGGRAPH has grown from a handful of computer graphics enthusiasts to a diverse membership of 12,000 people, including artists, engineers, animators, filmmakers, software and hardware developers, scientists, mathematicians, and other professionals in the field of computer graphics.

In addition to its own annual conference, SIGGRAPH sponsors other conferences, supports a wide range of educational activities, produces a variety of publications, and maintains active relationships with other professional technical organizations around the world. SIGGRAPH has established local groups across the United States and internationally.

For general information on SIGGRAPH and ACM membership services you can reach many SIGGRAPH volunteers and information sources through the email forwarding service on the siggraph.org system. Below are a number of ways to reach individuals or groups, or get information, through electronic mail. In any address below, you may use lower case letters instead of capitals in the address.

If you cannot identify the person or group you want to reach from the information on this page, send mail to directory@siggraph.org.

Your mail will be scanned by an automated mail responder that will try to respond to keywords in your subject line and message body with SIGGRAPH resources of interest to you. If you do not know where to begin a search, simply forward an empty message with the subject line "help." A general directory assistance message will be returned immediately to you.

If you want to reach someone whose name you know, address the email message as surname@siggraph.org where surname is replaced by the person's surname and, again, capitalization is not important. For example, to reach Sylvie Rueff, the SIGGRAPH vice chair, address email to rueff@siggraph.org. In case there is more than one person with a given surname, use the first initial followed by the surname. For example, to reach Judith R. Brown, the

The following groups can be reached by addressing mail to Group@siggraph.org:

EC (executive committee)

CPC (conference planning committee)

EC+CPC (both of the groups above)

EducationCommittee

LocalGroupsSteeringCommittee

LocalGroupsChairs

NominatingCommittee

PublicationsCommittee

Information about the following topics can be obtained by addressing mail to Info.Topic@siggraph.org:

Info.Membership

Info.LocalGroups

Info.Education

Info.Careers

Info.Artists

Info.Publicity

Info.SmallConferences

Info.ConferencePlanning

Info.VideoReviews

Info.Publications

Information about many parts of the annual SIGGRAPH conference can be obtained by addressing mail to Topic@siggraph.org:

Siggraph94

Registration.Siggraph94

Papers.Siggraph94

Tech.Sketches.Siggraph94

Panels.Siggraph94

Courses.Siggraph94

TechnicalProgram.Siggraph94

ET.Siggraph94

ArtDesign.Siggraph94

The_edge.Siggraph94

Vroom.Siggraph94

SIGKids.Siggraph94

Slides.Siggraph94

Multimedia.Siggraph94

Students.Siggraph94

ElectronicPublishing.Siggraph94

Exhibits.Siggraph94

To join ACM, change your membership status, or inquire about your status:

212.626.0500

212.944.1318 fax

acmhelp@acm.org

SIGGRAPH past chair, address your email to jbrown@siggraph.org; to reach Maxine Brown, the SIGGRAPH '92 chair, use mbrown@siggraph.org.

If you want to address email to the person holding a given office, address mail to office.group@siggraph.org. For example, to reach the SIGGRAPH chair, send mail to chair.ec@siggraph.org, or to reach the SIGGRAPH 93 co-chairs, you can send mail to cochairs.siggraph93@siggraph.org.

To change your address (include member number in all correspondence):

212.626.0500

212.944.1318 fax

acmcoa@acm.org

To inquire about membership publications that you have not received:

212.626.0500

212.944.1318 fax

acmhelp@acm.org

For general questions on ACM and/or SIGGRAPH membership:

212.626.0500

212.944.1318 fax

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To order proceedings, slides, or other materials from ACM:

ACM Order Department

P.O. Box 64145

Baltimore, MD 21264

800.342.6626

410.528.8596 fax

single-copy orders

410.528.4261

customer service, or orders outside the United States or in Maryland or Alaska

(8:15 am–4:15 pm, Monday–Friday, US Eastern Time)

acmpubs@acm.org

To inquire about single copy orders you may not have received:

ACM Order Department

800.342.6626

410.528.4261

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410.528.8596 fax

acmpubs@acm.org

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First Priority

P.O. Box 576

Itasca, IL 60143-0576

800.523.5503

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708.250.0038 fax orders

708.250.0807

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Issues are available in NTSC and PAL standards, VHS and U-matic formats.

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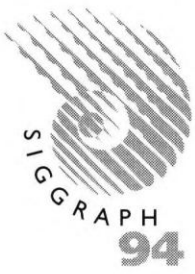
Conference
24-29 July 1994

Exhibition
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Orange County Convention Center

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“See you next year”

On Thursday and Friday, those will be the most frequently heard words in Anaheim. They always are, every year, as another SIGGRAPH conference and exhibition winds down. And this year, SIGGRAPH attendees have more to look forward to than ever before.

There's only one SIGGRAPH. Only one annual gathering of the people, ideas, inspirations, and products that define computer graphics and interactive techniques. Only one opportunity to learn how the field has evolved in the previous 12 months. To meet your colleagues from around the world and exchange concepts in an energized, synergistic environment.

There will be only one SIGGRAPH 94. Be prepared for a whole new experience when we meet again next summer, in Orlando. Of course, you'll find many of the familiar SIGGRAPH landmarks: Papers, Panels, Courses, the Art and Design Show, the Electronic Theater, and the Exhibition. But the content will be different. In some cases, radically different, even revolutionary.

Computer graphics is a volatile, fast-changing field. There's no reliable way to predict where its evolution will take us by this time next year. The only way to know is to join the rest of the computer graphics community at SIGGRAPH 94. Along with 25,000-30,000 other scientists, engineers, executives, artists, producers, thinkers, and enthusiasts, you'll experience:

- Technical Sketches of advanced research in progress.
- Stereoscopic HDTV.
- The world's first audience-participation, high-definition, stereoscopic computer game.
- Collaborative, interactive virtual worlds generated by massive scientific and engineering datasets.
- SIGKids, for the next generation of computer graphics pioneers.
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I n O

Where better than Orlando, one of the world's great centers of applied computer graphics?

Most of Orlando's best-known tourist destinations feature interactive displays in computer-designed, computer-controlled attractions, and computer-processed imagery. These systems have had a huge impact on popular culture, and their ingenious appeal brings more than 13 million visitors to Orlando each year.

But Orlando is far more than a world-renowned entertainment destination. It's also a world-class center of immersive technologies. It's the test community for the first truly interactive cable television system. And it's the home of a high-tech academic institution (the University of Central Florida), a multidisciplinary interactive technologies research institute, and industrial and military research organizations that are developing advanced technologies in simulation, training, electro-optics, and lasers.

Orlando's youthful exuberance is redefining the future. In every way, it's the ideal experience for SIGGRAPH attendees, and their families.

For complete information on Orlando attractions and accommodations, call the Orlando/Orange County Convention & Visitors Bureau:

1-800-643-9492.

r l a n d o

SIGGRAPH 94 Conference and Exhibition

The SIGGRAPH 94 experience includes all the traditional venues for technical and esthetic exploration, plus some new adventures in the future of computer graphics and interactive techniques.

Papers

Researchers redefine the future in the pre-eminent international forum for current inquiry in computer graphics theory and applications.

Technical Sketches

This new technical venue encourages informal discussion of late-breaking, creative, surprising, provocative, and controversial ideas and approaches. A committee of technical contributors will review proposals in May and select sketches that have the best potential to stimulate new ideas and conversations in the computer graphics community.

Panels

Watch advanced concepts merge and clash. Listen to the experts agree and disagree on the relationship between technology and other human activities. Join the interactive audience and contribute your own questions and comments on computer graphics issues, directions, and visions.

Courses

Probe the breadth and depth of advanced ideas. Or learn the basics of computer graphics using creative techniques and state-of-the-art technologies. As always, course offerings at SIGGRAPH 94 will enlighten, inform, and educate.

Art and Design Show

The world's leading exhibit of creativity inspired by the interaction of technology and esthetic expression extends the boundaries of imagination in a broad range of formats: performance, animation, interactive media, 2D and 3D display, design, and alternate media.

Electronic Theater

SIGGRAPH's international celebration of the most innovative computer imagery produced during the previous 12 months. In addition to works in traditional film and video formats, the SIGGRAPH 94 Electronic Theater audience will see early examples of stereoscopic HDTV and play Loren

Carpenter's new creation: the world's first high-definition, stereoscopic computer game.

The Edge

Interactive, multidisciplinary, immersive environments, both virtual and real, produced by those who dare to think without limits and work on the outer frontiers of the possible. Explore far horizons, risk-taking, newborn ideas, and leaps of faith off sheer cliffs of imagination to the next generation of experience.

VROOM

A virtual reality room demonstrating the actual use and future direction of scientific visualization. Become smaller than an atom or larger than the universe. Stand in the middle of a thunderstorm or travel through the human bloodstream. In the VROOM's collaborative virtual worlds, you'll

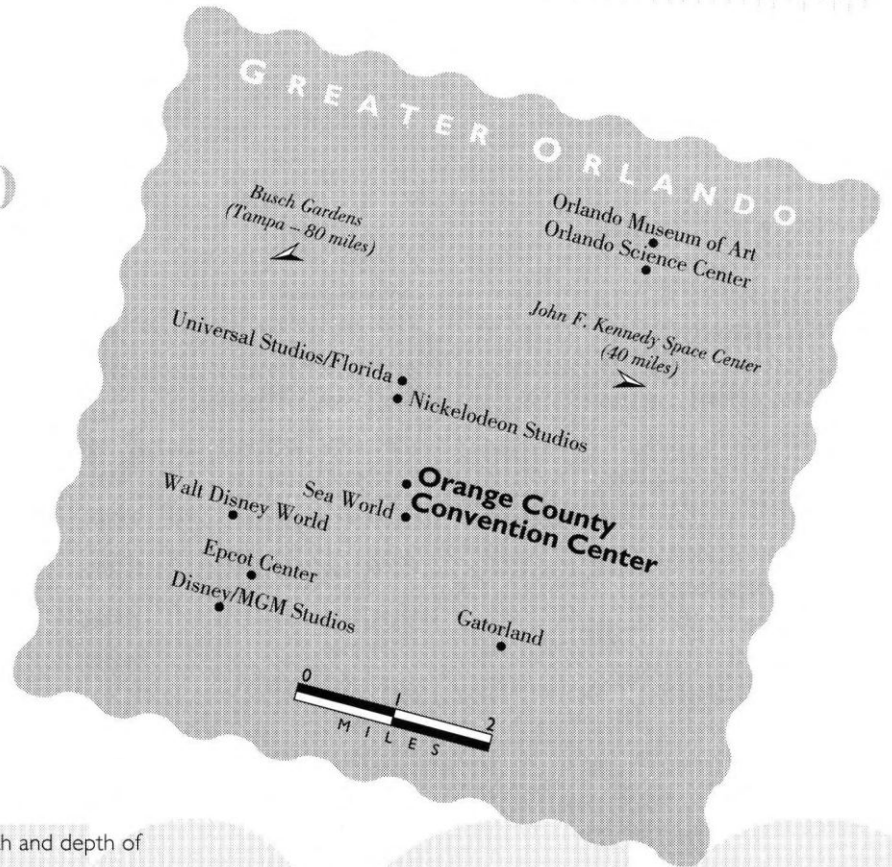
experience full 3D immersion in massive scientific and engineering datasets and see how they can be used interactively for practical problem-solving.

SIGKids

A computer graphics house with a series of rooms where kids can experience interactive technologies, video and animation production, art, design, music, mathematics, and science.

Exhibition

See, learn about, and experience all the latest computer graphics hardware, software, and services. This is the industry's primary annual opportunity to interact with you and thousands of other attendees in a focused, high-energy environment.



Create the Experience

The best way to experience SIGGRAPH 94 is to become part of it.

Present a paper, organize a course, lead a panel. Display your finest achievements in the Art and Design Show. Dazzle the Electronic Theater audience with your creativity. Extend the limits of human-computer interactivity. Create collaborative, immersive, real-time visualizations. Contribute your work for publication in the SIGGRAPH 94 Slide Sets and Multimedia CD-ROM. Display your latest hardware, software, and services in the SIGGRAPH 94 Exhibition.

The first step: pick up a Call for Participation at the SIGGRAPH 94 booth or request one by calling the conference management office. It contains all the information you need to become a participant. Select an appropriate venue, or two or three. Write a paper, prepare a proposal. Enter your finest artistic work, your film or

video extravaganza, your technical slides, or your multimedia piece. Please observe the deadlines. Then get ready to experience it all at SIGGRAPH 94.

SIGGRAPH 94 exhibitors should make plans as early as possible. The best locations in the Orange County Convention Center's 350,000 square feet of world-class exhibition space will go quickly. Complete information on the SIGGRAPH 94 Exhibition is available at the SIGGRAPH 94 booth, or by calling the exhibition management office.

Conference registration materials will be distributed with the SIGGRAPH 94 Advance Program in April. To request an Advance Program, contact the conference management office. Early registration is strongly advised. Substantial discounts apply to registrations received by Friday, 17 June 1994.

For general conference information:

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For exhibition information:

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English is the official language of the conference.

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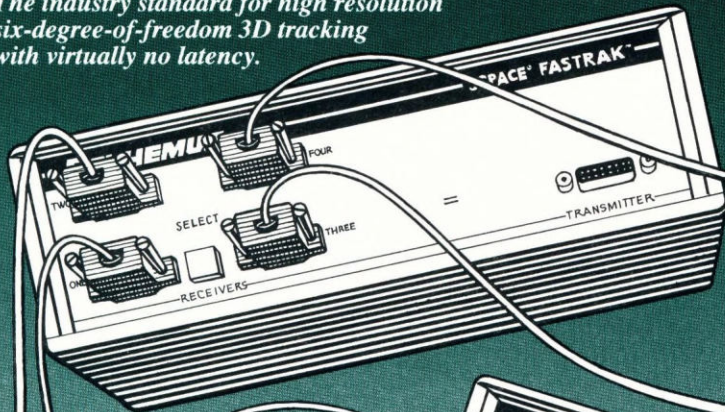
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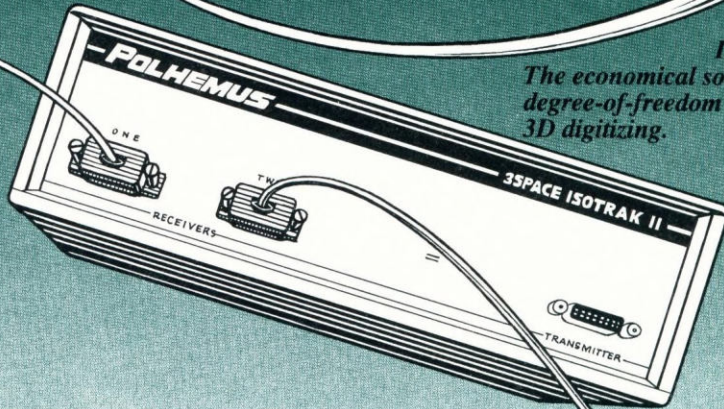
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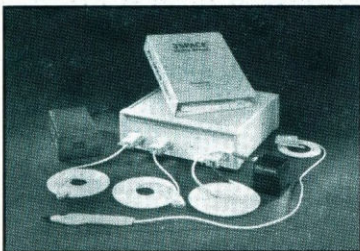
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