SIGGRAPH2005

The 32nd International Conference on Computer Graphics and Interactive Techniques

Conference 31 July-4 August 2005 Exhibition 2-4 August 2005 Los Angeles Convention Center

program & buyer's guide

conference at a glance

SIGGRAPH 2005 Conference Registration Categories:

- ● Full Conference
- ◎ Conference Select
- ○ Exhibits Plus

		SAT, 30 JULY	SUN, 31 JULY	MON, 1 AUG	TUES, 2 AUG	WED, 3 AUG	THU, 4 AUG
●◎○	Registration	6 – 8 pm	8 am – 6 pm	8 am – 6 pm	8 am – 4 pm	8 am – 4 pm	8 am – 2 pm
●◎○	Merchandise Pickup	6 – 8 pm	8 am – 6 pm	8 am – 6 pm	8 am – 4 pm	8 am – 4 pm	8 am – 2 pm
●◎○	SIGGRAPH Store	6 – 8 pm	8 am – 6 pm	8 am – 6 pm	8 am – 6 pm	8 am – 6 pm	8 am – 6 pm
●◎○	Exhibition				10 am – 6 pm	10 am – 6 pm	10 am – 5 pm
	PRESENTATIONS						
●	Courses		8:30 am – 5:30 pm	8:30 am – 5:30 pm	8:30 am – 5:30 pm	8:30 am – 5:30 pm	
●	Papers			8:30 am – 5:30 pm	8:30 am – 5:30 pm	8:30 am – 5:30 pm	8:30 am – 5:30 pm
●	Panels			8:30 – 10:15 am & 3:45 – 5:30 pm	10:30 am – 12:15 pm & 3:45 – 5:30 pm	10:30 am – 12:15 pm & 3:45 – 5:30 pm	8:30 – 10:15 am & 1:45 – 3:30 pm
●◎	Sketches			10:30 am – 5:30 pm	8:30 am – 5:30 pm	8:30 am – 5:30 pm	8:30 am – 5:30 pm
●◎○	Posters		8:30 am – 5:30 pm	3:45 – 5:30 pm	8:30 am – 5:30 pm	8:30 am – 5:30 pm	8:30 am – noon
●◎	Web Program					8:30 am – 5:30 pm	8:30 am – 5:30 pm
●◎	Educators Program					8 am – 5:45 pm	8 am – 5:30 pm
●◎○	*Keynote Address/Awards			1:15 – 3:15 pm			
●◎	Special Sessions						
	Games: Beyond the Joystick			6 – 8 pm			
	From the Earth to Infinity				3:45 – 5:45 pm		
	A Star Wars Retrospective				6 – 8 pm		
	Legacy of Disney Animation					10:30 am – 12:30 pm	
	Extreme Fashion					5:30 – 7:30 pm	
	"The Polar Express"						11:30 am – 1:15 pm
●◎○	Special Events						
	Fast-Forward Papers Preview		6 – 8 pm				
	ACM Student Research Competition Presentations				3:45 – 5:30 pm		
	Cyber Fashion Show					7:30 – 9:30 pm	
●◎○	Exhibitor Tech Talks				10 am – 6 pm	10 am – 6 pm	10 am – 5 pm
	EXPERIENCES						
●◎○	Art Gallery		1 – 6 pm	9 am – 6 pm	9 am – 6 pm	9 am – 6 pm	9 am – 5 pm
	Computer Animation Festival						
●	**Electronic Theater			7 – 9 pm	7 – 9 pm	7 – 9 pm	
●◎	**Electronic Theater Matinée				1:30 – 3:30 pm	1:30 – 3:30 pm	
●◎○	Animation Theaters		1 – 6 pm	9 am – 6 pm	9 am – 6 pm	9 am – 6 pm	9 am – 5 pm
●◎○	Emerging Technologies		1 – 6 pm	9 am – 6 pm	9 am – 6 pm	9 am – 6 pm	9 am – 5 pm
●◎○	Guerilla Studio		1 – 6 pm	9 am – 6 pm	9 am – 6 pm	9 am – 6 pm	9 am – 5 pm
●	Reception					8 – 10 pm	
	SERVICES						
●◎○	Birds of a Feather	Throughout the week					
●◎○	Get Involved				5 – 6:30 pm		
●◎○	International Resources	6 – 8 pm	8 am – 6 pm	8 am – 6 pm	8 am – 6 pm	8 am – 6 pm	8 am – 5 pm
●◎○	Job Fair				10 am – 4 pm	10 am – 4 pm	
●◎○	Pathfinders	6 – 8 pm	8 am – 6 pm	8 am – 6 pm	8 am – 6 pm	8 am – 6 pm	8 am – 2 pm

***Conference Select and Exhibits Plus attendees will have access to the Keynote Address via closed circuit TV in West Hall B.**

****The Electronic Theater includes a pre-show event, which begins 20 minutes before showtime: a live graphic performance by J. Walt Adamczyk specially created for SIGGRAPH 2005. For more info: johnadamczyk.com/performance.html**

table of contents

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1515 Broadway
New York, New York 10036 USA

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welcome to SIGGRAPH 2005

This user manual for the 32nd international conference on computer graphics and interactive techniques is packed with opportunities for learning, connecting, collaborating, and creating.

PDA Schedule

If you prefer to navigate SIGGRAPH 2005 via your PDA or cell phone, the complete conference schedule is also available on the web: www.siggraph.org/s2005/pda

Pathfinders

If you're new to the SIGGRAPH conference and need some tips on how to select the sessions that are best for you, visit the Pathfinders booth in the South Lobby.

And just before the keynote address, I hope you will join me in thanking all the over 1,000 volunteers who contributed their time and energy and expertise to creating this year's conference. If you would like to help organize future conferences, you can explore many volunteer opportunities at:

Get Involved
Tuesday, 2 August, 5 – 6:30 pm
West Hall Lobby

One event you won't want to miss

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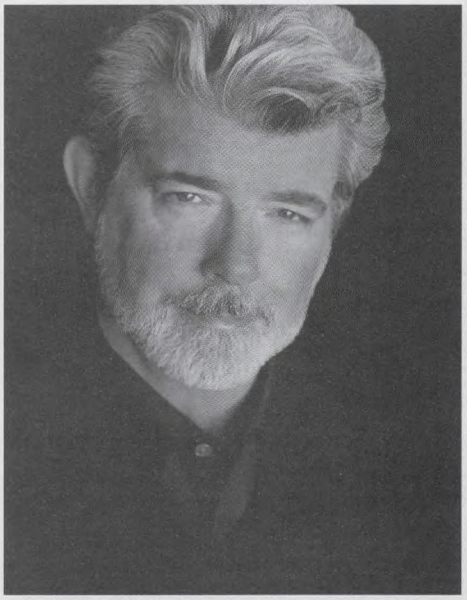
George Lucas: SIGGRAPH 2005 Keynote Address
Monday, 1 August, 1:15 – 3:15 pm
West Hall A



The world-renowned director, producer, and screenwriter on digital cinema, storytelling, and life beyond "Star Wars."

"George Lucas: A Keynote Q&A With the Father of Digital Cinema"

Bruce Carse, who has produced, hosted, and moderated over 100 live events for the professional filmmaking community in the past three years, moderates the keynote session.

This session also includes special congratulations for the 2005 award winners:

Steven A. Coons Award
Tomoyuki Nishita, University of Tokyo

Computer Graphics Achievement Award
Jos Stam, Alias Systems

Significant New Researcher Award
Ronald Fedkiw, Stanford University

Full Conference or One Day registrations for Monday, 1 August, can attend the keynote in the main presentation room, West Hall A.

Conference Select or Exhibits Plus badged attendees will be seated in the satellite presentation room, West Hall B, to view the session via simulcast. The doors open at 12:30 pm.

X-Wing Starfighter

South Lobby
30 July – 4 August

In the Star Wars galaxy, T-65 X-wing starfighters are built by the Incom Corporation, and were one of the most advanced starfighters flying when Luke Skywalker battled the Imperials at the first Death Star, during the events of "Star Wars: A New Hope." The ship takes its name from the pair of double-layered wings that deploy into the familiar X formation during combat.

The X-wing Starfighter on display at SIGGRAPH 2005 is of this galaxy, a replica owned by Lucasfilm Ltd. It is one of nine built in Frankfurt, Germany to celebrate the Star Wars Special Editions in 1997. X-wings, each weighing more than 5000 pounds, traveled to Australia, Germany, France, Benelux, Italy, Japan, South Korea, Spain, the United Kingdom, and the United States. This model still resides at the Wings Over the Rockies Museum in Denver, Colorado when not traveling to shows and exhibitions.

West Hall A
Tuesday, 2 August, 6 – 8 pm

Special Session
A Star Wars Retrospective From Industrial Light & Magic: Environments, Space Battles, and the Characters Who Fought Them From 1977 to 2005

Mars Exploration Rover

West Lobby
30 July – 4 August

A full-scale model of the Mars Exploration Rovers currently working on Mars. The Spirit Rover is currently exploring Husband Hill, and the Opportunity Rover is studying Purgatory Dune.

West Hall B
Tuesday, 2 August, 3:45 – 5:45 pm

Special Session
From the Earth to Infinity: Scientists From Caltech's Jet Propulsion Laboratory Reveal Secrets of the Universe Through Remarkable Images of Mars, Saturn, Earth, and the Deepest Reaches of Space

I hope you enjoy an amazing, successful, and adventurous week in Los Angeles!

James L. Mohler
SIGGRAPH 2005 Conference Chair

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- ● Full Conference
- ⊙ Conference Select
- ○ Exhibits Plus

presentations

●

Courses

Sunday – Wednesday, 31 July – 3 August

Learn how to master the latest digital theories and expert practices in the art and science of computer graphics. In quick tutorials, half-day sessions, and full-day courses, leading academic and industry specialists teach topics that deepen understanding, inspire exploration, and immediately enhance real-world skills. These courses are only available at SIGGRAPH 2005.

New this year: A special selection of courses that explore innovation and practice in open-source computer graphics.

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Papers

Monday – Thursday, 1 – 4 August

Experience the highest standard of research excellence. In SIGGRAPH 2005 Papers, internationally renowned researchers challenge conventional wisdom and establish new paradigms for future inquiry. No other conference presents the full range of the world's most significant achievements in computer graphics and interactive techniques.

●

Panels

Monday – Thursday, 1 – 4 August

Agree or disagree with outspoken advocates on every side of controversies that affect our digital future. Panelists discuss, confer with, and debate each other in a free-flowing format that generates con-sensus, controversy, confusion, and clarity – sometimes simultaneously.

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Sketches

Monday – Thursday, 1 – 4 August

Review the latest work in every aspect of computer graphics and interactive techniques: art, cinema, advertising, design, science, and engineering. Following each sketch presentation, authors answer questions and discuss future implications of their work.

New this year: Implementation Sketches

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Educators Program

Wednesday – Thursday, 3 – 4 August
Room 502B

Educators Program: Incubator, Room 502A

Explore the future of teaching and learning: virtual instructors, toys as teaching tools, individual versus community learning, and how computers can make education more engaging. In papers, panels, forums, and QuickTakes, educators and students share ideas, analysis, and discussion.

New this year: The Incubator, a demo space for interactive educational products.

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Posters

Sunday – Thursday, 31 July – 4 August
West Hall A

Encounter intriguing early results, speculative ideas, and the people who generated them. Posters are displayed throughout the conference week. In scheduled sessions, poster presenters discuss their work and answer questions.

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Web Program

Wednesday – Thursday, 3 – 4 August
Room 501AB

Understand how graphics and interaction define, extend, and optimize online environments. Web Program sessions focus on standards, technologies, rich media, usability, accessibility, art, design, visualization, and internationalization.

New this year: Refereed technical presentations.

●⊙○

Exhibitor Tech Talks

Tuesday – Thursday, 2 – 4 August
South Hall J, Room 1 and 2

Interact with SIGGRAPH 2005 exhibitors as they explain and demonstrate breakthroughs that accelerate digital processes, simplify content creation, improve training, strengthen security systems, and much more. After the sessions, schedule one-on-one discussions with the industry's leading companies.

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- ● Full Conference
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- ○ Exhibits Plus

●●○

Special Events

Fast-Forward Papers Preview
Sunday, 31 July, 6 – 8 pm
West Hall B

Snapshot overviews of the paper sessions, in which authors give short summaries of their work. It's a fast, fun, and provocative preview of the latest and most significant findings in computer graphics and interactive techniques.

ACM Student Research Competition Presentations
Tuesday, 2 August, 3:45 – 5:30 pm
Room 501AB

Winners of the ACM Student Research Competition at SIGGRAPH 2005 present brief summaries of the work they are displaying in the Posters program.

Cyber Fashion Show 2005
Wednesday, 3 August, 7:30 – 9:30 pm
West Hall A

The annual Cyber Fashion Show will again be hosted by Psymbiote, the technology-clad cyborg who educates, elucidates, and entertains as she parades models down the runway garbed in the latest functional tech gear and aesthetic cyber wear. The show features a variety of wearable computers, head-mounted displays, smart clothes, luminous clothing and accessories, futuristic club wear, and CAD/CAM jewelry and bodywear. The wide-ranging selection of far-out products, innovative prototypes, and unique creations projects us into future realms of body-technology assimilation.

Organizer
Isa Gordon
Psymbiote

participants

Adidas

Annissë
Anissë Designs

Jo Bangphraxay
See-Throo

Laura Bardier
PAN

John Bell
Nyx

Vanessa Bonet
Kasey McMahon
Psycho Girlfriend

Jonah Brucker-Cohen
Ludica

Jim Bunkelman
Galatea Productions

Elise Co
mintymonkey

Sara Diamond
Di Mainstone
The Am-I-Able Design Team
Banff New Media Institute

Luisa Paraguai Donati
Institute of Arts, Unicamp, Brazil

eMagin Corporation

Louis Fleischauer
AMF Korsets

FOSSIL®

Chris Golas
Tyler School of Art

Tina Gonsalves
Tom Donaldson
CLUTCH

Lizbeth Goodman
The SMARTlab Centre, Central St. Martins College of Art & Design

Isa Gordon
Jesse Jarrell
DEvan Brown
Psymbiote Project / SintheteX Fashions

Janet Hansen
Brett Spivey
Enlighted Designs

Darryl Licht
MuTech Corp.

Alex Lightman
Charmed Technology

Craig McCullough
Strange Attractors

Jacquelyn Ford Morie
Skydeas: Seams

Katherine Moriwaki

Gauri Nanda
MIT Media Lab

Oakley

Nikita Pashenkov
Ratstar Labs

Simona Brusa Pasque'
Interaction Design Ivrea

Francesca Rosella
Ryan Genz
CuteCircuit (Italy, USA)

Christine Satchell
SmartInternet
Technology CRC

Thecla Schiphorst
whisper[s] research group
Simon Fraser University

Jennifer Sholtis
Stephen F. Austin State University

Bethany Shorb
Cyberoptix

Alexei Shulgin
Aristarkh Chernyshev
Electroboutique

Rebecca Strzelec
Penn State University Altoona College

Atau Tanaka
Sony CSL Paris

Jenny Tillotson
Central Saint Martins College of Art & Design

Isabel C. Valverde
University of California, Irvine

Akira Wakita
Keio University

Wearable Computing Fashion Group
The Advanced Institute of Wearable Environmental Information Networks (WIN)

Victor B. Zordan
University of California, Riverside

●●

Special Sessions

This year's slate of Special Sessions offers a glimpse into the past, present, and future of digital technologies. Industry experts offer enlightening insights into the art, science, trends, and breakthrough concepts of the current and future state of computer graphics and interactive techniques.

Jill Smolin
Special Sessions Chair
The Gnomon Workshop

Jump! Shout! Dance! Sing!

An Interactive Conversation About Games, Game Art, and Play That Goes Way Beyond the Joystick

Monday, 1 August, 6 – 8 pm
West Hall A

Whether you dance in front of it, sing into it, or jump on it, there's a new dimension in the gaming world that goes way beyond 3D. With new controllers and a whole new generation of game boxes enabling ever more beautiful images, this session brings together art directors, game designers, and controller builders for an enlightening, entertaining and possibly hilarious look into an alternate future of gaming.

Moderator
Alex Pham
Los Angeles Times

Panelists
Henry LaBounta
Electronic Arts Canada

Greg LoPiccolo
Harmonix Music Systems

Richard Marks
Sony Computer Entertainment America

Michael McHale
Konami Digital Entertainment

Fred Swan
Logitech, Inc

From the Earth to Infinity:

Scientists From Caltech's Jet Propulsion Laboratory Reveal Secrets of the Universe Through Remarkable Images of Mars, Saturn, Earth, and the Deepest Reaches of Space

Tuesday, 2 August, 3:45 – 5:45 pm
West Hall B

Leading scientists at NASA/JPL give us a rare look at our universe: the latest images from Mars, explorations of Saturn and Titan, a trip back in time to shortly after the birth of the universe, and new perspectives of our own planet.

Moderator and Organizer
Daniel McCleese
Jet Propulsion Laboratory

Panelists
Ronald Blom
Eric De Jong
Torrence Johnson
Michael Werner
Jet Propulsion Laboratory

A Star Wars Retrospective From Industrial Light & Magic:

Environments, Space Battles, and the Characters Who Fought Them From 1977 to 2005

Tuesday, 2 August, 6 – 8 pm
West Hall A

In 1977, George Lucas' "Star Wars" opened our eyes and blasted our senses with brave new worlds, remarkable characters, and operatic battles. In the five films that followed, these images continued to make cinematic history, taking us to places we never thought possible and blazing the trail for the visual effects and animation industry.

In this presentation, Dennis Muren, John Knoll, Roger Guyett, and Rob Coleman walk us through all six installments in the series, comparing the techniques that ILM employed over the years to bring these historical environments, characters, and space battles to the screen.

Organizer
Kate Shaw
Industrial Light & Magic

Moderator
Don Shay
Cinefex

Panelists
Rob Coleman
Roger Guyett
John Knoll
Dennis Muren
Industrial Light & Magic

The Legacy of Disney Animation:

A Journey to the Past, Present and Future Through the Eyes of Disney Animators, Directors, Designers, and Storytellers

Wednesday, 3 August, 10:30 am – 12:30 pm
West Hall A

Join Walt Disney Feature Animation's top filmmakers for a look at the studio's 70-year legacy of storytelling, animation, and innovation. Featuring clips from the Disney vaults, along with footage from current and upcoming projects, the filmmakers demonstrate how color, animation, art direction, and storytelling influence contemporary animation techniques as the Disney legacy is passed on to a new generation of artists.

Moderator and Organizer
Steve R. Goldberg
Walt Disney Feature Animation

Panelists
Eamonn Butler
Dan Cooper
Mark Dindal
Randy Fullmer
Ian Gooding
Glen Keane
Walt Disney Feature Animation

Extreme Fashion:

Designers, Artists, and Technologists Present a Glimpse Into the Place Where High Fashion Collides With High Technology

Wednesday, 3 August, 5:30 – 7:30 pm
West Hall B

The Fourth Annual Cyber Fashion Show follows immediately in West Hall A.

Incorporating computer graphics, science, and technology into the fashion industry has transformed computer-enhanced garments, textiles, and wearables from fantasy to reality. This session brings together high-end fashion designers, textile producers, a garment manufacturer, artists, and scientists for some fascinating information and a really cool show and tell.

Moderator
Margaret Orth
International Fashion Machines

Panelists
Elise Co
mintymonkey

Katherine Moriwaki
Trinity College Dublin

Thad E. Starner
Georgia Institute of Technology

Jenny Tillotson
Central Saint Martins College of Art & Design

"The Polar Express":

Artists and Technicians Reveal How They Transformed a 3D Train Ride Into a 3D Stereoscopic Adventure

Thursday, 4 August, 11:30 am – 1:15 pm
IMAX Theater at the California Science Center

When "The Polar Express" left the station and exploded onto movie screens, first in 3D and then in stereoscopic 3D, we saw that the art of moviemaking had once again been forever transformed. In this Special Session at the IMAX Theater at the California Science Center, visual effects supervisors, artists, and technologists show how they transformed Robert Zemeckis' painterly film into an exciting IMAX escapade. This unique session features footage from "The Polar Express" and some very early glimpses at a Sony Pictures Imageworks project still in production, both in true 70mm stereoscopic IMAX.

Important Note: Due to limited seating, tickets are required for entrance to this Special Session at the California Science Center IMAX Theater. Tickets are distributed to Full Conference and Conference Select registrants who board the shuttle buses. There is no additional charge for tickets, but they are distributed on a first-come, first-served basis. Attendance Is limited to the 480-seat capacity of the IMAX Theater.

Organizer
Sande Scoredos
Sony Pictures Imageworks

Moderator
Rob Engle
Sony Pictures Imageworks

Panelists
Rob Bredow
Sony Pictures Imageworks

Hugh Murray
IMAX Corporation

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experiences

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Art Gallery: Threading Time

Sunday – Thursday, 31 July – 4 August
Concourse Foyer/Room 153A

Observe the real-time evolution of art history in 21st-century work that traces threads through time and space, figurative and abstract, linear and non-linear, moving and still. The Art Gallery presents 2D, 3D, and screen-based work that examines how the use of computer graphics relates to the form and content of the artwork. For the first time ever,

New this year:
See the Electronic Theater storyboards on display in the Art Gallery.

Computer Animation Festival

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Animation Theater

Sunday – Thursday, 31 July – 4 August
Room 409AB and 408B

●

Electronic Theater

Monday – Wednesday, 1 – 3 August
South Hall K

●◉

Electronic Theater Matinée

Tuesday – Wednesday, 2 – 3 August
South Hall K

Experience the year's finest achievements in animation, visualization, simulation, visual effects, and technical imagery. The Computer Animation Festival presents selected works in the Electronic Theater (matinée and evening shows) and the Animation Theater (throughout the week). The Electronic Theater also includes a pre-show event, which begins 20 minutes before showtime: a live graphic performance by J. Walt Adamczyk entitled "Autocosm: Gardens of Thuban," specially created for SIGGRAPH 2005. For more information about J. Walt Adamczyk, visit: johnadamczyk.com/performance.html

New this year:
Projecting in high-definition (1080i and 1080p).

●○○

Full-Dome Animation Theater

South Hall G

Immerse yourself in the world's best Full-Dome animations, from DomeFest 2005 (www.domefest.com). The animations, produced by students, institutions, and Full-Dome professionals, are screened daily on a 9-meter-diameter digital dome assembled especially for SIGGRAPH 2005.

Full-Dome video is a rapidly growing medium, with over 125 immersive displays deployed worldwide in planetariums and special-venue theaters. Freed from the "tyranny of the frame," artists transport viewers into fully immersive, mind-bending environments and alternate worlds as they explore storytelling techniques for this new medium.

New this year: Full-Dome Animation Theater.

●○○

Emerging Technologies

Sunday – Thursday, 31 July – 4 August
Room 150-152

Interact with digital experiences that move beyond digital tradition, blur the boundaries between art and science, and transform social assumptions. Emerging Technologies presents work from many sub-disciplines of interactive techniques, with a special emphasis on projects that explore science, high-resolution digital-cinema technologies, and interactive art-science narrative.

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Access Grid

Room 406AB

At SIGGRAPH 2005, the Access Grid supports a global collaborative performance piece, international art panels, and multi-site community interaction. This emerging, scalable teleconferencing technology enables interaction between individual desktops, 3,000-person theaters, and everything in between.The grid's 1,500 users throughout the world interact through thousands of nodes, designed spaces that contain the high-end audio and visual technology needed to provide a high-quality, compelling user experience. The nodes are also used as a research environment for development of distributed data and visualization corridors, and to study issues related to collaborative work in distributed environments. The SIGGRAPH 2005 node includes three large screens in a dedicated Access Grid space.

New this year: Access Grid.

services

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Guerilla Studio

Sunday – Thursday, 31 July – 4 August
Room 403AB

The Guerilla Studio is an integrated network of machines for realizing ideas in 2D, 3D, 4D, and n-dimensional media, a working computer graphics laboratory for explorations in fine art, animation, science, and other CG disciplines. It features high-end computer workstations, a multitude of software (featuring 2D and 3D design), and print technologies. Artists, scientists, and engineers can walk in, create, and realize their creations right in the lab.

The Guerilla Studio also features artists in residence, who instruct attendees on technique and explore the possibilities of digital art. And the Guerilla Studio will co-host the annual Cyber Fashion Show with Special Sessions.

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Reception

Wednesday, 3 August, 8 – 10 pm

Mingle with the movers and synergize with the shakers as the international computer graphics community gathers for its biggest social event of the year. Bring your business cards. SIGGRAPH 2005 provides food, beverages, and a location designed for social networking.

The Center at Cathedral Plaza
555 West Temple Street
Downtown Los Angeles

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Birds of a Feather

Attendees who want to get together with others who share their interests, goals, technologies, environments, or backgrounds are invited to attend a Birds of a Feather event.

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Get Involved

Tuesday, 2 August, 5 – 6:30 pm
West Hall Lobby

Discover how you can contribute your expertise and energy to SIGGRAPH 2006 and SIGGRAPH 2007. All attendees, exhibitors, and presenters are invited. All questions and comments are welcome.

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International Resources

South Lobby

Connect with colleagues and friends from your region or country. The International Center offers informal translation services and space for meetings, talks, and demonstrations. See page 143 for the International Committee listing.

New this year: Bilingual guided tours of the Art Gallery and Emerging Technologies.

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Job Fair

Tuesday – Wednesday,
2 – 3 August, 10 am – 4 pm
South Hall G

The Art Institutes are once again sponsoring the ACM SIGGRAPH 2005 Job Fair for leading companies in all related ACM SIGGRAPH fields to discuss employment opportunities with thousands of SIGGRAPH 2005 attendees in a relaxed, informal setting.

All registered SIGGRAPH 2005 attendees are welcome to attend the Job Fair at no additional cost. For list of participants, see page 150.

Sponsored by:

exhibitor tech talks

Interact with SIGGRAPH 2005 exhibitors as they explain and demonstrate breakthroughs that accelerate digital processes, simplify content creation, improve training, strengthen security systems, and much more. After the sessions, schedule one-on-one discussions with the industry's leading companies.

3ds Max - Advanced Maxscript and the SDK

Autodesk Media and Entertainment
Tuesday, 2 August, 1 – 3 pm
South Hall J, Room 2

3ds Max is widely used as a platform for development of custom tools, exporters, and plug-ins. This session, presented by engineers from the 3ds Max development team, outlines the best techniques and practices for unlocking the power of 3ds Max at the lowest levels. Specific areas of focus include IGame, IGameExporter XML, Mental Ray shaders, Direct X, ASHLI, custom max materials, and a variety of other foundational issues. Anyone who uses writing tools on top of the 3ds Max framework will gain valuable insight from this session and the ability to interact directly with members of the development team.

Sylva Batmanian
Autodesk Media and Entertainment
10 Duke Street
Montréal, Québec H3C 2L7 Canada
Sylva.batmanian@autodesk.com

Architecting the Future

SGI
Tuesday, 2 August, 1 – 3 pm
South Hall J, Room 1

SGI and ATI look beyond today's top graphics products and provide insight into their near-term and long-term product plans, highlighting opportunities for users and developers to get a jump on tomorrow's problems with the latest scalable computing and visualization technology.

Chelsea Palmer
SGI
5 Port Street
Laguna Niguel, California 92677 USA
Chelsea@sgi.com

Syflex: Behind the Scenes

Syflex LLC
Wednesday, 3 August, 10 am – Noon
South Hall J, Room 1

Come meet Syflex users and learn how our acclaimed cloth simulation technology is being used in real production! Five clients, ranging from big-name studios to smaller special effects houses and independent animators, present short demos based on actual projects. Visit our booth (#2104) for a detailed program.

Tami Zori
Syflex LLC
507 Iliaina Street
Kailua, Hawaii 96734 USA
tami@syflex.biz

Training for Careers in Animation and Technology

Vancouver Film School
Wednesday, 3 August, 10 am – Noon
South Hall J, Room 2

Interested in a career in the world of animation? This session includes a screening of outstanding student work, a comprehensive overview of the Vancouver Film School's Classical and 3D animation programs, admissions requirements, discussion of career opportunities, and a question-and-answer period.

Janet Cacchioni
Vancouver Film School
200-198 West Hastings Street
Vancouver, British Columbia V6B 1H2 Canada
jan@vfs.com

3ds Max - Advanced Artist Workflows and Techniques

Autodesk Media and Entertainment
Wednesday, 3 August, 1 – 3 pm
South Hall J, Room 2

In this fast-paced session, application engineers from all over the US share best tips and techniques for advanced users working in 3ds Max. Tricks will be presented for all areas of the application, whether final output is designed for film or games. Even artists who have worked in 3ds Max for years will walk away with tons of new information and faster workflows to implement immediately.

Sylva Batmanian
Autodesk Media and Entertainment
10 Duke Street
Montréal, Québec H3C 2L7 Canada
Sylva.batmanian@autodesk.com

COLLADA: An open Digital Asset Exchange Schema for the Interactive 3D Industry

Sony Computer Entertainment
Wednesday, 3 August, 1 – 3 pm
South Hall J, Room 1

A lot has happened with COLLADA since its introduction at SIGGRAPH 2004. COLLADA has grown stronger in usability, quality, and feature-set. This year, we will talk about the conformance test suite, the COLLADA API, the enhanced exporters and importers, new features, and in particular: COLLADA FX, a cross-platform (Cg, CgFX, GLSL, HLSL, FX) shader effects format.

Remi Arnaud
Sony Computer Entertainment
919 East Hillsdale Boulevard, 2nd Floor
Foster City, California 94404 USA
remi_arnaud@playstation.sony.com

exhibitor sessions

GPU Rendering Analysis and Performance Tools

NVIDIA Corporation
Thursday, 4 August, 10 am – Noon
Room 404A

Finding and addressing GPU performance bottlenecks can be a challenging proposition. Leveraging our intimate knowledge of the GPU and driver, NVIDIA has developed an arsenal of performance tools that expose critical performance metrics, giving you the insider's edge. This talk covers performance analysis methodology using these latest analysis and optimization tools, including brand-new resources for OpenGL and Direct3D programmers in the form of NVPerfKit, and further extensions to make NVPerfHUD even more powerful.

GPU Programming Exposed: The Naked Truth Behind NVIDIA's Demos

NVIDIA Corporation
Thursday, 4 August, 1 – 3 pm
Room 404A

This talk presents a cutting-edge collection of techniques and visual effects from NVIDIA that give you the knowledge you need to push the visual limits of your projects. Exclusively, for the first time ever, go behind the scenes of the latest stunning real-time effects as the NVIDIA demo team dissects their most recent demo suite, including real-time translucency, improved skin and hair rendering, innovative dynamic lighting effects, shadowing techniques, and much more. Next, programmers and 3D artists alike learn how to create real-world implementations of GPU effects for gaming, CAD, and image processing.

Bea Langsdorf
NVIDIA Corporation
2701 San Tomas Expressway
Santa Clara, California 95050 USA
blangsdorf@nvidia.com

Locations

West Hall A, West Hall B, Petree Hall C, Petree Hall D,
Rooms 501AB, 502A, 502B, 511AB, 515A, 515B

courses

Learn how to master the latest digital theories and expert practices in the art and science of computer graphics. In quick tutorials, half-day sessions, and full-day courses, leading academic and industry specialists teach topics that deepen understanding, inspire exploration, and immediately enhance real-world skills. These courses are only available at SIGGRAPH 2005.

New this year: A special selection of courses that explore innovation and practice in open-source computer graphics.

Full Conference registration allows attendees access to all SIGGRAPH 2005 courses. All the Course Notes are on the Full Conference DVD-ROM that Full Conference attendees receive with their registration.

Seating in courses is on a first-come, first-served basis. Please be sure to arrive early for the courses you wish to attend.

Courses Committee

John Fujii
Courses Chair
Hewlett-Packard Company

Anthony Apodaca
Pixar Animation Studios

Nan Schaller
Rochester Institute of Technology

Peter Schröder
California Institute of Technology

Scott Senften
Silicon Graphics, Inc.

Dave Shreiner
SIGGRAPH 2006 Courses Chair
Silicon Graphics, Inc.

Katie Rylander
Program Coordinator

Course Evaluation

All course attendees are encouraged to evaluate SIGGRAPH 2005 Courses content and presenters. Online evaluation forms are available at: www.siggraph.org/courses_evaluation

Your comments are very important. They will be used to ensure that the annual SIGGRAPH conference offers excellent courses on topics that are important to the SIGGRAPH community.

Sunday, 31 July

1

Anyone Can Make Quality Animated Films! (The Eight Basic Steps to Success)

Half-Day, Sunday, 31 July, 8:30 am – 12:15 pm

West Hall A

Level: Intermediate

Whether the film is one minute or one hour, there are simple basic steps to producing any animated film. This course explains how anyone with a little talent can apply industry-standard techniques to create polished, professional, commercial animated films. All the basic techniques, from developing the initial concept to compositing the final release print, are summarized and discussed. Comprehensive handouts guide attendees through the process.

Prerequisites
Basic knowledge of 2D and 3D animation techniques, Photoshop, and Premiere or AfterEffects or Final Cut Pro.

Intended Audience
People who want to create their own complete animated films.

Co-Organizers

Eric Van Hamersveld
The Art Institute of California - San Diego

Bob Hanon
The Art Institute of California - San Diego

Lecturer

Debra Miller
The Art Institute of California - San Diego

Schedule

8:30 Introduction

8:45 Step 1: Story & Script
Step 2: Developing the Style
Step 3: Storyboarding
Step 4: Recording Voices
Step 5: Layouts & Backgrounds/ Environments
Step 6: Animation
Step 7: Compositing
Step 8: Release Prints
Van Hamersveld, Hanon and Miller

Sunday, 31 July

2

Introduction to Articulated Rigid Body Dynamics

Half-Day, Sunday, 31 July, 8:30 am – 12:15 pm

Room 515B

Level: Intermediate

A comprehensive overview of articulated-rigid-body dynamics simulation based on Featherstone's recursive method and supplemented with analytical constraints, impact, frictional contact, joint-space control, and implicit integration. Novel applications from film production and video games, including simulation of foliage, hair, and character dynamics, are demonstrated.

Prerequisites

Familiarity with physically based simulation techniques, rigid-body dynamics, collision detection, kinematics of articulated bodies, numerical linear algebra, differential equations, and numerical methods.

Intended Audience

This course is intended for practitioners with some experience in physically based modeling and an interest in articulated body simulation. It provides a comprehensive overview of the topic, practical implementation details, and suggestions for novel areas of application. The intended audience also includes effects developers, technical directors, and researchers in the area.

Co-Organizers

Sunil Hadap
PDI/DreamWorks

Vangelis Kokkevis
Sony Computer Entertainment

Schedule

Session I - Introduction

8:30
- Dynamics of Articulated Bodies – Problem Statement
- Formulating the Equations of Motion: Maximal vs. Reduced Coordinates

Kokkevis

Session II - Featherstone's Articulated Body Method

8:55
- Introduction to Spatial Algebra
- Brief Overview of Featherstone's Algorithm
- Implementation Details

Hadap

Session III - Constraints and Implicit Integration

9:50
- Introduction to Analytical Constraints
- Bilateral Constraints for ABM

Kokkevis

10:15 Break

10:30
- Impacts, Contacts and Unilateral Constraints
- Solving the Constraint System. The Iterative LCP Solver

Kokkevis

11:05 Stiff Articulated Rigid Body Dynamics Using Differential Algebraic Equations
Hadap

Session IV—Applications From Feature Productions and Video Games Technology

11:25
- Character Dynamics and Dynamics of Wavy/Curly Hair
- Dynamics of Strands, Vines and Foliage

Hadap

Noon Real-Time Dynamics and Control of Articulated Characters
Kokkevis

12:10 *Session V- Questions & Answers*

Sunday, 31 July

3

Computational Photography

Half-Day, Sunday, 31 July, 8:30 am – 12:15 pm

Room 502A

Level: Intermediate

Learn the latest computational methods in digital imaging that overcome the traditional limitations of a camera and enable novel imaging applications. The course provides a practical guide to topics in image capture, lighting, and manipulation methods for generating compelling pictures for computer graphics and for extracting scene properties for computer vision.

Prerequisites
A basic understanding of camera operation and image processing is required. Familiarity with concepts of linear systems, convolution, and machine vision is useful.

Intended Audience
Photographers, digital artists, image-processing programmers, and vision researchers who use or build applications for digital cameras or images.

Co-Organizers

Ramesh Raskar
Mitsubishi Electric Research Labs (MERL)

Jack Tumblin
Northwestern University

Schedule

8:30 Introduction
Raskar

8:40 Understanding the Camera
Tumblin

9:10 Image Processing and Reconstruction Tools
Raskar

9:40 Improving Performance
Tumblin

10:10 Questions & Answers

10:15 Break

10:30 Image Processing and Reconstruction Techniques
Raskar

11:15 Computational Imaging Beyond Photography
Tumblin

11:35 Future Smart and Unconventional Cameras
Raskar and Tumblin

12:05 Summary and Discussion
Raskar and Tumblin

Sunday, 31 July

4

An Interactive Introduction to OpenGL Programming

Half-Day, Sunday, 31 July, 8:30 am – 12:15 pm

Room 502B

Level: Beginning

A complete introduction to authoring interactive 3D graphics applications using OpenGL. The course covers fundamental topics such as modeling, lighting, depth buffering, and texture mapping. A brief survey of more advanced topics is also presented. At the completion of the course, attendees will be able to write interactive OpenGL applications with moving, lit, textured 3D objects.

Prerequisites

Ability to read simple programs written in the C programming language. The course presents concepts from linear algebra (vector notation and matrix multiplication), but knowledge of those subjects is not required to understand the material.

Intended Audience

Anyone interested in learning how to author applications with OpenGL.

Organizer

Dave Shreiner
SGI

Lecturers

Ed Angel
University of New Mexico

Vicki Shreiner
SGI

Schedule

Getting Started

8:30
- What You Need to Write an OpenGL Application
- Opening an OpenGL window
- Accessing OpenGL functions

V. Shreiner

Using User Input

9 Working With Objects in OpenGL
- How OpenGL Specifies Objects
- Working With Geometric Transformations
- Depth Buffering
- Animation - Getting Objects to Move

V. Shreiner

9:45 Lighting
- Specifying Lighting Normals
- Lights, Materials, Action ...

D. Shreiner

10:30 *Texture Mapping*
Fundamentals
- Loading Textures
- Enabling Texture Mapping
- Specifying Texture Coordinates

How Textures Are Applied
- Texel Filtering
- Reflection/Cube Maps

D. Shreiner and Angel

11:30 Framebuffer Tricks
- Alpha Blending

Angel

Noon Conclusion and Questions & Answers

All

Sunday, 31 July

5

"Madagascar:" Bringing a New Visual Style to the Screen

Half-Day, Sunday, 31 July, 1:45 – 5:30 pm

West Hall A

Level: Beginning

New insights into the creative and technical thought processes required to evolve a new look for a CG movie. Highlights include how moving away from stylized realism required rethinking the creative process, development methods, and technologies, plus a comparison of the approaches that worked with approaches that did not.

Prerequisites

A basic understanding of the principles of computer graphics and 3D animation. For best results, attendees should have seen the animated feature "Madagascar."

Intended Audience

Attendees who are interested in the technical aspects of production of 3D animated feature films and who have a basic understanding of computer-generated animation.

Co-Organizers

Philippe Gluckman
Denise Minter
DreamWorks Animation

Lecturers

Philippe Gluckman
Kendal Chronkhite
Cassidy Curtis
Milana Huang
Rob Vogt
Scott Singer
DreamWorks Animation

Schedule

1:45 Introduction to Madagascar
- Balancing 2D and 3D Influences
- Structure of the Coruse & Speaker Introduction

Gluckman

2 *Character Design*
Art and Concepts for the Principal Characters
Cronkhite

2:20 *Character Animation & Character Rigging*
- The Madagascar Animation Style
- Enabling Extreme Deformations
- Squash and Stretch
- Hair and Fur

Curtis, Huang, Vogt

3:30 Break

3:45 *Visual Concepts: The Art of Madagascar*
- Presentation of the Visual Goals of the Movie and How They Evolved Through the Production

Cronkhite

4:05 *Visuals on the Computer: The Main Challenges*
- Lighting Style
- Managing the Complexity: Jungle and Furry Animal Crowds
- Effects Systems Designed for Hand-Animation and Art-Directability

Gluckman

4:35 *Non-Realistic Effects*
Example of Cartoony Effects and the Techniques to Execute Them
Singer

5:20 Conclusion & Questions
All

6

Advanced Topics on Clothing Simulation and Animation

Half-Day, Sunday, 31 July, 1:45 – 5:30 pm **Room 515B**

Level: Advanced

An introduction to state-of-the-art techniques for simulating and animating clothing. The course begins by presenting cloth simulation procedures, then presents in-depth knowledge on physical modeling of cloth and collision-resolution techniques, including practical issues in implementation. It closes by showing a variety of fashions constructed by a major digital fashion company.

Prerequisites
Rudimentary knowledge of computer graphics, computer animation, geometric modeling, linear algebra, calculus, and numerical computing.

Intended Audience
Graduate students and/or people from industry who are interested in developing physically based simulation techniques.

Co-Organizers

Kwang-Jin Choi
FXGear Inc.

Hyeong-Seok Ko
Seoul National University

Lecturers

Ronald Fedkiw
Stanford University

Dongliang Zhang
Digital Fashion Ltd

Schedule

1:45 Introduction
Opening
How Clothing Simulation Works?
Ko

2 Physical Model of Cloth I
- Introduction to the Immediate Buckling Model (IBM)
- Implementation of the IBM (10 min)
- Mathematical Analysis of Force Jacobians

Ko

2:45 Physical Model of Cloth II
- Stability Analysis of the IBM
- Damping Analysis of the IBM
- Extension to Triangular Meshes

Choi

3:30 Break

3:45 Impulse-Based Collision Resolution
- Introduction
- Repulsion based forces
- Robust geometric collisions
- Hybrid methods for robustness and efficiency
- Examples

Fedkiw

4:30 Cloth Design and Applications
- 3D Cloth Design
- OGM: A Measurement Device for BRDF
- Cloth Simulation Results

Zhang

5 Current State-of-the-Art and Challenges Ahead
- Results of recent experiments
- Challenges ahead

Ko

Sunday, 31 July

7

Line Drawings From 3D Models

Half-Day, Sunday, 31 July, 1:45 – 5:30 pm **Room 502A**

Level: Intermediate

Techniques for automated rendering of 3D models using sparse line drawing styles, for applications ranging from illustration through cartoons and games. The course introduces concepts of visual perception; defines silhouettes, contours, creases, and suggestive contours; describes efficient algorithms for finding these lines; and presents methods for artistic stylization.

Prerequisites
Basic familiarity with the computer graphics pipeline and some knowledge of calculus and linear algebra.

Intended Audience
Practitioners and researchers who would like a deeper understanding of how NPR line drawings are created and why they are effective.

Organizer
Szymon Rusinkiewicz
Princeton University

Lecturers
Doug DeCarlo
Rutgers University

Adam Finkelstein
Princeton University

Schedule

1:45 *Nonphotorealistic Rendering*
- Why NPR?
- Techniques

Finkelstein

2:15 *Defining Lines on Surfaces*
- Silhouettes and Contours
- Basics of Differential Geometry for Surfaces in 3D
- Suggestive Contours
- Ridges and Valleys

Rusinkiewicz

3 *Line Drawings and Perception*
- Line Drawings by Artists
- Information in Line Drawings
- Ambiguities
- Psychophysical studies

DeCarlo

3:30 Break

3:45 *Algorithms for Finding Lines*
- Image-Space Algorithms
- Object-Space Algorithms and Acceleration Techniques
- Hybrid Algorithms

Rusinkiewicz

4:15 *V. Stylization of Line Drawings*
- Visibility
- Parameterization
- Temporal Coherence
- User Interaction

Finkelstein

5 *Abstraction and Evaluation*
- Abstraction, Attention and Detail
- Evaluation of NPR Displays

DeCarlo

8

The Web as a Procedural Sketchbook

Half-Day, Sunday, 31 July, 1:45 – 5:30 pm **Room 502B**

Level: Intermediate

Ideas that effectively integrate new technology with new visual design can be quickly developed and published on the web, using only Java applets. This course uses a selection of applets as illustrative examples to show how you can rapidly develop and publish new ideas on the web. Attendees learn to use Java applets to quickly disseminate visual and procedural ideas (animation, modeling, design, gameplay paradigms, etc.). The course provides source code for an extensive set of libraries that enable rapid development of applets.

Prerequisites
The first module requires no prerequisites. The second module requires knowledge of C or Java or an equivalent language. Participants may benefit more from some subtopics if they have a knowledge of graphics.

Intended Audience
People who are familiar with programming and want to communicate their ideas to a larger community.

Organizer
Ken Perlin
New York University

Schedule

1:45 Introduction
- Design Module Overview
- Technology Module Overview

Design Module
- Discussion of principles
- Examples

3:30 Break

3:45 Focus on Technology
- Principles
- Tools
- Animation
- Unusual Math
- Where do you put the content?
- Conclusions

Perlin

Sunday, 31 July

9

Digital Face Cloning

Full-Day, Sunday, 31 July, 8:30 am – 5:30 pm

West Hall B

Level: Intermediate

Digitally cloned actors have recently become a reality. This course describes the distinct technologies used in producing a photo-real digital clone and outlines the significant remaining research challenges in this emerging field.

Prerequisites

Familiarity with computer graphics modeling, animation, and rendering concepts and algorithms. Knowledge of computer graphics mathematics and linear algebra is required to fully understand the theory topics.

Intended Audience

Researchers, technical directors, and programmers in computer graphics, especially those who have an interest in creating realistic rather than stylized human representations.

Co-Organizers

Fred Pighin
University of Southern California

J.P. Lewis
Graphics Primitive

Lecturers

David Bennett
Sony Pictures ImageWorks

George Borshukov
Electronic Arts

Paul Debevec
USC Institute for Creative Technologies

Christophe Hery
Steve Sullivan
Industrial Light & Magic

Lance Williams
Applied Minds, Inc.

Li Zhang
The University of Washington

Schedule

8:30	Introduction and Overview **Pighin**
9	Face Scanning and Dense Motion Capture Technologies **Zhang**
10	Break
10:15	Reflectance Modeling and Capture **Debevec and Lewis**
11:15	Facial Parameterization and Cross-Mapping **Lewis and Pighin**
12:15	Lunch
1:30	Case Study: Face Cloning at ILM **Hery and Sullivan**
2:15	Case Study: The Gemini Man **Williams**
3	Case study: Leaping the Uncanny Valley With Data (Face Cloning in the Matrix Sequels) **Borshukov**
3:45	Break
4	Case Study: Polar Express **Bennett**
4:45	Perception of Facial Realism **J.P. Lewis**
5:15	Panel on the Future of Digital Face Cloning **All**

Sunday, 31 July

10

Realistic Materials in Computer Graphics

Full-Day, Sunday, 31 July, 8:30 am – 5:30 pm

Petree Hall C

Level: Intermediate

An overview of measuring reflection properties of materials for computer graphics. The course presents a set of current acquisition methods in which each approach is particularly suited for a specific type of material: opaque surfaces, subsurface scattering, fibers, and complete objects.

Prerequisites

Working knowledge of basic concepts of realistic rendering and object representations such as triangle meshes or texture maps.

Intended Audience

People with a general knowledge of computer graphics and realistic rendering who are interested in digitizing and using real materials and objects.

Co-Organizers

Hendrik P. A. Lensch
Stanford University

Michael Goesele
MPI Informatik

Lecturers

Yung-Yu Chuang
National Taiwan University

Tim Hawkins
University of Southern California

Steve Marschner
Cornell University

Wojciech Matusik
Mitsubishi Electric Research Laboratories (MERL)

Gero Mueller
Universität Bonn

Schedule

8:30 Welcome and Speaker Introduction

8:45 Introduction
- Material Properties
- Classification

Lensch

9:30 Acquisition Basics
Goesele

10:15 Break

10:30 Homogeneous Isotropic BRDFs
Matusik

11:15 Heterogeneous Isotropic BRDFs
Lensch

11:45 Translucent Materials
Goesele

12:15 Lunch

1:45 Transparent/Specular Materials
Chuang

2:30 Fibers
Marschner

3:30 Break

3:45 BTFs
Mueller

4:30 Reflectance Fields
Hawkins

5:15 Conclusion, Questions & Answers
All

Sunday, 31 July

11

Recent Advances in Haptic Rendering & Applications

Full-Day, Sunday, 31 July, 8:30 am – 5:30 pm

Petree Hall D

Level: Intermediate

An overview of recent haptic rendering algorithms that use the sense of touch as a communication medium in addition to graphical display. The course also presents different approaches to designing touch-enabled interfaces for various applications, from scientific visualization, medical training, 3D-model design, and virtual prototyping to creative processes.

Prerequisites
Familiarity with basic 3D graphics, geometric operation, and elementary physics is highly recommended.

Intended Audience
Programmers and researchers who have done some implementation of 3D graphics and want to learn more about how to incorporate recent advances in haptic rendering with their 3D graphics applications or virtual environments. Also: people who are working in VR and other applications such as digital sculpting and painting, medical training, scientific visualization, CAD/CAM, rapid prototyping, engineering design, education, and training.

Co-Organizers

Ming C. Lin
University of North Carolina at Chapel Hill

Miguel Otaduy
Eidgenössische Technische Hochschule Zürich

Lecturers

Federico Barbagli
Stanford and Hansen Medical

Bill Baxter
OLM Digital, Inc.

Elaine Cohen
David Johnson
University of Utah

Roberta Klatzky
Carnegie Mellon University

Bill McNeely
Boeing Research

Dinesh Pai
Rutgers University

Hong Tan
Purdue University

Russell Taylor
University of North Carolina at Chapel Hill

Schedule

8:30 Introduction and Overview
Lin and Otaduy

Session I: Design Guidelines and basic point-based techniques

8:45 Haptic Perception & Design Guidelines
Klatzky

9:30 Basics of 3-DOF Haptic Display
Lin

Session II: 6-DOF Haptic Rendering for Object-Object Interaction

10 Introduction to 6-DOF Haptic Display
McNeely

10:15 Break

10:30 6-DOF Haptic Display Using Voxel Sampling & Applications to Virtual Prototyping
McNeely

10:55 Sensation Preserving Simplification for 6-DOF Haptic Display
Otaduy

11:20 6-DOF Haptic Display Using Normal Cones
Johnson

Session III: Haptic Rendering of Higher-Order Primitives

11:45 Haptic Display of Sculptured Surfaces
Cohen

12:15 Questions & Answers
All Morning Speakers

12:15 Lunch

Session IV: Rendering of Textures and Deformable Surfaces

1:45 Wearable Vibrotactile Haptic Displays Toward Realistic Haptic Rendering of Textures
Tan

2:20 Haptic Rendering of Textured Surfaces
Otaduy

2:45 Modeling of Deformable Objects
Pai

Session V: Novel Applications

3:10 Reality-based Modeling for Multimodal Display
Pai

3:30 Break

3:45 chai3d: An Open-source Toolkit for Haptic Rendering & Applications
Barbagli

4:15 Applications in Scientific Visualization
Taylor

4:45 Physically-Based Haptic Painting & Interaction With Fluid Media
Baxter

Sunday, 31 July

12

Introduction to SIGGRAPH and Computer Graphics

Full-Day, Sunday, 31 July, 8:30 am – 5:30 pm

Room 515A

Level: Beginning

Course 12 is open to Exhibits Plus, Conference Select, and Full Conference attendees. All other Courses require Full Conference registration.

You're in the convention center. Now what? This course eases newcomers into the SIGGRAPH experience. It begins with a guide to making the most of attending SIGGRAPH 2005, then provides a complete summary, using slides and demos, of how graphics works and some key applications. An annotated bibliography is included in the notes.

Prerequisites

Basic understanding of computers and algebra.

Intended Audience

Newcomers to SIGGRAPH and computer graphics who want to learn some of the field's basic terms and concepts and receive some guidance on how to get the most out of attending SIGGRAPH 2005.

Organizer

Mike Bailey

Oregon State University

Lecturer

Andrew Glassner

Coyote Wind Studios

Schedule

8:30
- Welcome and Overview
- How to attend a SIGGRAPH
- How to Understand What They are Saying in the Vendor Show

Bailey

10 Break

10:15
- Modeling
- Rendering

Glassner

12:15 Lunch

1:45
- Rendering (continued)
- Animation

Glassner

3:15 Break

3:30
- Scientific and Data Visualization
- Virtual Reality
- Finding additional information

Bailey

5 Questions and General Discussion

Bailey and Glassner

Sunday, 31July

13

Modern Techniques for Implicit Modeling

Full-Day, Sunday, 31 July, 8:30 am – 5:30 pm

Room 511AB

Level: Intermediate

Recent developments in modern implicit surfaces, particularly the use of radial-basis functions, MPUs, and digital Morse theory, plus examples of real-world applications from shape transformation to medical modeling. Lectures include the mathematics of implicit modeling and some formal treatment of smoothness issues and sampling analysis for constrained, interpolating, implicit surfaces. Attendees will acquire an overview of the techniques, a better understanding of the mathematics, an introduction to real-world applications, and a primer on open-source software that is freely available for modeling with implicit surfaces.

Prerequisites

A good working knowledge of basic graphics techniques. Attendees should not be easily frightened by terms such as "partial differential equations," "radial basis functions," or "line integral." Familiarity with basic implicit-surface techniques is useful, but not necessary.

Intended Audience

People who want to use implicit surfaces to model something other than goo (not that there's anything wrong with goo).

Co-Organizers

James F. O'Brien
University of California, Berkeley

Terry S. Yoo
National Library of Medicine, NIH

Lecturers

Marc Alexa
Technische Universität Darmstadt

Haixia Du
National Library of Medicine, NIH

John C. Hart
University of Illinois at Urbana-Champaign

Schedule

8:30	Welcome, Introduction to Implicit Modeling **Yoo**
8:55	Implicit Surfaces that Interpolate **O'Brien**
9:30	Radial Spline Theory **Hart**
10:15	Break
10:30	Compactly Supported RBFs in Implicit Surface Management **Yoo**
11:25	Implicit Modeling with PDE-based Techniques **Du**
12:15	Lunch
1:45	Multi-level Partition of Unity Implicits (MPUs) **Alexa**
2:40	Implicit Moving Least Squares Surfaces (IMLS) **O'Brien**
3:30	Break
3:45	Medical Applications of Implicit Surfaces **Yoo**
4:30	Wickbert: An Open-Source Interactive Implicit Surface Modeler **Hart**

14

Discrete Differential Geometry: An Applied Introduction

Full-Day, Sunday, 31 July, 8:30 am – 5:30 pm **Room 501AB**

Level: Intermediate

An introduction to fundamentals of discrete differential geometry. This new and elegant area of mathematics has exciting applications, as this course demonstrates in practical examples of surface fairing, parameterization, cloth/shell simulation, and fluid flow.

Prerequisites
A basic background in vector calculus and familiarity with triangle meshes.

Intended Audience
Graduate students, researchers, and application developers who seek a unified understanding of the mathematics underlying common geometry-processing operations and how these fundamentals apply to problems such as Laplacian smoothing, surface fairing using prescribed curvature flow, remeshing, conformal parameterization, cloth/shell simulation, and fluid flow.

Organizer
Eitan Grinspun
Columbia University

Lecturers
Mathieu Desbrun
Peter Schröder
California Institute of Technology

Schedule

8:30 Welcome
All

8:35 Introduction
- Motivation
- Preview - Think Discrete Differential - Not Purely Discrete Nor Purely Differential

Schröder

9:15 Didactic Example in 1D and 2D
- Curves in 1D as polyline
- Meshes in 2D

Grinspun

9:35 Geometry Processing
Mesh Parameterization
Desbrun+Schröder

10:15 Break

10:30 What Can We Measure?
- Simplicial Complexes
- Integral Geometry
- Geometric Measure Theory
- Discrete Measures => Simpler Implementation

Grinspun and Schröder

11:20 Discrete Shells
- Principal Curvatures
- Discrete Shape Operator Applications

Grinspun

12:15 Lunch

1:30 Barycentric Coordinates and Whitney Forms
Desbrun

2:15 Discrete Fluids
Desbrun and Schröder

3:15 Break

3:30 Surfaces From Circles
Schröder

4:20 Meshing
Desbrun

Wrap-up & Questions
All

Monday, 1 August

15

Crowd and Group Animation

Half-Day, Monday, 1 August, 8:30 am – 12:15 pm

Petree Hall D

Level: Intermediate

A continuous challenge for special effects in movies is the production of realistic virtual crowds. There is also a need for real-time crowds in games and VR. This course presents state-of-the-art techniques and examples from recent movies ("Lord of the Rings," "Shrek2," "Madagascar") and VR applications.

Prerequisites
Experience with computer animation is recommended but not mandatory.

Intended Audience
Animators and designers.

Organizer

Daniel Thalmann
EPFL VRlab

Lecturers

Laurent Kermel
William Opdyke
PDI/DreamWorks

Stephen Regelous
Massive Software

Schedule

8:30
- Crowd Concepts and Background
- Virtual Humans: Individuals, Groups, and Crowds
- Real-time Crowds

Thalmann

9:30
- Autonomous Agents
- A.I. and A-Life Methods

Regelous

10:15 Break

10:30 MASSIVE
Regelous

10:45 Human and Animal Crowds in Dreamworks/PDI CG Movie "Madagascar"
Kermel and Opdyke

11:45 Discussion and Questions
All

Monday, 1 August

16

Video-Based Rendering

Half-Day, Monday, 1 August, 8:30 am – 12:15 pm **Room 515A**

Level: Intermediate

A thorough introduction to how to acquire and process multiple video streams for omni-perspective, interactive rendering of real-world, dynamic scenes. Attendees learn how to reconstruct and represent dynamic scene geometry from multi-video footage, as well as how to render time-varying scenes video-realistically from arbitrary viewpoints in real time.

Prerequisites
Familiarity with the concept of image-based rendering. Some basic knowledge of computer vision fundamentals is helpful but not mandatory.

Intended Audience
Graduate students interested in interdisciplinary graphics and vision research, and professionals from the movie, special effects, and interactive entertainment industries.

Co-Organizers

Marcus Magnor
MPI Informatik

Marc Pollefeys
University of North Carolina at Chapel Hill

Lecturers

German Cheung
Neven Vision Inc.
(formerly Carnegie Mellon University)

Wojciech Matusik
Mitsubishi Electric Research Laboratory (MERL)

Schedule

8:30	Introduction **Magnor**
8:45	Multi-Video Acquisition **Cheung**
9:05	Small-baseline VBR **Matusik and Magnor**
9:45	Wide-baseline VBR **Matusik and Pollefeys**
10:15	Break
10:30	Camera Calibration **Pollefeys**
11	Spacetime Coherence **Cheung and Magnor**
11:30	Model-Based VBR **Cheung and Magnor**
Noon	Outlook & Discussion **Pollefeys**

Monday, 1 August

17

Acting and Movement for Animators: Students, Teachers, and Professionals

Half-Day, Monday, 1 August, 8:30 am – 12:15 pm **Room 502A**

Level: Beginning

Animators perceive and apply acting theory in a different way than do stage actors. Ed Hooks, author of Acting for Animators (revised 2nd edition, 2003), pioneered acting workshops that are specifically designed for the needs of the animator. Each consists of a lecture, simple improvisations, and acting analysis and deconstruction of clips from films. Hooks does not try to make stage actors out of animators. He teaches them acting theory in a fun, painless, and empowering way.

The primary focus of Acting for Animators is to explore the connections among thinking, emotion, and physical action as they relate to performance animation.

Attendance at this course is highly encouraged. Its exclusive content will not be recorded in any post-conference video documentation.

Prerequisites
No prerequisites except an open mind and a willingness to explore new ideas.

Intended Audience
Professional animators, students, and teachers of animation.

Organizer
John C. Finnegan
Purdue University

Lecturer
Ed Hooks

Schedule

8:30 Introductions
Finnegan and Hooks

8:45 Acting Theory Lecture and discussion
Hooks

10:15 Break

10:30 Power Centers
- Two Animators at a Time to Improvise
- Status Transactions
- Psychological Gesture
- Show Film Clips from "Multiplicity" and "A Streetcar Named Desire" These clips demonstrate power centers
- Status Transactions and Michael Chekhov's Psychological Gesture

Hooks

11:30 Deconstruction of "Father and Daughter" by Michael Dudok De Wit.
Hooks

Noon Questions & Answers
Finnegan and Hooks

18

Pre-Computed Radiance Transfer: Theory and Practice

Half-Day, Monday, 1 August, 8:30 am – 12:15 pm

Petree Hall C

Level: Intermediate

Realistic shading and how it can be achieved using precomputed radiance transfer. The course covers: the theory underlying a general model of shading and shadowing for real-time rendering, basic radiance transfer techniques, more advanced techniques that incorporate higher-frequency lighting and arbitrary BRDFs, the differences among these algorithms, and insights the presenters have gained working in this area. And it includes implementation details and a complete theoretical derivation.

Prerequisites

Some knowledge of a low-level graphics API such as DirectX or OpenGL. Knowledge of shading algorithms, linear algebra, and basic global illumination is useful.

Intended Audience

Everybody who is interested in realistic real-time shading. The course is designed for people who already have some knowledge of real-time rendering and want to learn a more sophisticated shading technique.

Co-Organizers

Jan Kautz
Massachusetts Institute of Technology

Jaakko Lehtinen
Helsinki University of Technology and Remedy Entertainment Ltd.

Peter-Pike Sloan
Microsoft Corporation

Schedule

8:30	Introduction • Problem Statement • Definitions **Kautz**
9	Diffuse Precomputed Radiance Transfer **Kautz**
9:15	General Precomputed Radiance Transfer **Jaakko and Lehtinen**
10:15	Break
10:30	SH Light Representations **Kautz**
11:00	Practical PRT I **Sloan**
11:30	Practical PRT II **Sloan**
Noon	Conclusions/Summary **Sloan**

Monday, 1 August

19

Performance OpenGL: Platform Independent Techniques

Half-Day, Monday, 1 August, 8:30 am – 12:15 pm **Room 502B**

Level: Intermediate

OpenGL performance analysis, tips, and techniques to help programmers write better OpenGL programs regardless of their development platform. Topics include: the causes of and solutions to performance problems in OpenGL programs, techniques for organizing data, and how advanced OpenGL features can make OpenGL programs run faster.

Prerequisites

The course assumes that attendees are comfortable programming with the OpenGL programming interface, understand the methods for rendering geometry and images with OpenGL, and know how to control rendering by manipulating OpenGL's state.

Intended Audience

This course is designed for novice to intermediate OpenGL programmers or those seeking insights into how to make interactive graphics applications perform better. You are beyond the level of the course if you have evaluated and tuned graphics programs and systems and are aware of the options and tradeoffs available in OpenGL.

Co-Organizers

Bob Kuehne
Blue Newt Software

Dave Shreiner
SGI

Lecturers

Alan Commike
SGI

Tom True
NVIDIA Corporation

Schedule

8:30	Overview of OpenGL Pipeline Operation **Shreiner**
9:10	Geometry Processing and Performance **Kuehne**
10	Rasterization and Pixel Processing and Performance **True**
10:15	Break
10:30	Rasterization and Pixel Processing and Performance (continued) **True**
10:45	Application Considerations **Commike**
11:45	Case Studies **Shreiner**
12:10	Conclusion and Questions & Answers **All**

20

An Open-Source CVE for Programming Education: A Case Study

Half-Day, Monday, 1 August, 8:30 am – 12:15 pm **Room 511AB**

Level: Intermediate

The Multi-User Programming Pedagogy for Enhancing Traditional Study (M.U.P.P.E.T.S.) system (a fully featured collaborative virtual environment) has been in development at Rochester Institute of Technology for several years. This course describes how the system was built and how it is used in the classroom for programming and graphics education, as well as how Open Source has affected the system, its development, and its deployment.

Prerequisites
Familiarity with OpenGL and/or another graphics APIs. Familiarity with graphics and programming education.

Intended Audience
Educators who are teaching computer programming and/or computer graphics, and anyone interested in seeing a multi-user system that doubles as a CVE and a fully capable development environment.

Organizer
Andrew Phelps
Rochester Institute of Technology

Lecturers
Kevin Bierre
Christopher Egert
David Parks
Rochester Institute of Technology

Schedule

8:30	Introduction
8:40	What is M.U.P.P.E.T.S.?
9:10	The Changing Face of Education and Student Expectation
9:30	M.U.P.P.E.T.S. in Use: A Contextual Environment for Critical Thinking
10:15	Break
10:30	M.U.P.P.E.T.S. in Use: An Introductory Java Programming Course
11	M.U.P.P.E.T.S. in Use: A Model for Sharing Content & Development Extensibility
11:35	M.U.P.P.E.T.S. as Open Source

Monday, 1 August

21

Manifolds and Modeling

Half-Day, Monday, 1 August, 8:30 am – 12:15 pm

Room 501AB

Level: Advanced

What do the configuration space of an animation skeleton, a subdivision surface, and a lightfield have in common? All of these are examples of manifolds. This course presents an overview of manifold constructions useful for graphics applications, with a focus on two-dimensional manifolds.

Prerequisites

The course is mostly self-contained. Mathematical prerequisites are basic calculus, complex numbers, and vector and matrix algebra. General familiarity with graphics research is helpful, but not required.

Intended Audience

Researchers from academia and industry who are interested in learning techniques for constructing manifolds and applying these techniques to different research areas in graphics.

Co-Organizers

Cindy Grimm
Washington University in St. Louis

Denis Zorin
New York University

Schedule

8:30 Introduction
Grimm

8:45 What is a Manifold?
Grimm

9:15 Advantages of Using Manifolds
Zorin

9:30 Building Manifolds From Meshes
Grimm and Zorin

10:15 Break

10:30 Building Manifolds From Canonical Domains
Grimm

10:55 Surface Parameterization and Manifolds
Zorin

11:30 Applications in Graphics and Vision
Grimm

Monday, 1 August

22

Résumés and Demo Reels: If Yours Aren't Working, Neither are You!

Tutorial, Monday, 1 August, 3:45 – 5:30 pm | **Petree Hall D**

Level: Beginning

Learn what it takes to get a job in the computer graphics field. A top career coach and recruiter reveals the secrets of how to create an irresistible résumé and showcase your talent in a demo reel to get the job you want. Sample résumés and demo reels are included.

Prerequisites
None.

Intended Audience
Hiring managers and job seekers at all levels.

Organizer
Pamela Kleibrink Thompson
Ideas to Go

Schedule

3:45	Introduction
3:50	Resumes and Cover Letters
4:10	Portfolios
4:25	Demo Reels and Breakdown Sheets
5:15	Career Tips–Attitude, etc.
5:20	Conclusion and Questions & Answers **Thompson**

Monday, 1 August

23

Taxonomy of Digital Creatures: Interpreting Character Designs as Computer Graphics Techniques

Tutorial, Monday, 1 August, 3:45 – 5:30 pm **Room 515A**

Level: Beginning

The process of developing digital creatures from concept to the screen is presented as a series of decision points. The focus is on classifying issues to allow design and performance requirements to drive the techniques employed in execution of the final product.

Prerequisites
Experience with animation, character modeling, and character set-up is recommended, but not required.

Intended Audience
Animators and character designers.

Organizer
Tim McLaughlin
Industrial Light & Magic

Schedule

3:45	Introduction
4	Sources of Information
4:10	Questions Regarding Look
4:50	Questions Regarding Performance
5:15	Conclusion and Questions & Answers **McLaughlin**

24

Digital Modeling of the Appearance of Materials

Tutorial, Monday, 1 August, 3:45 – 5:30 pm **Room 502A**

Level: Beginning

Realistic computer graphics rendering requires modeling the appearance of materials. This course covers the range of techniques for specifying the materials, including classifying physical materials by observation, basic mathematical representations, and modeling changes in material appearance over time.

Prerequisites
An introductory level of familiarity with computer graphics from another course or from practical experience. Attendees should understand ideas such as setting a pixel color by specifying values of red, green, and blue, and projecting a triangle into an image given a virtual pinhole camera.

Intended Audience
People who are interested in realistic rendering, who want to know how to achieve realistic appearance of materials by using the capabilities of existing software packages, or who want to write their own code for realistically shading objects.

Organizer
Holly Rushmeier
Yale University

Lecturer
Julie Dorsey
Yale University

Schedule

3:45	Introduction **Rushmeier**
3:55	A Visual Tour of Materials and Their Classification **Rushmeier**
4:15	Terminology and Mathematical Descriptions **Rushmeier**
4:25	Models for Reflectance **Rushmeier**
4:45	Spatial Variations **Rushmeier**
5	Processing of Materials **Dorsey**

Monday, 1 August

25

Open Source 2005 and Beyond: Thriving Despite the DMCA and Patent Threats to Linux

Tutorial, Monday, 1 August, 3:45 – 5:30 pm **Room 502B**

Level: Beginning

This tutorial focuses on issues confronting computer graphics designers and other software developers. The parameters of intellectual property risk, applicable rules, and the possible future repercussions of using open-source libraries are addressed from the viewpoint of how to make prudent choices in advancing your business or research.

Prerequisites
Interest in the issues surrounding open source, whether you are pro or con.

Intended Audience
Software developers, video producers, hardware designers, software producers and sellers, academic researchers, students, company owners, investors, and attorneys.

Organizer
Robert P. Cogan
Nath & Associates

Schedule

3:45 The Digital Millennium Copyright Act and Software Development
- Activities prohibited
- Copyright Office Exceptions to Anticirumvention Rules

4 The Uniform Computer Information Transactions Act
- Its Counterproductive Provisions
- "Bomb Shelter" Anti UCITA Statutes

4:20 Elcom and Sklyarov – The Criminal Law Considerations
- DVD Copy Control Assn. v. Bunner (DeCSS case) - Post US Supreme Court Decision Update
- Other Cases Affecting Development

4:40 Linux and Patents
- The Risk Assessment Factors
- Who's Responsible? How to Hedge Your Bets

5 The Bigger Picture
- The Outlook Abroad
- The Future

Question & Answers
Cogan

Monday, 1 August

26

Visualizing Quaternions

Tutorial, Monday, 1 August, 3:45 – 5:30 pm **Room 511AB**

Level: Advanced

This tutorial exposes the fundamental features of quaternions as they apply to all fields of computer graphics and visualization by using visual representations of quaternions themselves to provide intuition and insight.

Prerequisites
Attendees should be comfortable with and have an appreciation for conventional mathematical methods of 3D computer graphics and geometry used in geometric transformations and polygon rendering. The course will be of most interest to people who wish to deepen their intuitive understanding of moving coordinate frames and quaternion-based animation techniques.

Intended Audience
Students, scientists, and practitioners whose work and/or interests involve 3D orientation frames.

Organizer
Andrew J. Hanson
Indiana University

Schedule
3:45 Twisting Belts, Rolling Balls, and Locking Gimbals: Explaining Rotation Sequences With Quaternions

4:30 Quaternion Fields: Curves, Surfaces, and Volumes
Hanson

Monday, 1 August

27

Layered Manufacturing as a Graphics Display Device

Tutorial, Monday, 1 August, 3:45 – 5:30 pm **Room 501AB**

Level: Beginning

An introduction to 3D layered manufacturing. Overview and comparison of commercial layered manufacturing systems; software techniques, interchange issues, and process planning; and application areas with case studies, from visualization models to working prototype parts.

Prerequisites
Basic familiarity with 3D modeling or CAD.

Intended Audience
People who may have seen layered manufacturing displays in the SIGGRAPH 2005 Exhibition and want to learn more about what it's good for, details about how it works in practice, and an unbiased comparison of the different technologies available.

Organizer
Sara McMains
University of California, Berkeley

Lecturers
Mike Bailey
Oregon State University

Richard Crawford
The University of Texas at Austin

Schedule

3:45 Introduction to 3D layered manufacturing
Commercial 3D layered manufacturing processes
- Photopolymers
  –Photolithography
- Thermoplastic deposition
  –Extrusion
- Powder based
  –3D Printing, mono and color
  –Sintering

Applications experiences: functional mechanical parts
McMains

4:45
- Lamination

Applications experiences: scientific visualization
-molecular modeling
-medical modeling
-terrain surfaces
-isovolumes
Bailey

5:25 Summary, Questions & Answers (including discussion of parts/application areas suggested by audience)
All

Tuesday, 2 August

28

From Mocap to Movie: The Making of "The Polar Express"

Half-Day, Tuesday, 2 August, 8:30 am – 12:15 pm

West Hall B

Level: Beginning

Supervisors present an in-depth look at the making of "The Polar Express," including innovations in on-stage motion capture, virtual camera systems, animation, fx, and rendering, which contributed to the film' s unique look and style.

Prerequisites
Familiarity with basic 3D techniques.

Intended Audience
3D animation professionals and those interested 3D animated films.

Special Session

Artists and technicians from Sony Pictures Imageworks also present a Special Session on how they transformed the theatrical release into a 3D stereoscopic adventure, Thursday, 4 August, 11:30 am – 1:15 pm, at the IMAX Theater at the California Science Center.

Organizer
Rob Bredow
Sony Pictures Imageworks

Lecturers
David Schaub
Rob Engle
Daniel Kramer
Albert Hastings
Sony Pictures Imageworks

Schedule

8:30
- Welcome, Introduction & Pipeline Overview
- On-Stage
- Virtual Camera System - "Wheels"

Bredow

Performance Animation
Hastings and Schaub

9:05 Motion Capture Integration
Hastings

9:35
- Animation Tools in Detail
- Fully Animated Characters

Schaub

10:15 Break

10:30 FX Animation
Kramer

11:10 Lighting and Rendering
Bredow

11:40 3d Imax
Engle

Noon Wrapup, Futures, Questions & Answers
All

Tuesday, 2 August

29

High-Dynamic-Range Imaging and Image-Based Lighting

Half-Day, Tuesday, 2 August, 8:30 am – 12:15 pm **Room 515A**

Level: Intermediate

New techniques in capturing, representing, processing, and displaying high-dynamic-range images that cover the full range of light in the real world. The techniques enable marked improvements in visual fidelity and photorealism for computer graphics. The course also summarizes applications to photoreal lighting and compositing.

Prerequisites
Familiarity with basic techniques in digital photography, traditional 8-bit image editing, and basic computer graphics modeling and rendering. Also helpful: familiarity with a specific image-editing package or 3D modeling and rendering package.

Intended Audience
Students, researchers, and industrial developers in digital photography, computer graphics rendering, real-time photoreal graphics, and visual effects production (especially rendering and compositing).

Co-Organizers
Paul Debevec
USC Institute for Creative Technologies

Erik Reinhard
University of Central Florida

Lecturers
Sumanta Pattanaik
University of Central Florida

Greg Ward
AnyHere Software

Schedule

8:30	Introduction	**Reinhard**
8:40	Taking High Dynamic Range Images	**Debevec**
9:15	HDR Image Representation and Display	**Ward**
10	Break	
10:15	Dynamic Range Reduction	**Pattanaik**
10;50	Tone Reproduction Operators	**Reinhard**
11:20	HDR Image Based Lighting	**Debevec**
12:05	Discussions and Questions & Answers	**All**

30

Spatial Augmented Reality: Merging Real and Virtual Worlds

Half-Day, Tuesday, 2 August, 8:30 am – 12:15 pm

Room 502A

Level: Beginning

A survey of the latest techniques for augmented reality that go beyond conventional head-mounted-displays. The course introduces prototypes, explains rendering and calibration algorithms, discusses case studies, and presents examples that combine the real and virtual worlds. Participants learn about new applications in art, science, education, and industry that are enabled by modern AR techniques.

Prerequisites

No programming or specific mathematical background is required. General knowledge of basic computer graphics techniques, 3D tools, and optics is helpful, but not necessary.

Intended Audience

Designers of AR systems and programmers and artists who are working on interactive applications.

Co-Organizers

Oliver Bimber
Bauhaus-Universität Weimar

Ramesh Raskar
Mitsubishi Electric Research Lab (MERL)

Schedule

8:30 Introduction and Overview (Goals, Outline, Speakers, Schedule, Opportunities)
Raskar

8:40 Introduction to Current Approaches
Bimber

9:20 New Directions in Augmentation
Raskar

10:10 Questions & Answers
All

10:15 Break

10:30 Augmentation Using Optical Elements
Bimber

11:15 Prototypes and Experiences
Bimber and Raskar

12:05 Questions & Answers
All

Tuesday, 2 August

31

Computer-Generated Medical, Technical, and Scientific Illustration

Half-Day, Tuesday, 2 August, 8:30 am – 12:15 pm **Room 511AB**

Level: Intermediate

Important research and developments in computer-generated illustration techniques within non-photorealistic rendering (NPR). The course focuses on illustration techniques, including methods for computer-generated technical, scientific, and medical illustration; interactive illustrations of surface and volumetric data; and practical perspectives on the use of illustration in medical education and training.

Prerequisites

Required: intermediate knowledge of 3D computer graphics and scientific-visualization algorithms. Programming experience using a 3D library for interactive graphics and some awareness of existing NPR techniques may be helpful. Not required: prior knowledge of or background in artistic techniques, traditional scientific illustration, or perceptual psychology.

Intended Audience

Programmers, designers, illustrators, visualization and NPR researchers, graduate students, and others interested in the latest techniques for compact, meaningful depictions of objects and data.

Co-Organizers

David S. Ebert
Purdue University

Mario Costa Sousa
University of Calgary

Lecturers

Amy Gooch
Northwestern University

Don Stredney
Ohio Supercomputer Center

Schedule

8:30 NPR Systems for Technical and Science Subjects
Sousa

9:15 Interactive Medical Volume Illustration
Ebert

10:15 Break

10;30 Illustration: Lighting and Material Properties
Gooch

11:20 An Illustrator's Perspective on Computer-generated Illustration Techniques
Stredney

32

Quantum Rendering: An Introduction to Quantum Computing and Quantum Algorithms, and Their Applications to Computer Graphics

Half-Day, Tuesday, 2 August, 8:30 am – 12:15 pm **Room 501AB**

Level: Intermediate

A concise and self-contained introduction to quantum computing and its application to computer graphics. In addition to providing a general overview of quantum computing, the course reviews the theoretical limitations of classical computing for graphics and simulation, and how quantum computers can overcome these restrictions.

Prerequisites

The course is self-contained and does not assume any prior knowledge of quantum physics or quantum computing. Familiarity with classical rendering algorithms such as Z-Buffering and ray casting is helpful. A basic understanding of linear algebra and vector spaces is absolutely required.

Intended Audience

People interested in a concise introduction to quantum computing and quantum rendering, and who wish to learn how the future of computing will affect computer graphics.

Co-Organizers

Marco Lanzagorta
NCI Information Systems/US Naval Research Laboratory

Jeffrey K. Uhlmann
University of Missouri-Columbia

Schedule

8:30	Welcome and Introduction **Lanzagorta**
8:45	Introduction to Quantum Physics and Quantum Computing **Lanzagorta**
9:45	Quantum Search Algorithms **Uhlmann**
10:15	Break
10:30	Quantum Computational Geometry **Uhlmann**
11:20	Quantum Rendering Algorithms **Lanzagorta**
Noon	Conclusions, Questions & Answers **Lanzagorta and Uhlmann**

Tuesday, 2 August

33

Hot Topics in 3D Medical Visualization

Tutorial, Tuesday, 2 August, 1:45 – 3:30 pm **Room 501AB**

Level: Intermediate

Recent open-source research initiatives have created new APIs for complex data analysis. Combined with computer graphics, these tools become powerful applications for computer-assisted medicine. This tutorial covers medical applications, data analysis, and visualization, and touches on the policies and digital infrastructure for engaging in open-source software development.

Prerequisites
A good working knowledge of basic 3D computer graphics and an understanding of the basic principles of image processing. Some familiarity with medical terminology or experience working on a clinical project is useful, but not necessary.

Intended Audience
Members of the graphics community who are interested in expanding their research directions toward medicine. Researchers interested in learning about the rewards and difficulties of working on open-source 3D visualization software in medical applications.

Organizer

Luis Ibanez
Kitware Inc.

Lecturers

Stephen Aylward
University of North Carolina at Chapel Hill

Gordon Kindlmann
Brigham and Women's Hospital

Schedule

8:30 Image Registration
- Image Resampling
- Geometry of Image Mapping
- Registration Framework
- Image Metrics
- Transforms
- Interpolators
- Optimizers
- Multi-Resolution

Ibanez

2:15 Volume Rendering and Transfer Functions
- Convolution-Based Value and Derivative Sampling
- Multi-Dimensional Transfer Functions
- Non-Photo RealisticVolume Rendering
- Interactive Rendering and Exploration
- Basis Functions

Kindlmann

2:40 Diffusion Tensor Visualization
- Tensor Glyphs
- Fiber Tractography
- Direction Volume Rendering

Kindlmann

3 Clinical Applications From an Open-Source Laboratory
- Multi-Modality Image Registration and Visualization at Intra-Operative Speeds
- Multi-Gigabyte, Multi-Scale, Histological and Magnetic Resonance Image Atlases
- Registering Without Correspondence: Vascular Atlases for Diffuse Disease Detection
- The Daily Costs and Benefits of Using Open-Source

Aylward

Tuesday, 2 August

34

The Invisible Actor

Half-Day, Tuesday, 2 August, 1:45 – 5:30 pm **Room 515A**

Level: Beginning

An examination of the role of staging and composition in computer-animated films. Using examples from "Madagascar," the course explores the core elements of composition and how they are used to create a visual style.

Prerequisites

None. A basic understanding of the terminology and principles of computer graphics and 3D animation is helpful, but not required.

Intended Audience

Animators, artists, and other attendees who are interested in the artistic aspects of visual storytelling.

Co-Organizers

Ewan Johnson
Denise Minter
DreamWorks Animation

Schedule

1:45 Introduction

1:50 Basic Elements of Composition
- The Frame
- Points
- Line
- Shape
- Value
- Color
- Texture
- Pattern
- Contrast
- Depth Cues
- Space
- Intrinsic Elements of 3d

2:35 Putting the Pieces Together
- Creating context – Building the Complete Picture
- Working Across Shots
- Types of Treatments
- Staging and Camera as a Character in the Film

3:15 Break

3:45 Approaching a Scene – Marty is Gone

4:15 The Camera Arc of Madagascar

5:05 Character Driven Camera

5:25 Wrap-up & Questions & Answers
Johnson and Minter

Tuesday, 2 August

35

Developing Mobile 3D Applications With OpenGL ES and M3G

Half-Day, Tuesday, 2 August, 1:45 – 5:30 pm **Room 502A**

Level: Intermediate

This course presents two new 3D graphics APIs for mobile platforms: OpenGL ES and M3G. Topics include the structure of the APIs, the evolution of mobile graphics standards, programming examples, and tips and tricks for programmers and artists. Attendees gain an understanding of the functionality the standards provide and how to use them to create efficient graphics applications.

Prerequisites
Basic knowledge of 3D computer graphics such as that provided by SIGGRAPH 2005's introductory course. Working knowledge of a modern graphics API like OpenGL, VRML, X3D, or Java3D. Ability to read simple computer programs written in C and Java.

Intended Audience
Anyone who is interested in 3D graphics on mobile devices, although the course is intended more for programmers than graphic designers.

Organizer

Kari Pulli
Nokia Research Center & Massachusetts Institute of Technology

Lecturers

Tomi Aarnio
Nokia Research Center

Mark Callow
HI Corporation

Ville Miettinen
Hybrid Graphics, Ltd.

Jani Vaarala
Nokia Corporation

Schedule

1:45	Introduction	**Pulli**
1:55	OpenGL ES Overview	**Pulli**
2:20	Using OpenGL ES	**Vaarala**
3:30	OpenGL ES Performance	**Miettinen**
3:30	Break	
3:45	M3G Introduction	**Pulli**
3:50	M3G API Overview	**Aarnio**
4:45	Using M3G	**Callow**
5:25	Closing & Summary	**Pulli**

36

Spatial Displays and Computer Graphics

Half-Day, Tuesday, 2 August, 1:45 – 5:30 pm **Room 511AB**

Level: Intermediate

This course provides a foundation for understanding how spatial ("three-dimensional") displays work, with an emphasis on autostereoscopic displays. The course covers common properties of all spatial displays, specifics of three classes of display technologies (multi-view displays, volumetric displays, and holographic video), and computer graphics techniques for 3D image synthesis.

Prerequisites
Familiarity with basic principles of computer graphics. Attendees will benefit from previous exposure to simple optics, photography, signal processing, and light fields, although these subjects are not strict prerequisites.

Intended Audience
If you've ever wondered how a 3D display works, what the relationship between light fields and holography is, or how to generate dimensional imagery better or faster, this course is for you.

Organizer
Michael Halle
Harvard Medical School, MIT Media Lab

Lecturer
Joshua Napoli
Actuality Systems, Inc.

Schedule
1:45 Introduction
Halle

1:55 Thinking About Optics for 3D Displays
Halle

2:35 Holography and Holographic Stereograms
Halle

3:00 Computation and Bandlimiting for Discrete Parallax Displays
Halle

3:30 Break

3:45 Volumetric Displays and Implementation Experience
Napoli

4:30 Computed Holograms and Holographic Video
Halle

5:15 Conclusion and Questions

Tuesday, 2 August

37

GPU Shading and Rendering

Full-Day, Tuesday, 2 August, 8:30 am – 5:30 pm | **Petree Hall D**

Level: Intermediate

Real-time programmable shading can now be experienced everywhere from game consoles to the highest-end PCs. This updated course brings together leading researchers from industry and academia to present the foundations of hardware shading, the latest developments, and how shading hardware is increasingly used for non-real-time rendering.

Prerequisites
Working knowledge of a modern real-time graphics API such as OpenGL or Direct3D. Familiarity with the concepts of programmable shading and shading languages.

Intended Audience
Practitioners and software developers using or intending to use graphics hardware for shading.

Organizer
Marc Olano
University of Maryland, Baltimore County

Lecturers
Avi Bleiweiss
ATI Research

Larry Gritz
NVIDIA Corporation

John C. Hart
University of Illinois at Urbana-Champaign

Mark Kilgard
NVIDIA Corporation

Michael McCool
University of Waterloo

Pedro Sander
ATI Research

Schedule

	Shading Technology
8:30	Introduction/Graphics Architectures **Olano**
9:25	Shading Compilers **Bleiweiss**
10:15	Break
	Shading Languages
10:50	OpenGL Shading Language **Olano**
10:55	Cg **Kilgard**
11:20	HLSL **Sander**
11:45	Shader Metaprogramming With Sh **McCool**
12:15	Lunch
	GPU Rendering
1:45	Rendering Algorithms **Hart**
2:35	GPU Production Rendering **Gritz**
3:30	Break
	Hardware Systems
3:45	ATI **Shader**
4:25	NVIDIA **Kilgard**
5:05	Discussion and Questions & Answers **All**

38

Introduction to Real-Time Ray Tracing

Full-Day, Wednesday, 3 August, 8:30 am – 5:30 pm

Petree Hall D

Level: Intermediate

Real-time ray tracing brings physically correct images, advanced rendering features, and easy content creation to interactive 3D graphics. This course gives attendees the background and insight required to build their own fast ray tracers, discusses advanced applications, and provides first-hand experience through software distributed freely to all attendees.

Prerequisites

For best results, attendees should have a basic background in graphics. Some experience with existing graphics APIs (programmers) or content tools (content creators) is helpful, but familiarity with the details of ray tracing is not required.

Intended Audience

Programmers, content creators, and decision makers interested in advanced graphics technology. It provides insight for programmers to best use the technology in their applications, informs content creators about the simplicity and advanced features, and enables decision makers to understand the long-term implications.

Co-Organizers

Peter Shirley
University of Utah

Philipp Slusallek
Universität des Saarlandes

Lecturers

Bill Mark
The University of Texas at Austin

Gordon Stoll
Intel Corporation

Ingo Wald
Max-Planck-Institut für Informatik

Schedule

	Part I: Fundamentals
8:30	Introduction to Ray Tracing **Slusallek and Shirley**
9:15	The Basic Algorithms **Stoll and Wald**
10:15	Break
	Part II: Achieving Real-Time
10:30	Optimization Techniques **Stoll**
11:15	Parallelization & Distributed Processing **Shirley and Slusallek**
11:50	Supporting Dynamic Scenes with Animation or Interaction **Wald**
12:15	Lunch
	Part III: Advanced Features
1:30	Volume Rendering with Ray Tracing **Shirley**
2	Rendering of Massive Models **Slusallek**
2:30	Hardware Support for Ray Tracing **Mark and Slusallek**
3:15	Break
	Part IV: Using Real-Time Ray Tracing
3:30	Programming with OpenRT Writing and Using Real-time Shaders **Wald**
4:50	Using the OpenRT System **Slusallek**
5:15	Final Discussion **All**

Wednesday, 3 August

39

GPGPU: General-Purpose Computation on Graphics Hardware

Full-Day, Wednesday, 3 August, 8:30 am – 5:30 pm **Room 515A**

Level: Intermediate

Recent advances in graphics processor (GPU) technology have transformed GPUs into powerful engines capable of a variety of computations beyond computer graphics. This course presents a detailed introduction to general-purpose computation on graphics hardware (GPGPU), with emphasis on core computational building blocks ranging from linear algebra to database queries.

Prerequisites
This is an introduction to general-purpose GPU computing, but attendees are expected to have experience with a modern graphics API (OpenGL or Direct3D), including basic experience programming vertex and pixel shaders. No former GPGPU experience is assumed.

Intended Audience
Researchers interested in investigating general-purpose computation on graphics hardware and graphics and games developers interested in incorporating these techniques into their applications.

Co-Organizers

Mark Harris
NVIDIA Corporation

David Luebke
University of Virginia

Lecturers

Ian Buck
NVIDIA Corporation

Naga Govindaraju
University of North Carolina at Chapel Hill

Jens Kruger
Technische Universität München

Aaron Lefohn
University of California, Davis

Tim Purcell
NVIDIA Corporation

Cliff Woolley
University of Virginia

Schedule

8:30 Introduction
Luebke

GPU Building Blocks
8:50 Computational Concepts: CPU-GPU
Harris

9:15 Linear Algebra
Krüger

9:50 Sorting & Searching
Purcell

10:15 Break

10:30 Geometric Computation
Govindaraju

LANGUAGES AND TOOLS
11 High-Level Languages
Buck

11:30 Debugging Tools
Purcell

EFFECTIVE GPGPU PROGRAMMING
11:50 GPU Program Optimization
Woolley

12:15 Lunch

1:45 GPU Memory Models
Lefohn

2:15 GPU Computation Strategies & Tricks
Buck

2:55 GPU Data Structures
Lefohn

3:30 Break

CASE STUDIES
3:45 Databases & Data Mining on GPUs
Govindraju

4:15 Geometry Processing on GPUs
Krüger

4:45 Applications of Adaptive Data Structures
Lefohn

5:15 GPGPU: The Year in Review
Harris

papers

In SIGGRAPH 2005 Papers, internationally renowned researchers challenge conventional wisdom and establish new paradigms for future inquiry. No other conference presents the full range of the world's most significant achievements in computer graphics and interactive techniques.

Full Conference registration allows attendees access to all SIGGRAPH 2005 Papers. Seating is on a first-come, first-served basis. Please be sure to arrive early for the Paper sessions you wish to attend.

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Tel Aviv University

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University of Toronto

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Steven J. Gortler
Harvard University

Leonidas Guibas
Stanford University

Wolfgang Heidrich
The University of British Columbia

Hugues Hoppe
Microsoft Research

John F. Hughes
Brown University

David Kirk
NVIDIA Corporation

Leif Kobbelt
RWTH-Aachen

Jehee Lee
Seoul National University

Marc Levoy
Stanford University

Steve Marschner
Cornell University

Wojciech Matusik
Mitsubishi Electric Research Laboratories (MERL)

Nelson Max
Lawrence Livermore National Laboratory

Dinesh Pai
Rutgers University

Hanspeter Pfister
Mitsubishi Electric Research Laboratories (MERL)

Nancy Pollard
Carnegie Mellon University

Jovan Popović
Massachusetts Institute of Technology Computer Science and Artificial Intelligence Laboratory

Jarek Rossignac
Georgia Institute of Technology

Szymon Rusinkiewicz
Princeton University

David H. Salesin
University of Washington & Microsoft Research

Roberto Scopigno
Istituto Scienza e Tecnologie dell'nformazion (ISTI)

Steve Seitz
University of Washington

Alla Sheffer
The University of British Columbia

Harry Shum
Microsoft Research Asia

François Sillion
ARTIS, GRAVIR/IMAG - INRIA

Mel Slater
University College London

John Snyder
Microsoft Corporation

Marc Stamminger
University of Erlangen

Greg Turk
Georgia Institute of Technology

Michiel van de Panne
The University of British Columbia

Monday, 1 August

8:30 – 10:15 am
West Hall A

Skin & Faces

Session Chair: Ronen Barzel, Pixar Animation Studios

Skinning Mesh Animations

Doug L. James
Christopher D. Twigg
Carnegie Mellon University
djames@cs.cmu.edu

SCAPE: Shape Completion and Animation of People

Dragomir Anguelov
Praveen Srinivasan
Daphne Koller
Sebastian Thrun
Jim Rodgers
Stanford University
drago@stanford.edu

James Davis
University of California, Santa Cruz

Automatic Determination of Facial Muscle Activations From Sparse Motion Capture Marker Data

Eftychios Sifakis
Igor Neverov
Stanford University
sifakis@graphics.stanford.edu

Ronald Fedkiw
Stanford University and Industrial Light & Magic

Face Transfer With Multilinear Models

Daniel Vlasic
Massachusetts Institute of Technology
Computer Science and Artificial Intelligence Laboratory
drdaniel@mit.edu

Matt Brand
Hanspeter Pfister
Mitsubishi Electric Research Laboratories (MERL)

Jovan Popović
Massachusetts Institute of Technology
Computer Science and Artificial Intelligence Laboratory

8:30 – 10:15 am
West Hall B

Hardware Rendering

Session Chair: Hanspeter Pfister, Mitsubishi Electric Research Laboratories (MERL)

RPU: A Programmable Ray Processing Unit for Realtime Ray Tracing

Sven Woop
Jörg Schmittler
Philipp Slusallek
Universität des Saarlandes
woop@graphics.cs.uni-sb.de

User-Configurable Automatic Shader Simplification

Fabio Pellacini
Cornell University
fabio@graphics.cornell.edu

A Relational Debugging Engine for the Graphics Pipeline

Implementation Sketch: page 81

Nathaniel Duca
Krzysztof Nishki
Jonathan Bilodeau
Matthew Bolitho
Yuan Chen
Jonathan Cohen
Johns Hopkins University
cohen@cs.jhu.edu

Lpics: A Hybrid Hardware-Accelerated Relighting Engine for Computer Cinematography

Fabio Pellacini
Kiril Vidimce
Aaron Lefohn
Alex Mohr
Mark Leone
John Warren
Pixar Animation Studios
fabio@graphics.cornell.edu

10:30 am – 12:15 pm
West Hall A

Mesh Manipulation

Session Chair: Ioana Boier-Martin, IBM T.J. Watson Research Center

Meshless Deformations Based on Shape Matching

Matthias Müller
Novodex/AGEIA & Eidgenossische Technische Hochschule Zurich
muellerm@inf.ethz.ch

Bruno Heidelberger
Eidgenössische Technische Hochschule Zürich

Matthias Teschner
Universität Freiburg

Markus Gross
Eidgenössische Technische Hochschule Zürich

Linear Rotation-Invariant Coordinates for Meshes

Yaron Lipman
Olga Sorkine
David Levin
Daniel Cohen-Or
Tel Aviv University
lipmanya@post.tau.ac.il

Mesh-Based Inverse Kinematics

Robert W. Sumner
Matthias Zwicker
Massachusetts Institute of Technology
Computer Science and Artificial Intelligence Laboratory
sumner@graphics.csail.mit.edu

Craig Gotsman
Harvard University

Jovan Popović
Massachusetts Institute of Technology
Computer Science and Artificial Intelligence Laboratory

Large Mesh Deformation Using the Volumetric Graph Laplacian

Kun Zhou
Microsoft Research Asia
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Jin Huang
Zhejiang University

John Snyder
Microsoft Research

Xinguo Liu
Microsoft Research Asia

Hujun Bao
Zhejiang University

Baining Guo
Heung-Yeung Shum
Microsoft Research Asia

Note: Hall A will be cleared immediately after this session so it can be set up for the Keynote Address/Awards at 1:15 pm.

Monday, 1 August

10:30 am – 12:15 pm
West Hall B

Illustration and Image-Based Modeling

Session Chair: François X. Sillion
ARTIS, GRAVIR/IMAG – INRIA

MoXi: Real-Time Ink Dispersion in Absorbent Paper

Implementation Sketch: page 82

Nelson S.-H. Chu
Chiew-Lan Tai
Hong Kong University of Science and Technology
cpegnel@ust.hk

Line Drawings From Volume Data

Michael Burns
Janek Klawe
Szymon Rusinkiewicz
Adam Finkelstein
Princeton University
mburns@cs.princeton.edu

Doug DeCarlo
Rutgers University

Motion Magnification

Ce Liu
Antonio Torralba
William T. Freeman
Frédo Durand
Massachusetts Institute of Technology
Computer Science and Artificial Intelligence Laboratory
celiu@mit.edu

Edward H. Adelson
Massachusetts Institute of Technology
Department of Brain and Cognitive Sciences, and Computer Science and Artificial Intelligence Laboratory

Out-of-Core Tensor Approximation of Multi-Dimensional Matrices of Visual Data

Hongcheng Wang
Qing Wu
Yizhou Yu
Narendra Ahuja
University of Illinois at Urbana-Champaign
wanghc@vision.ai.uiuc.edu

3:45 – 5:30 pm
West Hall A

Meshes I

Session Chair: Alla Sheffer, The University of British Columbia

Efficiently Combining Positions and Normals for Precise 3D Geometry

Diego Nehab
Szymon Rusinkiewicz
Princeton University
diego@cs.princeton.edu

James Davis
University of California, Santa Cruz

Ravi Ramamoorthi
Columbia University

Robust Moving Least-Squares Fitting With Sharp Features

Shachar Fleishman
University of Utah
shachar@sci.utah.edu

Daniel Cohen-Or
Tel Aviv University

Claudio T. Silva
University of Utah

Fast Exact and Approximate Geodesics on Meshes

Vitaly Surazhsky
Tatiana Surazhsky
University of Oslo and Technion
vitaly@surazhsky.com

Danil Kirsanov
Steven J. Gortler
Harvard University

Hugues Hoppe
Microsoft Research

Mean Value Coordinates for Closed Triangular Meshes

Tao Ju
Scott Schaefer
Joe Warren
Rice University
jutao@cs.rice.edu

3:45 – 5:30 pm
West Hall B

Video & Image Matting

Session Chair: Wojciech Matusik, Mitsubishi Electric Research Laboratories (MERL)

Defocus Video Matting

Morgan McGuire
Brown University
morgan@cs.brown.edu

Wojciech Matusik
Hanspeter Pfister
Mitsubishi Electric Research Laboratories (MERL)

John F. Hughes
Brown University

Frédo Durand
Massachusetts Institute of Technology
Computer Science and Artificial Intelligence Laboratory

Automatic Photo Pop-up

Derek Hoiem
Alexei Efros
Martial Hebert
Carnegie Mellon University
dhoiem@cs.cmu.edu

Interactive Video Cutout

Implementation Sketch: page 97

Jue Wang
Pravin Bhat
University of Washington
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Alex Colburn
Maneesh Agrawala
Michael F. Cohen
Microsoft Research

Video Object Cut and Paste

Yin Li
Jian Sun
Heung-Yeung Shum
Microsoft Research Asia
t-yinli@microsoft.com

Tuesday, 2 August

8:30 – 10:15 am
West Hall A

Meshes II

Session Chair: Hugues Hoppe, Microsoft Research

Surface Compression With Geometric Bandelets

Gabriel Peyré
Stéphane Mallat
CMAP Ecole Polytechnique
gabriel.peyre@polytechnique.fr

Geometry-Guided Progressive Lossless 3D Mesh Coding With Octree (OT) Decomposition

Jingliang Peng
C.-C. Jay Kuo
University of Southern California
jingliap@usc.edu

Variational Tetrahedral Meshing

Pierre Alliez
David Cohen-Steiner
Mariette Yvinec
INRIA
pierre.alliez@sophia.inria.fr

Mathieu Desbrun
California Institute of Technology

Shell Maps

Serban D. Porumbescu
Brian Budge
Louis Feng
Kenneth I. Joy
University of California, Davis
sdporumbescu@ucdavis.edu

8:30 – 10:15 am
Room 502B

Perception

Session Chair: Maneesh Agrawala, Microsoft Research

Color2Gray: Salience-Preserving Color Removal

Amy A. Gooch
Sven Olsen
Bruce Gooch
Jack Tumblin
Northwestern University
amygooch@northwestern.edu

Evaluation of Tone Mapping Operators Using a High Dynamic Range Display

Patrick Ledda
Alan Chalmers
Tom Troscianko
University of Bristol
ledda@cs.bris.ac.uk

Helge Seetzen
Sunnybrook Technologies

A Photon Accurate Model of the Human Eye

Implementation Sketch: page 73

Michael F. Deering
deeringm@acm.org

Mesh Saliency

Chang Ha Lee
Amitabh Varshney
David W. Jacobs
University of Maryland at College Park
chlee@cs.umd.edu

10:30 am – 12:15 pm
West Hall A

Motion Capture Data: Interaction and Selection

Session Chair: Nancy Pollard, Carnegie Mellon University

Action Synopsis: Pose Selection and Illustration

Jackie Assa
Yaron Caspi
Daniel Cohen-Or
Tel Aviv University
jackassa@post.tau.ac.il

Efficient Content-Based Retrieval of Motion Capture Data

Meinard Mueller
Tido Roeder
Michael Clausen
Universität Bonn
meinard@cs.uni-bonn.de

Performance Animation From Low-Dimensional Control Signals

Jinxiang Chai
Jessica K. Hodgins
Carnegie Mellon University
jchai@cs.cmu.edu

Dynamic Response for Motion Capture Animation

Victor Zordan
Anna Majkowska
Bill Chiu
Matthew Fast
University of California, Riverside
vbz@cs.ucr.edu

Tuesday, 2 August

10:30 am – 12:15 pm
Room 502B

Plants

Session Chair: Greg Turk, Georgia Institute of Technology

Modeling and Visualization of Leaf Venation Patterns

Adam Runions
Martin Fuhrer
Brendan Lane
Pavol Federl
Anne-Gaëlle Rolland-Lagan
Przemyslaw Prusinkiewicz
University of Calgary
runionsa@cpsc.ucalgary.ca

Real-Time Rendering of Plant Leaves

Lifeng Wang
Microsoft Research Asia
lfwang@microsoft.com

Wenle Wang
Tsinghua University

Julie Dorsey
Yale University

Xu Yang
Nankai University

Baining Guo
Heung-Yeung Shum
Microsoft Research Asia

Floral Diagrams and Inflorescences: Interactive Flower Modeling Using Botanical Structural Constraints

Takashi Ijiri
The University of Tokyo
ijiri@ui.is.s.u-tokyo.ac.jp

Shigeru Owada
The University of Tokyo and Sony CSL

Makoto Okabe
The University of Tokyo

Takeo Igarashi
The University of Tokyo and JST/PRESTO

Measuring and Modeling the Appearance of Finished Wood

Stephen R. Marschner
Stephen H. Westin
Adam Arbree
Jonathan T. Moon
Cornell University
srm@cs.cornell.edu

1:45 – 3:30 pm
West Hall A

Capturing Reality I

Session Chair: Szymon Rusinkiewicz, Princeton University

Fourier Slice Photography

Ren Ng
Stanford University
renng@graphics.stanford.edu

Dual Photography

Pradeep Sen
Billy Chen
Gaurav Garg
Stanford University
psen@stanford.edu

Stephen R. Marschner
Cornell University

Mark Horowitz
Marc Levoy
Hendrik P. A. Lensch
Stanford University

Performance Relighting and Reflectance Transformation With Time-Multiplexed Illumination

Andreas Wenger
Andrew Gardner
Chris Tchou
Jonas Unger
Tim Hawkins
Paul Debevec
University of Southern California, Institute for Creative Technologies
wenger@ict.usc.edu

High Performance Imaging Using Large Camera Arrays

Bennett Wilburn
Stanford University
wilburn@stanford.edu

Neel Joshi
University of California, San Diego

Vaibhav Vaish
Eino-Ville Talvala
Emilio Antunez
Adam Barth
Andrew Adams
Mark Horowitz
Marc Levoy
Stanford University

1:45 – 3:30 pm
Petree Hall C

Texture Synthesis

Session Chair: Heung-Yeung Shum, Microsoft Research Asia

Parallel Controllable Texture Synthesis

Sylvain Lefebvre
Hugues Hoppe
Microsoft Research
sylefeb@microsoft.com

Texture Design Using a Simplicial Complex of Morphable Textures

Wojciech Matusik
Mitsubishi Electric Research Laboratories (MERL)
wojciech@graphics.csail.mit.edu

Matthias Zwicker
Frédo Durand
Massachusetts Institute of Technology Computer Science and Artificial Intelligence Laboratory

Texture Optimization for Example-Based Synthesis

Vivek Kwatra
Irfan Essa
Aaron F. Bobick
kwatra@cc.gatech.edu

Nipun Kwatra
Georgia Institute of Technology

Wavelet Noise

Rob Cook
Tony DeRose
Pixar Animation Studios
rob@pixar.com

Tuesday, 2 August

3:45 – 5:30 pm
West Hall A

Capturing Reality II

Session Chair: Steve Marschner, Cornell University

Acquisition of Time-Varying Participating Media

Tim Hawkins
Per Einarsson
Paul Debevec
University of Southern California, Institute for Creative Technologies
timh@ict.usc.edu

Modeling Hair From Multiple Views

Implementation Sketch: page 72

Yichen Wei
Hong Kong University of Science and Technology
yichenw@cs.ust.hk

Eyal Ofek
Microsoft Research Asia

Long Quan
Hong Kong University of Science and Technology

Heung-Yeung Shum
Microsoft Research Asia

Panoramic Video Textures

Aseem Agarwala
Ke Colin Zheng
University of Washington
aseem@cs.washington.edu

Chris Pal
University of Massachusetts Amherst

Maneesh Agrawala
Michael F. Cohen
Microsoft Research

Brian Curless
University of Washington

David H. Salesin
University of Washington & Microsoft Research

Richard Szeliski
Microsoft Research

Removing Photography Artifacts Using Gradient Projection and Flash-Exposure Sampling

Amit Agrawal
Ramesh Raskar
Mitsubishi Electric Research Laboratories (MERL)
aagrawal@umd.edu

Shree Nayar
Columbia University

Yuanzhen Li
Mitsubishi Electric Research Laboratories (MERL)

Wednesday, 3 August

8:30 – 10:15 am
West Hall A

Image Processing

Session Chair: Chris Begler, New York University

Compressing and Companding High Dynamic Range Images With Multiscale Wavelet Architectures

Yuanzhen Li
Lavanya Sharan
Edward H. Adelson
Massachusetts Institute of Technology Department of Brain and Cognitive Sciences, and Computer Science and Artificial Intelligence Laboratory
yzli@mit.edu

Video Enhancement Using Per-Pixel Virtual Exposures

Eric P. Bennett
Leonard McMillan
University of North Carolina at Chapel Hill
bennett@cs.unc.edu

Animating Pictures With Stochastic Motion Textures

Yung-Yu Chuang
National Taiwan University

Daniel B. Goldman
Ke Colin Zheng
Brian Curless
University of Washington

David H. Salesin
University of Washington and Microsoft Research

Richard Szeliski
Microsoft Research

Image Completion With Structure Propagation

Jian Sun
Microsoft Research Asia
jiansun@microsoft.com

Lu Yuan
Tsinghua University

Jiaya Jia
Chinese University of Hong Kong

Heung-Yeung Shum
Microsoft Research Asia

8:30 – 10:15 am
West Hall B

Large Models & Large Displays

Session Chair: Marc Stamminger, University of Erlangen

GoLD: Interactive Display of Huge Colored and Textured Models

Louis Borgeat
Guy Godin
Philippe Massicotte
François Blais
National Research Council of Canada
louis.borgeat@nrc-cnrc.gc.ca

Christian Lahanier
Centre de Recherche et de Restauration des Musées de France

Far Voxels: A Multiresolution Framework for Interactive Rendering of Huge Complex 3D Models on Commodity Graphics Platforms

Enrico Gobbetti
Fabio Marton
Center for Advanced Studies, Research and Development in Sardinia
gobbetti@crs4.it

Cache-Oblivious Mesh Layouts

Sung-Eui Yoon
University of North Carolina at Chapel Hill
sungeui@cs.unc.edu

Peter Lindstrom
Valerio Pascucci
Lawrence Livermore National Laboratory

Dinesh Manocha
University of North Carolina at Chapel Hill

The Varrier Autostereoscopic Virtual Reality Display

Daniel J. Sandin
Todd Margolis
Jinghua Ge
Javier Girado
Tom Peterka
Thomas A. DeFanti
University of Illinois at Chicago, Electronic Visualization Laboratory
dan@uic.edu

Wednesday, 3 August

10:30 am – 12:15 pm
West Hall B

Fluid Simulation

Session Chair: John Anderson, Pixar Animation Studios

Animating Gases With Hybrid Meshes

Bryan E. Feldman
James F. O'Brien
Bryan M. Klinger
University of California, Berkeley
bfeldman@eecs.berkley.edu

A Vortex Particle Method for Smoke, Water, and Explosions

Andrew Selle
Stanford University and Intel Corporation
aselle@stanford.edu

Nick Rasmussen
Industrial Light & Magic

Ronald Fedkiw
Stanford University and Industrial Light & Magic

Discontinuous Fluids

Jeong-Mo Hong
Chang-Hun Kim
Korea University
saden@korea.ac.kr

Water Drops on Surfaces

Huamin Wang
Peter J. Mucha
Greg Turk
Georgia Institute of Technology
whmin@cc.gatech.edu

1:45 – 3:30 pm
Room 515B

Reprise of UIST and I3D

The User-Interface Software and Technology Symposium and the Symposium on Interactive 3D Graphics and Games are two leading conferences sponsored by ACM SIGGRAPH. Six of the best papers from the most recent UIST and I3D symposia are presented in abbreviated form.

UIST Papers

CrossY: A Crossing-Based Drawing Application
Georg Apitz
François Guimbretière
University of Maryland
apitz@cs.umd.edu

Multi-Finger Gestural Interaction With 3D Volumetric Displays
Tovi Grossman
Daniel Wigdor
Ravin Balakrishnan
University of Toronto
tovi@dgp.toronto.edu

DART: A Toolkit for Rapid Design Exploration of Augmented Reality Experiences
Blair MacIntyre
Maribeth Gandy
Steven Dow
Jay David Bolter
Georgia Institute of Technology
blair@cc.gatech.edu

I3D Papers

Geopostors: A Real-Time Geometry/Impostor Crowd Rendering System
Simon Dobbyn
John Hamill
Keith O'Conor
Carol O'Sullivan
Image Synthesis Group, Trinity College Dublin
simon.dobbyn@cs.tcd.ie

Sketching Mesh Deformations
Youngihn Kho
Michael Garland
University of Illinois at Urbana-Champaign
kho@students.uiuc.edu

Real-Time Relief Mapping on Arbitrary Polygonal Surfaces
Fábio Policarpo
Paralelo Computação Ltda.
fabio@paralelo.com.br

Manuel M. Oliveira
João L. D. Comba
Universidade Federal do Rio Grande do Sul

1:45 – 3:30 pm
Petree Hall C

Dynamics of Solids

Session Chair: Jovan Popović, Massachusetts Institute of Technology Computer Science and Artificial Intelligence Laboratory

Adaptive Dynamics of Articulated Bodies

Implementation Sketch: page 78

Stephane Redon
Nico Galoppo
Ming C. Lin
University of North Carolina at Chapel Hill
stephane.redon@inria.fr

Fast Frictional Dynamics for Rigid Bodies

Implementation Sketch: page 76

Danny Kaufman
Timothy Edmunds
Dinesh K. Pai
Rutgers University
kaufman@cs.rutgers.edu

Meshless Animation of Fracturing Solids

Mark Pauly
Stanford University
mapauly@stanford.edu

Richard Keiser
Eidgenössische Technische Hochschule Zürich

Bart Adams
Philip Dutré
Katholieke Universiteit Leuven

Markus Gross
Eidgenössische Technische Hochschule Zürich

Leonidas Guibas
Stanford University

Thursday, 4 August

3:45 – 5:30 pm
West Hall B

Deformable Models

Session Chair: Mathieu Desbrun, California Institute of Technology

Animating Sand as a Fluid

Yongning Zhu
Robert Bridson
The University of British Columbia
yzhu@cs.ubc.ca

Coupling Water and Smoke to Thin Deformable and Rigid Shells

Eran Guendelman
Stanford University and Industrial Light & Magic
erang@stanford.edu

Andrew Selle
Stanford University and Intel Corporation

Frank Losasso
Ronald Fedkiw
Stanford University and Industrial Light & Magic

Real-Time Subspace Integration for St.Venant-Kirchhoff Deformable Models

Jernej Barbic
Doug L. James
Carnegie Mellon University
barbic@cs.cmu.edu

Interactive Collision Detection Between Deformable Models Using Chromatic Decomposition

Naga Govindaraju
David Knott
Nitin Jain
Ilknurk Kabal
University of North Carolina at Chapel Hill
naga@cs.unc.edu

Rasmus Tamstorf
Walt Disney Feature Animation

Russel Gayle
Ming C. Lin
Dinesh Manocha
University of North Carolina at Chapel Hill

8:30 – 10:15 am
West Hall A

Geometry on GPUs

Session Chair: Henry Fuchs, University of North Carolina at Chapel Hill

Resolution Independent Curve Rendering Using Programmable Graphics Hardware

Charles Loop
Jim Blinn
Microsoft Research
cloop@microsoft.com

Realtime GPU Subdivision Kernel

Le-Jeng Shiue
Ian Jones
Jörg Peters
University of Florida
sle-jeng@cise.ufl.edu

GPU-Based Trimming and Tessellation of NURBS and T-Spline Surfaces

Implementation Sketch: page 83

Michael Guthe
Ákos Balázs
Reinhard Klein
Universität Bonn
guthe@cs.uni-bonn.de

Blister: GPU-Based Rendering of Boolean Combinations of Free-Form Triangulated Shapes

John Hable
Jarek Rossignac
Georgia Institute of Technology
gte886u@mail.gatech.edu

8:30 – 10:15 am
West Hall B

Transparency & Translucency

Session Chair: George Drettakis, REVES/INRIA

Light Diffusion in Multi-Layered Translucent Materials

Craig Donner
Henrik Wann Jensen
University of California, San Diego
cdonner@graphics.ucsd.edu

A Practical Analytic Single Scattering Model for Real Time Rendering

Implementation Sketch: page 80

Bo Sun
Ravi Ramamoorthi
Columbia University
bosun@cs.columbia.edu

Srinivasa Narasimhan
Carnegie Mellon University

Shree Nayar
Columbia University

An Approximate Image-Space Approach for Interactive Refraction

Chris Wyman
University of Iowa
cwyman@cs.uiowa.edu

Modeling and Rendering of Quasi-Homogeneous Materials

Xin Tong
Microsoft Research Asia
xtong@microsoft.com

Jiaping Wang
Institute of Computing Technology, CAS

Steve Lin
Baining Guo
Heung-Yeung Shum
Microsoft Research Asia

Thursday, 4 August

10:30 am – 12:15 pm
West Hall A

Styles of Human Motion

Session Chair: Jehee Lee, Seoul National University

Geostatistical Motion Interpolation

Tomohiko Mukai
Shigeru Kuriyama
Toyohashi University of Technology
mukai@vcl.ics.tut.ac.jp

Learning Physics-Based Motion Style With Nonlinear Inverse Optimization

C. Karen Liu
University of Washington
karenliu@cs.washington.edu

Aaron Hertzmann
University of Toronto

Zoran Popović
University of Washington

Style Translation for Human Motion

Eugene Hsu
Massachusetts Institute of Technology
Computer Science and Artificial Intelligence Laboratory
ehsu@csail.mit.edu

Kari Pulli
Nokia/Massachusetts Institute of Technology
Computer Science and Artificial Intelligence Laboratory

Jovan Popović
Massachusetts Institute of Technology
Computer Science and Artificial Intelligence Laboratory

A Data-Driven Approach to Quantifying Natural Human Motion

Liu Ren
Carnegie Mellon University
liuren@cs.cmu.edu

Alton Patrick
Georgia Institute of Technology

Alexei Efros
Jessica K. Hodgins
Carnegie Mellon University

James Rehg
Georgia Institute of Technology

10:30 am – 12:15 pm
West Hall B

Appearance & Illumination

Session Chair: Julie Dorsey, Yale University

Lightcuts: A Scalable Approach to Illumination

Implementation Sketch: page 84

Bruce Walter
Sebastian Fernandez
Adam Arbree
Kavita Bala
Michael Donikian
Donald P. Greenberg
Cornell University
bjw@graphics.cornell.edu

Fast and Detailed Approximate Global Illumination by Irradiance Decomposition

Okan Arikan
David Forsyth
James F. O'Brien
University of California, Berkeley
okan@cs.berkeley.edu

A Frequency Analysis of Light Transport

Frédo Durand
Massachusetts Institute of Technology, Computer Science and Artificial Intelligence Laboratory
fredo@mit.edu

Nicolas Holzschuch
Cyril Soler
ARTIS, GRAVIR/IMAG – INRIA

Eric Chan
Massachusetts Institute of Technology, Computer Science and Artificial Intelligence Laboratory

François X. Sillion
ARTIS, GRAVIR/IMAG – INRIA

Visual Simulation of Weathering by gamma-ton Tracing

Yanyun Chen
Microsoft Research Asia
yachen@microsoft.com

Lin Xia
Zhejiang University

Tien Tsin Wong
Chinese University of Hong Kong

Xin Tong
Microsoft Research Asia

Hujun Bao
Zhejiang University

Baining Guo
Heung-Yeung Shum
Microsoft Research Asia

1:45 – 3:30 pm
West Hall A

Shape & Texture

Session Chair: David Ebert, Purdue University

As-Rigid-As-Possible Shape Manipulation

Takeo Igarashi
The University of Tokyo
takeo@is.s.u-tokyo.ac.jp

Tomer Moscovich
John F. Hughes
Brown University

A Sketch-Based Interface for Detail-Preserving Mesh Editing

Andrew Nealen
Technische Universität Darmstadt
nealen@informatik.tu-darmstadt.de

Olga Sorkine
Tel Aviv University

Marc Alexa
Technische Universität Darmstadt

Daniel Cohen-Or
Tel Aviv University

TextureMontage: Seamless Texturing of Arbitrary Surfaces From Multiple Images

Kun Zhou
Xi Wang
Microsoft Research Asia
kunzhou@microsoft.com

Yiying Tong
Mathieu Desbrun
California Institute of Technology

Baining Guo
Heung-Yeung Shum
Microsoft Research Asia

Thursday, 4 August

1:45 – 3:30 pm
West Hall B

Ray Tracing

Session Chair: Nelson Max, Lawrence Livermore National Laboratory

Soft Shadow Volumes for Ray Tracing

Samuli Laine
Helsinki University of Technology
samuli@tml.hut.fi

Timo Aila
Helsinki University of Technology and Hybrid Graphics Ltd.

Ulf Assarsson
ARTIS INRIA and Illuminate Labs Ltd.

Jaakko Lehtinen
Helsinki University of Technology and Remedy Entertainment Ltd.

Tomas Akenine-Möller
Lunds universitet

Wavelet Importance Sampling: Efficiently Evaluating Products of Complex Functions

Petrik Clarberg
Lunds universitet
d99pc@efd.lth.se

Wojciech Jarosz
University of California, San Diego

Tomas Akenine-Möller
Lunds universitet

Henrik Wann Jensen
University of California, San Diego

Multi-Level Ray Tracing Algorithm

Alexander Reshetov
Alexei Soupikov
Jim Hurley
Intel Corporation
Alexander.Reshetov@intel.com

Unbiased Energy Redistribution Path Tracing

David Cline
Justin Talbot
Parris Egbert
Brigham Young University
cline@rivit.cs.byu.edu

3:45 – 5:30 pm
West Hall A

Precomputed Light Transport

Session Chair: Wolfgang Heidrich, The University of British Columbia

Precomputed Shadow Fields for Dynamic Scenes

Kun Zhou
Yaohua Hu
Steve Lin
Baining Guo
Heung-Yeung Shum
Microsoft Research Asia
kunzhou@microsoft.com

All-Frequency Interactive Relighting of Translucent Objects With Single and Multiple Scattering

Rui Wang
John Tran
David Luebke
University of Virginia
rw2p@cs.virginia.edu

Precomputed Local Radiance Transfer for Real-Time Lighting Design

Anders Wang Kristensen
University of California, San Diego
wang@graphics.ucsd.edu

Tomas Akenine-Möller
Lunds universitet

Henrik Wann Jensen
University of California, San Diego

Local, Deformable Precomputed Radiance Transfer

Peter-Pike Sloan
Ben Luna
Microsoft Corporation
ppsloan@microsoft.com

John Snyder
Microsoft Research

panels

Panelists discuss, confer with, and debate each other in a free-flowing format that generates consensus, controversy, confusion, and clarity – sometimes simultaneously.

Panelist position papers are presented in the Full Conference DVD-ROM that Full Conference attendees receive with their registration.

Full Conference registration allows attendees access to all Panels. Seating is on a first-come, first-served basis. Please be sure to arrive early for Panel sessions you wish to attend.

Panels Committee

Jill Smolin
Panels Chair
The Gnomon Workshop

David (grue) DeBry
SIGGRAPH 2006 Panels Chair
Tippett Studios

Scott Easley
Heavy Iron Studios

Ken Perlin
New York University

Kathryn Saunders
Kathryn Saunders Design, Inc.

Josh Strickon
SIGGRAPH 2006 Special Sessions Chair
Kargo Global Inc.

Jackie White
California State University, Los Angeles

Monday, 1 August

8:30 – 10:15 am
Room 515B

Ubiquitous Music: How Are Sharing, Copyright, and Really Cool Technology Changing the Roles of the Artist and the Audience?

Since the 1970s, when the Walkman liberated music, we've moved on to iPods and mobile phones, which define contemporary social music experiences. How will we listen to music tomorrow? Because music is often a technological harbinger (digital representation, workstation editing, and optical storage came to sound before its media counterparts), this panel looks beyond current debates on copyright and presents new forms of music creation, listening, and sharing. It sheds light on ubiquitous content and social-interaction models afforded by mobile technologies.

Panelists from all segments of this nascent industry discuss current and future systems; the technical, artistic, and legal ramifications of sharing; new paradigms; and the roles of artists and listeners in the creative process.

Moderators

Lars Erik Holmquist
Viktoria Institute

Atau Tanaka
Sony CSL Paris

Panelists

Akseli Anttila
Nokia Corporation

Arianna Bassoli
London School of Economics and Political Sciences

Gideon D'Arcangelo
New York University

Lalya Gaye
Viktoria Institute, Future Application Lab

3:45 – 5:30 pm
Room 515B

Networked Performance: How Does Art Affect Technology and Vice Versa?

An exploration of the worlds of performance, social collaboration, and play. Artists, technologists, educators, and scientists converse on all manner of computationally dependent cultural practices, including wireless culture, location technologies (GPS), grid computing, sensing, and reactive (sensor-based) interactivity. Mobile computing and network practice cut across all aspects of practice and research, engaging optimization, visualization, tool creation, hacking, etc.

Moderators

Michelle Riel
California State University, Monterey Bay

Helen Thorington
turbulence.org

Panelists

Julian Bleecker
University of Southern California

Susan Kozel
Simon Fraser University

Martin Rieser
Bath Spa University College

Andrea Zapp
Manchester Metropolitan University

Tuesday, 2 August

10:30 am – 12:15 pm
Petree Hall C

International CG Collaboration: Good, Bad, or Just Impossible?

We live, work, and collaborate in a global economy. Some artists move overseas to find work. Some local supervisors hire artists and companies in other countries to produce work for local productions. Some local companies are creating entire subsidiaries in other countries for local productions. The implications are vast. Far beyond time and language differences, cultural differences are sometimes insurmountable, but global production brings income and untold opportunities to all kinds of artists and technologists throughout the world. In this panel, supervisors, producers, and artists from all over the globe convene to talk about the good, bad, and impossible of outsourcing creativity and production.

Moderator

Frank Foster
Tigar Hare Studios

Panelists

Carlos Arguello
StudioC

Evan Hirsch
Immaginare

Jai Natarajan

Bill Schultz
Taffy Entertainment/Mike Young Productions

Rajesh Turakhia
Maya Entertainment Ltd.

Tuesday, 2 August

1:45 – 3:30 pm
Room 502B

The Open-Source Movement and the Graphics Community: How Can Open-Source, Third Party, and Proprietary Software Models Coexist?

In recent years, the open-source movement has increased dramatically. Harnessing the power of thousands of developers and testers has proven successful, to varying degrees, in developing operating systems, graphics applications, and web tools, including Linux, POV-Ray, Blender, Gimp, and Apache. In this session, developers of open-source software, in-house proprietary software, and commercial software, and practitioners who encounter all kinds of software discuss whether the open-source model is relevant and useful to the graphics community. Does the model of proprietary application research, development, and usage serve the industry better? Or will commercial facilities continue to primarily choose off-the-shelf solutions? Can all models work together?

Moderator

Gil Irizarry
Conoa, Inc.

Panelists

Florian Kainz
Industrial Light & Magic

James Mainard
DreamWorks Animation

Daniel Maskit
Digital Domain

Ton Roosendaal
Blender Foundation

William Schroeder
Kitware, Inc

Wednesday, 3 August

10:30 am – 12:15 pm
Petree Hall C

Believable Characters: Are AI-Driven Characters Possible, and Where Will They Take Us?

Processing power is increasing as fast as player expectations, which raises far more questions than answers:

- Where are we (and our characters) going with artificial intelligence?
- How is interactive entertainment changing in games for Playstation3, Xbox2, and massive multiplayer, online role-playing environments?
- How does AI affect development of emotionally believable characters?
- How can we prioritize and balance graphic techniques to support perceived realism in a character?
- Are there rules or guidelines we can distill from the more successful game characters?
- What are the subliminal tip-offs that spoil the illusion of credible characters?

In this panel, industry experts, artists, character animators, and programmers share their insights and help us sift through the graphics-technology clutter to uncover some believable character gems and answer some fundamental questions.

Moderator

Stephen Gray
Electronic Arts

Panelists

Eric Armstrong
Electronic Arts Canada

Gregory Garvey
Quinnipiac University

Andrew Stern
InteractiveStory.net

Frank Vitz
Electronic Arts

3:45 – 5:30 pm
Petree Hall C

From University Lab to Movie Screen and Back Again: How Does Research Change Production Tools, and How Do Production Needs Influence Academic Research?

How and when do academic research ideas make their way into feature animation and visual effects production facilities? What kinds of graphics research ideas have made good production tools, and how are they transformed by practical experience and needs? What pressing production issues should be considered in academic circles? To what extent is the industry using standardized tools, which might be slowing adoption of new techniques? How are intellectual property issues resolved? How could academia and industry work together more closely to bridge the gaps? Panelists from academia and production explore these and other issues in this vital relationship.

Moderator

Daniel Goldman
University of Washington

Panelists

Tony DeRose
Pixar Animation Studios

Andrew Hendrickson
PDI/DreamWorks

Barbara Mones
University of Washington

Paul Salvini
Side Effects Software Inc.

Steve Sullivan
Industrial Light & Magic

Thursday, 4 August

8:30 – 10:15 am
Room 515B

The Ultimate Display: What Will It Be?

The invention of television radically shaped the 20th century. Today we view most of our visual entertainment on new and innovative displays. This panel examines future trends in display technology, ranging from stereoscopic and autostereoscopic techniques, holography, and 3DTV to projector-based concepts. Leading experts from science and industry discuss possibilities, developments, and limitations of tomorrow's displays; fundamental facts; and emerging trends and applications in entertainment, science, and education.

Moderator

Oliver Bimber
Bauhaus-Universität Weimar

Panelists

Neil Dodgson
University of Cambridge Computer Laboratory

Gregg Favalora
Actuality Systems, Inc.

David Luebke
University of Virginia

Ramesh Raskar
Mitsubishi Electric Research Laboratories (MERL)

Chris Slinger
QinetiQ

1:45 – 3:30 pm
Room 515B

WWAI: How is the Web Growing? Into a Social Super-Organism or a Mass of Disconnected Information?

While the World Wide Web could become the nerve center for a social super-organism, it remains frustratingly rudimentary. Documents lack uniformity and integration; linking is unintelligent and unstable; interaction is limited, controlled by authors and browsers. However, things are changing. Advances in artificial intelligence could be applied to the WWW, transforming it to a globally distributed, massively parallel, wetware-oriented universe. Panelists from all areas of web development discuss this and other possibilities for the future of the web.

Moderator

Robert Lisek
Fundamental Research Lab

Panelists

Jonah Brucker-Cohen
Trinity College Dublin

Martha Carrer Cruz Gabriel
Universidade de São Paulo
Universidade Anhembi Morumbi

Alessandro Ludovico
UBERMORGEN.COM

Monika May
www.DigtialMAY.com
Colorado Technical University

Locations

Rooms 511AB, 515A, 515B, West Hall B, Petree Hall C, Petree Hall D

sketches

Review the latest work in every aspect of computer graphics and interactive techniques: art, cinema, advertising, design, science, and engineering. Following each sketch presentation, authors answer questions and discuss future implications of their work.

Sketches Committee

Juan Buhler
Sketches Chair

Edward Angel
University of New Mexico

Joanna Berzowska
Extra Soft Lab/Concordia University

Kevin Bjorke
NVIDIA Corporation

Raquel Coelho
Independent Artist

Cassidy Curtis
DreamWorks Animation

Steve Derrick
Vicarious Visions

Cindy Grimm
Washington University in St. Louis

Andre Gueziec
Triangle Software

Diego Gutierrez
Universidad de Zaragoza

Eric Haines
Autodesk Inc.

Wendy Ju
Stanford University

Joe Kniss
University of Utah

Daniel Maskit
Digital Domain

Hanspeter Pfister
SIGGRAPH 2006 Sketches Chair
Mistubishi Electric Research Laboratories (MERL)

Apurva Shah
Pixar Animation Studios

Mark VandeWetter
Pixar Animation Studios

Daniel Wexler
NVIDIA Corporation

Monday, 1 August

10:30 am – 12:15 pm
Room 515B

Session Chair
Raquel Coelho, Independent Artist

Twisted Perspectives

Twisted City

An innovative approach for creating three-dimensional transitions between two-dimensional images. Demonstrated in a short animation entitled "Twisted City."

Samantha Meisels
NCCA Bournemouth University
b1423413@bmth.ac.uk

Dominic Halford
NCCA Bournemouth University

Guy Newbery
NCCA Bournemouth University

Multiperspective Collages

The process and tools used by the artist to create multi-perspective collages, combining dozens of photographs taken from different locations. Two works by this artist are also presented in the SIGGRAPH 2005 Art Gallery.

Jon Meyer
www.cybergrain.com
jonmeyer@gmail.com

"ZECTO" Cinematography for Depth-Based Live-Action Imaging

A new live-action imaging technique using "Axi-Vision," a depth-capturing camera, and a plug-in to generate exaggerated perspective images that are impossible to express by lens operation.

Go Fujimoto
Keio University imgl/Inakage Lab
go@imgl.sfc.keio.ac.jp

Masahiro Kawakita
NHK Science and Technical Research Laboratories/NHK Engineering Service

Masa Inakage
Keio University imgl/Inakage Lab

Media Mirror

An interactive video installation in which 200 channels of live cable television are continuously arranged to form a video-mosaic of the person in front of it.

Jefferson Y. Han
New York University
Media Research Lab
jhan@mrl.nyu.edu

3:45 – 5:30 pm
Petree Hall C

Session Chair
Apurva Shah, Pixar Animation Studios

Feature Fries

Moving the Jungle in "Madagascar"

A summary of the various techniques used to generate hierarchical data and apply foliage motion to stylized hand-modeled trees in an animated jungle.

David Caeiro
PDI/DreamWorks
dcaeiro@pdi.com

Krzysztof Rost
David Hart
David Allen
Scott Singer
Joanne Thiel
PDI/DreamWorks

The Wig System

Initially developed for "Shrek 2," the Wig System is a flexible and highly controllable hair animation and simulation tool that is specifically suited for the demands of feature-film animation.

Nicolas Scapel
DreamWorks Animation
nico@dreamworksanimation.com

Terran Boylan
DreamWorks Animation

An Integrated 2D and 3D Production Pipeline for Independent Filmmakers

How to use widely available tools to develop an integrated 2D and 3D production pipeline suitable for independent filmmakers. This sketch introduces the pipeline and techniques used in "Shanghai Beauty."

Ding Ye
Cinematic Artist
yeding1977@Hotmail.com

Carl Irwin

Procedural and Customizable Vine System in "Madagascar"

The vine system allowed quick addition of "vine designs" via a simple user interface so hundreds of vines could be created in a single shot for "Madagascar."

Laurent Kermel
PDI/DreamWorks
lkermel@hotmail.com

Tuesday, 2 August

8:30 – 10:15 am
Petree Hall C

Session Chair
Eric Haines, Autodesk, Inc.

Global Illumination and Occlusion

Practical Dynamic Parallax Occlusion Mapping

An improved parallax occlusion mapping algorithm for dynamic real-time lighting of surfaces including soft shadows, a directable LOD system, and robust critical height field-ray intersection computation.

Natalya Tatarchuk
ATI Research, Inc.
natashat@bu.edu

Correlated Visibility Sampling for Direct Illumination

Using the Metropolis-Hastings algorithm to sample according to the triple product of incident illumination, BRDF, and visibility.

Abhijeet Ghosh
The University of British Columbia
ghosh@cs.ubc.ca

Wolfgang Heidrich
The University of British Columbia

Precomputed Light Sets for Fast High-Quality Global Illumination

Fast high-quality global illumination based on instant radiosity is achieved by using local light sets, which were generated during a preprocessing stage and contain visibility information.

Johannes Günther
Max-Planck-Institut für Informatik
guenther@mpi-sb.mpg.de

Ingo Wald
Hans-Peter-Seidel
Max-Planck-Institut für Informatik

Importance Sampling for Video Environment Maps

A system composed of acquisition of video environment maps, light-source simplification, and rendering on graphics hardware for fully dynamic scenes without precomputation with applications in augmented reality.

Vlastimil Havran
Max-Planck-Institut für Informatik
havran@mpi-sb.mpg.de

Miloslaw Smyk
Grzegorz Krawczyk
Karol Myszkowski
Hans-Peter Seidel
Max-Planck-Institut für Informatik

8:30 – 10:15 am
Room 515B

Session Chair
Raquel Coelho, Independent Artist

Performances

Landing Place: Remapping Motion Capture of Dance Movement to Objects and Environments

In collaboration on Landing Place, a multimedia dance performance, motion capture was used to inspire visuals without preliminary planning. Marker-point data were used to produce the animations in Maya.

Vita Berezina-Blackburn
Ohio State University
vberezin@accad.osu.edu

Bebe Miller
The Bebe Miller Company/Department of Dance, The Ohio State University

Brian Windsor
The Ohio State University

Active Space: Embodied Media in Performance

An interactive physical environment for dance, theater, and music performance. As the system responds to movement, participants engage its behaviors and "play the space" as an instrument.

John Crawford
University of California, Irvine
johncraw@uci.edu

eVokability: The Interactive Costume

Developing wearable devices that sense movement and voice, and generate live media, for participants with disabilities in a performance setting.

Sarah Drury
Temple University
sdrury@temple.edu

Cave Writing: Toward a Platform for Literary Immersive VR

In this interdisciplinary workshop course, students create virtual reality hypermedia from literary narrative, bodily space, and spatialized audio. The sketch describes student projects enabled by novel 3D graphics and interaction technology.

Sascha Becker
Brown University
sbshine@gmail.com

Shawn Greenlee
Dmitri Lemmerman
Morgan McGuire
Nicholas Musurca
Noah Wardrip-Fruin
Brown University

Tuesday, 2 August

10:30 am – 12:15 pm
Room 515B

Session Chair
Cassidy Curtis, DreamWorks Animation

Sketch-Based Modeling

Sketch-Based Modeling of Parameterized Objects

A modeling system that is capable of constructing 3D models of particular object classes from 2D sketches.

Chen Yang
The University of British Columbia
cyang@cs.ubc.ca

Dana Sharon
Michiel van de Panne
The University of British Columbia

Sketch-Based Modeling With the BlobTree

An interactive sketch-based modeling tool based on the BlobTree hierarchical implicit modeling system. The tool supports intuitive gesture-driven CSG and blending operations with a built-in construction history.

Ryan Schmidt
University of Calgary
rms@cpsc.ucalgary.ca

Brian Wyvill
Mario Costa-Sousa
University of Calgary

Inferring 3D Free-Form Shapes From Contour Drawings

An interface for creating a free-form 3D shape from a complex 2D sketch. The resulting 3D model matches the contour and is a plausible interpretation of the drawing.

Olga Karpenko
Brown University
koa@cs.brown.edu

John F. Hughes
Brown University

Dynamic Planar Map Illustration

Live Paint is a new illustration metaphor that combines the editability of traditional vector illustration with the simplicity and straightforwardness of planar map illustration.

Paul Asente
Adobe Systems Incorporated
asente@adobe.com

Mike Schuster
Adobe Systems Incorporated

1:45 – 3:30 pm
Room 515B

Session Chair
Cassidy Curtis, DreamWorks Animation

Artistic Depiction

Non-Photorealistic Motion Blur for 3D Animation

Defining motion blur in cel animation as non-photorealistic motion blur and in computer animation as photorealistic motion blur.

Syoichi Obayashi
Saitama University
obayasi_s@ke.ics.saitama-u.ac.jp

Kunio Kondo
Saitama University

Toshihiro Konma
Ken-ichi Wamoto
Shobi University

Stylizing 2.5D Video

A system for taking video with depth information (2.5D video) and producing temporally coherent non-photorealistic animations with strong depth cues.

Noah Snavely
University of Washington
snavely@cs.washington.edu

Larry Zitnick
Sing Bing Kang
Michael Cohen
Microsoft Research

Interactive Design and Visualization of Tensor Fields on Surfaces

A framework for interactive design and display of second-order symmetric tensor fields on 3D surfaces, with applications in painterly rendering and pen-and-ink sketches.

Eugene Zhang
Oregon State University
zhange@cs.orst.edu

James Hays
Carnegie Mellon University

Greg Turk
Georgia Institute of Technology

Geometric Clustering for Line Drawing Simplification

A new approach to simplification of line drawings that maintains the morphological structure of the original drawing while decreasing the number of lines.

Pascal Barla
ARTIS GRAVIR/IMAG INRIA
Pascal.Barla@imag.fr

Joelle Thollot
François X. Sillion
ARTIS GRAVIR/IMAG INRIA

Tuesday, 2 August

1:45 – 3:30 pm
West Hall B

Session Chair
Apurva Shah, Pixar Animation Studios

Production Rendering

Modeling and Rendering of Clouds on "Stealth"

"Stealth" required new techniques for modeling cloud details and a pipeline for rendering large voxel volumes efficiently. This sketch summarizes these new systems for generating photorealistic cloudscapes.

Joshua Krall
Digital Domain
joshuakrall@pobox.com

Cody Harrington
Digital Domain

It's Not Wise to Upset a Wookiee

In "Star Wars Episode 3," the wookiee planet of Kashyyyk was populated using a completely ambient lighting solution for rendering the hair and by retargeting the hair simulations.

Tim Fortenberry
Industrial Light & Magic
tfort@ilm.com

Pat Conran
Industrial Light & Magic

Shader Compositing on "Stealth"

An exploration of using a compositor as a major part of the lighting pipeline by delegating many of the shader's tasks to the compositor.

Chris Harvey
Digital Domain
charvey@d2.com

Esdras Varagnolo
Hanzhi Tang
Ryan Vance
Digital Domain

Space Battle Pyromania

How the artists and researchers at Industrial Light & Magic created large-scale pyrotechnics for the opening space battle in "Star Wars: Episode 3."

Willi Geiger
Industrial Light & Magic
wgeiger@ilm.com

Nick Rasmussen
Samir Hoon
Industrial Light & Magic

Ron Fedkiw
Stanford University/
Industrial Light & Magic

3:45 – 5:30 pm
Petree Hall C

Session Chair
Kevin Bjorke, NVIDIA Corporation

Cinematography

Shutter Efficiency and Temporal Sampling

Motion blur in rendering systems is typically based upon a perfect shutter. Lower shutter efficiency, as exhibited by real leaf shutters, can produce better images, both in theory and practice.

Ian Stephenson
NCCA Bournemouth University
istephen@bmth.ac.uk

A New Camera Calibration Method Taking Blur Effects Into Account

A new camera calibration method that takes into account both geometric information of feature points and defocus information of edges.

Masashi Baba
Hiroshima City University
baba@its.hiroshima-cu.ac.jp

Naoki Asada
Masayuki Mukunoki
Hiroshima City University

Cinematized Reality: Cinematographic Camera Control in 3D Videos

Cinematized Reality aims to record big moments in our daily lives as cinematographic videos by setting virtual cameras' positions according to the grammar of film language and expertise.

Ryuuki Sakamoto
ATR Intelligent Robotics and Communication Laboratories
skmt@atr.jp

Defocus Difference Matting

A simplification of defocus matting that can pull mattes when the background is static and known. This technique avoids the color restrictions of blue-screen and background subtraction methods.

Morgan McGuire
Brown University
morgan@cs.brown.edu

Wojciech Matusik
Mistubishi Electric Research Laboratories (MERL)

Multi-Perspective Rendering for Autostereoscopic Displays

This study presents multi-perspective rendering techniques to decrease eye fatigue by auto-stereoscopic displays. Binocular disparities and exaggerations of perspective effects are controlled independently.

Kei Utsugi
Hitachi Ltd.
utsugi@sdl.hitachi.co.jp

Takafumi Koike
Michio Oikawa
Hitachi Ltd.

Tuesday, 2 August

3:45 – 5:30 pm
Room 515B

Session Chair
Cassidy Curtis, DreamWorks Animation

Beautiful Things

A Fast Fractal Growth Algorithm

A fast, simple, easy-to-implement fractal growth algorithm that is three orders of magnitude faster than previous methods. It is used to generate trees, lightning, and textures.

Theodore Kim
University of North Carolina at Chapel Hill
kim@cs.unc.edu

Jason Sewall
Avneesh Sud
Ming C. Lin
University of North Carolina at Chapel Hill

Aggregation: Complexity Out of Simplicity

A look at the creative processes and mathematical algorithms used to ceate the Aggregation series of digital organic sculptures presented in the SIGGRAPH 2005 Art Gallery.

Andy Lomas
andylomas@yahoo.com

Digital Paper Cutting

Paper cutting is an ancient art form based on symmetry. This sketch presents methods to analyze real-world paper cuttings and provide folding and cutting instructions to users, which make paper cutting more widely accessible.

Yanxi Liu
Carnegie Mellon University

James Hays
Carngie Mellon University

Ying-Qing Xu
Harry Shum
Microsoft Research Asia

Artworks Using Metaball Representation With Stepwise Approach

A method for drawing 2D metaballs using stepwise threshold detection. This sketch also describes an application of the method in artworks.

Joe Takayama
Kyushu University
joe@designer.so-net.ne.jp

Etsuo Genda
Kyushu University

Wednesday, 3 August

8:30 – 10:15 am
Petree Hall C

Session Chair
Joe Kniss, University of Utah

Fluid Simulation

Cartesian Grid Fluid Simulation With Irregular Boundary Voxels

The simulation grid can often be seen in fluid simulations. Using irregular boundary voxels in fluid simulation and advection, we are able to capture more detail than we can with traditional methods.

Doug Roble
Digital Domain
doug_roble@siggraph.org

Nafees bin Zafar
Digital Domain

Henrik Falt
Digital Domain/Sony Pictures Imageworks

Fluid Simulation Via Disjoint Translating Grids

An adaptive fluid-simulation technique that splits the computation domain into multiple moving grids. Using this technique, we are able to simulate fluids over large spatial domains.

Jonathan Cohen
Rhythm & Hues Studios

Frederic Pighin
University of Southern California, Institute for Creative Technologies

Sanjit Patel
Anson Chu
University of Southern California

A Semi-Lagrangian Contouring Method for Fluid Simulation

A semi-Lagrangian surface tracking method for use with fluid simulations. This method maintains an explicit polygonal mesh, which defines the surface, and a supplemental octree data structure.

Adam W. Bargteil
University of California, Berkeley
adamb@cs.berkeley.edu

Tolga G. Goktekin
James F. O'Brien
John A. Strain
University of California, Berkeley

Gigantic Deformable Surfaces

Demonstration of the Compact RLE (a highly scalable and efficient level set representation) and massive model representation (+1 Bvoxels), ray-trace rendering, and full sparse-fluid simulation.

Ben Houston
Frantic Films
ben@exocortex.org

Michael B. Nielsen
University of Arhus

Christopher Batty
Frantic Films

Ola Nilsson
Ken Museth
Linköpings universitet

8:30 – 10:15 am
Room 511AB

Session Chair
Joey Berzowska, Extra Soft Lab/Concordia University

Interfaces

Interface Currents: Supporting Fluent Face-to-Face Collaboration

Flexible containers that provide a controllable flow of interface items to support creativity during collaborative tasks and enable intuitive organization and sharing of digital information around horizontal displays.

Uta Hinrichs
Universität Magdeburg

Sheelagh Carpendale
Stacey D. Scott
University of Calgary

Graphical Digital Storytelling: Visualizing Personal Histories and Relations

A graphical storytelling system for visualizing personal histories and relations between people.

Yuya Nomata
University of Tsukuba
nomata@graphic.esys.tsukuba.ac.jp

Junichi Hoshino
University of Tsukuba

Intersection: Computer Graphics for Everyday Living

A wall-hung display for office and home environments that presents real-time information on buses and trams. It investigates how computer graphics can support daily activities in everyday environments.

Sara Ljungblad
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Dylan Tinlun Chan
Lars Erik Holmquist
Future Applications Lab, Viktoria Institute

Multi-Touch Sensing Through Frustrated Total Internal Reflection

A simple, low-cost technique for multi-touch sensing based on the phenomenon of frustrated total internal reflection.

Jefferson Y. Han
New York University
Media Research Lab
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Wednesday, 3 August

8:30 – 10:15 am
Room 515B

Session Chair
Juan Buhler

Image-Based Rendering

Carved Visual Hulls for High-Accuracy Image-Based Modeling

A novel method for acquiring high-accuracy solid models of complex 3D shapes from multiple calibrated photographs by enforcing available photometric and geometric information.

Yasutaka Furukawa
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Svetlana Lazebnik
Jean Ponce
Beckman Institute, University of Illinois at Urbana-Champaign

Image-Based Rendering From a Sparse Set of Images

Exploiting spatial coherence to recover the complex, spatially varying reflectance of an object from a small number of images.

Todd Zickler
Harvard University
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Sebastian Enrique
Ravi Ramamoorthi
Peter Belhumeur
Columbia University

Image-Based Material Editing

Given a single high-dynamic-range image, this set of methods automatically replaces the material of an object in the image with another, completely different, material.

Erum Arif Khan
University of Central Florida
ekhan@cs.ucf.edu

Erik Reinhard
University of Central Florida

Roland Fleming
Heinrich Bulthoff
Max Planck Institute for Biological Cybernetics

Implementation of Modeling Hair From Multiple Views

Implementation Sketch

A practical approach to capturing hair geometry from multiple images of a given subject from different viewpoints, taken under natural lighting conditions without any specific setup. This sketch discusses the implementation details underlying the SIGGRAPH 2005 Paper: Modeling Hair From Multiple Views.

Wei Yichen
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Eyal Ofek
Microsoft Research Asia

Long Quan
Hong Kong University of Science and Technology

Harry Shum
Microsoft Research Asia

10:30 am – 12:15 pm
Room 511AB

Session Chair
Hanspeter Pfister, Mistubishi Electric Research Laboratories (MERL)

Mesh Thingies

Unconstrained Spherical Parameterization

A simple modification makes traditional planar parameterization methods work on the sphere, without having to introduce additional distortion by specifying artificial constraints.

Ilja Friedel
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Peter Schröder
Mathieu Desbrun
California Institute of Technology

Combining Metrics for Mesh Simplification and Parameterization

A mesh simplification strategy for generating polygonal meshes with well-shaped faces in the presence of constraints. This sketch introduces a novel combination of metrics to drive the simplification process.

Jordan Smith
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Ioana Boier-Martin
IBM T.J. Watson Research Center

Streaming Compression of Triangle Meshes

This radical departure from the traditional approach to mesh compression proposes a scheme that incrementally encodes a mesh in the order vertices and triangles are given to the compressor.

Martin Isenburg
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Peter Lindstrom
Lawrence Livermore National Laboratory

Jack Snoeyink
University of North Carolina at Chapel Hill

Predictive Point-Cloud Compression

A single-resolution compression technique for point clouds that can exploit fine-scale structures as they arise in 3D scans and resampled data.

Stefan Gumhold
Max-Planck-Institut für Informatik
gumhold@uni-tuebingen.de

Zachi Karni
Martin Isenburg
Hans-Peter Seidel
Max-Planck-Institut für Informatik

Wednesday, 3 August

10:30 am – 12:15 pm
Room 515B

Session Chair
Joe Kniss, University of Utah

Perception

Manipulating Volumetric Abstractions to Match Color Perception Between Dissimilar Gamuts

A novel interactive technique for leveraging GPU acceleration, designed to efficiently refine procedurally generated color transformations to attain a perceptually accurate match between devices of significantly disparate gamuts.

Dominic Glynn
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John Carey
Zoe Glynn
C.O.R.E Feature Animation

Perceptually Based Image Rendering of Art Paintings

A method for perceptually based image rendering of art paintings on a display device by considering surface properties and chromatic adaptation for the purpose of the total digital archive.

Shoji Tominaga
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Mariko Nakagawa
Osaka Electro-Communication University

Norihiro Tanaka
Nagano University

A Human Eye Retinal Cone Synthesizer

Implementation Sketch

A new algorithm models the growth of the five million cones in the human eye's retina. The position, size, shape, and orientation of each cone are modeled individually. This sketch discusses the implementation details underlying the SIGGRAPH 2005 Paper: A Photon Accurate Model of the Human Eye.

Michael F. Deering
deeringm@acm.org

Spatio-Temporal Video Warping

A new framework for spatio-temporal warping of video, with a focus on one novel effect: the spatio-temporal magnifying glass, which is particularly well-suited for instant replays in sports broadcasts.

Alex Rav-Acha
Yael Pritch
Dani Lischinski
Shmuel Peleg
The Hebrew University

1:45 – 3:30 pm
West Hall B

Session Chair
Diego Gutierrez, Universidad de Zaragoza

Effects Omelette

Visual Simulation of Wispy Smoke

For the movie "Cursed," Frantic Films needed to replicate the wispy smoke of werewolves touching silver. This sketch describes the techniques and tools developed to do it.

Christopher Batty
Frantic Films
R3B cbatty@franticfilms.com

Ben Houston
Neuralsoft

Highway to Hell

For "Constantine," we had to create a highly stylized depiction of hell. A 3D world was rendered with burning sky, crumbling buildings, flying debris, and crawling demons.

Matt Jacobs
Tippett Studio
mjacobs@tippett.com

Cartoony Fluid Animation

Dynamic solutions, while effective, don't easily provide a cartoony style for fluid. We focused on hand-drawn animation choices to help our 3D tools arrive at effective fluid caricature.

Yvett Merino
Walt Disney Feature Animation
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Peter DeMund
Walt Disney Feature Animation

Surfing Zebra, A "Madagascar" Effects Breakdown

The production elements and techniques used to create drama through ever-changing patterns in foam and spray as a wave breaks, spills, and hurtles a surfing zebra towards the Madagascar shore.

Marty Usiak
PDI/DreamWorks
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Matt Baer
Mark Manfrey
David Hart
PDI/DreamWorks

Wednesday, 3 August

1:45 – 3:30 pm
Room 511AB

Session Chair
Wendy Ju, Stanford University

Augmented and Virtual Reality

Enhanced Eyes for Better Gaze Awareness in Mixed Reality

Enhanced eyes restore gaze awareness in a shared mixed-reality space. Three schemes are proposed and evaluated: controlling highlight, deforming eyelids, and adjusting rotation angle of eyeballs.

Keisuke Tateno
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Masayuki Takemura
Yuichi Ohta
University of Tsukuba

A Car-Navigation System Based on Augmented Reality

A display method for car-navigation systems based on an augmented-reality technique.

Hiroaki Sawano
Waseda University
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Minoru Okada
Waseda University

Enabling View-Dependent Stereoscopic Projection in Real Environments

How to enable view-dependent stereoscopic projection on ordinary surfaces in everyday environments. Display configurations for AR/VR applications that require permanent and artificial projection canvases might become unnecessary.

Oliver Bimber
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Gordon Wetzstein
Andreas Emmerling
Christian Nitschke
Bauhaus-Universität Weimar

Immersive Virtual Studio

A natural-image screen composition of real object and virtual space was achieved using transmission retro-reflection material, projectors, and coaxial infrared rays.

Hideki Mitsumine
NHK Science and Technical Research Laboratories
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3:45 – 5:30 pm
Room 515B

Session Chair
Eric Haines, Autodesk, Inc.

Textures

Time-Varying Textures: Definition, Acquisition, and Synthesis

A new class of textures with simple algorithms for synthesis and controllability: Time-varying textures, in which appearance evolves over time. A database of these textures is being created.

Sebastian Enrique
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Melissa Koudelka
Yale University

Peter Belhumeur
Columbia University

Julie Dorsey
Yale University

Shree Nayar
Ravi Ramamoorthi
Columbia University

Efficient Magnification of Bi-Level Textures

Standard tri-linear filtering blurs road signs and similar items excessively. We use a single-channel MIP map of small size and an efficient pixel shader to significantly improve bi-level textures.

Jörn Loviscach
Hochschule Bremen
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Real-Time Image-Based Control of Skin Melanin Texture

A novel process to control skin melanin texture over a continuous range. The process is implemented on graphics hardware and can achieve real-time processing for live video streams.

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Toshiya Nakaguchi
Koichi Takase
Saya Okaguchi
Ryoko Usuba
Yoichi Miyake
Chiba University

Nobutoshi Ojima
Mitsuhiro Shiraishi
Natsuko Okiyama
Kimihiko Hori
Kao Corporation

NRT-Based Texture Replacement in Real Videos

A near-regular-texture-based approach for dynamic texture replacement in video that preserves geometric and lighting effects on the original texture.

Wen-Chieh Lin
Carnegie Mellon University
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Yanxi Liu
Carnegie Mellon University

Wednesday, 3 August

3:45 – 5:30 pm
Room 511AB

Session Chair
Hanspeter Pfister, Mitsubishi Electric Research Laboratories (MERL)

Interactive Modeling

Boneless Motion Reconstruction

A new automated technique for character animation from motion-capture data that does not require global information (skeleton) and can be applied directly to animating mesh models.

Vladislav Kraevoy
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Alla Sheffer
The University of British Columbia

Surfacing By Numbers

Combining graph-cut-based methods for surface selection and detail transfer to provide a fast and flexible system for reusing geometry and texture across 3D surfaces.

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Michael Garland
University of Illinois
at Urbana-Champaign

Knowledge-Based Modeling of Laser-Scanned Trees

A new method that uses knowledge about tree structures and allometric theory to produce full polygonal models of range-scanned trees, without suffering from the inherent incompleteness of such data.

Hui Xu
University of Minnesota
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Nathan Gossett
Baoquan Chen
University of Minnesota

Interaction Capture and Synthesis

Capture and reuse of interaction is improved by measuring both forces and motion. Assuming that captured motion emulated impedance-based control, the technique computes compliances from capture data and retargets via simulation.

Paul G. Kry
The University of British Columbia
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Dinesh K. Pai
Rutgers University

Thursday, 4 August

8:30 – 10:15 am
Room 515A

Session Chair
Ed Angel, University of New Mexico

Collisions

Using Particles for Footprints and Body Interactions With Ground

Interactions with sand in "Madagascar" (due to feet or bodies) had to leave impressions. The footprint system semi-automates footprint data generation and saves enough additional information for further variations.

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Alain De Hoe
Juan Buhler
Scott Singer
David Allen
PDI/DreamWorks

Implementation of Fast Frictional Dynamics for Rigid Bodies

Implementation Sketch

This sketch presents some important details that went into implementation of our Fast Frictional Dynamics algorithm. The goal is fast simulation of large sets of non-convex rigid bodies. This sketch discusses the implementation details underlying the SIGGRAPH 2005 Paper: Fast Frictional Dynamics for Rigid Bodies.

Danny M. Kaufman
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Timothy Edmunds
Dinesh K. Pai
Rutgers University

Pre-Stabilization for Rigid-Body Articulation With Contact and Collision

A novel approach for dynamically simulating articulated rigid bodies undergoing frequent and unpredictable contact and collision using pre-stabilization to enforce constraints.

Rachel Weinstein
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Joseph Teran
Stanford University

Ronald Fedkiw
Stanford University
and Industrial Light & Magic

Detection and Evaluation of Grasping Positions

Two techniques for detecting appropriate portions to be grasped on the surface of an object, and for forming hand shape to grasp various objects.

Fumihito Kyota
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Tomoyuki Watabe
Tokyo Institute of Technology

Suguru Saito
Masayuki Nakajima
Tokyo Institute of Technology

8:30 – 10:15 am
Petree Hall C

Session Chair
Dan Maskit, Digital Domain

Breakfast Theater

Generating Secondary Motions in Shadow Play Animations With Motion-Planning Techniques

The Chinese shadow play as an example of automatic generation of both primary and secondary motions for a human character with motion-planning techniques.

Shu-Wei Hsu
National Chengchi University

Tsai-Yen Li
National Chengchi University

A-maize-ing Dynamic Cornfield Toolkit

When the "Chicken Little" EFX team was asked to create a vast, dynamic cornfield, Paint Effects and Softbody Dynamics were integrated using a custom UI and Maya Embedded Language.

Yvett Merino
Walt Disney Feature Animation
yvett.merino@disney.com

Ian J. Coony
Dale Mayeda
Walt Disney Feature Animation

Descent to the Underworld: A Game-Film

The largest collaborative project undertaken on Internet2 creates an online studio with eight universities in five states and four countries.

Nora Barry
Druid Media, Inc.
nora@druidmedia.com

Rhythmic Character Animation: Interactive Chinese Lion Dance

RhyCAP (rhythmic character animation playacting) is a procedural animation system that allows a designer to interactively direct Chinese lion dance by adjusting rhythmic parameters such as tempo, exaggeration, and timing.

Je-Ren Chen
National Chengchi University
g9115@cs.nccu.edu.tw

Tsai-Yen Li
National Chengchi University

Thursday, 4 August

8:30 – 10:15 am
Room 511AB

Session Chair
Wendy Ju, Stanford University

Interactive Interaction

3motion: Untethered 3D Gesture Interaction

An approach to new free-roaming 3D interactive applications and experiences through application of novel 3D gesture-trajectory matching of position and inertial signatures.

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Glasgow School of Art
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Paul Keir
Jocelyn Elgoyhen
Tom Kenny
Martin Naef, Digita
Glasgow School of Art

Creating Face Models From Vague Mental Images

The user navigates face space using a 3D morphable model. The system exploits feature correlations and provides intuitive control. System performance is comparable to a commercial system operated by a professional.

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Volker Blanz
Jörg Haber
Hans-Peter Seidel
Max-Planck-Institut für Informatik

A Fluid-Resistance-Map Method for Real-Time Haptic Interaction With Fluids

A fast method for simulating the dynamics of water for real-time force display.

Yoshinori Dobashi
Hokkaido University
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Shoichi Hasegawa
Mitsuaki Kato
Makoto Sato
Tokyo Institute of Technology

Tsuyoshi Yamamoto
Hokkaido University

Tomoyuki Nishita
The University of Tokyo

Inside Interactive Video Cutout

Implementation Sketch

Video Cutout is an interactive system for efficiently extracting foreground objects from a video. This sketch discusses the implementation details underlying the SIGGRAPH 2005 Paper: Interactive Video Cutout.

Jue Wang
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Pravin Bhat
University of Washington

Alex Colburn
Maneesh Agrawala
Michael F. Cohen
Microsoft Research

8:30 – 10:15 am
Petree Hall D

Session Chair
Steve Derrick, Vicarious Visions

Illumination Capture and Display

Real Illumination from Virtual Environments

A method for actively controlling room illumination so that it is consistent with a virtual world, triggering natural adaptation processes in the human visual system.

Abhijeet Ghosh
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Matthew Trentacoste
Helge Seetzen
Wolfgang Heidrich
The University of British Columbia

High-Fidelity Color Reproduction Based on Multi-Channel BTF/BRDF Acquisition, Rendering, and Display

An image-simulation system based on multi-channel BTF/BRDF acquisition, rendering, and display to simulate an object with the same color and gloss as a real object in front of an observer.

Masaru Tsuchida
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Yoshiyuki Sakaguchi
Digital Fashion Ltd.

Hiroyuki Arai
NTT Corporation

Masami Nishiko
Solve Inc.

Norihito Fujikawa
National Institute of Information and Communications Technology

Automatic HDRI Generation of Dynamic Scenes

Conventional HDRI generation methods using multiple exposures require a static scene, which limits its application field. This sketch presents an HDRI generation method for dynamic scenes containing object and camera movements.

Katrien Jacobs
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Greg Ward
Anyhere Software

Celine Loscos
University College London

Light Waving: Estimating Light Positions From Photographs Alone

An inexpensive, portable, and calibration-free algorithm to automatically estimate three-dimensional light positions from an unordered set of images.

Holger Winnemoeller
Northwestern University

Ankit Mohan
Jack Tumblin
Bruce Gooch
Northwestern University

Thursday, 4 August

10:30 am – 12:15 pm
Room 515B

Session Chair
Andre Gueziec, Triangle Software

Animating Humans in a Physical World

Fast Physically Based Musculoskeletal Simulation

Efficient physically based models for musculoskeletal systems and other complex articulated bodies. The models feature close contact, stable constitutive properties, and robust numerics for large simulations.

Dinesh K. Pai
Rutgers University
dpai@cs.rutgers.edu

Shinjiro Sueda
Qi Wei
Rutgers University

Interactive and Reactive Dynamic Control

An interface for controlling humanoid characters under physical simulation. The characters can be controlled interactively, and they have a set of reactive behaviors.

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Petros Faloutsos
University of California, Los Angeles

Adaptive Dynamics of Articulated Bodies: Key Implementation Issues

Implementation Sketch

Some key implementation issues related to the algorithm described in the SIGGRAPH 2005 Paper: Adaptive Dynamics of Articulated Bodies.

Stephane Redon
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Nico Galoppo
Ming C. Lin
University of North Carolina at Chapel Hill

Fast Volume Preservation for Realistic Muscle Deformation

An efficient volume-preservation technique that provides not only robust volume preservation but an ability to control the distribution of volume depending on the characteristics of external loadings.

Min Hong
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Sunhwa Jung
Min-Hyung Choi
Samuel Welch
University of Colorado at Denver and Health Sciences Center

10:30 am – 12:15 pm
Room 511AB

Session Chair
Cindy Grimm, Washington University in St. Louis

Modeling

Vectorfield Isosurface-Based Reconstruction From Oriented Points

A volumetric method of surface reconstruction. Instead of imposing constraints and regularization values of a scalar field, this method imposes constraints and regularization on the gradient field.

Peter G. Sibley
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Gabriel Taubin
Brown University

Modeling With Implicit Complexes

A novel method for modeling heterogeneous objects that contain entities of various dimensionalities with non-homogeneous internal structure. A hybrid model called Implicit Complex integrates cellular representations and constructive function representations.

Elena Kartasheva
Institute for Mathematical Modeling and Bournemouth University

Valery Adzhiev
Peter Comninos
Bournemouth University

Alexander Pasko
Benjamin Schmitt
Hosei University

Non-Rigid Global Alignment Using Thin-Plate Splines

Global non-rigid alignment of 3D range scans and images that compensates for low-frequency warps such as those arising from calibration errors.

Benedict J. Brown
Princeton University
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Szymon Rusinkiewicz
Princeton University

Fair Curve Networks in Nonlinear Geometries

A useful new design tool for creation of fair meshes, texture mapping, and surface creation in the presence of obstacles.

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Helmut Pottmann
Technische Universität Wien

Michael Hofer
University of Minnesota

Thursday, 4 August

10:30 am – 12:15 pm
Petree Hall D

Session Chair
Ed Angel, University of New Mexico

Relighting

Joint Motion and Reflectance Capture for Relightable 3D Video

A method for acquisition and rendering of relightable 3D videos of human actors.

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Naveed Ahmed
Edilson de Aguiar
Gernot Ziegler
Max-Planck-Institut für Informatik

Hendrik Lensch
Stanford University

Marcus Magnor
Hans-Peter Seidel
Max-Planck-Institut für Informatik

Performance Geometry Capture for Spatially Varying Relighting

A technique for capturing reflectance and geometry for real-time performances using high-speed, time-multiplexed LED and projector light patterns. This sketch explores how the dataset allows for local lighting effects.

Andrew Jones
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Andrew Gardner
University of Southern California, Institute for Creative Technologies

Mark Bollas
Ian McDowall
Fakespace Labs

Paul Debevec
University of Southern California, Institute for Creative Technologies

Optimal Illumination for Image and Video Relighting

Exploration of the optimal way to illuminate a scene to reduce the number of required reference images when relighting images and video sequences.

Francesc Moreno-Noguer
Universitat Politècnica de Catalunya
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Shree K. Nayar
Peter N. Belhumeur
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Tabletop Computed Lighting for Practical Digital Photography

A commodity-level solution to the problem of generating well-lit object photographs that is fast, cheap, and easy to use.

Ankit Mohan
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Jack Tumblin
Northwestern University

Bobby Bodenheimer
Vanderbilt University

Reynold Bailey
Cindy Grimm
Washington University in St. Louis

10:30 am – 12:15 pm
Room 515A

Session Chair
Dan Wexler, NVIDIA Corporation

GPU Rendering Tricks

Angular Extent Filtering with Edge Fixup for Seamless Cubemap Filtering

Two methods for cubemap filtering, angular extent filtering, and edge fixup that alleviate the edge-seam artifacts that commonly occur when using cubemaps on graphics hardware.

John R. Isidoro
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Interactive Summed-Area Table Generation for Glossy Environmental Reflections

A technique for generating summed-area tables at interactive rates and how to use the resulting summed-area tables to render glossy environmental reflections.

Justin Hensley
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Thorsten Scheuermann
ATI Research, Inc.

Montek Singh
Anselmo Lastra
University of North Carolina at Chapel Hill

Percentage-Closer Soft Shadows

A new method for perceptually correct soft-shadow rendering that is easy to integrate, robust, and runs interactively on consumer graphics hardware.

Randima Fernando
NVIDIA Corporation
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Radiance Cache Splatting: A GPU-Friendly Global Illumination Algorithm

A GPU-based rendering technique for fast, high-quality rendering of first-bounce global illumination.

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Jaroslav Krivanek
Czech Technical University and IRISA/INRIA

Kadi Bouatouch
IRISA/INRIA

Sumanta Pattanaik
University of Central Florida

Thursday, 4 August

10:30 am – 12:15 pm
Petree Hall C

Session Chair
Kevin Bjorke, NVIDIA Corporation

Lighting Models in Rendering

Rendering Hair-Like Objects with Indirect Illumination

A new framework for indirect illumination of hair-like structures that has never been done before. It enables rendering of images that have not been created before.

Cem Yuksel
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Ergun Akleman
Texas A&M University

SpecVar Maps: Baking Bump Maps into Specular Response

Baking the effect of bump maps on specular response into a modified specular response that is less susceptible to texture filtering effects when CG models are small in frame.

Patrick Conran
Industrial Light & Magic
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A Practical Analytic Single Scattering Model for Real-Time Rendering

Implementation Sketch

A practical physically based approach for real-time rendering of scenes in participating media that captures important qualitative effects while maintaining the ease-of-use of the OpenGL fog model. This sketch discusses the implementation details underlying the SIGGRAPH 2005 Paper: A Practical Analytic Single Scattering Model for Real-Time Rendering.

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Ravi Ramamoorthi
Columbia University

Srinivasa G. Narasimhan
Carnegie Mellon University

Shree K. Nayar
Columbia University

An Empirical Model for Heterogeneous Translucent Objects

An empirical model for multiple scattering in heterogeneous translucent objects for which classical approximations such as the dipole approximation to the diffusion equation are no longer valid.

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Michael Goesele
Tongbo Chen
Hans-Peter Seidel
Max-Planck-Institut für Informatik

1:45 – 3:30 pm
Petree Hall C

Session Chair
Mark VandeWettering, Pixar Animation Studios

Capture and Simulation of Cloth

Cloth Capture

A method for capturing the geometry and parameterization of fast-moving cloth using multiple video cameras, without requiring camera calibration.

Ryan White
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Anthony Lobay
D.A. Forsyth
University of California, Berkeley

Garment Motion Capture Using Color-Coded Patterns

An image-based algorithm for surface reconstruction of a moving garment from multiple calibrated video cameras. Using a color-coded cloth texture generates convincing reconstruction results.

Volker Scholz
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Timo Stich
Marcus Magnor
Max-Planck-Institut für Informatik

Michael Keckeisen
Markus Wacker
WSI/GRIS Universität Tübingen

Cloth Simulation on the GPU

A robust method to simulate cloth on any GPU supporting Shader Model 3. Because it is geared toward performance and visual realism, it is suitable for virtual reality and games.

Cyril Zeller
NVIDIA Corporation
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Model Flowing: Capturing and Tracking of Deformable Geometry

A new markerless deformable-model capture system using an array of cameras. The 3D deformation is solved directly and in all views simultaneously.

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John Flynn
Doug Roble
Digital Domain

Ken Museth
Linköpings universitet

Thursday, 4 August

1:45 – 3:30 pm
Petree Hall D

Session Chair
Cindy Grimm, Washington University in St. Louis

Making Graphics Real

(elf) electronic-life-forms

Elfs are very simple life-approaching systems powered by solar energy. The immediate compassion for these life forms is an amazing experience, even though their abilities are very limited.

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Martina Höfflin
Academy of Media Arts

Emo System: A Public Message Display to Share Emotional Information

A proposal for a networked location-based message system that supports a sense of togetherness among workers within a company.

Atsuro Ueki
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Tsubasa Tokunaga
Inakage Lab, Keio University

Yoshimasa Niwa
Inakage Lab, Keio University

Masayuki Iwai
Tokuda Lab, Keio University

Masa Inakage
Inakage Lab, Keio University

Real Toys from Virtual Models

The design of sewing patterns for 3D objects is a time honored art. This work introduces an algorithm for automatic pattern design that focuses on patterns for soft, stuffed toys.

Dan Julius
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Vladislav Kraevoy
Alla Sheffer
The University of British Columbia

Bump Mapping Onto Real Objects

A method that applies a three-dimensional appearance onto real objects. The method forms anisotropy based on the normal vector, and it works just like bump mapping onto real surfaces.

Naoki Kawai
DaiNippon Printing Co., Ltd.
Kawai-N@mail.dnp.co.jp

1:45 – 3:30 pm
Room 515A

Session Chair
Dan Wexler, NVIDIA Corporation

GPU Programming

Dynamic Adaptive Shadow Maps on Graphics Hardware

A novel implementation of adaptive shadow maps (ASMs) that supports interactive rendering with a moving light and viewpoint. The ASM data structure and refinement algorithm are implemented on the GPU.

Aaron Lefohn
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lefohn@cs.ucdavis.edu

Shubhabrata Sengupta
University of California, Davis

Joe Kniss
University of Utah

Robert Strzodka
Caesar Research Institute

John Owens
University of California, Davis

Building a Graphics Debugger

Implementation Sketch

Building a graphics debugger entails a number of software engineering and algorithmic challenges. This sketch shows which are fundamental to the task and which are simply quirks of today's systems. It discusses the implementation details underlying the SIGGRAPH 2005 Paper: A Relational Debugging Engine for the Graphics Pipeline.

Nathaniel Duca
Johns Hopkins University
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Jonathan Cohen
Johns Hopkins University

GPU-Accelerated Iterated Function Systems

This sketch describes GPUflame, an application that generates high-quality renderings of iterated function system fractals using GPU hardware to accelerate both the computation and display of the final images.

Simon G. Green
NVIDIA Corporation
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Octree Textures on Graphics Hardware

An interactive 3D painting application that stores paint in an octree-like GPU-based adaptive data structure. The implementation supports effective resolutions up to 2048x2048x2048 with quadlinear (mipmap) filtering.

Joe Kniss
University of Utah

Aaron Lefohn
University of California, Davis

Robert Strzodka
Caesar Research Institute

Shubhabrata Sengupta
John D. Owens
University of California, Davis

Thursday, 4 August

1:45 – 3:30 pm
Room 511AB

Session Chair
Joey Berzowska, Extra Soft Lab/Concordia University

Tangible/Ambient

Hako-ne: An Augmented Musical Dollhouse

A hybrid art-and-technology project that drives the development of augmented reality. This project integrates 3D graphics with the real world, using a custom Pocket PC-based optical see-through viewer device.

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Kenji Iguchi
Inakage Lab, Keio University

Masa Inakage
Inakage Lab, Keio University

Heterogeneous Character Animation: How to Make an Interactive Character Jump Between Stationary and Mobile Graphical Computers

A method for enabling a real-time animated character to appear to jump between a stationary computer screen and a mobile graphical device.

Bill Tomlinson
University of California, Irvine
wmt@uci.edu

Man Lok Yau
University of California, Irvine

Jesse Gray
Massachusetts Institute of Technology, Media Laboratory

Location-Aware Interactive Applications

This sketch describes two novel interactive applications. Both use the user's location to control the interaction, and the user's interface provides movement through the physical environment.

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Constance Fleuriot
University of Bristol

Richard Hull
Josephine Reid
Hewlett Packard Laboratories

Future Cast System

A new visual entertainment presented at Expo 2005 in Aichi Japan. The special feature of this entertainment system is that the entire audience can become virtual movie performers.

Shigeo Morishima
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shigeo@waseda.jp

Akinobu Maejima
Waseda University

Shuhei Wemler
Silicon Studio Corp.

Tamotsu Machida
VINO AZUL Inc.

Masao Takebayashi
DENTSU TEC Inc.

3:45 – 5:30 pm
Room 515B

Session Chair
Mark VandeWettering, Pixar Animation Studios

Simulations for Artistic Effect

Visual Simulation of Melting Ice Considering the Natural Convection

A method for generating melting ice animations considering thermal energy propagation between air with the properties of fluid and ice.

Masaaki Matsumura
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aki@verygood.aid.design.kyushu-u.ac.jp

Reiji Tsuruno
Kyushu University

MoXi: Real-Time Ink Dispersion in Absorbent Paper

Implementation Sketch

A paint system that allows users to paint in the spontaneous style of Eastern ink painting on a computer. This sketch discusses the implementation details underlying the SIGGRAPH 2005 Paper of the same title.

Nelson S-H. Chu
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Chiew-Lan Tai
Hong Kong University of Science and Technology

Real-Time Simulation of Thin Paint Media

An application for real-time interactive creation of images with thin watery paint, including watercolor, gouache, and Chinese ink.

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Limburgs Universitair Centrum, Expertise Centre Digital Media
tom.vanlaerhoven@luc.ac.be

Frank Van Reeth
Limburgs Universitair Centrum, Expertise Centre Digital Media

Spring-Bead Animation of Viscoelastic Materials

A method to simulate viscoelastic material using a spring-mass system. Many particles (20,000) are used to create a randomly connected mesh that mimics the structure of polymeric material.

Nobuhiko Tamura
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Norimichi Tsumura
Toshiya Nakaguchi
Yoichi Miyake
Chiba University

Thursday, 4 August

3:45 – 5:30 pm
Room 515A

Session Chair
Steve Derrick, Vicarious Visions

GPU Modeling

GPU-Based Trimming and Tessellation of NURBS and T-Spline Surfaces

Implementation Sketch

Implementation details (class hierarchy, data structures, and GPU programs) from the SIGGRAPH 2005 Paper: GPU-Based Trimming and Tessellation of NURBS and T-Spline Surfaces.

Michael Guthe
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Ákos Balázs
Reinhard Klein
Universität Bonn, Institute of Computer Science II

Image-Space Construction of Displaced Normal Maps

A hybrid 2D/3D algorithm for efficiently constructing a normal map of displacement-mapped geometry. It handles arbitrary procedural displacement and doesn't require fine tessellation or REYES dicing.

Ivan Neulander
Rhythm & Hues Studios
ivan@rhythm.com

Rendering Detailed Outdoor Ground Surfaces on the GPU

A new technique for rendering extremely detailed, heterogeneous outdoor ground surfaces in real time, using minimal memory bandwidth and performing all computation on the GPU.

Orin Tresnjak-Smith
University of Maryland
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Real-Time Rendering of Billboard Plants in a Dynamic Lighting Environment

A new method to render large landscapes that are covered by thousands of trees in a dynamic lighting environment. The billboard plants are illuminated using a special texture.

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Oliver Deussen
Universität Konstanz

3:45 – 5:30 pm
Petree Hall D

Session Chair
Juan Buhler

Visualization

Spirit and Opportunity: Animating NASA & Mission to Mars

Behind the scenes of the most realistic, dramatic visualization of NASA's Mars Exploration Rover mission.

Daniel Maas
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Real-Time Data Fusion and Visualization for the Mars Exploration Rovers

A case study of several real-time data fusion and visualization techniques employed by NASA/JPL's Science Activity Planner software to support Mars Rover operations.

Justin Wick
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Data-Visualization Strategies for Tsunami Research

A summary of workflow improvements for animation and real-time rendering of tsunami simulation data.

Roger Edberg
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VolumeShop: Interactive Direct Volume Illustration

Methods to realize an interactive system for creation of dynamic illustrations directly from volumetric datasets that combine artistic visual styles and expressive visualization techniques.

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Ivan Viola
Technische Universität Wien

M. Eduard Gröller
Technische Universität Wien

Thursday, 4 August

3:45 – 5:30 pm
Petree Hall C

Session Chair
Diego Gutierrez, Universidad de Zaragoza

Raytracing and PhotoMaps

Optimized Photon Tracing Using Spherical Harmonic Light Maps

Optimizing photon tracing using spherical harmonic light maps to represent photon accumulation on surfaces. This sketch shows how this can be used with normal maps to light real-time scenes.

Otavio Good
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Zachary Taylor
Secret Level Inc.

Interactive Ray Tracing of Point-Based Models

Point-based methods have recently gained significant interest in both modeling and rendering. This sketch summarizes new developments in interactively ray tracing point-based models, including complex models and photorealistic shading.

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Hans-Peter Seidel
Max-Planck-Institut für Informatik

Implementing Lightcuts

Implementation Sketch

Techniques for creating an efficient implementation of the new lightcuts rendering framework. This sketch is designed to complement the SIGGRAPH 2005 Paper: Lightcuts: A Scalable Approach to Illumination.

Bruce Walter
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Sebastian Fernandez
Adam Arbree
Kavita Bala
Michael Donikian
Donald P. Greenberg
Cornell University

Ray Tracing Depth Maps Using Precomputed Edge Tables

A data structure for tracing many shadow rays in parallel using a depth map.

Kevin Egan
Rhythm & Hues Studios
kegan@rhythm.com

Ivan Neulander
Rhythm & Hues Studios

3:45 – 5:30 pm
Room 511AB

Session Chair
Eric Haines, Autodesk, Inc.

Autonomous Characters

Animating Autonomous Pedestrians

This research addresses the challenge of animating pedestrians in urban environments through an artificial-life approach, which integrates motor, perceptual, behavioral, and cognitive components.

Wei Shao
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Demetri Terzopoulos
New York University

Learning to Move Autonomously in a Hostile World

As virtual worlds become richer and more complex, the agents that populate them face increasingly complicated control decisions. This sketch describes a framework for controlling autonomous agents online in real time.

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Okan Arikan
David Forsyth
University of California, Berkeley

Composite Behavior Synthesis Technique for Mental Communication Games

A new technique for expressing CG characters' mental status by synthesizing pose, unconscious movement, and conversational gesture.

Atsushi Nakano
University of Tsukuba
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Motion Patches: Building Blocks for Virtual Environments Annotated With Motion Data

Motion patches represent motion sets integrated with environment objects. Using a small number of motion patches, multiple characters can be animated at interactive rates in large, complex virtual environments.

Kang Hoon Lee
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Myeong Geol Choi
Jehee Lee
Seoul National University

Thursday, 4 August

3:45 – 5:30 pm
West Hall B

Session Chair
Dan Maskit, Digital Domain

Fooling Mother Nature

Lava, Lava Everywhere

How Industrial Light & Magic created the lava planet Mustafar for "Star Wars: Episode 3."

Willi Geiger
Industrial Light & Magic
wgeiger@ilm.com

Philippe Rebours
Kevin Sprout
John Helms
Industrial Light & Magic

A Production Tool for Terrain Generation

Overview of an intuitive tool that lets non-technical artists create technically complex, procedural terrains for a large-scale feature production.

Magnus Wrenninge
Digital Domain
magnus@wrenninge.se

Mårten Larsson
Lucio Flores
Brad Herman
Digital Domain

Animating Waves on the Beaches of Madagascar

Summary of the wave animation system (FX-surf) and the techniques used to create and animate crashing and lapping waves for "Madagascar."

Mahesh Ramasubramanian
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mahesh_ramas@yahoo.com

Leapin' Lizards: Anatomy of a Four-Ton Varactyl

On "Star Wars Episode III: Revenge of the Sith," performance-driven simulation and layered anatomical models were used to create realistic flesh, skin, and feathers for giant lizard creatures.

Jason Smith
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Aaron Ferguson
Juan Sanchez
Sunny Wei
Sang Jun Lee
Ryan Kautzman
Industrial Light & Magic

Poster Viewing

Posters are on display in West Hall A throughout the conference:

Sunday, 31 July	8:30 am – 5:30 pm
Monday, 1 August	3:45 – 5:30 pm
Tuesday, 2 August	8:30 am – 5:30 pm
Wednesday, 3 August	8:30 am – 5:30 pm
Thursday, 4 August	8:30 am – Noon

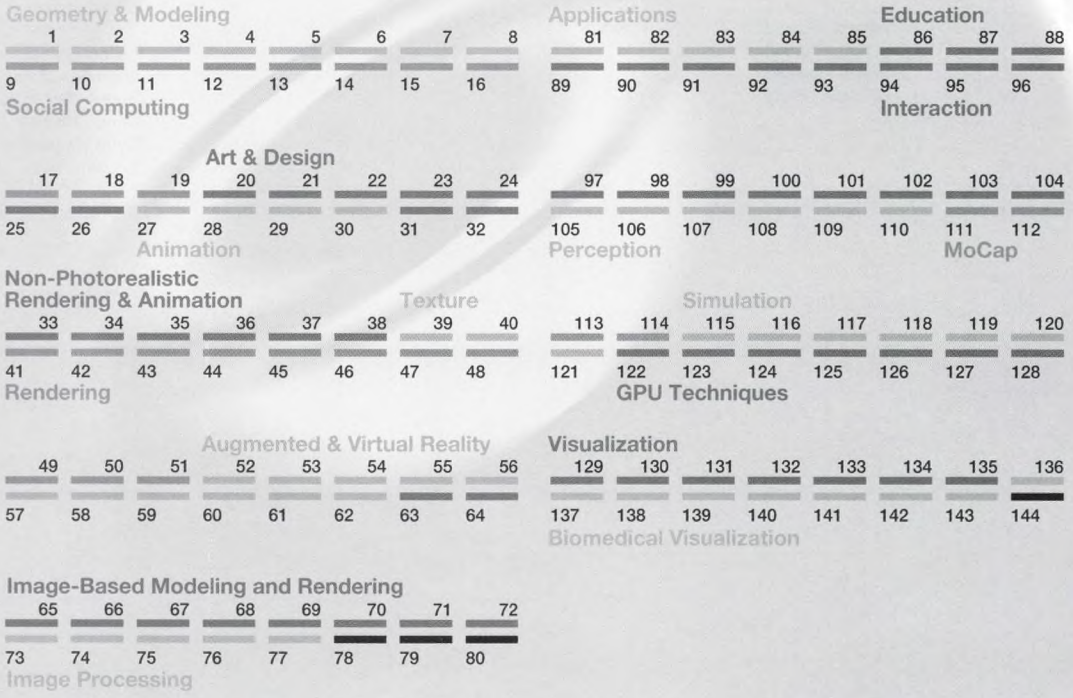
Poster Sessions

Poster authors will stand by their posters to talk with attendees and demonstrate their work during these times:

Tuesday, 2 August	10:30 am – 12:15 pm
Wednesday, 3 August	10:30 am – 12:15 pm

posters

Encounter intriguing early results, speculative ideas, and the people who generated them. Posters are displayed throughout the conference week. In scheduled sessions, poster presenters discuss their work and answer questions.



Posters Committee

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Ronen Barzel
Pixar Animation Studios
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Universität Hamburg

David Hart
Independent

Nigel John
University of Wales, Bangor

Jehee Lee
Seoul National University

Michael McGrath
Colorado School of Mines

Shawn Neely
Pixar Animation Studios

G. Scott Owen
Georgia State University

Doug Roble
Digital Domain

Marc Stamminger
Friedrich-Alexander Universität Erlangen-Nuremberg

José Carlos Teixeira
Universidade de Coimbra

Deepak Tolani
PDI/DreamWorks

Ying Zhu
Georgia State University

Geometry & Modeling

1
The Method of Fundamental Solutions in Geometric Design With Potential Fields
Roman Tankelevich
Graeme Fairweather
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Andreas Karageorghis
Yiorgos-Sokratis Smyrlis
University of Cyprus

2
Feature Comparison of 3D Meshes by Inferring 2D Feature Maps
Blerim Mustafa
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Vlado Trajkovik
Danco Davcev
Faculty of Electrical Engineering Skopje

3
Automatic Generation of 3D Building Model From Divided Building Polygon
Kenichi Sugihara
Gifu Keizai University
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4
Volume-Based Mesh Editing Using Cylindrical Parameterization
Yoshiyuki Furukawa
National Institute of Advanced Industrial Science and Technology
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Yasuhiro Yoshioka
Hiroshi Masuda
The University of Tokyo

5
Material Aware Mesh Deformations
Tiberiu Popa
Dan Julius
Alla Sheffer
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6
Repetitive Deviations: Techniques in Planar Fabrication of 3D Curvilinear Forms
Robert Trempe
Temple University
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Christopher Redmann
Drexel University

7
Hierarchical G1 Smooth Surface Interpolation With Local Control
Gabriel Taubin
Brown University
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William Klug
University of California, Los Angeles

8
Procedural Modeling of Medieval Castles
Kevin S. Colyar
Geoffrey B. Matthews
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Social Computing

9
KAYAGOMORI
Daisuke Uriu
Naohito Okude
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10
Vestis
Luisa Paraguai Donati
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11
KiitemoiideTUNE: Listening to the Conversation System at a Party
Yoshiro Sugano
Jumpei Ohtsuji
Shigeyuki Takeuchi
Yusuke Ozawa
Mariko Koizumi
Naohito Okude
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12
Synesthetic Recipes: Foraging for Food With the Family, in Taste-Space
Hugo Liu
Matthew Hockenberry
Ted Selker
Massachusetts Institute of Technology, Media Lab
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13
Visualization of Personal Stories
Yuya Nomata
Junichi Hoshino
University of Tsukuba
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14
Ubiquitous Ivy: A Communication Medium for Intimate Company
Itsuki Shibata
Naohito Okude
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15
LATTEMEGANE: Glasses and Actuator Network for Looking for One's Own Treasure
Sho Hashimoto
Daisuke Uriu
Shota Nagao
Yuto Fukushima
Naohito Okude
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16
DinnerWare: Why Playing With Food Should Be Encouraged
Marcelo Coelho
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17
PiedPiper: A Medium to Create a New Site of Pilgrimage in Town
Tetsuya Hamada
Satoru Hashimoto
Yumi Furuoka
Naohito Okude
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18
Mobile Group Interaction With Interactive Video on Large Public Display
Jürgen Scheible
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Timo Ojala
University of Oulu

19
Mallrats: A Table for Exposing and Developing Common Topics
Satoru Hashimoto
Kaori Ochiai
Jun Usui
Gai Inoue
Naohito Okude
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Art & Design

20
Time Slices to Sonic Maps
Brian Evans
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21
Real-Time Interactive Multimedia Performance
Joel Rathgaber
Daryl H. Hepting
David Gerhard
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22

Hyper-Paint:A Possible Software Toy

Jun Fujiki
Kiyoshi Tomimatsu
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23

Operation Rhinoctopus: A Real-Time Interactive Video Manipulation Device

Paige Taylor
Diane Gromala
Kevin Stamper
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24

The HYPERREAL Design System

Keiko Yamamoto
Masaru Hisada
Ichiro Kanaya
Kosuke Sato
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25

Re-Thinking Real-Time Video Making for the Museum Exhibition Space

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Michael John Gorman
The Ark

Andrew Clancy
Sculptor

Brendan Tangney
Trinity College Dublin

26

A Multimodal Artistic Interface

Nicola Quinn
Mikael Fernstrom
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Animation

27

Keyframing Using Linear Interpolation of Matrices

Amy Hawkins
Cindy M. Grimm
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28

Speech-to-Talking-Heads System Based on Hidden Markov Models

Tatsuo Yotsukura
Satoshi Nakamura
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Shigeo Morishima
Waseda University/ATR Spoken Language Communication Research Laboratories

29

Automatic Head-Movement Control for Emotional Speech

Shinichi Kawamoto
Tatsuo Yotsukura
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Shigeo Morishima
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30

Automatic Camera Navigation for Time-Variant Objects

Matt Berger
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Non-Photorealistic Rendering & Animation

31

Color Decomposition for Reproducing Multi-Color Woodblock Prints

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Tomokazu Terai
SGI Japan

Shinji Mizuno
Toyohashi University of Technology

32

Using NPAR to Reveal "The Swan"

Chris Rowland
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Colin Martin
University of St. Andrews

33

NIGAO: Interactive Facial Caricature Drawing System Using Genetic Algorithm

Toshiaki Nakasu
Naiwala P. Chandrasiri
Takeshi Naemura
Hiroshi Harashima
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34

Virtual Mezzotint Using a Model-Driven Strategy

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Shinji Mizuno
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35

More Sketchy More AR, More Fun!

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Florian Landerl
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Mark Billinghurst
HitLabNZ

36

Semantics-Guided Procedural Rendering for Woodcut Maps

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37

Enviromosaics

Salil Apte
Matt Loper
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38

Real-Time Non-Photorealistic Paint Spreading Using Stencil Volumes

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Texture

39

Real-Time Texton Substitution for Super Resolution

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Hideto Motomura
Katsuhiro Kanamori
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40

Stealing Autumn Colors

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Rendering

41

A Real Virtual Pinhole

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42

A Fast Translucency Appearance Model

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43

Fast Rendering Method for Point-Sampled Translucent Geometry

Masashi Oda
Kei Iwasaki
Saeko Takagi
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44

Glare Simulation and Its Application to Evaluation of Bright Lights With Spectral Power Distribution

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Kaoru Matsuoka
Tomoyuki Nishita
Takeshi Naemura
Hiroshi Harashima
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45

Effective Level-of-Detail Management Using Fuzzy Logic

Chee-Kien Gabriyel Wong
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46

Efficient Rendering of Integral Images

Ruigang Yang
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47

Reflectance Estimation of Sparkle in Metallic Paints

Masashi Baba
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48

Level-of-Detail Continuum for Huge Geometric Data

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Carlos Hernandez
Francis Schmitt
ENST Paris

George Drettakis
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49

Exploring Volume Rendering With Path Tracing

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50

Spectral BRDF Creation for Structural Colors

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51

Efficient Physically Based Perceptual Rendering of Participating Media

Diego Gutierrez
Oscar Anson
Francisco J. Seron
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Veronica Sundstedt
Alan Chalmers
University of Bristol

Augmented and Virtual Reality

52

A Tile/Scenario Algorithm for Real-Time 3D Environments

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53

Magic Boards

Michael N. Wallick
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54

Air Traffic Control Tower Augmented-Reality Field Test

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Stephen Ellis
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55

Plausible Physics in Augmented Images

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Kristin Boyle
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56

Expansible Table: For Visualizing Daily Experiences of Reading

Marie Akita
Itsuki Shibata
Kazuya Sumaki
Kaori Ochiai
Naohito Okude
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57

A Sketch Interface to Support Storyboarding of Augmented Reality Experiences

Peter Presti
Maribeth Gandy
Blair MacIntyre
Steven Dow
Georgia Institute of Technology
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58

FloatOmeter: User-Friendly Input of Floating-Point Numbers in Virtual Environments

Matthias Kreiser
Jürgen P. Schulze
Andrew S. Forsberg
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59

VSARD: A Low-Cost Augmented Reality System for Desktop Applications

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Derrick Parkhurst
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60
3D Workflow Pipeline for Cave Virtual Environments
Mark J. Prusten
Silicon Arts
photondyn@hotmail.com

Michelle McIntrye
Marvin Landis
University of Arizona

61
A Haptic Rendering for Hybrid Environments
Jong-Phil Kim
Beom-Chan Lee
Jeha Ryu
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62
Augmented Reality Kitchen
Chia-Hsun Lee
Leonardo Bonanni
Ted Selker
Massachusetts Institute of Technology, Media Lab
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Image-Based Modeling & Rendering

63
Free-Viewpoint Thumbnail for Light-Field Compression
Yuichi Taguchi
Takeshi Naemura
The University of Tokyo
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64
Full-Spectral Image-Based Lighting With Skylight
Tomohiro Tachi
The University of Tokyo
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65
Real-Time Shape Recovery From Silhouette and Disparity
Hansung Kim
Dongbo Min
Shinwoo Choi
Donghyun Kim
Kwanghoon Sohn
Yonsei University
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66
Real-Time Fusion of Range and Light Field Images
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Christof Rezk Salama
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67
A Median-Cut Algorithm for Light-Probe Sampling
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68
All-in-Focus Light Field Live With Thousands of Lenslets
Jonghyun Ha
Masaru Kojima
Keita Takahashi
Takeshi Naemura
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69
3D Computer Graphics World by Stage Setting Model
Makoto Fujimura
Yusuke Kajiwara
Hideo Kuroda
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70
Real-Time Video Lighting
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71
Image-Based Rug Patterns
Daniel Crispell
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72
Calibrating a Catadioptric Light-Field Array
Gabriel Taubin
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Image Processing

73
High-Dynamic-Range Images From Digital-Cameras Raw Data
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William Puech
Frederic Comby
LIRMM CNRS Montpellier

Jacques Joffre
ENSCM Montpellier

74
Autostereoscopic Integral Photography Imaging Using Pixel Distribution of Computer-Graphics-Generated Image
Hongen Liao
Keisuke Nomura
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75
Ray-Space Interpolation for Free Viewpoint Generation
Yaser Jazouane
Tomohiro Yendo
Toshiaki Fujii
Masayuki Tanimoto
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76
Scene Analysis Based on an Optimization of CG Images
Shinsaku Hiura
Takayuki Moritani
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77
No More Blurred Blown-Up Images!
Hongseok Kim
Chang-Joon Park
In-Ho Lee
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Applications

81
Interactive Speech-Conversion System Cloning Speaker Intonation Automatically
Yoshihiro Adachi
Shigeo Morishima
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82
Spectral-Based Image-Editing System
Hiroyuki Fukuda
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83

Similarity-Based Retrieval From a 3D Human Database

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84

BROAFERENCE: Using Emotion Data in Multimedia Services

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85

An Augmented-Surface Environment for Storyboard Presentations

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Education

86

Digital-Age Education of Artists

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87

Creating a Real-World Environment for WMD Incident Command Training

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Andrew Wilson
Jason Brandt
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88

"Tath": Tangible Mathematic Media

Daisuke Horiguchi
Toshiya Usui
Jumpei Ohtsuji
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89

Building an Active Conversation Environment for Edutainment

Lei Zhang
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90

An Evaluation of Animation in a Pedagogical Agent

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91

ChemPad: Generating 3D Molecules From 2D Sketches

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92

The Graphics Teaching Tool for Non-Technical Students

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93

A Kinesthetic Exercise for Teaching Computer Animation

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Interaction

94

Pictan: Interacting Through Free-Hand Images

Mari Yoshimura
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95

Context-Inference Techniques for a Wearable Exercise Support System

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96

An Innovative Non-Grounding Haptic Interface ("GyroCubeSensuous") Displaying Illusion Sensation of Push, Pull, and Lift

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97

CubeCam: A Screen-Space Camera Manipulation Tool

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Karan Singh
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98

Interface for Clay Animation Creation

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99

Interactive Video Genres: Memory, Storytelling, and Meaning

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Jon Bulava
Justin Gaynor
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100

A System for Controlling Multiple Wearable Cameras

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Tomoko Itao
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Anna Morandin
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101

LED-Matrix Z-agon: The Tangible Multi-Display Cube and Algorithm

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102

Lift-Mouse: Tangible Device to Feel 3D Surface of 2D Picture

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103

A Haptic Interface for Creating Smooth 3D Curves With Varying Line Weight

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104

Dipa: Play Equipment With Respiration-Sense Interface

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Perception

105

Perception of Optical Flow and Geometric Field of View

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106

Automatic Selection of Level of Detail Based on Just Noticeable Difference (JND)

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107

Color Palette With Enhanced Psychological Effect Uncovered by Multiprimary Color Display

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Hideaki Haneishi
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108

The Just Noticeable Difference for Transition Durations

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109

Assessing Functional Realism

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110

The Effects of Binocular Stereo Display on Spatial Memory Schema Activation Within Immersive Virtual Environments

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Motion Capture

111

A Real-Time Sequential Algorithm for Human Joint Localization

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112

Quantitative Representation of Face Expressions

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113

Reconstructing Motion Using a Human Structure Model

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114

Modular Dynamic Response From Motion Databases

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Simulation

115

A Spring-Net Deformable Model For Surgery Simulation With Haptic Feedback

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Kenneth E. Barner
Karl Steiner
University of Delaware

116

Optimized Free-Surface Fluids on Adaptive Grids With the Lattice Boltzmann Method

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117

Fast Dynamic Fracture of Brittle Objects

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118

Combined Lagrangian-Eulerian Approach for Accurate Advection

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119

Crowd Realism

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120

Simulating Crowds With Balance Dynamics

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121

The Complexity of Hierarchical Collision Detection

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Jan Klein
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GPU Techniques

122

Fine-Grained Graphics Architectural Simulation With Qsilver

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123

Particle Filter on GPUs for Multiple Object Tracking in HCI Applications

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124

A New Real-Time Video Synthesis Method for Virtual Studio Environments Using GPU and Projected Screens

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Hideki Mitsumine
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Simon Richir
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125

Parallax Searching and Mesosurface Shadowing

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126

Development of Robotic TV Game Player Using Haptic Interface and GPU Image Recognition

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127

Real-Time Loop Subdivision on the GPU

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128

Emphasizing the Area of Interest Using Real-Time Shaders

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Visualization

129

Advanced Data Visualization on 3D Accelerated PDAs

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130

Visualization of Large Isosurfaces Based on Nested Clipboxes

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131

Particles With a History: Visualizing Flow Fields With GPU-Based Streamlines

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132

A Partial Shape-Matching Technique for 3D Model Retrieval Systems

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133

Automatic Cross-Sectioning Using 3D Field Topology Analysis

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134

Using 3D Visualization to Enhance Understanding of Computer-Network State

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135

A 3D Graphics Toolkit for Studying Neural Basis of Adaptive Behaviors

David Cofer
James Reid
Ying Zhu
Donald H. Edwards
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Biomedical Visualization

136

3D Cancer Cell Visualization for Patients and Scientists

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137

Discovering Biostructure Constraints Using VRML Visualization

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Hatice Gulcin Ozer
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138

Robust Automatic Optic-Disk Segmentation

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139

Modeling the Fluffy Lens: Construction of the Virtual Chinchilla

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140

Multi-Scale and Multi-Physics Visualization

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141

Volume Interaction With Voxels by Manipulating 3D General Grids

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142

Design and Implementation of MVL: Medical VR Simulation Library

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Hiroshi Oyama
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Hiroyuki Yoshihara
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143

An Explorational Exhibit of a Pig's Heart

Thomas Wischgoll
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Joerg Meyer

Location

Room 501AB

web program

Understand how graphics and interaction define, extend, and optimize online environments. Web Program sessions focus on standards, technologies, rich media, usability, accessibility, art, design, visualization, and internationalization.

The Web Program includes three tracks: Application, Paradigm, and Technical and one panel discussion. The Application Track showcases short presentations about cutting-edge applications on the web. The Paradigm Track showcases presentations about cutting-edge advances in such areas as web standards, usability, user experience, and design. The Technical Track consists of the presentation of peer-reviewed papers.

Web Program Committee

Nishant Kothary
Web Program Chair
Amazon.com

Amit Pitaru
Application & Paradigm Track Chair
New York University

Ying Zhu
Technical Track Chair
Georgia State University

Technical Track Subcommittee

Luca Chittaro
Università degli studi di Udine

Rynson Lau
City University of Hong Kong

Nadia Magnenat-Thalmann
L'Université de Genève

Nicholas Polys
Virginia Polytechnic Institute and State University

Wednesday, 3 August

8:30 – 9:15 am
Room 501AB

Session Chair
Nishant Kothary, Amazon.com

Experience Design Unplugged

Paradigm Track

At the crossroads of web design and ubiquitous computing, the user experience is out of control. Salvation lies in the strange connections between social software, semantic webs, convergent architecture, and interaction design. In this cyberspace safari, Peter Morville draws ideas about everyware from his new book on ambient findability.

Peter Morville
Semantic Studios
morville@semanticstudios.com

9:30 – 10:15 am
Room 501AB

Session Chair
Nishant Kothary, Amazon.com

Designing an Interactive Experience for Ease of Use

Paradigm Track

This session reviews a set of proven techniques for iteratively designing interactive experiences in order to maximize ease of learning, efficiency of interaction, and user satisfaction. Examples from the presenters' work is used to illustrate the process, including examples from sites for General Motors, Merrill Lynch, and Office Depot. Attendees receive straightforward exercises that will improve the usability of any web site.

Howard Tiersky
Capgemini US, LLC
howard.tiersky@capgemini.com

10:30 – 11:15 am
Room 501AB

Session Chair
Amit Pitaru, New York University

Processing.org: A Networked Context for Learning Computer Programming

Application Track

Processing is a programming language and environment built for the electronic arts and design communities. It is created to teach fundamentals of computer programming within a visual context and to serve as a software sketchbook. It is used by students, artists, designers, architects, and researchers for learning, prototyping, and production.

Casey Reas
University of California, Los Angeles Design | Media Arts
reas@processing.org

Benjamin Fry
The Broad Institute

11:30 am – 12:15 pm
Room 501AB

Session Chair
Amit Pitaru, New York University

Moovl, Doodles That Move

Application Track

Moovl is a sketchpad for children in which their drawings come alive with interactive motion and sound by adding simulated physical dynamics to freehand strokes. This deceptively simple transformation places the intuitive activity of drawing in a motivating and often surprising feedback loop of hypothesis and experiment, creation, and play.

Ed Burton
Soda Creative Ltd.
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Wednesday, 3 August

1:45 – 2:30 pm
Room 501AB

Session Chair
Amit Pitaru, New York University

The Social Web: Platforms, Communities, and Creativity

Panel

Today's web is far more than a bidirectional graph. It has a brain, a voice. It is a virtual "living" organism, a social system. The explosive spread of blogs, combined with the rapid emergence of friendly technologies that enable users to interact with ease, has bred a web that affects society, perceptions, and commerce. As we look ahead to new platforms and paradigms that support seamless communication, it is important to consider how we must evolve as practitioners, users, and creators of web technologies.

How are blogs affecting companies? How do communities build themselves around platforms? Does the creative process play an important role in web development? How do you satiate the new generation of socially savvy users?

Amit Pitaru
New York University
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Casey Reas
University of California, Los Angeles, Design | Media Arts

Dennis Crowley
dodgeball.com

Howard Tiersky
Capgemini US, LLC

Michael Luck Schneider
New York University ITP

Ze Frank
zefrank.com

2:45 – 3:30 pm
Room 501AB

Session Chair
Amit Pitaru, New York University

The Creative Act

Paradigm Track

The transition to an authorship society brings with it massive amounts of content to consume, but it also brings a new relationship between our society and the notion of creativity. This session explores real-time creativity and how it effects the way we think about teaching and learning.

Ze Frank
zefrank.com
ze@zefrank.com

3:45 – 4:30 pm
Room 501AB

Session Chair
Nishant Kothary, Amazon.com

WorldEar: Alternative Interfaces for the Web

Application Track

Advances in embedded network technology have made it possible to start designing physical objects and spaces that harness the power of the internet to connect people, relay information, and entertain. This presentation is an overview of networked objects and a summary of the design process used to create WorldEar.

Michael Luck Schneider
New York University ITP
mo@motohoho.com

Kentaro Okuda
SGF Associates

Kenneth Haller
Decker Design

4:45 – 5:30 pm
Room 501AB

Session Chair
Nishant Kothary, Amazon.com

A New Kind of Programmer

Paradigm Track

This session focuses on teaching computational media to art students and how should we go about teaching a traditional engineering craft to minds that are more interested in self-expression than engineering achievements. Should the foundation methodologies persist, or should new paradigms be used instead? Is it even the same craft that has been traditionally taught in computer science, or have artists widened the actual definition of machine programming?

Amit Pitaru
New York University
pitaru@nyu.edu

Thursday, 4 August

8:30 – 8:55 am
Room 501AB

Session Chair
Ying Zhu, Georgia State University

Exploiting an Evolutionary Accident in Web3D Communications to Integrate Application Components

Technical Track

The Virtual Reality Modeling Language (VRML) ushered in a new era in computer graphics by providing the first international standard 3D format for the web (web3D). Unfortunately, some who tried VRML applications found they did not work and naturally blamed the language. However, the problem often lay in the sensitivity to different client software environments of the programming interfaces used to extend VRML. In many cases, VRML applications had to be extended to include things VRML lacked, such as sophisticated user interface and interactivity, database access, multiuser support, security, and system-integration support. These important aspects of modern systems were added via a programming interface called the External Authoring Interface (EAI). The problem was that applications based on the EAI would not work reliably due to changes in the client environment by competitive commercial stakeholders, which affected things like support for a required third party programming language. It is this problem that often lead to unsatisfactory user experiences, not VRML itself.

Below the client battlefield radar, three small web3D functions accidentally evolved, in symbiosis with the web, to provide an alternative integration method built on a simple but solid foundation: the Hypertext Transport Protocol (HTTP).

Chris Thorne
University of Western Australia and Ping Interactive Broadband
dragonmagi@gmail.com

9:10 – 9:35 am
Room 501AB

Session Chair
Ying Zhu, Georgia State University

Web-Based Molecular Visualization Using Procedural Shaders in X3D

Technical Track

The introduction of programmable graphics processing units (GPUs) and the addition of procedural shaders to the web3D standard X3D provide new techniques to develop real-time web-based visualization. This paper discusses the applications of these techniques to bioinformatics and chemistry visualization, specifically the visualization of large biomolecules. By using procedural shaders, we are able to produce higher quality visualizations with minimal performance penalty. We have developed methods to automatically convert from the standard bioinformatics PDB format to CML and then to X3D. The procedural shaders are automatically inserted during the CML-to-X3D conversion. This provides higher quality images and leads to future possibilities of more flexible and enhanced visualizations.

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G. Scott Owen
Georgia State University
owen@siggraph.org

Ying Zhu
Irene Weber
Robert Harrison
Georgia State University

9:50 – 10:15 am
Room 501AB

Session Chair
Ying Zhu, Georgia State University

Perceptually Optimized 3D Transmission Over Wireless Networks

Technical Track

Many protocols optimized for transmission over wireless networks have been proposed. However, these protocols do not consider human perception in deciding a transmission strategy for 3D objects. Many factors, such as the number of vertices and the resolution of texture, can affect the display quality of 3D objects. When the resources of a graphics system are not sufficient to render the ideal image, degradation is inevitable. It is therefore important to study how individual factors will affect the overall quality, and how the degradation can be controlled given limited bandwidth resources and possibility of data loss.

This paper reviews the essential factors that determine display quality. It provides an overview of our research on designing a 3D perceptual-quality metric integrating two important factors, resolution of texture and resolution of mesh, that control the transmission bandwidth. It then suggests alternative strategies for packet 3D transmission of both texture and mesh. These strategies are compared with respect to preserving 3D perceptual quality under packet loss.

Irene Cheng
Anup Basu
University of Alberta
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10:30 – 10:55 am
Room 501AB

Session Chair
Ying Zhu, Georgia State University

The Fourth Party in Online Arbitration as a Shared Virtual Workspace

Technical Track

This paper considers collaboration, implementation, and legal issues that arise from using a shared virtual workspace during online arbitration. Based on the concept of the fourth party, the authors developed an interface that influences the process of communication and negotiation, something that adds decision-making value to an arbitrator. The paper begins with a discussion of the legal arbitration issues that will influence our design methodology. We analyze the group dynamics and how a virtual workspace may work toward improving some of the human interactions that take place during an arbitration proceeding. We then describe the design methodology of the shared virtual workspace and consider some implementation results.

Dimitrios Protopsaltou
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Nadia Magenat-Thalmann
Université de Genève

Thursday, 4 August

11:10 – 11:35 am
Room 501AB

Session Chair
Ying Zhu, Georgia State University

The Rigid Body Physics Component: A Proposed Amendment to the X3D Specification

Paradigm Track

This presentation proposes an amendment to X3D to add a rigid body physics component for integrating a physics engine into X3D. The presenters demonstrate a working version within the Xj3D browser, describe the key concepts required, and summarize their implementation.

Stephen N. Matsuba
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Alan D. Hudson
Justin Couch
Yumetech, Inc.

11:50 am – 12:15 pm
Room 501AB

Session Chair
Ying Zhu, Georgia State University

Kanji Block

Application Track

Kanji Block is a new web-based visual application for learning Japanese Kanji characters. Teaching Kanji can be a very complex task because of the multi-faceted nature of the writing system. This application uses a three-dimensional approach to this interface design challenge.

Miho Aoki
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Ben Barton
Kirikiri.com

Yoko-Collier Sanuki
University of Alaska Fairbanks

1:45 – 2:10 pm
Room 501AB

Session Chair
Nishant Kothary, Amazon.com

placeMap: Building Community Through Active Context Mapping

Application Track

A web application that builds a community through an understanding of the user's context in an active spatial landscape. Beginning with the traditional campus map, placeMap reimagines what a map should be by placing the user's community life at the center of the map.

Matthew Hockenberry
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Rob Gens
Ted Selker
Massachusetts Institute of Technology, Media Lab

2:25 – 2:50 pm
Room 501AB

Session Chair
Nishant Kothary, Amazon.com

CellMailGraph

Application Track

CellMailGraph is a tool to visualize an email inbox on a cell phone or PDA screen. It tracks the emails that certain users have sent and keywords in the messages, and represents that information using colors, shapes, and arrangement.

Laura Garcia-Barrio
New York University
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Thursday, 4 August

3:05 – 3:30 pm
Room 501AB

Session Chair
Nishant Kothary, Amazon.com

e-Stadium: Wireless Football Infotainment Applications

Application Track

By dynamically reformatting data generated by the Ross-Ade Stadium statistician, e-Stadium provides Purdue University fans an array of real-time information on their palmtop displays, including up-to-the-minute statistics, video highlights, and play-by-play descriptions. The system also delivers diversions such as food locations, trivia, Boilermaker history, weather reports, and the latest updates on other games.

Ronald J. Glotzbach
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Edward J. Coyle
Nathan Bingham
Purdue University

3:45 – 4:30 pm
Room 501AB

Session Chair
Nishant Kothary, Amazon.com

Mobile Content-Delivery Technologies

Application Track

An overview of mobile content-delivery technologies, highlighting strengths, weaknesses and best practices.

Ezra Freedman
Schematic
efreedman@schematic.com

Jonathan Barsook
Schematic

4:45 – 5:30 pm
Room 501AB

Session Chair
Nishant Kothary, Amazon.com

An Ubiquitous Approach to Mobile Applications

Application Track

The world gets more interesting as the devices around us get smarter. The problem is, sometimes it's no fun sitting around waiting for devices to evolve. Mobile location-based services, games, and social software are more fun when everyone can play, not just those with the latest and greatest mobile devices. This talk discusses an approach to making emerging technologies work on ubiquitous devices (the phones most people carry in their pockets today) using examples from dodgeball (mobile social software), ConQwest (semacode treasure hunt) and PacManhattan (big urban game).

Dennis Crowley
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Locations

Educators Program	Room 502B
Incubator	Room 502A

educators program

Explore the future of teaching and learning: virtual instructors, toys as teaching tools, individual versus community learning, and how computers can make education more engaging. In papers, panels, forums, and QuickTakes, educators and students share ideas, analysis, and discussion.

New this year: The Incubator, a demo space for interactive educational products.

Educators Program Committee

Patricia Beckmann-Wells
Educators Program Chair

Bridget Gaynor
Savannah College of Art and Design

Darryl Naylor Johnson
Savannah College of Art and Design

David Masher
Bobvila.com

Sande Scoredos
Sony Pictures Imageworks

Carol Strohecker

Scott Traylor
360KID

Scott Wells
Animax Design

Wednesday, 3 August

8 – 8:30 am

Ramp In

This session, sponsored by the ACM SIGGRAPH Education Committee, presents a fast overview of the Educators Program. Meet the people involved and hear the ideas behind this year's schedule.

Patricia Beckmann-Wells
Educators Program Chair

8:30 – 10 am Learning Environments

Flash: Animation in the Third Dimension

How to conceptualize and build a variety of interactive 3D solutions. This presentation provides computer graphics designers with tools to create interactive learning systems within a three-dimensional Flash world. The presentation provides tips for conceptualizing solutions, visualizing data, and developing practical interactive applications. Flash examples consist of both practical and experimental applications. To further enhance the creative process, complete working models are deconstructed for each particular interactive system. Examples demonstrate a broad range of Flash applications, from web sites to CD-ROM delivery.

The main feature that sets this presentation apart is application of real and simulated 3D space in a traditional 2D environment.

Chris Jackson
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Jim Ver Hague
Rochester Institute of Technology

Creating Virtual Environments in a Multidisciplinary Classroom

This paper reports on an interdisciplinary course, Computing and Art, taught at Sabanci Üniversitesi, Istanbul, for the first time in the fall of 2004. The two faculty members teaching the course, and the students, are 50 percent from the visual communication design department and 50 percent from the computer science department. Two-student teams, one from each department, create interactive 3D virtual environments. The challenge is to develop real-time graphics software and well-designed virtual spaces and/or interfaces, but the primary mission is to create meaningful content that can be implemented in a non-linear spatial structure, with non-linear narrative. This requires content development, scenario and dialogue writing, as well as research on relevant social, historic, audio, or scientific data, when and as needed.

Selim Balcisoy
Sabanci Üniversitesi
balcisoy@sabanciuniv.edu

Elif Ayiter
Sabanci Üniversitesi

Inquiry-Based Honors Physics Labs

This paper describes a new set of laboratories for the Honors Freshman Physics class at the University of Minnesota. The new labs are much more free-form than conventional ones; students are given a topic (such as "do an experiment about air resistance") and allowed to design, analyze, and simulate their own experiments. After analyzing their experiments, they present their results to the rest of the class. The new labs are much more like working in a real research environment, and they lead to a much deeper and more flexible understanding of the topic. The labs are running smoothly after one semester, and our students seem quite happy with them, though we do not have any hard assessment results so far.

Peter Border
University of Minnesota

3D Environments as Social Learning Tools: The VIRTU@LIS Experience

New forms of dialogue and new mechanisms for introducing scientific issues to non-scientific audiences require radical design of interfaces between scientific processes and audiences. The VIRTU@LIS project has explored the use of "convivial interfaces" in games. These tools stimulate self-reflection, discussion, and possible negotiation to enhance relationships with the rest of the community that promote awareness and responsibility among citizens and grounds for personal decision-making power and social learning. These types of tools can be used individually or in a context of debate about empowerment and lifestyles strategies. They can also be used in educational contexts, to raise issues and deploy discussion. In this paper, VGAS (which relates lifestyles to climate change) and Fishu@lis (which relates personal consumption to sustainable fisheries) are presented as examples of such tools.

Tiago de Sousa Pedrosa
European Commission Directorate-General Joint Research Centre

10 am – Noon Panel

Studio Views of Demo Tapes

A distinguished group of computer-animation professionals discusses (and illustrates by example) what they look for when reviewing demo tapes and portfolios of recent college graduates. The session addresses such topics as what to include and what not to include in demo reels, what length and what format the reel should be, audio for the demo reel, and issues related to the job-application process.

Art Durinski
The Durinski Design Group
Otis College of Art and Design
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John Andrews
ka-chew! (a Klasky Csupo Company)

Ginger Bowman
Sony Pictures Imageworks

Frank Gladstone
IDT Entertainment

Paul Sidlo
Rezn8 Productions, Inc.

Michael Tigar
Tigar Hare Studios

Noon – 1 pm Panel

Résumés and Demo Reels: If Yours Aren't Working, Neither are You!

What does it take to get a job at a visual effects, computer animation, or game or interactive company? This workshop shows how to open the door to interviews, create an irresistible résumé, and showcase your talent in a demo reel. A top career coach and recruiter in the industry reveals the secrets of how to make yourself a successful candidate and get the job you want.

Pamela Thompson
Ideas to Go
PamRecruit@aol.com

1 – 2:30 pm Learning Games and Narrative

Electronic Games: 2D or not 2D?

Should graphics in educational electronic games be 2D or 3D? This research investigates whether the use of 2D and 3D graphics in computer and video games affects how attracted a male is to playing an electronic game versus how attracted a female is. Published research indicates males outperform women in 3D virtual environments; a female's inherent traits could have significant influence on how attracted she is to an electronic game.

Tina Ziemek
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Research and Development of K-12 Learning Games Via the Undergraduate Student

There is an increasing amount of specific research on children's interactive learning games and the fascination of video games. "The fact that children spend considerable amounts of time playing computer games is a phenomenon that has not gone unnoticed by educators" [Robertson and Good 2005]. This paper explores how an undergraduate computer graphics program can take advantage of current research while considering the K-12 curricula.

The current traditional undergraduate population consists of a vast reservoir of potential insights, and curricula should be developed to take advantage of these insights. This is one of the first groups of students in which most have had technology available to them throughout their educational careers. This area is just newly explored, and it will take time to understand how it can actually enhance classroom activity and whether these technologies can be successfully integrated into the classroom.

Jana Whittington
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K. James Nankivell
Purdue University Calumet

The Crucial Role of Animated Children's Educational Games

The role of animated children's educational games can not be understated. With the abundance of television programming that is purely entertainment, children are idling away alarming amounts of time watching only television programs that have no educational substance. Their formative years are hampered by the lack of cognitive stimuli that educational programming can provide.

Based on research on current television viewing habits, programming trends, successful educational television shows, and sound educational principles, this paper maintains that educational games will be a strong component in alleviating the excessive amount of time that children spend with pure entertainment television. Subsequent research on popular educational games has led to development of a basic set of criteria that would provide the most effective educational games. Companies can capitalize on the proliferation of computers in homes and schools, and elevate engaging educational games to a level of prominence among current media outlets.

Patrick McCue
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Beyond Virtual Tutors: Semi-Autonomous Characters as Learning Companions

How do electronic interactive learning media support constructive learning beyond mere instruction and predefined exercises? This presentation considers the new technical possibilities of virtual interoperable characters as learning companions. Following a brief summary of state-of-the-art interactive storytelling issues that must be considered in the creative process, the presentation shows first experiences from two projects with different approaches that employ playful text-based conversations with graphical animated bots. The results lead to the (surprising) conclusion that the most significant learning process seemed to be achieved by active authors of the conversational dialogues. Beyond an instructive "virtual tutor" (primarily misunderstood as replacing a human educator), different metaphors are suggested that change some expectations for learning with virtual characters. As a result, learners will be viewed as authors who create and shape their own virtual companions.

Ulrike Spierling
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2:30 – 3:30 pm Forum

Teaching 3D Animation Online: The Ultimate Challenge?

3D computer animation is a very challenging subject to teach and to learn because it requires a seamless blend of artistic and technical skills. In the last few years, online education has made major strides in other fields, providing previously impossible educational opportunities to thousands of students. Application of online technologies can improve instructional quality, reduce costs, increase accessibility (particularly to non-traditional students), and provide flexibility for both faculty and students.

To date, however, relatively few institutions have offered 3D animation courses online. This panel presents a group of educators and professionals from a wide variety of practices and perspectives to discuss the challenges: some who currently teach 3D online, some who teach mostly in traditional classroom settings, and others who supplement place-based education with online elements.

Tereza Flaxman
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Jeremy Cantor
Sony Pictures Imageworks

Perry Harovas
XVIVO Digital Animation

William J. Joel
West Connecticut State University

Shawn Kelly
Industrial Light & Magic

Wednesday, 3 August

3:45 – 5:15 pm Learning Projects

Fashionable Education: Is RGB the New Black?

This presentation describes the results of introducing the concept of computer graphics and computer animation into the assessment procedure for a module of a degree program in electrical and electronic engineering: virtual reality systems.

The fundamental question was whether this source of fashionable education is simply a fad or will it become a closet staple? That is, does the use of educational entertainment improve learning and teaching outcomes in science-based subjects.

The results show that by including a significant proportion of peer-reviewed design material into the syllabus, students become highly motivated and achieve a deeper level of comprehension.

Karen McMenemy
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Stuart Ferguson
Queen's University Belfast

Vietnam Remembered: Reflections on a War - An Interactive Learning Resource

This CD, "Vietnam Remembered: Reflections on a War," is the culmination of a web project that solicited remembrances and commentaries from over 5,000 individuals between 1996-2004. It features a dramatic narrative of over 100 photographs taken during the Vietnam War of American and Vietnamese soldiers, street children, Vietnamese civilians, and American protesters combined with commentaries by veterans, read by professional actors. Viewers can explore and consider the various stories told within the dramatic narrative with self-guided selections from the remembrances selected from the web site's collection.

The Educators Program presentation focuses on the process of creating the CD and organizing the content to preserve an historical or cultural picture of an era.

Kenneth Hoffman
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Design and Communication of Architectural Space Using 3D Graphics and Film Language

This paper examines how architecture students can use film language to more fully apply 3D modeling and animation software in the architectural design process and in communicating the results. Specifically, the paper covers the work and processes of two teams of six upper-level architectural students over the course of a year-long studio and production of a short computer-generated film. The studio combined architectural-design methods with the process and concepts of film production.

Matthew Knox
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Community Curation of Small-Scale Animation and Video for Museums

How museum staff and volunteers can use newer technologies and techniques to storyboard, process, construct, and incorporate small-scale animation and video resources into gallery and education program design without detracting from the objects on display, cluttering the gallery space, or applying a logistical nightmare to an educator's presentation. Specifically, this paper covers development and production of three multimedia modules: a video project documenting Alaska Native artists at work, an animation project on the science of the Northern Lights, and a video-animation project that illustrates the cultural significance and function of the Inupiaq toggling harpoon head.

Roger Topp
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Herminia Din
University of Alaska Anchorage

5:15 – 5:55 pm Papers

Fake Fun: Transforming the Challenges of Learning Into Play

In the spring of 2004, a small first-person shooter game engine was adapted as the basis for a non-violent educational game titled "Go Fish." Produced within the Georgia Tech Research Institute, the project was surprisingly modest, but the insight it generated was remarkable. Structural differences between play and education were exposed. Resolving these differences, completing the project, and making sure that it was both fun and educational required merging educational content into individual acts of play. The result was an attempt to solve the problem of "Fake Fun": the lack of enjoyment found in educational games. Bypassing the finer points of the narratology vs. ludology debate and remaining within conservative educational boundaries, the authors hope to provide simple, practical advice for those seeking to transform educational challenges into challenges of play.

Stephen L Guynup
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Jim Demmers
Georgia Tech Research Institute

Sign-Language Subtitling

A new method of sign-language subtitling for motion pictures aimed at deaf children who cannot read English yet and can communicate only via signs. The method is based on the recently introduced concept of "semantroid" (an animated 3D avatar limited to head and hands) and on implementation of a new scrolling technique that allows for concurrent display of four subtitling windows at the bottom of the screen.

The highlights of the presentation are:

- The semantroid model optimized for maximum visibility and readability of face and hands configurations
- Advantages and disadvantages of the semantroid model versus human signers and full-body avatars
- Difficulties with traditional sign-language subtitling methods
- The new scrolling subtitling technique applied to an educational video of a chemistry experiment.
- Report on testing and evaluation of the method.

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Thursday, 4 August

8 – 9 am QuickTakes

Accelerating Online Discourse via 3D Online Learning Environments

3D online learning environments can provide a discourse, cognitive scaffolding that supports accelerated online text-based inquiry when used in a blended course. This presentation compares five courses conducted between 2003 and 2004 that used web-based course delivery, blended face-to-face delivery, and blended 3D online learning environments.

James G Jones
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MOCAP in the Classroom: Now & Tomorrow

From Robert Abel's Sexy Robot of 20 years ago to Tom Hanks' tour-de-force multi-role performance in the computer-animated feature "Polar Express," motion capture and motion tracking have made important changes to how computer animation is planned and carried out for film and game production. The frontier of the analysis, understanding, and quantification of human (and even animal) motion promises many new exciting innovations. This presentation addresses the educational use of motion-capture technology and how it affects curricula. Models for adoption and integration are presented by showcasing animation projects completed by undergraduates at Quinnipiac University and team projects completed by graduate students at Parsons School of Design. A look ahead examines future developments.

Gregory P. Garvey
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Anezka Sebek
Parsons School of Design

Haptic Device Medical Training

One of the most difficult challenges of medical training is accurately simulating real-world conditions. This presentation addresses one solution for training students in the use of an endovaginal ultrasound. Due to the nature of the procedure, precautions must be taken to minimize patient discomfort. With a virtual training system, these and other issues can be addressed more than adequately.

Christopher P. Redmann
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A New Model of Interaction: Digital Music and 3D Animation

How do we get students to think less about the mechanics of multimedia software and more about its creative potential for telling a story? One way is through collaboration with students in different but synergistic disciplines. This presentation summarizes an exciting new model for interdisciplinary collaborative teaching that provides a richer and more flexible alternative to the traditional team-teaching approach. The model is applied to 3D computer animation and digital music.

Genevieve B. Orr
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Designing Computer Graphics Courses for Distance Learning

This presentation addresses effective design of computer graphics courses for a distance-learning environment. It focuses on three distance-learning guidelines: student motivation, visual appeal, and student interaction.

Dino Schweitzer
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Pocket Virtual Worlds

When people think of virtual worlds, they think of themselves sitting by a computer, in a chair in front of a desk. What's needed is a virtual world in your pocket that you can take with you. Pocket PCs can allow a person to explore a "pocket" virtual world. Their small size makes the experience personal and portable. Of course, you are still sitting in your chair, so we have to take it to the next level: add a digital compass and pedometer. Now you can pull out your Pocket PC and start walking around your virtual world. Add wireless to your Pocket PC and WiFi to your field, and now it's a multi-user experience. This presentation outline some of the ideas that could make this a reality.

Jared Bendis
Case Western Reserve University,
The New Media Studio
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Larry Hatch
Bowling Green State University

9 – 10 am Panel

Lessons Learned From Games for Education

There is increasing interest in the possibility that good game design can help promote learner states that are conducive to learning. However, we are only beginning to understand what features of games make them educationally effective. This panel brings together researchers who are experienced in creating educational games and studying their effects on learning to address key questions:

- What features of games are most important for promoting learning?
- How do non-game learning activities and learning aids change when game-based activities are introduced? How can they best be integrated?
- How does game-based learning transfer to the real world?

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Idit Caperton
MaMaMedia, Inc.

Carrie Heeter
Michigan State University

Yasmin Kafai
University of California, Los Angeles

Brian Slator
North Dakota State University

Thursday, 4 August

10:15 – 11:15 am Forum A: Issues of Scale

We Are Too Small To Do That: Challenges and Opportunities of Computer Graphics Education in Small Art Departments

As more institutions in higher education integrate computer graphics technology into their existing art programs, smaller art departments in particular are facing many challenges and obstacles. From curriculum design and pedagogical concerns to finding necessary resources and promoting the program, implementing a computer graphics program is a complex endeavor. Many issues apply to any size art program, but smaller departments often face stiffer challenges, from limited financial resources to a lack of qualified faculty and inadequate facilities. In order to overcome such obstacles, small art departments must be more resourceful and inventive than larger programs. The educators on this panel invite open dialogue and share their ideas and concerns about preparation and implementation of computer graphics technology in small visual art programs.

Miho Aoki
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Andrew Bongsung Bac
Youngstown State University

Colleen Mae Case
Schoolcraft College

Neal McDonald
University of Saint Francis

11:15 am – 12:15 pm Forum B: Issues of Scale

What Role Does Technology Play in Starting Your Digital Media Program?

In the last few years, the number of departments that offer digital media programs has expanded dramatically, in four-year colleges and universities that offer terminal degrees, institutions that offer certificate programs, and continuing education classes. When educators develop these programs, there are obviously concerns about accreditation, faculty recruitment, and curriculum development, but the role of technology in supporting such endeavors should not be discounted.

This forum features some of the educators who have successfully developed digital media programs and their experiences with integrating technology.

Mark Thomasson
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Pam Hogarth
Gnomon School of Visual Effects

Marty Hasselbach
Vancouver Film School

Angela Stukator
Sheridan College

Richard Weinberg
University of Southern California

1:30 – 3 pm Issues of Curriculum

Project-Based Learning Within a Digital Arts and Design Environment

Over the past decade, several new digital-art programs have been implemented, including animation, special effects, and interactive gaming. These schools have realized the challenge of keeping current with hardware and software as well as training for faculty and technical support. In addition, there is a need to develop a curriculum within the time constraints, learn complicated software, and teach design issues, media, or even necessary management skills, all at the same time.

How is this related to Walter Benjamin's early-20th-century proposal that defined the "author as a producer" (a change from the ideal romantic concept of authorship to the world of mass media and production). Should we integrate this knowledge in our curricula?

Is project-based learning the answer?

Jurgen Faust
Cleveland Institute of Art
jfaust@gate.cia.edu

Team Tactics: Using Industry Workflow Standards in a 3D Curriculum

Aspiring animators, especially student animators, are often solitary creatures. Coincidentally, animation curricula are highly focused on the "solo-flight" model of instruction, in which one student conceives, designs, and completely produces an animation project.

However, with very few exceptions, studios work in collaborative teams, never in solo-flight mode. Project complexity requires artists to specialize so that multiple aspects of a project can be worked on concurrently. While modelers are modeling, texture artists are texturing; while riggers are rigging, the animators are animating the same project. Clearly, the solo-flight model of instruction is counter to industry standards.

This paper lays out the details of the team concept vs. solo-flight problem and its potential benefits to students and future employers. It illustrates one effective team-based solution that keeps students engaged and active throughout the semester. Most importantly, it better prepares students for employment in the animation industry.

Adam Watkins
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Thursday, 4 August

Deepening Assignments

This paper discusses deepening assignments as part of a graphics course in which students are allowed to choose their assignments according to their own interests. The result: students have an opportunity to adjust the course for maximum benefit in the diversified and growing field of computer graphics. The authors have applied this concept for eight years.

Lars Kjelldahl
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Virtual Theatre: A Collaborative Curriculum for Artists and Technologists

From the beginning, computer graphics research and applications have involved collaborations between professionals in both technical and artistic areas. And collaboration between technicians and artists have been an inherent component of the theatre for centuries. Virtual Theatre merges these two collaborative arenas with the goal of providing a springboard for learning through interdisciplinary collaboration and teamwork. The project is geared toward those who want to enter electronic entertainment industries, where successful collaboration between artists and technologists is crucial to the success of a project.

In the spring of 2004, students in three courses worked together to create a virtual theatre production at the Rochester Institute of Technology. This paper describes the collaborative learning approach taken in these courses and discusses the results and issues that emerged.

Joe Geigel
Rochester Institute of Technology
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Marla Schweppe
Rochester Institute of Technology

3:15 – 4:35 pm Papers

GameX: A Platform for Incremental Instruction in Computer Graphics and Game Design

Recent trends have generated more focus on game design as a topic for teaching in higher education. Although many game engines currently exist, few of them were designed with educational goals in mind. This paper distinguishes between industry-oriented engines and instructional game engines designed to teach a range of concepts. The features needed to teach game development to college undergraduates in engineering and the humanities are explored. Specifically, the authors developed a platform that supports incremental education in game design: GameX, an open-source instructional game engine that was used to initiate the Game Design Initiative in the Department of Computer Science at Cornell University.

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David Schwartz
Cornell University

A Virtual-Environment-Based Parachute Descent Simulator

A large-scale, immersive virtual-environment-based parachute descent simulator has been developed and deployed in the Air and Space Gallery at the Museum of Science and Industry in Manchester, UK. The unattended interactive installation promotes interaction and understanding of the underlying physics involved. The installation is based on the recent successful testing of Leonardo da Vinci's parachute design of 1483, but it allows users to modify attributes of the parachute and environmental conditions. User feedback and learning outcomes have been assessed with positive results. The simulator contains a number of novel features that promote group interaction and discussion. The lessons learned from this project will prove useful in informing future large-scale immersive exhibits in public spaces.

Nick J. Avis
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Teaching Programmable Shaders: Lightweight Versus Heavyweight Approach

The most exciting recent advance in computer graphics has been the development of programmable graphics processing units (GPUs). This paper summarizes different approaches to and some of the issues involved in teaching the use of GPUs.

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Bryson Payne
Georgia College and State University

Ying Zhu
Jeff Chastine
Georgia State University

Live Graphics Gems as a Way to Raise Repositories for Computer Graphics

This paper presents two technologies, code-based interactivity and server-side compiling, that add value to an educational repository and address the challenges of achieving a critical mass of submissions. These technologies are part of current efforts in the computer graphics community to collect, preserve, and share educational material. This novel repository service introduces "live" graphics gems to the material: modifiable program listings with corresponding interactivities that are compiled and versioned on the server side. Repository material evolves on the fly. Authors who are not willing to submit their material as open source are given a granular source control. The paper describes the implications of this approach (for example, a common, repository-driven content markup, didactics of code-based interactivity, and crucial technical services and tools). Prototype implementations and showcases are included.

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Frank Hanisch
Wolfgang Straßer
WSI/GRIS Universität Tübingen

4:45 – 5:30 pm

Ramp Out

A summary of on-going initiatives in computer graphics education and an invitation to get involved.

The Incubator

Wednesday, 3 August 10:30 am – 5:30 pm
Thursday, 4 August 8:30 am – 5:30 pm
Room 502A

Agent-Based Models in Stereoscopic 3D

Agent-based modeling (ABM) is a new strategy for the mathematical sciences. At least one ABM programming environment, NetLogo, includes 3D capability. This project combines NetLogo3D and stereo 3D display technology into a scientific visualization system for mathematics and scientific communication, research, and teaching.

Ralph Abraham
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John Miller
Michael Miller
Enter Network Corporation

Computer Graphics as a Space Journey and as a Murder Mystery

Story-centered curriculum is a novel method of instruction that is well suited for online learning, where the physical presence of the instructor is minimal or non-existent. In this new introductory course on computer graphics, students participate as actors in two stories. In the first story, the student is a member of a NASA simulation team that is building virtual reality models for a space journey. In the second story, the student is a detective investigating a murder in a museum.

Kiran Varanasi
International Institute of Information Technology

The Convertible Podium: A Rich Media Teaching Tool for Next-Generation Classrooms

Rich media permeates next-generation classrooms. Even today, high-end systems feature a multiplicity of display screens, smart whiteboards, robotic cameras, and smart remote conferencing systems, all intended to support heterogeneous data and document types. Exploiting the capabilities of such a room, however, is a daunting task. Faced with three or more screens, all but a few lecturers opt for simply replicating the same image on all of them.

The Convertible Podium is a central control station for rich media presentations, including multi-screen presentation, networked annotation and document capture, just-in-time printing, and digital multimedia support for teleconferencing. Designed for intelligent presenter support, it is a way station for directing information. The podium also controls the room environment: lights, sound, and projector controls.

Maribeth J. Back
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Game-Based Interaction Technology for Public Aquaria

The Interactive Aquarium addresses how to introduce the benefits of interaction to informal education in environments where direct tactile interaction is not feasible. It does so by using a public aquarium to study and develop novel edutainment approaches and technologies for promoting interactivity. The results include The Virtual Aquarium, Personalizable Dynamic Interaction Panels, Mobile Interaction Panels, and Game-Based Simulation of Deep-Sea Environments.

Peter Stephenson
The Imedia Academy

Pedro Branco
Sara Czyzewicz
L. Miguel Encarnação
Petar Horvatic
Jan Jungclaus
Stephen Lecrenski
The Imedia Academy

Getting Schoolkids Moving: Innovative Technology and PE4life

Many people complain about this generation of children spending too much time with video games. If you include computers, TV, video games, and cell phones, the average child spends 5.5 hours with these distractions on an average day. Technology is often cast as the leading culprit in the current inactivity and obesity crisis, but we are not going to convince the "game generation" to ignore their games.

Interactive video games and corresponding technologies can inspire a new breed of activity, as demonstrated in PE4life Institutes and Programs.

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PE4life
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Phil Lawler
Ken Reed
PE4life

Immersive Environment With Perhaps Multiple Characters and 3D Projection

Mark Chavez
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It's Virtually Pedagogical: Pedagogical Agents in Mixed Reality Learning Environments

This presentation discusses virtual instructors, pedagogical agents, and pedagogical embodied conversational agents that raise the question: Can virtual instructors replace human instructors? It also demonstrates a functioning prototype of a pedagogical agent, explains its development, summarizes its software and system architecture, and discusses its ability to provide instruction based on standard pedagogical techniques.

Jayfus Doswell
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Moovl: Doodles That Move

Ed Burton
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Moving Pictures: Looking Out/Looking In

In this paper, the authors present a robust, tangible, multi-user system that invites young users to create, explore, manipulate, and share video content with others. Moving Pictures enables a meaningful, spontaneous, and collaborative approach to video creation, selection, and sequencing.

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Glorianna Davenport
Massachusetts Institute of Technology

Oskar Fjellstrom
Mikael Wiberg
Umea University

NASA World Wind

Zoom from satellite altitude to any place on Earth. Use high-resolution LandSat imagery and Shuttle Radar Topography Mission elevation data to experience Earth terrain (or any other planet) in visually rich 3D.. Virtually visit anyplace in the world. Look across the Andes, into the Grand Canyon, over the Alps or along the Sahara.

World Wind dynamically delivers terabytes of NASA data from publicly available NASA servers, something that was only possible on $250,000 SGI systems just a few years ago. World Wind also delivers daily planetary datasets for global cloud cover, precipitation, temperature, barometric pressure, and the very latest planetary imagery from NASA's Terra and Aqua satellites and planetary-scale animations from the NASA Scientific Visualization Studio.

Patrick Hogan
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Chris Maxwell
Randy Kim
NASA

Wonderwalls: Playful Peer-to-Expert and Peer-to-Peer Collaborative Learning Spaces

Wonderwalls connect learners, teachers, and outside experts in real time and asynchronously to persistent, playful, moderated, spatial communication environments designed for collaborative learning. Participants compose or upload and position text or graphical "post-its" on the Wonderwall. The moderator or teacher or expert can attach answers to posts and stream real-time audio.

Wonderwalls are currently used extensively by elementary school classes to connect the class with "Dr. Norm" they follow up on science field trips to the Children's Garden. When fourth graders voluntarily log in over the weekend to do more science, teachers smile. Wonderwalls are also used in graduate online and face-to-face classes. One of the participation assignments each week is for students to visit the Wonderwall to post things they wonder about from that week's readings. They are also encouraged to whimsically yet plausibly impersonate the textbook authors.

Carrie Heeter
Michigan State University
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Norm Lownds
Ben Rhodes
Michigan State University

Art Gallery

Concourse Foyer, Room 153A

Days & Hours

Sunday, 31 July	1 – 6 pm
Monday, 1 August	9 am – 6 pm
Tuesday, 2 August	9 am – 6 pm
Wednesday, 3 August	9 am – 6 pm
Thursday, 4 August	9 am – 5 pm

art gallery: threading time

Observe the real-time evolution of art history in 21st-century work that traces new narrative threads through time and space, figurative and abstract, linear and non-linear, moving and still. The Art Gallery presents 2D, 3D, and screen-based work that examines how the use of computer graphics relates to the form and content of the artwork. For the first time ever, see the Electronic Theater storyboards on display in the Art Gallery.

Art Gallery Committee

Linda Lauro-Lazin
Art Gallery Chair
Pratt Institute

Mary Phillipuk
Assistant to the Art Gallery Chair

Art Gallery Juries

Donna Cox
Emerging Technologies Chair
NCSA/University of Illinois at Urbana-Champaign

Perry Hoberman

Jon Ippolito
Guggenheim Museum

Bonnie Mitchell
SIGGRAPH 2006 Art Gallery (orange) Chair
Bowling Green State University,

Kathryn Saunders
Kathryn Saunders Design, Inc.

Alternate Jurors

Samuel Lord Black
Computer Animation Festival Chair

Lynn Pocock
New York Institute of Technology

Online Jury

Carl Goodman
The American Museum of the Moving Image

Nishant Kothary
Web Program Chair
Amazon.com

Peter Mackey
Pratt Institute

Tomoe Moriyama
Tokyo Museum of Photography

Christiane Paul
The Whitney Museum

Advisors

Jon Ippolito
Guggenheim Museum

Jacquelyn Martino
Massachusetts Institute of Technology

Dominique Nahas
Independent Critic and Curator

Lynn Pocock
New York Institute of Technology

Noah Wardrip-Fruin
Brown University

Christina Yang
The Kitchen

Onsite Subcommittee

Roy Ascott
Planetary Collegium, University of Plymouth

Dena Eber
Publications
Bowling Green State University

Garth Garrett
Independent Writer

Madge Gleeson
Western Washington University

Alex Jimenez
Technical Support
Pratt Institute

Peter Mackey
Pratt Institute

Jeff Mayer
Jeff Mayer & Partners, LLC

Bonnie Mitchell
SIGGRAPH 2006 Art Gallery (orange) Chair
Bowling Green State University

Natalie Moore
Art Director, Art Web Site
Pratt Institute

Cheryl Stockton
Stockshot Studio and Pratt Institute

Beth Warshafsky
Art Gallery Video Promo Producer
Pratt Institute

Ruth West
National Center for Microscopy and Imaging Research
University of California, San Diego

Yaryna Wynar
Pratt Institute

Special Events

Concourse Foyer/Room 153A

Sunday, 31 July
4 – 6 pm
Art Gallery Opening Reception

Monday, 1 August
10:30 am – Noon
Artist's Talks

Noon – 12:45 pm
Guided Tours - (English)

Tuesday, 2 August
10:30 am – Noon
Artist's Talks

Noon – 12:45 pm
Guided Tours - (English)

Wednesday, 3 August
10:30 am – Noon
Artist's Talks

Noon – 12:45 pm
Guided Tours - (English)

Thursday, 4 August
10:30 am – Noon
Artist's Talks

Noon – 12:45 pm
Guided Tours - (English)

Art Gallery & Guerilla Studio Outreach – Synapse Panel

Tuesday, 2 August
10 am – 12:30 pm
Hall J, Exhibitor Tech Room 1

Moderators
Art Durinski
Tom Leeser
Michael Wright

Panelists
David Em
Sue Gollifer
Yoichiro Kawaguchi
Tony Longson
Micahel Masucci
Jennifer Steinkamp
Bruce Wands

Art Gallery: Presentations, Room 407

Sunday, 31 July

1:45 – 3:30 pm
Art Panel

Rethinking the Narrative Thread

Moderator
Roy Ascott
Planetary Collegium, University of Plymouth

Featured Panelists
Charles Morrow
Charles Morrow Ltd.

Jon Wilkinson
Full Circle Design

Monday, 1 August

3:45 – 5:30 pm
Art Panel

Poetics of Digital Space and Time

Moderator
Roy Ascott
Planetary Collegium, University of Plymouth

Featured Panelists
Camille Utterback
Brian Knep
boredomResearch

Tuesday, 2 August

1:45 – 3:30 pm
Art Papers

Moderator
Roy Ascott
Planetary Collegium, University of Plymouth

A Transformational Object: Artistic Authorship and the Phenomenal Aesthetics of New Media

Stephanie Owens
Parsons School of Design

Doing Interface Ecology: The Practice of Metadisciplinary

Andruid Kerne
Texas A&M University

Dare to be Digital: Japan's Pioneering Contributions to Today's International Art and Technology Movement

Jean Ippolito
University of Hawaii at Hilo

3:45 – 5:30 pm
Art Papers

Moderator
Roy Ascott
Planetary Collegium, University of Plymouth

Memory Rich Garments: Body-Based Displays

Joanna Berzowska
XS Labs
Paul Yarin
Blackdust Design

Interactive Wallpaper

Jeffrey Huang
Harvard University

Being Paintings

Alain Lioret
ATI

Wednesday, 3 August

1:45 – 3:30 pm
Art Panel

Digital Activism: Political Artwork

Moderator
Roy Ascott
Planetary Collegium, University of Plymouth

Featured Panelists
Perry Hoberman
University of Southern California

Liggorano/Reed
Pureproducts.com

David Lu
Futurefarmers.com

3:45 – 5:30 pm
Art Panel

Curating Digital Media: Perspectives From Museum, Gallery and Alternative Art Venues

Moderator
Roy Ascott
Planetary Collegium, University of Plymouth

Featured Panelists
Carl Goodman
The American Museum of the Moving Image

Tomoe Moriyama
The Tokyo Museum of Photography

Invited Artists

Jim Campbell

Motion and Rest #5
Custom electronics

Church on Fifth Avenue
Custom electronics, treated Plexiglas

Portrait Of A Portrait Of Claude Shannon
Custom electronics, treated Plexiglas

Portrait Of A Portrait Of Harry Nyquist
Custom electronics, treated Plexiglas

John Gerrard

Watchful Portrait (Caroline)

Variable (projection piece)

Perry Hoberman

My Life in Spam: One Week (November 1-30, 1998)
Digital print

My Life in Spam: One Day (December 11, 2002)
Digital print

Art Under Contract (End User License Agreement)
Installation

Paul Kaiser & Shelley Eshkar

Arrival (2004)
Interactive installation

Camille Utterback

Untitled 5 (External Measures Series)
Interactive installation

Juried Artists

Hitoshi Akayama
Dice
Medium: Animation

Brian Andrews
Quadruped Hominid
Medium: Lightjet print

Amphibian Hominid
Medium: Lightjet print

Lee Arnold
Here
Medium: Time-based art

Yann Bertrand & Damien Serban
Chrysalide
Medium: Animation

Chiara Boeri
MAI PIU' - NEVER AGAIN
Medium: Mixed media

Tabula Fantastica
Medium: Mixed media

Maud Bonassi (collaborators ...)
LOOP
Medium: Animation

boredomresearch
Ornamental Bug Garden 001
Medium: Computational

Thomas Briggs
The Greater Accumulation of the Infinite Fractions of Solitude
Medium: Ink on paper

Arlecchino
Medium: Ink on paper

50000 Attempts At A Circle
Medium: Ink on paper

Hue Walker Bumgarner-Kirby (collaborators ...)
Gronk's BrainFlame
Medium: Animation

Max Chandler
Climbing
Medium: Acrylic on canvas with robot

Kate Chapman
Falling Down
Medium: Sculpture

David Crawford
Stop Motion Studies: Series 13
Medium: Web art

Hans Dehlinger
Striche_10
Medium: Plotter drawing, pencil on paper

Small_Elements_K
Medium: Plotter drawing, pencil on paper

time-lines
Medium: Laser-cut on layered plastic sheet

Anna Dumitriu
Bed Flora
Medium: Lightjet print

Plate Flora
Medium: Lightjet print

Table Flora
Medium: Lightjet print

Doug Easterly and Matt Kenyon
Spore 1.1
Medium: Installation
(In Emerging Technologies)

Heather Elliott-Famularo
ACQ: B14 (and me)
Medium: Inkjet print on back light film, florescent lights, wood, Plexiglass

ACQ: E3 (and me)
Medium: Inkjet print on back light film, florescent lights, wood, Plexiglass

ACQ: F7 (and me)
Medium: Inkjet print on back light film, florescent lights, wood, Plexiglass

Sherban Epure
The Poem of Apricots and Peaches
Medium: Inkjet

Persona in Fields
Medium: Inkjet

Condottiere
Medium: Inkjet

Brian Evans
limosa
Medium: Animation

Juried Artists

Heather Freeman
Logophobia - Eat
Medium: Inkjet on canvas

Logophobia - Snap
Medium: Inkjet on canvas

Logophobia - Tongues
Medium: Inkjet on canvas

Gregory Garvey
HOMAGE TO THE SQUARE: STEREOSCOPIC SUPREMATIST COMPOSITION II
Medium: Inkjet print

HOMAGE TO THE SQUARE: STEREOSCOPIC SUPREMATIST COMPOSITION III
Medium: Inkjet print

Floyd Gillis
seri_C A_1
Medium: Giclée on archival paper

seri_G B_1
Medium: Giclée on archival paper

Pascal Glissmann & Martina Höfflin
Elf
Medium: Robot installation/sculpture

Meggan Gould
barcode
Medium: Photography

black+widow+spider
Medium: Photography

daguerreotype
Medium: Photography

mona+lisa
Medium: Photography

portrait
Medium: Photography

Céline Guesdon
Ondine: Absorbée
Medium: 2D and 3D Photographs

Ondine: Images-soeurs
Medium: 2D and 3D photographs

Ondine: Toison
Medium: 2D and 3D photographs

Jean-Pierre Hébert
Ulysse
Medium: Live sand traces and sounds sculpture

Eric Heller
Rogue IV
Medium: Lightjet print

Jessica Hodgins (collaborators: Moshe Mahler: artist, Bum Lee: artist, James Duesing: artist, Jessica Hodgins: computer scientist, David Tinapple: artist, Doug James: computer scientist, James Magaro: actor)
Oral Fixations
Medium: Single-channel video installation (7 hours)

Peter Horvath
Intervals
Medium: Web art

MarkDavid Hosale and John Thompson
DEFENDEX-ESPGX
Medium: Interactive art sculpture

Kenneth A. Huff
2004.4
Medium: Chromogenic print

2004.5
Medium: Chromogenic print

2005.1
Medium: Chromogenic print

Meditations Series, 2004.10a
Medium: Animation

Dolores Kaufman
Touring Suburbia/Number One
Medium: Lightjet print

Touring Suburbia/Number Three
Medium: Lightjet print

Touring Suburbia/Number Four
Medium: Lightjet print

Yoichiro Kawaguchi
Tentacle Tower
Medium: Lenticular 3D picture light box

Ji-Young Kim
Point of View
Medium: Animation

Brian Knep
Drift
Medium: DVD player, projector

Drip
Medium: DVD player, projector

Drift Grid 1
Medium: DVD player, projector

Kumiko Kushiyama
Transparent Blue
Medium: Touch screen

AnnMarie LeBlanc
Daughter's Rebirth
Medium: Archival digital print

Subterranean Empress
Medium: Archival digital print

Submariner: Epic Dance
Medium: Archival digital print

Patrick Lichty
Made In China: Mao vs. Andy
Medium: Network-based oils

Ligorano Reese (Nora Ligorano and Marshal Reese)
In Memory of Truth
Medium: Video sculpture

Andy Lomas
Aggregation 2
Medium: Printed digital image

Aggregation 4
Medium: Printed digital image

Aggregation 9
Medium: Printed digital image

David Lu
Future Farmers
Three Views of the US Senate
Medium: Web art

Seigow Matsuoka and Naoko Tosa
Inspiration Computing Robot
Medium: Robot Art Installation
(In Emerging Technologies)

Meats Meier
Rocking Horse
Medium: Digital print

Jonathan Meyer
#86B
Medium: Interactive program

#86b.1
Medium: Digital C print

Mark Millstein
Reach Kite
Medium: Inkjet on paper, mixed media

Echo Kite
Medium: Inkjet on paper, mixed media

Lichen Kite
Medium: Inkjet on paper, mixed media

Yuta Nakayama
3D Muscle
Medium: Network art installation

Juried Artists

Laura Nova
The Last Word
Medium: Banner-grade PVC

Stephanie Owens
Liquid Eden (The Discreet Paradise of Networks)
Medium: Network art

Vivek Patel
Black Lines Dancing
Medium: Animation

Four Plays
Medium: Animation

Kate Pemberton
Tracert
Medium: Cross stitch: Grey embroidery silk, black aida

Jan Piribeck
ColorTin
Medium: Inkjet print laminated to Plexiglass

ContourTin
Medium: Inkjet print laminated to Plexiglass

FunctionTin
Medium: Inkjet print laminated to Plexiglass

Amit Pitaru
Sonic Wire Sculptor
Medium: Projection, surround-sound system, Wacom Cintic, custom-made kiosk

Jeff Prentice
Diamond Age
Medium: Projection, surround-sound system, Wacom Cintic, custom-made kiosk

Kate Pullinger, Stefan Schemat, babel
The Breathing Wall
Medium: Interactive program

Afanassy Pud
Landscape
Medium: Digital art

Joohyun Pyune
Labyrinth
Medium: Dye sublimation/digital printing on fabrics sculptures

Kevin Quennesson
conscious=camera
Medium: Art installation
(In Emerging Technologies)

Laura Rusnak
(R) Doc Series #1: Our Citizenry Is Ambiguous To The Democracy
Medium: Inkjet print

(R) Doc Series #6: Absently In Hand, Then Down Again
Medium: Inkjet print

(R) Doc Series #8: Threatened And Too Scared ...
Medium: Inkjet print

Thecla Schiphorst
exhale: (breath between bodies)
Medium: Wearable art installation
(In Emerging Technologies)

Ansen Seale
Evergreen
Medium: Digital slitscan photography, Giclée

Robert Seidel
_grau
Medium: Animation

Joe Takayama
WATERDROPS
Medium: Art animation

LiQin Tan
Burl + 4
Medium: Digital rawhides prints with 3D animation

BurlNuts + 4
Medium: Digital woodprints with 3D animation

Anna Ursyn
Grammar of the City
Medium: Photo silkscreen, photo-lithograph

Yellow Pages
Medium: Photo silkscreen, photo-lithograph

Fragile Balance
Medium: Photo silkscreen, photo-lithograph

Roman Verostko
Illustrated Limited Edition of George Boole's "Derivation of the Laws ...", Frontpieces: #75 and #74
Medium: Artist's book: Algorithmic pen and brush plotter drawings

Limited Edition of George Boole's "Derivation of the Laws ...", Endpieces: #66 and #71
Medium: Artist's book: Algorithmic pen and brush plotter drawings

Limited Edition of George Boole's "Derivation of the Laws ...", Text Pages with Illustrations: Pages 15-16 and Pages 21-22
Medium: Artist's book: Algorithmic pen and brush plotter drawings

Pearl Park Scripture, George Boole on the Laws of Thought
Medium: Algorithmic pen and ink drawing

Marilyn Waligore
Contamination
Medium: Gelatin silver print

Sugar Jar
Medium: Gelatin silver print

Cocoon
Medium: Gelatin silver print

Ruth G. West (collaborators ...)
Ecce Homology
Medium: Interactive art installation
(In Emerging Technologies)

Jonathan Wilkinson
Interactive Panoramic Video Sequences
Medium: Interactive video

Brigitta Zics (collaborators ...)
Mirror_SPACE
Medium: Interactive art installation
(In Emerging Technologies)

Storyboards

9
USA
Director and Artist: Shane Acker
www.shaneacker.com
Contact: Shane Acker
shaneacker@gmail.com

La Dernière Minute
France
Director: Nicoles Salis
Artists: Forêt Bleue
Contact: Yan Allain
foret-bleue@foret-bleue.com

Dice
Japan
Director and Artist: Hitoshi Akayama
Kyoto Seika University
Contact: Hitoshi Akayama
akayama@kc5.so-net.ne.jp

Fallen Art
Poland
Director: Tomek Baginski
Artists: Rafal Wojtunik and Tomek Baginski
Platige Image
Contact: Marcin Kobylecki
mk@platige.com

HP "Constant Change" (and The Making of)
USA
Director: David Fincher
Artist: Ed Ulbrich
Digital Domain
Contact: Alex Serrano
alex@d2.com

ILM 2005
USA
Director: David Nakabayashi
Artists: Christian Alzmann and Wilson Tang
Industrial Light & Magic
Contact: Kate Shaw
kateshaw@ilm.com

La Migration Bigoudenn
France
Directors and Artists: Eric Castaing, Alexandre Heboyan, Fafah Togora
Gobelins, l'école de l'image
Contact: Eric Riewer
eriewer@gobelins.fr

Star Wars Episode 3: Revenge of the Sith
USA
Director: John Knoll
Artist: Aaron McBride
Industrial Light & Magic
Contact: Kate Shaw
kateshaw@ilm.com

Surly Squirrel
Canada
Director: Peter Lepeniotis
Artists: Peter Lepeniotis and Various Artists
Pantaloons Productions/DKP Studios
Contact: Peter Lepeniotis
peterl@dkp.com

Things That Go Bump in the Night
USA
Director: Joshua Beveridge
Artists: Patrick Jensen and Joshua Beveridge
Ringling School of Art and Design
Contact: Joshua Beveridge
jbeverid@rsad.edu

World of WarCraft
USA
Director: Matt Samia
Artists: Blizzard Film Department
Blizzard Entertainment
Contact: Scott Abeyta
sabeyta@blizzard.com

Animations

Black Lines Dancing
02:43
Vivek Patel
Florida Atlantic University

Chrysalide
20:36
Yann Bertrand & Damien Serban

Dice
01:55
Hitoshi Akayama
Kyoto Seika University

Four Plays
02:15
Vivek Patel
Florida Atlantic University

_grau
10:00
Robert Seidel

Gronk's BrainFlame
04:23
Hue Walker Bumgarner-Kirby

limosa
02:15
Brian Evans
University of Alabama

LOOP
08:00
Julien Rancoeur, Vincent Baertsoen, Emilie Boyard, Charles Blanchard
Supinfocom Arles

Meditations Series, 2004.10a
20:00
Kenneth A. Huff

Point of View
05:00
Ji Young Kim

WATERDROPS
01:00
Joe Takayama
Kyushu University

computer animation festival

Experience the year's finest achievements in animation, visualization, simulation, visual effects, and technical imagery. The Computer Animation Festival presents selected works in the Electronic Theater (matinée and evening shows) and the Animation Theater (throughout the week). The Electronic Theater also includes a pre-show event, which begins 20 minutes before showtime: a live graphic performance by J. Walt Adamczyk entitled "Autocosm: Gardens of Thuban," specially created for SIGGRAPH 2005.

New this year: projecting in high-definition (1080i and 1080p).

Computer Animation Festival Committee

Samuel Lord Black
Computer Animation Festival Chair
Penguin Flight Dynamics

Betsy Johnsmiller
Assistant Producer
Event Alchemy

BZ Petroff
Electronic Theater Director
Wild Brain

Leo Hourvitz
Animation Theater Director
Electronic Arts

Laurin Herr
Director of Technology
Pacific Interface

David Beining
Full-Dome Director
LodeStar Astronomy Center

Andrew Lyndon
Editor
izzit media

Terrence Masson
SIGGRAPH 2006 Computer Animation Festival Chair
Digital Fauxtography, Inc.

David Ebert
Outreach Director
Purdue University

Timothy Childs
Chocolatier
Cabaret Chocolates

Computer Animation Festival Jury

David Ebert
USA
Purdue University

Donna Cox
Emerging Technologies Chair
USA
National Center for Supercomputing Applications

Emru Townsend
Canada
fps Magazine

Linda Lauro-Lazin
Art Gallery Chair
USA
Pratt Institute

Pierre Hénon
France
Ecole Nationale Supérieure des Arts Décoratifs

Shuzo John Shiota
Japan
Polygon Pictures

Ted Burge
USA
Walt Disney Feature Animation

Alternate Jurors

BZ Petroff
Wild Brain

Leo Hourvitz
Electronic Arts

Terrence Masson
SIGGRAPH 2006 Computer Animation Festival Chair
Digital Fauxtography, Inc.

Electronic Theater

Location	South Hall K
Monday, 1 August	7 – 9 pm
Tuesday, 2 August	7 – 9 pm
Wednesday, 3 August	7 – 9 pm

Electronic Theater Matinée

Location	South Hall K
Tuesday, 2 August	1:30 – 3:30 pm
Wednesday, 3 August	1:30 – 3:30 pm

Animation Theater

Location	Rooms 408B and 409AB
Sunday, 31 July	1 – 6 pm
Monday, 1 August	9 am – 6 pm
Tuesday, 2 August	9 am – 6 pm
Wednesday, 3 August	9 am – 6 pm
Thursday, 4 August	9 am – 5 pm

New This Year!
Vote for the Computer Animation Festival's Peoples' Choice Award
Go to: http://siggraph.org/s2005/cafsurvey.html

Full-Dome Animation Theater

Immerse yourself in the world's best Full-Dome animations, from DomeFest 2005. The animations, produced by students, institutions, and Full-Dome professionals, are screened continuously on a 9-meter-diameter digital dome assembled especially for SIGGRAPH 2005.

Full-Dome video is a rapidly growing medium, with over 125 immersive displays deployed worldwide in planetariums and special-venue theaters. Freed from the "tyranny of the frame," artists transport viewers into fully immersive, mind-bending environments and alternate worlds as they explore storytelling techniques for this new medium.

Location	South Hall G
Saturday, 30 July	6 – 8 pm
Sunday, 31 July	9 am – 6 pm
Monday, 1 August	9 am – 6 pm
Tuesday, 2 August	9 am – 6 pm
Wednesday, 3 August	9 am – 6 pm
Thursday, 4 August	9 am – 5 pm

Black Hole: The Other Side of Infinity
Donna Cox
National Center for Supercomputing Applications/Denver Museum of Natural Science/Thomas Lucas Productions
Champaign, Illinois USA

Derivation of Chaos
Hue Walker & Panaiotis
Independent
Albuquerque, New Mexico USA

Evolution of the Universe: Galaxies Forming on Filamentary Structures
Donna Cox
National Center for Supercomputing Applications/San Diego Supercomputing Center
Champaign, Illinois USA

Kaluoka'Hina, the Enchanted Reef
Raul Erdossy
Softmachine
Munich, Germany

Moonlight
Andrew J. Quinn
Independent
(Lucerne Planetarium Artists in Labs Program)
Milano, Italy

Percepts: Precepts
Theo A. Artz
Amalgamation House, Drexel University
Philadelphia, Pennsylvania USA

Rings
Enrico Trujillo
Independent
Albuquerque, New Mexico USA

SP05
Irmin Wehmeier
University of New Mexico
Albuquerque, New Mexico, USA

Traveler
A Collaboration of Animation Students
University of New Mexico
Albuquerque, New Mexico USA

Visualization of an F3 Tornado Within a Supercell Simulation
Donna Cox
National Center for Supercomputing Applications
Champaign, Illinois USA

Meet the Artist

9
(Best of Show)
Tuesday, 2 August 2005
12:30 – 1:30 pm
Room 409AB
Speaker: Shane Acker

Fallen Art
(Jury Honors)
Wednesday, 3 August 2005
12:30 – 1:30 pm
Room 409AB
Speakers:
Tomek Baginski, Director
Grzegorz Jonkajtys,
Lead Character Animator
Platige Image

La Migration Bigoudenn
(Jury Honors)
Thursday, 4 August 2005
12:30 – 1:30 pm
Room 409AB
Speakers:
Alexandre Heboyan, Director
Eric Riewer, Animation
Department Head
Gobelins, l'école de l'image

Animation Theater Schedule

create

- Journey to the West
- True Color
- Samuroid Zero: Evil Does Not Conquer All
- Le Régulateur
- Moscow Souvenir
- Anti-Smoking "Growth"
- City Paradise

discover

- Scent of a Robot
- The New Deal
- "Life in the Fast Lane" (and The Making of)
- Nature Sweet "Triage"
- (Tippett Studio Creates) "Hell L.A." & "Vermin Man" in "Constantine"
- Recapturing the Lost Colors of BASARA
- Final Fantasy XII
- Transformations in Architectural Design
- (YKK AP Commercial) "Evolution"
- Esuvee "Keep it on All Fours"

dream

- Amfraid
- Jona/Tomberry
- La Dernière Minute

escape

- Twisted City
- Chohon
- Lucia

laugh

- Awkward
- Surly Squirrel
- Street Stories – Episode 14: "To Air is Human"
- Venice Beach
- Lionel
- Food for Thought

play

- Sal and the Great Frustration
- Piñata
- Hopeless Romantic
- Sealed Lips
- Hernando
- Love Letters
- The Zit

teach

- Surgical Planning in Congenital Heart Disease by Means of Real-Time Medical Visualisation and Simulation
- The Elbe Flood
- Tick Animation 1
- Cell Invasions: Visual Computing, Health, and Cancer
- Manufacturing Proteins with Biomolecular Machines
- Image-Based Material Editing

Special Presentations, Room 409AB

Meet the Artist
Tuesday, 2 August – Thursday, 4 August 12:30 pm

Japan Media Arts Festival Art Program
Tuesday, 2 August 4 pm

Japan Media Arts Festival Animation Program
Wednesday, 3 August 9 am

Japan Media Arts Festival Entertainment Program
Thursday, 4 August 1:30 pm

Room 408B	sunday	monday	tuesday	wednesday	thursday
create	3:30	11:00, 2:30	10:30, 2:00, 5:30	10:00, 1:30, 5:00	9:30, 1:00
discover	3:00	10:30, 2:00, 5:30	10:00, 1:30, 5:00	9:30, 1:00, 4:30	9:00, 12:30, 4:00
dream	1:00, 4:30	12:00, 3:30	11:30, 3:00	11:00, 2:30	10:30, 2:00
escape	2:30	10:00, 1:30, 5:00	9:30, 1:00, 4:30	9:00, 12:30, 4:00	12:00, 3:30
laugh	1:30, 5:00	9:00, 12:30, 4:00	12:00, 3:30	11:30, 3:00	11:00, 2:30
play	4:00	11:30, 3:00	11:00, 2:30	10:30, 2:00, 5:30	10:00, 1:30, 4:30
teach	2:00, 5:30	9:30, 1:00, 4:30	9:00, 12:30, 4:00	12:00, 3:30	11:30, 3:00

Room 409AB	sunday	monday	tuesday	wednesday	thursday
create	1:30, 5:00	9:00, 12:30, 4:00	9:30, 4:30	12:00, 3:30	11:30, 3:00
discover	1:00, 4:30	12:00, 3:30	9:00	11:30, 3:00	11:00, 2:30
dream	2:30	10:00, 1:30, 5:00	10:30, 2:00, 5:30	9:30, 4:30	9:00, 4:00
escape	4:00	11:30, 3:00	12:00, 3:30	11:00, 2:30	10:30, 2:00
laugh	3:00	10:30, 2:00, 5:30	11:00, 2:30	10:00, 1:30, 5:00	9:30, 4:30
play	2:00, 5:30	9:30, 1:00, 4:30	10:00, 1:30, 5:00	4:00	12:00, 3:30
teach	3:30	11:00, 2:30	11:30, 3:00	10:30, 2:00, 5:30	10:00

Animation Theater

Amfraid
France
Directors: Anne Sophie Bertrand, Thibault Debeurme, Sophie Van De Velde, Pascal Verkindt
Supinfocom Valenciennes
Contact: Florent Perrin
animation@premium-films.com

Anti-Smoking "Growth"
USA
Director: Dante Ariola
Method
Contact: Neysa Horsburgh
neysa@methodstudios.com

Awkward
USA
Director: Cesar Kuriyama
Pratt Institute/Embrionyc Productions
Contact: Cesar Kuriyama
cesarkuriyama@hotmail.com

Cell Invasions: Visual Computing, Health, and Cancer
Canada
Director: Charles Lumsden
Department of Medicine, University of Toronto
Contact: Charles Lumsden
charles.lumsden@utoronto.ca

Chohon
South Korea
Directors: Eunju Kim, Jung Sun Choi, Junsang Yoon, Kinam Kim, Youngju Park, Youno Park
Chung-Ang University
Contact: Jung Sun Choi
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Esuvee "Keep It on All Fours"
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(YKK AP Commercial) "Evolution"
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Final Fantasy XII
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Square Enix Co., Ltd.
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Food for Thought
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Hopeless Romantic
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Image-Based Material Editing
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Jona/Tomberry (abbreviated version)
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Journey to the West
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"Life in the Fast Lane" (and The Making of)
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Lionel
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Love Letters
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The Regulator (Le Régulateur) (abbreviated version)
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Sal and the Great Frustration
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Samuroid Zero: Evil Does Not Conquer All
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Scent of a Robot
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Sealed Lips
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Street Stories - Episode 14: "To Air is Human"
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Surgical Planning in Congenital Heart Disease by Means of Real-Time Medical Visualisation and Simulation
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MODIS Daily Global Snow Cover and Sea Ice Surface Temperature
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Overtime
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RESfest 2004 Opening
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A Semi-Lagrangian Contouring Method for Fluid Simulation
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Star Wars Episode 3: Revenge of the Sith
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Stealth
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Things That Go Bump in the Night
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Visualization of an F3 Tornado Within a Simulated Supercell Thunderstorm
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Visualizing the XYZ Color Space
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emerging technologies

Interact with digital experiences that move beyond digital tradition, blur the boundaries between art and science, and transform social assumptions. Emerging Technologies presents work from many sub-disciplines of interactive techniques, with a special emphasis on projects that explore science, high-resolution digital-cinema technologies, and interactive art-science narrative.

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Emerging Technologies

Rooms 150-152

Days & Hours

Sunday, 31 July	1 – 6 pm
Monday, 1 August	9 am – 6 pm
Tuesday, 2 August	9 am – 6 pm
Wednesday, 3 August	9 am – 6 pm
Thursday, 4 August	9 am – 5 pm

Emerging Technologies Presentations

Room 407

Bilingual Guided Tours

New for SIGGRAPH 2005: Bilingual guided tours of the Art Gallery and Emerging Technologies in five languages (Japanese, Korean, Spanish, German, and French).

Each 90-minute tour includes both the Art Gallery and Emerging Technologies. Reserve your tour at the International Center in the South Lobby, then meet your tour group at the appointed time.

Monday, 1 August
10:30 am: German
Noon: English
12:15 pm: Spanish, French

Tuesday, 2 August
10:30 am: German
Noon: English
12:15 pm: Spanish, French
3:45 pm: Korean, Japanese

Wednesday, 3 August
10:30 am: German
Noon: English
12:15 pm: Spanish, French
3:45 pm: Korean, Japanese

Thursday, 4 August
8:30 am: Japanese
Noon: English

Emerging Technologies: Presentations, Room 407

Sunday, 31 July

8:30 – 10:15 am
Emerging Technologies Panel: Art and Science Interactive Displays

- Spore 1.1
- Mirror_SPACE
- Ecce Homology
- Exhale: (breath between bodies)

10:15 am – 12:15 pm
Emerging Technologies Panel: Interactive and Visual Narratives: Pushing the Plotline

- I.plot
- Conscious=Camera
- The Living Room
- Khronos Projector

Monday, 1 August

8:30 – 10:15 am
Emerging Technologies Panel: Sensory Interfaces: Sights, Sounds, and Interaction

- SUIRIN
- TENORI-ON
- Seelinder: The Cylindrical Lightfield Display
- Interbots Initiative: An Extensible Platform for Interactive Social Experiences With an Animatronic Character

10:15 am – 12:15 pm
Emerging Technologies Panel: Real-Life, Virtual Games, Sensory Experiences

- The Virtual Raft Project: A Network of Mobile and Stationary Computer Systems Inhabited by Communities of Interactive Animated Agents
- Ton^2: A VR Application With Novel Interaction Method Using Displacement Data
- Haptic Video
- Volflex

Tuesday, 2 August

8:30 – 10:15 am
Emerging Technologies Panel: Smells, Sucking, Sensors, Imaging

- Ubiquitous Graphics
- Augmented Coliseum: Display-Based Computing for Augmented Reality Inspiration Computing Robot
- SpotScents
- Straw-Like User Interface

10:15 am – 12:15 pm
Emerging Technologies Panel: Sculptures, Art, and Shaking Your World

- Moo-Pong
- MotionSPHERE
- Color Enhanced Emotion
- Shaking the World: Galvanic Vestibular Stimulation as a Novel Sensation Interface

Wednesday, August 3

8:30 – 10:15 am
Emerging Technologies Panel: Augmented Mobile Computing in a Virtual World

- Kobito: Virtual Brownies
- Virtual Canoe: Real-Time Realistic Water Simulation for Haptic Interaction
- Virtual Hang-Gliding Over Rio de Janeiro
- X'talVisor

10:15 am – 12:15 pm
Emerging Technologies Panel: The Shapes and Colors of Displaying in Real-Time

- View-Dependent Stereoscopic Projection Onto Everyday Surfaces
- TouchLight: An Imaging Touch Screen and Display for Gesture-Based Interaction
- High-Performance Stereoscopic Methods for 3D Viewing Using DILA Projectors
- NCSA: Creating Stereo Visualizations

Thursday, August 4

10:15 am – 12:15 pm
Emerging Technologies Panel: Emotion and Camera Analysis and Laval Virtual

- Sustainable
- The Interactive FogScreen
- Laval Virtual Winner: Virtual VeeJeying

Access Grid Schedule

Room 406AB

Monday, 1 August

9 – 11 am
Planetary Collegium/CAiiA Panel 1
Consciousness and Connectivity

Chair
Roy Ascott

Margaret Dolinsky
Dene Grigar
Diana Slattery
Victoria Vesna

11:15 am – Noon
Telematic Mind in the Domain of Moistmedia

4 – 4:30 pm
Digital Worlds: A Global Distributed Live Performance

4:30 – 5 pm
Digital Worlds: A Global Distributed Live Performance

Tuesday, 2 August

9 – 11 am
Planetary Collegium/CAiiA. Panel 2 Extensions of Embodiment

Chair
Roy Ascott

Elif Ayiter
Diane Gromala
Thecla Schiphorst
Edward Shanken

4 – 4:30 pm
Digital Worlds: A Global Distributed Live Performance

4:30 – 5 pm
Digital Worlds: A Global Distributed Live Performance

Wednesday, 3 August

9:30 – 10:45 am
Loose Minds in a Box Performance

11 am – Noon
Network Touch

1 – 2 pm
AG Juggler

4 – 4:30 pm
Digital Worlds: A Global Distributed Live Performance

4:30 – 5 pm
Digital Worlds: A Global Distributed Live Performance

Thursday, 4 August

9:30 – 11 am
Global Distributed Art Panel

1 – 2:15 pm
Loose Minds in a Box Performance

4 – 4:30 pm
Digital Worlds: A Global Distributed Live Performance

Augmented Coliseum: Display-Based Computing for Augmented Reality Inspiration Computing Robot

This demonstration of a display-based measurement and control system measures the position and direction of the receiver units by drawing marker graphics. It is very useful for display-based augmented-reality environments.

Art and Science
This project uses recent developments in image-presentation devices for measurement and control to display optical information that changes dynamically. It is an example of display-based computing, a novel technique that uses performance of display devices to output dynamic information arbitrarily by performing division and multiplexing in space and time.

Goal
To stimulate and promote interest in display-based computing and to advance the symbiosis of robots and computer graphics.

Innovation
The system consists of display devices and zero-dimensional photo detectors, which demonstrates that display-based computing no longer needs image capture systems such as CCD cameras for measurement. The system measures position and direction based on the output image, so the result of the measurement can be acquired in the same coordinate system as the output image. This is a major benefit in mixed-reality applications, because there is no need for registration between the measurement devices and the display devices.

Vision
Augmented Coliseum shows how robotics meets computer graphics in the real world. Also, the technique demonstrated in Augmented Coliseum could be very useful in displays of art and products.

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Color-Enhanced Emotion

The Color-Enhanced Emotion system recognizes facial expressions and controls skin-pigment components using a real-time processor. The installation allows attendees to experience a system that will usher in a new era in communication and movie editing.

Art and Science
Scientists and engineers have invented several life-enhancing devices that correct and extend human input-output signals, such as glasses, hearing aids, and loud speakers. The Color Enhanced Emotion system enhances the most important and ambiguous human signal: emotions. The system may enable innovative communication and create a new communication paradigm.

Goals
The purpose of this project is to enhance and control ambiguous human emotional signals. Using image control based on physical properties, and by implementing impressive real-time processing, the system displays video images that have not seen before.

Innovation
The Color-Enhanced Emotion system consists of the following components:

- Emotion recognition based on facial images using computer vision techniques.
- Implementation of a hardware-accelerated real-time processing system that can control the pigment components of the skin to replicate a broad range of conditions: fair, suntanned, pale, drunk, etc.
- Decomposition of the surface reflection using accurate registration cameras.

Ultimately, this project could lead to a new communication culture and a new generation of video editing technology.

Vision
Development of image-based communication methods, such as video phones and video chat, is continuing, and these applications will certainly become more commonplace. The most frequent image displayed on these systems is the human face, and it will be increasingly important to control image quality in a limited-bandwidth environment as emotional expression is enhanced.

Enhancing images with human emotion can help us realize rich and enjoyable communications. Such real-time, highly realistic effects will have an impact on movie editing because they enable application of effects in real time for a reasonable cost, which has never been possible before.

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conscious=camera

The reality we perceive is not a flow of flat images as a digital camera or video camera would output, but consciousness "of things." This project attempts to represent that consciousness.

If the movement is slow, only the face and hands are shown: this is the consciousness of a static person. If the movement becomes more important, the face and hands disappear and the body begins to appear: this is the consciousness of a less distinguishable body in motion. A trailing effect makes each image integrate the "before" and "after" moments, which are components of the consciousness of movement. Each consciousness shown leaves a mark on the background, which will very slowly vanish. This represents the memory.

Art and Science
Initial reactions to conscious=camera are playful: users want to understand what it sees and get an idea of how it works. First, users see their hands filtered, then the effect of moving, and finally the memory effect (an image of their action on the camera background). Thus, they understand how previous users have generated other marks, making their actions present in the mind of the current users. The conscious=camera then creates a presence, and this presence is the presence of the others. It is an ephemeral mirror that reveals parts of what we are and how we act, and makes us see with new eyes the others who surround us.

Vision
Computer vision and graphics have reached a state where they can represent, detect, and generate through images a colossal part of what is meaningful to us, at continually increasing speeds. Although many algorithms are complex, understanding their complexity gives the programmer the ability to finely manipulate their output. It is through understanding how the lowest levels of the program's elements affect and transform the aesthetic aspect that we have been able to construct an engaging result.

Goals
By oscillating between movement/motion blur and static moments, only some poses of faces and bodies appear on the screen: perhaps a profile, or a face looking toward a particular direction. These are those "privileged moments" (Bergson) we would remember from an interaction with somebody, or those "decisive instants" (Cartier-Bresson) that a photographer would like to capture. If the conscious=camera does not represent the actual biological state of consciousness, it gives at least a poetic and meaningful way of looking at how we act and how we appear. Its memory also becomes a door to interactions in the social world.

Innovations
The project, relies on implementation of body-tracking techniques inspired by the MIT Pfinder. A first challenge was making the algorithm reliably track in real time the bodies of the variety of people who will experience the installation, even in extreme conditions (for instance, if the user gets very close to the camera). Another is the location of the creative center of our work: at the low-level manipulation of all the program's elements - the "inside" of the algorithm - inserted in a complex structure of filters and functions tuned to make the program produce the aesthetically desired result.

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Ecce Homology

This physically interactive new-media work visualizes genetic data as calligraphic forms. A novel computer-vision interface allows multiple participants, through their movement in the installation space, to select genes from the human genome for visualizing the Basic Local Alignment Search Tool (BLAST), a primary algorithm in comparative genomics.

Art and Science
For Ecce Homology, intermediate information about the progress of BLAST is revealed by an animation of the intermediate products of the algorithm as it operates on genomic data in real time overlaid on the calligraphic forms. This revelation of the operation of a normally invisible process is at the core of the installation's aesthetic experience. Transformed into an experience that proceeds at the scale of human-perceived time, BLAST is the engine and subject of this interactive installation.

Goals
To contribute simultaneously to the realms of science and art while retaining discipline-specific rigor. To investigate the nature of interdisciplinary collaboration. To foster awareness of tools that generate meaning and knowledge in science, particularly genomics. And to explore how artistic practice and aesthetic experience can nurture scientific discovery.

Innovation
Technical innovations include development of a novel calligraphic gene visualization incorporating multidimensional data and deployment of a new Java-based middle-ware framework: Kolo (and its associated scripting language Nebesko) developed at the UCLA Hypermedia Studio.

Vision
As the next era in the life sciences becomes increasingly dominated by interdisciplinary and discovery-based inquiry, Ecce Homology exemplifies an integrated art-science practice that goes beyond models of influence and convergence to explore the deep structures of science and technology in search of their expressive potentials and cultural relevance.

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exhale: (breath between bodies)

This research project is based on designing and fabricating "a-wearable" body networks for public spaces and uses breath as an interface for sharing our bodies' affective data. Through the networked breath of the participants, the system actuates the responses of small fans, vibrators, and speakers embedded in the lining of these sensually evocative skirts. The research integrates fashion and gestural interaction with wearable technologies.

Art and Science
This work embodies the confluence of artistic design and expression with software and hardware technology.

Goals
- To make visible the invisible non-verbal communication that occurs within ourselves and that is shared through self-to-other and self-to-group interactions, by creating a system that responds to the physiological state of the participants in the space.
- To design wearable systems that focus on "wearable" before "system": development of "wearables for the telephathicaly impaired," notions of "how we wear ourselves," and our own system state, both metaphori cally and physically.
- To explore gesture as a primary control mechanism in systems as a mechanism for non-verbal navigation and selection.
- To identify physiological signals that provide good discrimination between affective states, with an emphasis on those that can be detected with robust sensors.
- To apply experience modeling, particularly of first-person methodologies of performance practice to software and hardware designs.
- To develop a model for interaction based on a vocabulary of shared affective signals.
- To leverage the connectivity, semantics, and application of tangible and mobile computing.
- To develop innovative research methodologies that utilize collaborative interdisciplinary knowledge creation among engineers, computer scientists, and artists.

Innovation
The core technical innovation of exhale: (breath between bodies) is integration of non-verbal models of network communication in a playful multi-modal environment, using layers of directionally conductive fabric to provide both electronic pathways within the garment systems and a sensual tactile experience for participants. Connections between participants are realized through specialized electronics and embodied through acts of physical contact, such as touch. These physical contacts are designed using gestural models for interaction.

Vision
In this work, garments are a step in a progression to systems that transparently exchange and express mood and intentions via participant-mediated communication, mixing physiology-derived information with gestures and other non-verbal mechanisms.

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Haptic Video

Professional skills are typically taught with conventional materials such as videotapes that demonstrate expert procedures. But instruction is most effective when the haptic sense is proactive.

Art and Science
Since ancient times, artisans' skills have been handed down through training and guidance. Usually, the process requires a long-term commitment as an apprentice or many years of trial-and-error learning. Trainees can not obtain precisely the same skill-specific information that the experts apply during their work. Mental skills, on the other hand, can be presented precisely through language.

Recent technological developments have introduced a new capability: recording and reproducing movement and force information. In Haptic Video, this technology transmits physical operations with the same precision as language. By recording and reproducing an expert's procedures proactively, it demonstrates how humans can use technology to improve their skills in a wide variety of professional and aesthetic fields, from medicine to calligraphy to etiquette.

Goals
Haptic Video provides a precise and proactive approach to transmitting physical skills. By recording the working environment as well as the movement and force of an expert instructor, the goals are to develop an archiving system so that all pertinent skill information can be reproduced dynamically, clarify the meaning of proactivity for "active touch," verify the system's effectiveness as a training device, and demonstrate how haptic devices can be used for substantial improvement of existing skills.

Innovations
1. In the recording phase, position and applied force are recorded as the expert works. This information is transformed into position and impedance information, and archived in a database that can be dynamically interpolated. In the presentation phase, the impedance information is presented to the trainee along the trajectory direction, and virtual fixtures, which are like walls with elasticity, are presented orthogonal to the trajectory direction at the same time. As a result, the trainee tries to cancel the force that the expert exerted, and duplicate the desired force proactively.

2. The working environment near the expert's hand is recorded from the expert's point of view. Then, in the presenting phase, the play-back speed of the video is dynamically changed according to location information obtained from the trainee's proactive operation. As a result, the trainee can observe the changes near the expert's hand as an image corresponding to the trainee's movements. In this way, both vision and tactile information corresponding to an expert's skill, which until now could only be obtained passively, can be transmitted proactively.

Vision
Common linguistic expressions such as "press softer" and "be more rhythmical" are inherently vague. Conversely, exact verbal instructions such as "apply three kilograms" or "twist twelve degrees" cannot be realized precisely. Neither are sufficient to transmit physical information, which is key to acquiring complex skills. When trainees proactively reproduce the operation of an expert, the expert's force and images can be perceived, and skill can be transmitted not by passive interpretation but by an immediate and proactive expression of the haptic sense, with great accuracy. Future projects will clarify what is important for acquisition and improvement of physical skills by experimenting with transmission techniques.

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High-Performance Stereoscopic Methods for 3D Viewing Using DILA Projectors

With the ongoing improvements in computing power and graphic card developments, 3D visualization and modeling is becoming ever more popular. This project demonstrates high-efficiency 3D stereographic projects using DILA projectors.

Several examples of stereo high-definition productions are displayed on a 15-foot-wide screen: Mirimax's "Spy Kids 3D" and NCSA scientific visualizations, including "Flight to the Galactic Center," "Jet Instabilities in a Stratified Fluid Flow," and "The Visualization of an F3 Tornado," which is being shown in the SIGGRAPH 2005 Electronic Theater and Full-Dome Animation Theater.

Art and Science
Stereographic visualization.

Goal
To show improved methods of visualization.

Innovation
Improved polarization and filters to improve crosstalk in 3D.

Vision
Stereo will be a predominant mode of digital displays in the future.

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The Interactive FogScreen

The walk-through FogScreen was extremely popular in SIGGRAPH 2003 Emerging Technologies. Now, the new, improved FogScreen is also interactive and capable of some stunning magic. For example, SIGGRAPH 2005 attendees experience a performance specially created for the Interactive FogScreen.

Art and Science
One could even say that the FogScreen is an entirely novel medium, as demonstrated by actor Markku Laitinen as he presents short, entertaining performances that illustrate some of the medium's artistic and dramatic possibilities.

Goal
FogScreen's basic patented technology presents an enormous number of possible applications, sizes, forms, technical extensions (3D, for example), and versions. It can be merged with many technologies. For example computer-vision-based finger tracking could enable drawing in thin air, gaming, or a "fog web browser." With interactivity, the FogScreen becomes an immaterial computer touch screen with nearly unlimited applications.

Innovations
When people see the passive FogScreen, they are excited and interested, but interactivity offers a new level of inspiration. It is a major technical improvement. Various tracking methods, such as ultrasonic tracking, have been explored, and many demos and applications have been developed. Some of the most interesting developments are demonstrated at SIGGRAPH 2005, including unobtrusive finger tracking, which has not been shown publicly before.

Vision
Interesting future applications include walk-through, play-with advertisements in shops or malls; a walk-through screen for trade shows, museums, science centers, or theaters; special entrances to theme parks, etc. The FogScreen is unbreakable, which enables safe gaming, exercise, or training, and unsupervised public presentations.

This display technology of the future literally revolutionizes the limits of projection screens and blurs the boundaries among art, science, and fun.

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Interbots Initiative: An Extensible Platform for Interactive Social Experiences With an Animatronic Character

A highly expressive robotic character, a robust behavior control system, and a host of content-authoring tools combine to generate interactive social experiences with an animatronic character.

Art and Science
The extensible Interbots platform's greatest strength is that it provides an interface between artistic vision and technological implementation. Maya, a 3D modeling program, allows 3D artists to directly export animations to the animatronic robot's hardware. The platform leverages the power of Macromedia Flash and Macromedia Director, two multimedia applications most artists are very familiar with. Finally, a custom behavior-authoring tool allows people with no programming experience to design personalities and behaviors for the robot.

Goals
The primary goal was to create a platform capable of delivering a solid and engaging experience. Users should forget that they're interacting with an autonomous hunk of wires, metal, and plastic. They should see the character in front of them, not the robot.

Other goals include maximizing extensibility of the platform and giving non-technologists the ability to rapidly author content for interactive, entertaining, animatronic experiences.

Innovations
1. Developing a plug-in for Maya that allows animations created on a virtual model of the animatronic robot to be exported directly to the robot's hardware.

2. Controlling costs by combining largely off-the-shelf hardware with custom software.

3. The Interbots platform. This modular collection of software allows non-technologists to program interactive animatronic experiences, utilizing familiar tools like Maya, Flash, and Director along with a simple yet powerful GUI for programming states and behaviors.

Vision
In the immediate future, the Interbots Initiative seeks to refine and expand the set of tools for authoring content, allowing even deeper interactions to be created. On the control side, the Interbots Initiative is currently implementing a guided performance interface that will allow for simple wireless control of the platform and a virtual robot control system using the open-source 3D engine Panda3D, which will allow developers to see the full effect of their content (complete with animation, sound, and interactivity) before ever connecting it to the physical system.

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i.plot

The future of narrative in a project that studies the hidden relationships and contextual emergence of language.

Art and Science
This project uses "the future of narrative" as a theme to research how computers can offer humor, wisdom, and inspiration. So far, art-and-science research projects have focused mainly on nonverbal communication modes, such as feeling and atmosphere. In i.plot, the logical meaning of language and its intuitive aspects, such as atmosphere and feeling, have been joined together.

Goal
A future of narrative that can generate interactive literature and scripts for interactive cinema.

Innovations
1. Inspiration Space
   This system discovers the hidden connections between words. It determines that a connection between words exists if two words are found in the same thought-form or make up a stimulus-response pair in the Edinburgh Associative Thesaurus. Then it finds several connections between the two words by tracing a large set of possible paths between them, so that the paths traverse several two-word connections.

2. Inspiration Restaurant Guide
   A restaurant guide based on the inspiration system was built from France Télécom's Yellow Pages database. Each of the restaurant categories and locations in Paris was entered into the system and connected to related words (pizzeria: italian food, tomato; crêperie: date, sweets; fast food: quick, cheap).

3. Context Inspiration
   Users seed the system with a few idea words. The system then generates a sentence of various lengths ranging from two to five words (minus articles, conjunctions, etc.) based on these input words. Wherever there is a blank space in the sentence, the system fills it in, seeking words inspirationally linked to the words surrounding the space.

4. Symbol Inspiration
   Rather than attaching symbols to existing word associations, the system applies a set of associations directly between symbols. Users can seed the engine by entering words linked to images in the input textboxes or by clicking one of the colored thought-form buttons at the top of the screen.

5. Inspiration Blog
   The blog system allows the system to accept complete sentences as input. Connections between key words in the sentence are all considered, and intersecting words are displayed on the screen.

6. Robot Agent Interface
   The robot's emotional expression and synthesized voice are automatically generated in accordance with the inspirational word context.

Vision
The next phase of interaction technology and expression between computers and humans will focus on interactive narrative methods. Routine human-computer interactions still generate many logical, boring experiences. This project, because it provides inspiration containing humor and wisdom, offers people new opportunities for stimulation and symbiosis.

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Khronos Projector

An interactive art installation that allows people to visualize movie content in an entirely new way. By actually touching and deforming the screen, the user can send portions of the image forward or backward in time.

Art and Science
The Khronos Projector is a suggestive tribute to Einstein's Theory of Relativity: the temporal relationship between two physically separate events is a perception relative to the observer. It is not a serious platform for recreating any typical relativity paradox, because the interactive projection infringes one fundamental law of nature. Although it is true that temporal relationships are relative to the observer's inertial frame, causality is not relative (this follows from the fact that information cannot travel faster than light). Two events that are in causal relationship should therefore always maintain their temporal order. The Khronos Projector breaks this rule, but this is precisely what makes the experience interesting and fun.

Goals
From the artistic/cognitive point of view, the Khronos Projector suggests the possibility of freeing both filmmakers and audiences from the constraint of a pixel-ubiquitous time arrow. During a Khronos projection, we cannot change the nature of the pre-recorded events, only the perspective, only the way we perceive their temporal relationship. We are at the same time spectators of fixed movie content and, in a strong sense, directors of a personalized post-production process.

From the scientific point of view, the goal of this presentation is to gather as much feedback as possible from a large audience on a prototype "tangible" human-interface that tightly combines visual display and the sense of touch.

Innovations
The Khronos program that runs the installation defines the spatio-temporal filtering surface through surface models (physical or non-physical) or by using real-time acquired data from a real deformable surface. Precise reconstructions of complex screen deformations are computed using a constrained, finite-difference equation method.

Vision
Presently, even filmmakers who are less devoted to linear narratives are forced to integrate the screen-ubiquitous time arrow as a fact in their work. But imagine a version of Hitchcock's "Rear Window" prepared for the Khronos Projector. The audience would be able to go backward or forward in time at the desired window, literally. The movie would contain several possible interleaved stories, depending on the way the space-time volume is explored.

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Kobito: Virtual Brownies

Virtual creatures called "Kobito" interact with real objects and real people.

Art and Science
One common way to create imaginary, virtual creatures is to overlay computer graphics images on real scenes. But this method is not sufficient, because it allows people to only see the imaginary creatures. In Kobito: Virtual Brownies, imaginary creatures interact with the real world. They move real objects, and people interact with them through the real objects. The real objects function as a kind of "haptic interface." This technology can be used in the fields of design, amusement, and healthcare because it conveys haptic information in addition to the visual information that is delivered in current artificial life systems.

Goals
The goal of this project is to make people feel Kobitos as "creatures that exist in our real world."

Innovations
Each component of this system is based on existing technology, but the application and the combination of components are innovative.

The interaction between the Kobitos and a tea caddy is realized with physical simulation. Usually, physical simulation deals only with imaginary objects, but in this case, it includes a real object (the caddy). This is realized by synchronizing the movement between the real caddy (in the real world) and the imaginary caddy (in the physical-simulation world). Attendees can see the interaction through the Kobito window, which displays a combined image of the Kobito CG and the image of the real scene.

No previous virtual reality system has enabled imaginary creatures to move real objects.

Vision
Kobitos can be good playmates, because they are invisible sometimes and visible at other times. When they are invisible, and they move something in the real world, they generate a sense of wonder. Interaction with such a creature could be a new type of entertainment.

Beyond entertainment, this technology could be very useful in daily life. Kobitos are intermediate between physical agents and imaginary agents, so they could act as agents between human beings and machines.

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The Living Room

How does mobile technology change how classical forms of cathartic entertainment, particularly theater and puzzle games, can be realized? How can storytelling, gameplay, and mobile technology be combined to create a successful, coherent, and rich interactive piece?

Art and Science
Game design is now using mobile technologies to explore the potential of the real world as a playing field. Drawing from the availability and advantages of digital video, wireless, and RFID technologies, this project seeks to transform traditional theater and puzzle-gaming experiences into a new type of entertainment experience.

Goal
To deliver a rewarding experience via story, interaction, and play. The project is designed to deliver an entertaining and cathartic experience that challenges, frustrates, and rewards. This encompasses many sub-goals, including creation of a solid gameplay system, creation of a compelling narrative, and successfully compiling these into a physical experience. The project also aims to encourage a compelling spatial interactive experience through its narrative and gameplay.

Innovations
The Living Room combines several common and uncommon technologies to deliver a unique experience:

- Position tracking: Each moving unit contains an RFID reader that communicates with Director MX via serial USB cable. The floor is embedded with 21 RFID tags programmed with ID codes corresponding to the painted clues they are beneath.

- Peer-to-peer communication: Each of the laptops runs an identical Director executable that communicates wirelessly with a separate "parent" computer. The parent computer keeps track of all three unit positions and of which clues are locked or unlocked, sending the appropriate commands to the units as needed.

- Portable power: Each unit is powered by a gel-cell battery (similar to a car battery) running through a DC/AC inverter.

- Digital video: Scenes were shot on three Canon XL1's with a cast and crew of over 20 volunteers. Video was edited in Final Cut Pro, and playback is controlled by the Director executable. Each unit contains a 17-inch flatscreen LCD monitor for optimal viewing.

Vision
As technologies evolve, new forms of entertainment will emerge. This project aims to participate in this progress by combining the elements of traditional entertainment with emerging technologies in a unique way. It explores the possibilities that wireless and RFID technologies provide and applies them to entertainment and play.

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Mirror_SPACE

A virtual mirror in which viewers can see their images transformed, not according to the rules of geometric optics, but filtered by a "real-time scanning apparatus" that generates a "mirror image" of the information supplied via its data network.

The mirror image is a transformed, cell-shaped manifestation of the viewer's dynamic data. The aesthetic qualities of the objects combine a microcosmic vision of networked existence with a reduced visual component (virus/nano vision). The virus-like nature of the images represents a structure in which everything is interconnected.

Art and Science
This interactive networked installation projects a personal, virtual mirror image onto the screen by combining the viewer's face with data collected simultaneously from the internet. The image behaves like the physical presence of a real mirror image. It changes its position, dimensions, and features according to the movement of the viewer. The common mirror representations of individual viewers also interact with each other, and their audio/visual representation is perceivable as within the "mirror space." The mirror image is active and alterable as long as the visitor remains in the data-space of the installation. When the visitor departs, the image remains and continues to move together with other representations. The mirror images of previous viewers disappear when the images of new visitors appear on the screen.

Goals
1. To develop a technological system that is capable of expanding human conciousness through reactivity.

2. To create an interactive interface for intuitive generation of a personalized 3D avatar.

3. To create lifelike virtual spaceswith real-time 3D technology.

Innovation
The Mirror_SPACE is a communication system based on a complex scientific-artistic concept. Through communication among software systems (3D visualisation, motion-tracking, data-analysis, and sound-effects programs) and the internet, the real-time system creates an audio/visual sequence of events while taking into consideration the properties and movements of the viewer. The work examines how the audio/visual sequence created by the interactive system affects the user experience.

Vision
Mirroring in the physical sense always happens on the surface, Mirror_SPACE, however, probes deeper and tries to show the connections that influence human existence through human-machine interface.

Viewers are invited to identify with a virtual mirror image that reflects their internal state (through mood analysis) and their external affiliations (through information streams from the internet). The person is viewed as a node that is networked with the whole of existence. Effects that can be grasped by our perception are presented in this system as dynamic data and converted into three-dimensional objects. This process also involves compiling a virtual image, but the filter is a computer calculation , which not only processes our extended characteristics but also data gathered simultaneously from the outside world.

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moo-pong

Moo-pong devices enable users to pick up moving images from their environment, gather them, and display them like a kaleidoscope. A camera links the captured images with physical IDs. The IDs are collected in a container, which generates a movie relating to the IDs, where they become a living experience.

Art and Science
With moo-pong, users create original works without even realizing it. For example, if you use moo-pong while traveling, you could pass on memories of your trip much more effectively than buying commemorative postcards or DVDs. Moo-pong pieces can also be special gifts that are much more precious that expensive, useless objects.

Goal
To encourage people to use moo-pong in daily life, to commemorate events such as birthdays, trips, etc. and share memories with others.

Innovation
The core technical innovation of this project is that moo-pong incorporates technologies that relate physical objects and moving images to create a kaleidoscopic experience.

The acquisition system is composed of an RFID tag, a micro-controller, and LEDs that notify the user of the shooting state. The scope includes an RFID reader, a small (2.5-inch) LCD display, and push buttons. It communicates with a PC, and the PC displays the moving images that correspond with the pushed buttons.

Users can edit and browse among moving images by dropping moo-balls into the moo-scope. Mirrors the in moo-scope produce visual effects like a kaleidoscope.

Vision
Moo-pong allows people to make "pieces" about their daily lives, with more of their own feelings, passions, and experiences. In future versions, the functions of the moo-cam will be buried in the moo-ball, and users will be able to capture moving images by only using the moo-ball.

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MotionSPHERE

This image-processing technology stabilizes the trembling in images captured with a rotating camera in real time, and because of its "sphere" characteristics, it can track objects no matter how fast or where they are moving.

Art and Science
MotionSPHERE is a real-time, multi-camera image-processing technology that can record and display scenes that were impossible to capture before: spinning balls, swinging bats, trembling vehicles, etc.

Goal
Currently, stabilization and object tracking work fine separately, but they don't work together. The goal of this project is to combine them in real time, interactively.

Innovation
MotionSPHERE's main innovation is a very fast, robust algorithm that processes multi-camera images in real time. To stabilize the entire image, optical flow is obtained at more than a hundred locations, and the rotation parameters are estimated based on the minimum-square-error method. Object tracking is achieved by combining background extraction and color extraction. The static part of the sphere image is filtered out with background extraction to dramatically decrease processing requirements and realize real-time interaction.

Vision
In the future, digital cameras will be smaller, smarter, and more ubiquitous. For example, cameras will be embedded in basketballs, and spectators will see the game from the ball's viewpoint. Because the ball and the camera are spinning, MotionSPHERE's technologies will be necessary so spectators can see a steady image from inside the spinning ball.

Eventually, cameras will be embedded in many other previously impossible places. The result will be a new kind of visualization, entertainment, and artistic imagery.

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Seelinder: The Cylindrical Lightfield Display

With this unique cylindrical system, viewers can see 3D images in 360 degrees without special glasses. It is derived from an experimental display exhibited in SIGGRAPH 2001 Emerging Technologies. The current version shows color 3D moving images.

Art and Science
The system displays 3D images of real objects and human faces with real presence, so it is useful for advertising, exhibiting commercial products, entertainment, and, especially, telecommunication, where it enables people to communicate over long distances as if they are meeting in the same space.

Goal
The goal of Seelinder is to establish a 3D display technique that enables representation of natural dynamic lightfields around objects so that viewers can view them freely without fatigue.

Innovation
The display's most innovative technique reconstructs light rays in all horizontal directions with high density. This is realized with a rotating barrier with slits and high-speed light sources such as LEDs. The system also includes a method of light-ray control that enables representation of lightfields from a set of photos taken from all sides of an object. The 2001 version of the system only displayed images that were rendered by a model-based method. The new display uses an image-based method to show real images.

Vision
Conventional 3D displays are limited. For example, they require viewers to stand or sit in a specific position or use 3D glasses, and they cause viewer fatigue. Cylindrical 3D display technology is just an example of techniques that might eliminate such problems. The project team is continuing its efforts to realize true "viewer friendly" displays.

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Shaking The World: Galvanic Vestibular Stimulation as a Novel Sensation Interface

A novel sensation interface device that uses galvanic vestibular stimulation (GVS) to control balance. The device induces vection (virtual sense of acceleration) synchronized with optic flow or musical rhythms.

Art and Science
This device directly supports non-verbal human behavior. Its most direct application is in walking guidance and postural support. Other possible applications include automatic avoidance of collisions or falls, GPS-guided walking navigation, and pedestrian flow control. It can also provide a novel shared kinetic-sensation interface.

Goals
To communicate nonverbal feelings such as kinetic senses, which can not be shared conventionally, and to demonstrate and create awareness of the use of GVS as a novel sensation media.

Innovations
There is no feeling of enforced action. Because users are navigated very naturally and almost unconsciously, they are not distracted by the stimulation and are aware that their behavior was an effect of the stimulation only afterward.

The device provides a virtual sense of acceleration without an expensive mechanical platform synchronized to the flow of movies.

When the stimulation is synchronized to musical rhythms, the device provides a very amazing experience. Especially when stimulation is at a high frequency (more than 1~2 Hz), users feel as if their visual fields and bodies are tremblingly along with the rhythm.

Vision
One implication of this technology is its possible role in maintaining safety standards for electrical stimulation. Popularization of ubiquitous technology is another, because it would be useful for crowd control to have people walk in the same direction and sway to avoid collisions.

This technology could also become an important component of wearable computers. In future applicaitons, vection reproduction by GVS may be a standard function of communication, like sound reproduction in mobile telephones or portable music players.

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Spore 1.1

A physical computing project that creates an ecosystem for a rubber tree, where conditions for life or death are controlled by monitoring fluctuations in the price of Home Depot stock. The plant was purchased from The Home Depot, so the project is eligible for the company's one-year return policy if the tree dies.

Art and Science
Spore 1.1 makes visible the artificiality of our immediate reality by relating the stock market to the ecosystem. Using small-form-factor computing, microcontrollers, and custom software, the life of a plant is controlled with data typically used to monitor the life of a corporation.

Goal
The primary goal of the project was to find creative expression within a system of control that is systematically monitored through globalization, the growth of multinational corporations, and the loss of heterogeneity and market-driven economies. Another goal was to produce a visually engaging work that shows the familiar form of a potted plant encased within a cybernetic environment that reads as simultaneously unpleasant and bound, yet balanced and harmonious.

Innovation
Spore 1.1 derives creative expression from, and visually exposes, a growing system of control that has steadily been replacing heterogeneous market-driven economies. These systems (or multinational corporations) employ a variety of strategies in the name of consumer freedom (liberal return policies, etc.) but forcefully act as consumer-control mechanisms on the macroscopic level.

Vision
Spore 1.1 will continue indefinitely. The tree has already died twice and been replaced. New Spore projects are in progress, utilizing physical computing technology and data mined from economies of scale to affect living organisms. Spore 2.0 will use wireless internet signals to encourage slime mold growth in urban settings.

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SpotScents

Generated scent is delivered to a specified position through free space by scent projectors that accurately produce a small region of scented air. The user perceives the scent at a precise time and position without wearing any equipment.

Art and Science
Technologies that control olfactory space will enable people to enjoy scents as media in their daily life. SpotScents could be used at home, in shops, and in public places without special air-conditioning facilities or forcing users to wear any special devices. For example, at home people can enjoy movies and interactive games that feature rapid smell switching that corresponds to changes in scenes. For TV broadcasting, advertisers can provide a series of short "scented" commercial messages (perhaps 15 seconds). For example, a perfume commercial could follow a coffee commercial. In retail commerce, businesses can use suggestive smells to make people notice shops as they walk through shopping malls. In their creative works, artists can incorporate odors into multimodal pieces without worrying about mixing smells from adjacent works in an exhibit.

Goals
To control 3D olfactory space and incorporate the olfactory channel in virtual reality applications and ordinary audio-visual content, including movies and games. Ultimately, the goal is to achieve a natural, unencombered experience so that scent can become a commonly used component of digital media.

Innovation
So far, the major problem with emitting scents has been that odor diffuses to a wide area, and it does not dissipate quickly. And, of course, some people dislike scents that others love, so dispersed scents can be unwelcome.

To overcome these problems, SpotScents uses scent projectors to deliver localized odors to a human's nose through free space without requiring users to wear any special devices or trailing tubes. A scent projector is composed of an air cannon mounted on a pan-tilt platform. The air cannon launches vortex rings that can travel several meters (the distance depends on the design parameters of the air cannon, such as aperture size). Because Scent Projectors emit only a small amount of scented air, different scents can be delivered within a short time frame without air conditioning equipment.

One problem with the system's original design was that users could feel a significant wind force when the vortex ring hit their faces. The current system uses a novel method to allow scented air carried from a nearby place to stay awhile at a certain location without the unnatural sensation of a sudden air current. This was achieved by intentionally breaking the vortex rings, launching multiple rings, and letting them collide at the target point.

Vision
As scents become common spatio-temporally controllable media, artists and technologists can incorporate scents as well as sounds, images, and movies in their works. Future versions of SpotScents will closely combine the olfactory experience with audio/visual content, so users can feel the air of "the world beyond the screen."

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Straw-Like User Interface

An evolutionary interface system that allows users to virtually experience the sensations of drinking. The sensations are created by referencing sample data of actual pressures, vibrations, and sounds produced by drinking from an ordinary straw attached to the system.

Art and Science
Our lips and mouths are some of the most sensitive parts of the human body, as sensitive as fingers. For this reason, research on presenting various applications to this region of the body will be explored by many researchers in the near future. This project proposes an innovative methodology for presenting stimulation to the mouth and lips.

This project is the world's first attempt to present virtual drinking sensations to the mouth and lips. Because this body region is so highly sensitive, it is possible to develop many unique interfaces and extend their applications into several research fields, including interactive arts and entertainment.

Over 300 users experienced this system in the recent International Collegiate Virtual Reality Contest (IVRC) 2005, where it won first prize.

Goal
To transmit information to the mouth and lips by applying pressure and vibration.

Innovations
1. Presentation of the virtual drinking sensation
   The system transmits pressure changes to the straw, which applies vibrations to the mouth. The pressure changes are created by a valve in the interface. If the valve is closed, the pressure increases. If the valve is open, the pressure decreases. Appropriate control of the valve produce various changes in pressure. Also, when the speaker inside the interface vibrates, the straw attached to it receives the vibration and transmist it to the lips.

2. Recording information on drinking
   Pressure changes and sounds from real-world drinking experiences are recorded as data and installed in the interface to reproduce virtual drinking sensations. A pressure sensor installed near the straw gathers pressure values, and a small microphone acquires audio data.

Vision
With this interface, users can experience the happiness and fun associated with various drinking sensations. Future versions will be miniaturized, to about the size of an ordinary straw, so the interface can be carried in a pocket, and users can experience virtual drinking fun anywhere they go.

Providing wider varieties of information to the mouth and lips will extend development of useful interfaces to many areas. For example, it is possible to add virtual sensations to hands or legs while using this interface, which could create a new way of playing games. With telecommunication technology, this interface could enable distance communication via touch. It could also augment sense perception among the elderly and physically challenged. And it could support research and development on new beverages.

Eventually, the interface will be extended beyond the virtual drinking sensation to provide wider varieties of information to the mouth and lips.

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Sustainable

A networked model of a water-resource allocation algorithm that exhibits dynamic, emergent behaviors. It is inspired by the current water crisis in the western US. Water also serves as a metaphor for distribution of capital and cultural resources throughout our communities.

Art and Science
Sustainable is a dynamic, autonomous, robotic installation comprised of a network of seven independent water gongs. The network models a water-resource allocation algorithm that yields a perpetual evolution of the sonic, visual, and timbral aspects of the installation. Each gong node functions independently and autonomously, but through their simple interactions, the system as a whole exhibits dynamic, emergent behaviors that unfold over time.

In this work, the powerful language of art is integrated with current hardware, software, and research from the sciences to address issues of social and environmental importance in a visceral, immediate way. It is designed to raise concerns over the growing water crisis that currently confronts many parts of the world and will be one of the primary global issues in coming years. Viewers are challenged to consider these issues as they observe hundreds of gallons of water flowing through the network.

The project borrows from evolutionary computing techniques and current research in water resource distribution algorithms to implement and manage a dynamic system. It merges art and sophisticated scientific tools to allow viewers to focus on the organic and aesthetic aspects of the work.

As the sounds and visuals of the system slowly evolve, and viewers contemplate how close and interdependent our communities are, the work contributes to enhanced social and environmental awareness and reflection.

Goal
To implement a compelling physical system that integrates knowledge from the arts and sciences to realize a unique work that will stimulate thought and reflection.

Innovation
A core innovation of this work is design and implementation of a physical dynamic system that exhibits emergent properties. Though software models of dynamic systems are increasingly important, their physical realization poses logistical and conceptual challenges. Through simple, independent behaviors, as water, sound, and light move throught the system, the nodes are in constant flux.

The system uses Atmel microprocessors on custom PCB's to control sensors and actuators embedded in each water gong. The microcontroller software is written in C with the ICC-AVR IDE. The water tanks, support structures, and gong suspension armatures are custom fabricated.

Vision
Over the coming years, water distribution and allocation will become a pressing global issue. This work integrates current research in the sciences and the communicative power of the arts to address the immediacy of this environmental, social, and political concern. Sustainable models the complex, dynamic, networked world we live in and seeks to generate an immersive experience for contemplation and reflection.

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SUIRIN

This interactive sound-and-light artwork derives its name from "ukidama," an ancient Japanese ball-shaped glass artifact. The source of the sound and light is inside the ukidama, which is expanded by a digital filter.

Art and Science
Art is an essential part of every life; it is the source of enrichment for our sentiment and state of mind. Communicating with the essence of beauty, which has been lost through the process of modernization, can be recovered through the interactive arts. For example, with regular use at home, SUIRIN's soothing sound and lighting can relieve stress at the end of an exhausting day.

Innovation
As they experience SUIRIN in the real world, users can feel as if they are melting into the water in the container. This illusion is generated by SUIRIN's core technology. First, the container's sound is sampled with FFT (fast Fourier transform) through four pin microphones. After the noise is reduced, it is processed through several effects until, finally, a sound similar to the cry of a "suzumushi" (bell-ring cricket) is produced and projected through 4ch surround speakers. In the meantime, the output level of each speaker is synchronized with the brightness level of the four colors of the LED at the bottom of the container.

Vision
In the next generation of SUIRIN content, a sensor system will read users' moods and sentiments. For example, when users are depressed, the system will sense their emotions and offer a more up-beat sound. SUIRIN content can also be networked. In other words, through sound and light, users can convey their emotions to others in remote places, and vice versa, they can sense how a friend is feeling in a distant place. The content will evolve to create a novel device that people use in their daily lives.

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TENORI-ON

A musical interface that allows people to play music intuitively and create music visibly.

Art and Science
In this project, the relationship between art and science can be expressed as input and output. When the relationship between input and output is very natural, and the result of the output impresses people, the process is similar to the interaction between art and science.

Goal
To enable many people (including people who don't usually play musical instruments) to experience the pleasure of creating music.

Innovation
This interface is an embedded system operated by a real-time operating system called ITRON that mainly controls the sound output, LEDs, and the 256 switches. The core unique technology is the algorithm that makes music visible. The algorithm analyzes:

- How long one of the 256 switches has been touched.
- The direction of the touch.
- The angle of the interface with the acceleration sensor embedded in the interface.

This elaborate and highly developed technology makes it possible to receive many different types of information simultaneously, which we can't perceive with our eyes, and it expands expressive possibilities by providing an interface to the music and the LEDs.

Vision
TENORI-ON offers a new perspective on music, a new way of visualizing music that has never been seen before. It expands the range of musical enjoyment and provides more musical pleasure in everyday life.

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Ton^2: A VR Application With Novel Interaction Method Using Displacement Data

A novel interaction method using displacement data as a match-up-style VR application. Participants play the Japanese traditional game, Paper-Craft Sumo, in a typical way, with a system that captures waving-motion data.

Art and Science

Ton^2 is an interactive application that reveals a new sensory interface. User input interacts as 3D imagery in a Sumo contest, and waves interact with each other to provide further interaction. This combination of physical and visual sensation delivers a new type of sensory enjoyment.

Goals

To discover a new sensory application implemented by using intuitive and robust interaction methods.

Innovation

With water as a medium, this system uses distance sensors to create an intuitive interaction model. These sensing devices support a robust measurement method, which was developed without any disturbance.

Vision

Paper Sumo, like other traditional Japanese games, is not played by many children in the 21st century. Virtual reality technologies like those used in Ton^2 can help revive old-fashioned games and bring them back with new amazement and enjoyment.

In recent years, body-sensory applications have been developed with various innovative methods. But this interaction, in which participants feel the power of waves, demonstrates a new way to play traditional games. They could be played by many people in some kind of pool!

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TouchLight: An Imaging Touch Screen and Display for Gesture-Based Interaction

In this novel interactive display technology, the outputs of two video cameras behind a transparent projection display are combined to produce an image of objects on the display surface. An otherwise normal sheet of acrylic plastic is transformed into a high-bandwidth input/output surface suitable for gesture-based interaction.

Art and Science

Even in its current preliminary form, TouchLight establishes a relationship between the observer and the display that is more direct and intimate than has been seen before. For example, TouchLight has the ability to not only display what is placed on its surface, but also to see beyond the glass to what is in the environment. There is no requirement to make a distinction between what is on the surface and what is off the surface, and there is no cumbersome transition from one mode to the other. Users can interact with the display at a distance and in the next moment touch the display and every space in between.

In this way, TouchLight enables artists to explore novel ways of manipulating the observer's relationship with the image. From the perspective of science, TouchLight allows exploration of a wide variety of image-manipulation techniques, including computer vision, that take advantage of TouchLight's unique configuration to transition smoothly from surface sensing to sensing in depth.

Goals

Current goals include exploration of interaction techniques, signal processing algorithms and artistic installations that are idiomatic to this configuration. For example, the project team is less interested in driving a standard GUI interface with TouchLight and more interested in thinking about how an imaging touchscreen can be the centerpiece of a novel shell that supports multitouch, gesture, and multiple users in deep ways. The system's high-resolution capture of objects placed on the surface is also idiomatic: no other rear-projection-based interactive display can do this so directly.

Innovation

TouchLight's core innovation is its configuration of display and cameras, and the accompanying signal processing algorithms that form the touch image. It is a unique application of the novel HoloScreen technology, and a unique application of computer-vision techniques to blend touchscreen and other perceptual user-interface techniques into one coherent interactive display.

Vision

TouchLight has implications for a future of ubiquitous computing in which potentially any surface in the world is a site of input and computation, and the very displays we use and spaces we inhabit are aware of our presence. In the future, computation will be everywhere, and desktop computing will be only one small part of the action. More likely, we will always be in touch with our data via wall-sized displays, which, coupled with the appropriate sensing systems, will accommodate a variety of interaction styles. "Casual" and mobile computing in which the various displays are annexed as needed according to your proximity and task will overtake the standard desktop computing model.

TouchLight blurs the boundaries between art and science as it challenges future designers to think about the relationship between the user/observer and the image, principally the domain of art, and the display. Similarly, it challenges our traditional idea of the shell. Does the future really include the kind of interface seen in "Minority Report?"

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Ubiquitous Graphics

This system supports collaboration and interaction with very large computer graphics images. Position-aware handheld displays function as "magic lenses" that allow seamless access to both overview and detail on a large display.

In-place annotations and modifications can be added easily and are propagated throughout the system to facilitate multi-user collaboration.

Art and Science
The Ubiquitous Graphics system is an example of how computer graphics is becoming more and more integrated with the physical world.

It shows how the addition of position-sensing and networking can break the boundaries between devices, effectively creating a single large, shared graphics surface that is accessible to many users.

Goals
1. Development of novel techniques that allow handheld computers to interact with portions of a large workspace, using a combination of the "peephole" interaction technique and focus-plus context displays. The system should support several users working together, as well as displays of any size and resolution.

2. Creation of a system that can actually be used in a real work environment. Ubiquitous Graphics uses only standard off-the-shelf components.

Innovations
This project is being shown publicly for the first time at SIGGRAPH 2005.

The fluid combination of many different types of displays is novel. Since the system uses a cross-platform development environment, most portable displays fitted with an off-the-shelf ultrasonic transmitter can be used with it, including: tablet PCs, pocket PCs, Palm devices, smartphones, and other mobile phones. Users can switch between displays at any time, and several people can work in parallel using several displays on the same large-resolution workspace.

Vision
Mobile and handheld devices have become ubiquitous and are now a natural part of daily life. The same can be said for large information displays, which are now seen in most public places. Large plasma displays and projectors are used for a wide variety of purposes, from showing today's menu at a restaurant to presenting an overview of the subway network. This project integrates these two common technologies to create a system that can be used on any networked mobile device together with any large display, in any environment.

New mobile devices are constantly gaining more features; the latest mobile phones even have built-in GPS navigation and wireless LAN for short-range communication. Hardware for ultrasonic positioning might be one possible feature for mobile phones, if sufficiently interesting applications exist. Ubiquitous Graphics might be one such application, and could encourage hardware manufacturers to add positioning hardware to future mobile devices.

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View-Dependent Stereoscopic Projection Onto Everyday Surfaces

A fully automatic image correction technique that supports view-dependent stereoscopic projections of real-time graphics or ordinary video content onto everyday surfaces. The output appears to be projected onto artificial (white and planar) canvases.

The actual surfaces, however, can be geometrically complex, arbitrarily textured, and colored. This technique will enable upcoming portable projectors and ad-hoc stereoscopic visualizations.

Art and Science
In combination with future projector technologies, this technique could enhance life in four ways:

1. Immersive and semi-immersive displays in science, industry, and education

2. Museum edutainment and theme-park entertainment

3. Embedded home entertainment

4. Portable projectors

Goals
The overall goal of the project is to make artificial projection canvases unnecessary. Instead, images could be projected onto curtains, furniture, table-tops, or papered walls, etc. In addition, ad-hoc stereoscopic visualization of interactive computer graphics on arbitrary surfaces can be supported. This might make special-purpose display devices, such as CAVEs or special wall-like or table-like projection screens, unnecessary.

Innovations
Ad-hoc projection techniques demonstrate how image correction allows projection of pictures, videos, interactive games, or stereoscopic graphics onto arbitrary everyday surfaces. The system uses only off-the-shelf components (with a single exception of the attached LCD shutters for active stereo projection), and all of these techniques can be implemented in future projectors. These components can lead to embedded home-entertainment solutions, portable presentation technology, and ad-hoc immersive or semi-immersive projection devices.

Vision
Due to increasing market demand, the cost of future projectors will drop as dramatically as it the cost of personal computers, DVD players, and mobile phones. Thus, they will play a dominant role in future home-entertainment equipment. They will replace today's large-screen technologies (flat-panel LCDs, plasma screens, and back-projection screens.

Projectors are also becoming smaller. Another quantum leap toward wireless and portable systems will be utilization of bright, low-power LEDs as light sources. These portable projectors will enable large-screen visualization for mobile computers, such as cell-phones, PDAs, and laptops.

But one major problem remains: the need for an artificial (white and planar) projection canvas that must be as large as the required image. The solution to this problem is a real-time image-correction method that allows projection onto arbitrary surfaces that exist within the specific environment, such as papered walls, colored window curtains, textured table-tops, natural stone walls, etc. Furthermore, this method allows ad-hoc immersive stereoscopic projections, so it could make special-purpose displays such as CAVEs and other immersive or semi-immersive projection devices unnecessary.

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Virtual Canoe: Real-Time Realistic Water Simulation for Haptic Interaction

A real-time water simulator with a pre-computed database of 3D fluid dynamics. The system simulates a real-time wave model with a database for complex and fast-flow areas around objects that creates realistic wakes and force feedback of water resistance.

Art and Science
Virtual Canoe introduces realistic and interactive water into virtual worlds with haptic characteristics that enhance intuitivene interaction. Many real-time simulations of rigid and soft bodies for realistic haptic interaction have enhanced virtual experiences. Virtual Canoe extends this principle into science, engineering, and entertainment applications.

Goals
1. Invention of a real-time fluid model for virtual reality.

2. Invention of real-time visualization and haptization methods for the real-time fluid model.

3. Understanding of fluid-phenomena simulations in engineering.

Innovation
Virtual Canoe combines a pre-computed database and a real-time simulation. Both components are required to establish a realistic waveform. The real-time component is just a wave-function simulator, so it simply transmits water pressure and velocity. The pre-computed database provides a force pattern for a point on an object's surface at a constant input velocity. The pressure from the database affects the velocity of the water in the real-time wave simulation, which keys the query to the database. This enables the system to create a realistic waveform. It carefully decomposes the original Navier-Stokes equation into a simple real-time function and a complex pre-computed function considering the area and the phenomena.

Vision
Many phenomena are represented by differential equations. Engineers need to understand the implications of these equations to describe a phenomenon, understand it, and apply it to real situations.

In developing Virtual Canoe, non-linear differential equations were converted into simple linear differential equations and a pre-computed database. Then the system ran them and found the difference between the simulation and the real phenomena, and corrected the simulator. This process revealed implications of the original non-linear equations.

The development process demonstrates that creation of real-time simulations requires understanding real-world phenomena. Any research focused on understanding real phenomena can be applied to create realistic virtual worlds, and virtual reality is a very good way to understand the real world. There are still many phenomena that cannot be portrayed in virtual worlds, but deeper understanding of the real world will expand virtual reality's application and credibility.

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Virtual Hang-Gliding Over Rio de Janeiro

In this virtual tour, the user soars over Rio de Janeiro's famous cityscape and tourist sites, and experiences what a real hang-gliding flight feels like. The system delivers a stereoscopic experience, including stereo audio and wind sensations, and observers can watch the flight through an additional projection screen.

Art and Science
This project enhances life by providing a safe and fun environment in which people can experience truly immersive hang-gliding flights over different places or even synthetic places created by artists. It relieves fear by eliminating the risks of real hang-gliding. It provides a very enjoyable virtual experience. It can alleviate problems caused by diminished self-confidence. And it is a very good tool for training.

Goals
Enhance the hang-gliding simulation experience by adding more senses and improving quality. Provide a true feeling of being "immersed" and experiencing a real hang-gliding flight with a (stereoscopic) head-mounted display, wind sensations, and 3D sound modified by head orientation and position in the 3D space. Exploration of the city of Rio de Janeiro and its beautiful sights from a different perspective.

Innovation
The simulation uses commodity-cluster technologies. Each computer node is responsible for a specific task.

All hardware components are commercially available. The software is an internally developed library called JINX. Many hang-gliding simulations were developed, but this version, because it uses a head-mounted display with head-tracking, creates more degrees of freedom and a greater feeling of immersion.

The model of Rio de Janeiro was produced for a tourism exhibition. It was created with Maya, saved in VRML, and then converted to X3D. An avatar of the glider was also created, because the user wears a head-mounted display and cannot see the real one.

The audio simulation plays "Aquele Abraço" in the background, and some points in the environment have special sounds (for example, the Maracanã, the biggest soccer stadium in the world, and the Sambódromo, the carnival parade avenue).

Head tracking allows users to rotate their heads so they can see and hear different scenes at any time. Jinx, a 3D browser designed to support simulations that use commodity-cluster technologies, was used to visualize the scenes. It supports stereoscopic graphics and 3D sound, in addition to other possible expansions.

The X3D system is based on a scene graph, and because of the architecture of C++, it is very simple to simulate each X3D node as an object. The X3D system has some non-linear links. An XML parser is required to parse an X3D file, as well as the configuration files for Jinx, which is also in XML format.

Vision
Visual, audio, and tactile technologies should be more integrated, so systems can deliver a deeper immersion experience. Perception of the virtual world tends to be more complete when at least three of the five senses are employed. It doesn't really matter how realistic the image, the sound, or even the touch are. The essential criterion is the overall sensation of immersion, the feeling that one really exists in an alternate reality. In other words, what really matters is the system's verisimilitude.

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The Virtual Raft Project: A Network of Mobile and Stationary Computer Systems Inhabited by Communities of Interactive Animated Agents

A novel interaction paradigm in which computer screens serve as islands of virtual space ("iLands"). Mobile "virtual rafts" let people move animated agents between iLands. The project features innovations in heterogeneous computer graphics, tangible human-computer interaction, interactive animated characters, and mobile computing technology, and has applications in education, entertainment, and new-media art.

Art and Science
The Virtual Raft Project offers a unique physical and graphical interaction that can be used for interactive storytelling and learning, and as a "sand box" in which participants can experiment with interactions of animated agents.

Goals
1. To develop an interactive platform that enables physical human interaction with virtual characters.

2. To explore the implications of this kind of heterogeneous platform for animation of autonomous characters, as they break away from the constraints of a fixed desktop screen.

3. To enable interactive education and active learning by creating an engaging setting for exploring a range of content domains, starting here with color theory, but extending to more complex domains such as ecology and other system sciences.

Innovations
1. This project offers an example of animated characters that are able to move seamlessly among heterogeneous graphical systems. If a character exists on only one screen, it is a subset of that screen, a piece of that machine. If, on the other hand, a character can move between screens, then it appears to exist in some broader sense, to be independent of any given machine.

2. Through the virtual rafts, the work presents a novel tangible interaction between humans and virtual characters.

3. The work demonstrates an "island metaphor" for computational interactions, which helps to frame the relationship between real space and virtual space, and between the real creatures and virtual creatures who inhabit those spaces.

Vision
The "island metaphor" for computational devices points toward a new kind of interaction designed to accommodate and enhance the capabilities of autonomous systems. This interaction could be used as a platform for new kinds of educational exhibits, new genres of location-based entertainment, and new forms of interactive media art. In particular, the development team is currently collaborating with several science centers to develop a version of the project based on multi-species ecological interactions.

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Laval Virtual Winner: Virtual VeeJeying

In this virtual interface, participants use lighted gloves to mix images and videos

Art and Science
The work mixes image-analysis algorithms and real-time computer graphics images to illustrate what could be the future of some human-graphic interfaces.

Goal
The main goal of this project is to allow participants to become VJs and express themselves by moving images, mixing them, and applying real-time special effects while listening to recorded music.

Innovation
This is a multimodal graphic interface that uses a simple natural body language. The core technical innovation is the connection between a new haptic technique and video-jockey software that allows participants to interact with several flows of images in real time. The lighted glove is equivalent to a multimodal device, such as a mouse: with one finger, a participant can select an image element; with two fingers, a participant might move a selected element; and special hand motions change the mode of the interface. For example, turning one's hand switches the interface to a special-effect mode that applies effects to the image elements instead of moving them.

Vision
This presentation is part of the trend that merges technique and art. It is an example of what the future everyday interfaces could look like. Using virtual graphic interfaces should provide a better feeling for digital content, and anyone will be able to experience being a VJ by mixing images and videos. The gloves could replace current remote controls for interaction with our environments at home or at work. This application might also be adapted to applications in theme parks, where visitors can be actors in immersive environments.

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Volflex

A volumetric haptic display composed of a group of air balloons controlled by air cylinders. Each air cylinder is equipped with a pressure sensor that detects force applied by the user. Deformation is directly related to the hardness of the virtual clay.

Art and Science
Digital tools for 2D paint are mature technologies. Tools for 3D shape manipulation, on the other hand, are at a preliminary stage of development. The Volflex is a new haptic device that uses clay, a very popular medium for shape design, as the physical interface to a computer-controlled surface.

Goals
1. To provide a volumetric interface device that enables users to feel virtual objects using the whole palm.

2. To display visual images on the surface of the device.

Innovations
In this new haptic interface, a group of computer-controlled air balloons arranged in a body-centered cubic lattice provides the interaction surface. A tube is connected to each balloon, and the tubes are connected to each other by springs. The volume of each balloon is controlled by an air cylinder. This mechanical flexibility enables the interaction surface to assume arbitrary shapes.

Each air cylinder is equipped with a pressure sensor that detects force applied by the user. In reaction to the pressure data, the device is programmed to perform like clay. A projector set above the balloons displays images on the surface of the device, not on the user's hand. A mechanical rotary shutter separates the projector and camera. The camera captures the user's hand, which is eliminated from the projected image.

Vision
Virtual clay is one of the ultimate goals of 3D interactive graphics. The Volflex uses a lattice of air balloons to deliver an effective interface device for manipulation of virtual clay. It is a new digital tool for making 3D shapes, and it could lead to revolutionary changes in industrial design methodologies. Designers use their palms or the joints of their fingers to deform a clay model when carrying out rough design tasks. The Volflex simulates this type of natural manipulation.

The Volflex is also an interactive artwork. Physical properties of the virtual object can be designed by programming the balloon controllers. The projected image can be also designed. This combination of haptic and visual display provides a new platform for interactive sculpture.

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X'talVisor

A new-generation head-mounted projective display system. Using retro-reflective material as a projection screen, the system projects stereoscopic color images with high contrast and brightness. By using an all-reflective micro mirror to reflect projection images, it delivers an open field of view.

Art and Science
Because head-mounted displays (even the see-through variety) are primarily designed to explore the pure "computer world," they provide a quite limited view of the real world. And because the displays cover the wearer's eyes, they hinder delicate facial communication between users in the real world.

In contrast, X'talVisor obtains a virtual field of view without limiting the view of the real world, and the wearer's face is not covered by the display. These characteristics are essential for wearable displays that can be used in daily life, just like ordinary eyeglasses. X'talVisor's compact design and extended field of view will make stereoscopic head-mounted displays viable tools for a broad range of applications in collaborative environments, where they have been considered too inhibiting or uncomfortable.

Goal
To enable mutual communication between people in remote sites with a high sense of presence. This requires display of a high-quality image with natural stereoscopic viewing, a large real field of view, and a large field of view in the projected image.

Innovation
X'talVisor is a natural extension of retro-reflective projection technology (RPT). RPT consists of a projector, a half-mirror for reflecting projection images, and a retro-reflective screen for image projection. RPT makes it possible to project stereoscopic color images to a free-form surface screen with high contrast and brightness, but the large half-mirror covers most of the wearer's face.

In X'talVisor, the large half-mirror is replaced by an all-reflective spherical micro mirror. The pre-distorted image from the projector is concentrated by a condenser lens. The mirror is placed near the focal point of the lens so that the required mirror size becomes negligible. With a micro-spherical mirror, the image is expanded and distorted. Since the projected image is already pre-distorted, the image projected to the retro-reflective screen is not distorted, while the field of view is large. Because the mirror size is quite small, X'talVisor can display images without covering the wearer's face, so it enables natural, open-face-to-face exchanges.

Vision
X'talVisor allows "image experiences" to permeate deeply into our daily lives. Unlike conventional wearable displays, 3D scenography with heightened presence can be experienced with the same ease and comfort as wearing headphones to listen to music. For example, when users add a headset to X'talVisor, they can carry on conversations from remote locations as if they are in the same space. X'talVisor also enables training in mixed-reality environments with the same unimpeded feeling as in the real world, with no need for large systems such as flight simulators, CAVEs, etc.

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Location

Room 403AB

Days & Hours

Sunday, 31 July	1 – 6 pm
Monday, 1 August	9 am – 6 pm
Tuesday, 2 August	9 am – 6 pm
Wednesday, 3 August	9 am – 6 pm
Thursday, 4 August	9 am – 5 pm

guerilla studio

The Guerilla Studio is an integrated network of machines for realizing ideas in 2D, 3D, 4D, and n-dimensional media, a working computer graphics laboratory for explorations in fine art, animation, science, and other CG disciplines. It features high-end computer workstations, a multitude of software (featuring 2D and 3D design), and print technologies. Artists, scientists, and engineers can walk in, create, and realize their creations right in the lab.

The Guerilla Studio also features artists in residence, who instruct attendees on technique and explore the possibilities of digital art. And the Guerilla Studio will co-host the annual Cyber Fashion Show with Special Sessions.

Important Note: Because The Guerilla Studio totally relies upon donations from developers and commercial vendors, we can not guarantee that all technologies listed on these pages will be available at SIGGRAPH 2005. This information is based on previous Guerilla Studio configurations and current projections for this year.

Guerilla Studio Committee

Peter Braccio
Guerilla Studio Chair
Monterey Bay Aquarium Research Institute

Kathy Beal
kathybeal.com

Robert Berg
Arizona State University

Lyn Bishop
Artist

Rachel Braccio

John Brock
johnbrock.com

Chrissy Cain-Ramirez
Monterey Bay Aquarium Research Insitute

Patricia Clark
Arizona State University at West Campus

Gene Cooper
Four Chambers Studio

Tara DeMarco

Chrisopher Evans
Crytek GmbH

Janine Fron
Ludica

Tracy Fullerton
University of Southern California

Helen Golden
www.helengolden.com

Isa Gordon
Psymbiote Project / SintheteX Fashions

Bob Gould
videographer

Jeremy Hansen
PRISM Arizona State University

Sara Irvin

Nicolas Kizer

Peter Kreider

Byron Lahey
Arizona State University School of Art

Karl Lang

Amy Morie
Amigos de los Rios

Jacquelyn Morie
University of Southern California

Dave Nutty
Images By Nutty

Megan Orosz
Sony Pictures Imageworks

Susan Parker
Parker & Associates

Celia Pearce
Ceila Pearce & Friends

Brock Ramirez
Knowledge Adventure

Heather Raikes
University of California, San Diego

Manny Sepulveda
Integrated Color Solutions, Inc.

Cathy Sewell
Monterey Bay Aquarium Research Insitute

Makai Smith
Kreysler & Associates

Raleigh Souther
Motion Graphix

Rebeca Strzelec
Pennsylvania State University Altoona College

Chris Tome
3DVfX.net

Scott Van Note
PRISM Arizona State University

Kimberly Voigt
Temple University, Tyler School of Art

Claire Weigand

Chris Williams
Knowledge Adventure

Michael Wright
M Ragsdale Wright Studios
Otis College of Art + Design

Emily Young
Portland State University

Pamela Zimmerman
Temple University, Tyler School of Art

2D
An introduction to the world of 2D input and output. A wide array of computers loaded with industry-leading software is color calibrated and color matched, via ICC workflow, to large-format printers to ensure superior results. Color-management training is provided by professional master printers.

3D
State-of-the-art 3D data-capture systems, modeling packages, and rapid-prototyping equipment. Attendees can generate 3D digital objects either by modeling in the latest version of various full-featured software packages or by using 3D data-capture devices to scan actual objects. These 3D models can then be "printed" on rapid-prototyping equipment.

4D (Animation)
Introduction to various off-the shelf commercial animation software packages, general interface, workflow, and creation tools via hands-on sessions and interacting with the Guerilla Studio volunteers. Attendees can explore modeling, texturing, lighting, and application of the basic principles of animation to bring creatures, characters, props, and other scene elements to life.

Two-Person Optical Motion Capture
PhaseSpace is demonstrating the latest two-person, real-time, high-resolution, optical motion-capture technology in the Guerilla Studio. Dancers, performers, martial artists, and actors can capture their motion on standard characters, and character artists can perform and capture motion with their own characters.

Collaboration Area
Attendees can sign up for bookmaking sessions, postcard and greeting cards sessions, origami projects, digital drawing circle, stop-motion animation, and sessions on combining traditional and digital media with mentoring by our Artists in Residence (Helen Golden, Lyn Bishop, Kathy Beal, and Emily Young).

Audio Area
A new area for exploring live audio recording using guitars, keyboards, microphones, and even a mandolin (or two). If you're not a musician, you can still make music here using various software packages that come with a variety of canned loops or by using interactive multimedia software that uses MIDI data, audio and video signals, and other digital and analog sensors and actuators to create real-time mixed-media art and performance. Professionals in music, theater, robotics, sculpture, performance, and video art are contributing their expertise to this area.

Invited Technologies and Events
Michael Wright will create portraits using electronic media. He will demonstrate the portrait process while creating a gallery of real-time printed works. Michael Wright is a painter who began to explore digital media in the mid 1980s on an Amiga computer. He has exhibited digital and traditional works internationally.

Lenticular printing fills the gap between 2D and 3D, using special lenses to achieve a pseudo-3D effect in a 2D print. This area explores both fine-art and fun applications of this technology using Motion Graphix Live Lenticular 3D and Animation Capture solutions.

BLUIsculpt: creating sculpture in virtual reality with output for rapid prototyping. BLUi® is short for Body Language User Interface, a research project of the Arctic Region Supercomputing Center at the University of Alaska Fairbanks. BLUIsculpt is open source software.
synsnd: percussive audio generation in virtual reality. synthsnd builds on the lessons learned developing BLUIsculpt, extending into audio synthesis by way of a virtual reality interface into Max/MSP.

The Game Design Atelier, presented by Ludica. Game research is one of the fastest growing areas of SIGGRAPH. The Game Design Atelier seeks to create a fertile laboratory within the SIGGRAPH Guerrilla Studio. Rather than focus exclusively on digital techniques, this environment seeks to foster innovation and creativity through practical, hands-on exploration of new ideas and methods for game design and production. A list of scheduled workshops and demonstrations will be posted in the Guerrilla Studio.

SYNAPSE: The Exhibit.
Sunday, 31 July
8-10 pm
Los Angeles Center for Digital Art
107 West 5th Street

SYNAPSE is a group exhibition of seven artists who made a difference by not only pursuing their personal aesthetics but because they operated in such a way as to build bridges between art forms and art communities. Presented by The Los Angeles Center for Digital Art in association with EZTV, the CyberSpace Gallery, the SIGGRAPH Art Gallery and the SIGGRAPH Guerilla Studio

Works by Victor Acevedo, David Em, Kate Johnson, Tony Longson, Michael Masucci, Anneliese Varaldiev, and Michael Wright

SYNAPSE: The Panel.
Bridging The Gap: Art, Artists, Technology and the Art Establishment
Tuesday, 2 August
10 – 12:30 pm
South Hall J, Exhibitor Tech Talk Room 1

This two and a half hour panel will be free to the general public.More information can be found at http://www.eztvmedia.com/panel.html. This is a collaboration between The University of California Los Angeles Extension and Otis College of Art + Design in association with, the SIGGRAPH Art Gallery and the SIGGRAPH Guerilla Studio.

Cyber Fashion Show
Wednesday, 3 August
7:30 – 9:30 pm
West Hall A

The Guerilla Studio and The Special Sessions venues Presents: The Fourth Annual SIGGRAPH Cyber Fashion Show, see page 5.

The Guerilla Studio wishes to thank Intel Corporation for their generous support.

Location	Days & Hours	
South Lobby	Saturday, 30 July	6 – 8 pm
	Sunday, 31 july	8 am – 6 pm
	Monday, 1 August	8 am – 6 pm
	Tuesday, 2 August	8 am – 6 pm
	Wednesday, 3 August	8 am – 6 pm
	Thursday, 4 August	8 am – 5 pm

international resources

In the International Center, the multi-lingual International Resources Committee answers attendee questions, hosts presentations for attendees from specific countries and regions, offers space for talks and demonstrations, and provides informal translation services.

International Resources Committee

Chair
Rejane Spitz
Portuguese, English
Pontificia Universidade Catolica do Rio de Janeiro
rejane_spitz@siggraph.org

Matt Adcock
English
CSIRO Australia
Matt.Adcock@csiro.au

Sandro Alberti
Spanish, Italian, English
Colegio de Arquitectos, Guadalajara;
Friends of San Diego Architecture;
Universidad de Guadalajara
salberti@fen-om.com

Miho Aoki
Japanese, English
Arctic Region Supercomputing Center,
University of Alaska Fairbanks
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Christian Bauer
German, English
Bauer und Freunde
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Ravi Birje
Hindi, English
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Tulay Tetiker
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Pascal Vuylsteker
French, English
Australian National University
pvk@vuylsteker.net

Location
International Center, South Lobby

International Resources Events

Informative international sessions organized by representatives of ACM SIGGRAPH-affiliated societies and the worldwide computer graphics industry.

Sunday, 31 July

AFRIGRAPH (African Graphics Association)
2 – 3 pm
Members of AFRIGRAPH present details of their recent activities.

Patrick Marais
Patrick@cs.uct.ac.za

SEAGRAPH Business Meeting (South East Asian Graphics)
4 – 4:30 pm
Attendees from Southeast Asian countries and the surrounding region: If you know SEAGRAPH already, then join us and give us your support. If you don't yet know us, then come and find out how we can help each other and channel our immense energy to promote computer graphics activities.

Tian Feng
ASFTian@ntu.edu.sg

ANZGRAPH Business Meeting (Australian and New Zealand Graphics)
4:30 – 5 pm
In this meeting for attendees from Australia, New Zealand, and the surrounding region, members of ANZGRAPH present details of their activities during the year, including highlights of the upcoming Graphite 2005 Conference in New Zealand, 29 November to 2 December. Come along, meet others from the region, and find out how to get involved.

Matt Adcock
Matt.Adcock@csiro.au

Australasian and South East Asian Reception
5 – 6 pm
Come and meet professionals, artists, and students from Australia, New Zealand, and Southeast Asia. This is a great chance to find out what is happening in the computer graphics field in some of the most exotic places on earth. Hosts: the ANZGRAPH and SEAGRAPH organizations.

Matt Adcock
Matt.Adcock@csiro.au

Monday, 1 August

Overview of SIGGRAPH 2005 (with Japanese interpreter)
9 – 11 am
Members of the SIGGRAPH 2005 Committee present an overview of the conference and highlights of their programs.

Midori Kitagawa
SIGGRAPH Japanese Liaison
midori@utdallas.edu

The Computer Arts: Origins and Contexts
11 am – Noon
An opportunity to share knowledge, experiences, ongoing debate, and information about this significant area of research and development This is a continuation of the series of short meetings and exchanges on this topic that began at SIGGRAPH 2003.

Sue Gollifer
University of Brighton
s.c.gollifer@bton.ac.uk

Asian Event & Reception
4 – 6 pm
Come and meet professionals, artists, and students from Asia. Presentations, animation screening, performances, and much more!

Miho Aoki
ffma2@uaf.edu

Tuesday, 2 August

Inter-Society for the Electronic Arts (ISEA) Open Forum
12:15 – 1:30 pm
ISEA is an international non-profit organization fostering interdisciplinary academic discourse and exchange among culturally diverse organizations and individuals working with art, science, and emerging technologies. This discussion includes information about the organization and plans for the future. Representatives from ISEA2006 present information about the next ISEA to be held in San Jose in August 2006 and the concurrent Pacific Rim New Media Summit. All interested members of the electronic arts community are welcome to attend.

Cynthia Beth Rubin
info@cbrubin.net

Peter Anders
ptr@mindspaace.net

Pacific Rim New Media Summit Meeting
1:30 – 3 pm
In conjunction with ISEA2006, The CADRE Laboratory for New Media at San Jose State University will host a two-day pre-symposium: the Pacific Rim New Media Summit co-sponsored by Leonardo/ISAST. The summit is intended to explore and build interpretive bridges among institutional, corporate, social, and cultural enterprises with an emphasis on the emergence of new media arts programs. This presentation summarizes the summit to be held in August of 2006 and includes a panel discussion by summit participants on education initiatives and issues.

Joel Slayton
joel@well.com

Latinos Event & Reception
4 – 6 pm
Come and meet professionals, artists, and students from Latin America. Presentations, animation screening, performances, music, una piñata, and much more!

Rejane Spitz
rejane_spitz@siggraph.org

Wednesday, 3 August

ACM SIGGRAPH Professional and Student Chapters Start-Up Meeting
Noon – 1 pm
The Professional and Student Chapters of ACM SIGGRAPH span the globe. Within their local areas, chapters continue the work of ACM SIGGRAPH on a year-round basis via their meetings and other activities. Each chapter consists of individuals involved in education, research and development, the arts, industry, and entertainment who are interested in the advancement of computer graphics and interactive techniques, its related technologies, and applications. They gather throughout the year at meetings, site visits, conferences, video screenings, art shows, and special events.

This session explains how to start and run a successful ACM SIGGRAPH Professional or Student Chapter. Topics regarding the process are outlined in detail by members of the Chapters Committee and invited panelists: viability, support, team-building, and chapter event planning. A Q&A session with the presenters concludes the meeting.

Francis McAfee
ACM SIGGRAPH Director for Chapters
mcafee@fau.edu

Young Japanimation
2 – 3 pm
Japanimation is more active than ever with young talents fighting for recognition and 3D skills being constantly innovated. Newest pieces will be shown. Welcome to Young Japanimation!

Eddie Suzuki
DCAJ
Suzuki@dcaj.or.jp

Leonardo @ SIGGRAPH Town Hall Meeting
4 – 6 pm
All members of the Leonardo organizations and all those interested in the intersection of the arts, sciences, and technology are invited to a discussion of current Leonardo projects and future directions. This meeting is open to anyone interested in meeting with members of Leonardo boards, committees, and projects. Also: official announcement of the 2005 Frank J. Malina Leonardo Lifetime Achievement Award recipient: Brazilian artist Abraham Palatnik.

Roger Malina
Executive Editor, Leonardo; Board Chair, Leonardo/ISAST

Pamela Grant-Ryan
Managing Editor, Leonardo
pgr@leonardo.

graphicsnet

GraphicsNet is the digital infrastructure of SIGGRAPH 2005. It interconnects all programs and events, and is the gateway to the global graphics community. GraphicsNet is comprised of fiber and Fast Ethernet (100Mbs) links connecting the presentation rooms for Courses, the Educators Program, Emerging Technologies, Panels, Papers, Sketches, Special Sessions, and Web Programs. Two DS3 circuits connects the conference to the internet.

SIGGRAPH 2005 provides wireless Ethernet access in most areas of the Los Angeles Convention Center. To use the wireless links, attendees should have their own wireless (802.11b) cards. (See page 150 for further instructions.)

GraphicsNet Committee

Joseph M. Cychosz
GraphicsNet Chair
Network for Computational Nanotechnology
NASA Institute for Nanoelectronics and Computing
Purdue University

Tom Boone

Carlos Cardenas
Tyco Electronics M/A-Com

Robert Cromwell
Cromwell International

Larry Kauffman
Sallie Mae, Inc.

Ed Konowal
Lee County School District

Swaroop R. Shivarajapura
Network for Computational Nanotechnology
Purdue University

David Spoelstra
SIGGRAPH 2006 GraphicsNet Chair
MediaMachine

Rita Turkowski
Reality Pixels, Inc.

GraphicsNet is a small, dedicated team of volunteers.

pathfinders

This year, we're celebrating the 32nd annual SIGGRAPH conference, which promises to be one of the best conferences ever!

Pathfinders is a group of interested attendees dedicated to helping you make the best use of your time at SIGGRAPH 2005. We don't want you to miss a thing!

Pathfinders is here to help you maximize your conference experience. We know that the reasons for attending the SIGGRAPH conference are as varied as the creative personalities who return year after year. The opportunities for expanding your knowledge, creative awareness, job opportunities, equipment knowledge, hands-on experience, and much more are vast. Sometimes all the choices can be a little overwhelming for first-time attendees.

At the Pathfinders booth, all questions are welcome. We know the answers, or we know where to find them.

Location

South Lobby

Days & Hours

Saturday, 30 July	6 – 8 pm
Sunday, 31 July	8 am – 6 pm
Monday, 1 August	8 am – 6 pm
Tuesday, 2 August	8 am – 6 pm
Wednesday, 3 August	8 am – 6 pm
Thursday, 4 August	8 am – 2 pm

Pathfinders Committee

Mary Nichols
Pathfinders Chair
Middle Tennessee State University

Lou Harrison
SIGGRAPH 2006 Pathfinders Chair
North Carolina State University

Jim Kilmer
The Opal Group

Val Miller
Georgia State University

birds of a feather

Attendees who want to get together with others who share their interests, goals, technologies, environments, or backgrounds are invited to organize and/or attend a Birds of a Feather event. Contact:

3D Printing for Scientific Visualization
Michael Pique
pique@siggraph.org

ACCAD Alumni Gathering
Elaine Smith
elaine@accad.osu.edu

ACM SIGGRAPH Carto BOF
Theresa-Marie Rhyne
tmrhyne@ncsu.edu

Animation Mentor Gathering
Llesll e Aclaro
llesll e@animationmentor.com

Art and Content Pipelining BOF
Eskil Steenberg
eskil@obsession.se

Blender Foundation
Ton Roosendaal
ton@blender.org

BRL CAD: Open Source Solid Modeling
Christopher Sean Morrison
siggraph@brlcad.org

CAD Working Group, Web 3D Consortium
Julian Gomez
jgomez@mail.arc.nasa.gov

CG CHAR @ SIGGRAPH Event
Ricky May
Junk@toonstruck.com

CG Performance and Opening Barrel at SIGGRAPH 2005
Garth Garrett
garrettg@metro.net

CinePaint
Robin Rower
rower@movieeditor.com

Computer Graphics Pioneers
Sherry Keowen
Sherry@westworld.com

Computer Graphics Research for Undergraduates
William Joel
Joelw@wcsu.edu

DART: The Designer's Augmented Reality Toolkit
Blair MacIntyre
blair@cc.gatech.edu

DIVERSE: A Highly Flexible Open-Source API for Creating Hardware-Independent Virtual Environments and Networked Simulations
John Kelso
kelso@nist.gov

Dog Waffling With PD Pro Digital Painter
Phillip Staiger
dogwaffle@thebest3d.com

ETSU Digital Media Advisory Meeting & Reunion
Cher Cornett
chercornett@earthlink.net

Extensions for Interactivity in X3D
Pablo Figueroa
pfiguero@acm.org

Final Touch-the Gathering of Hollywood's Colorists
Philip Staiger
philip@siliconcolor.com

The Future of the SIGGRAPH Conference
Jackie White
jackie_white@siggraph.org

Next-Gen Game Development Series
Rudy Geronimo
rudy@igda.org

Georgia Tech GVU Center Reunion/Reception
Vivian Chandler
chandler@cc.gtech.edu

High-Dyamic-Range Imagery
Alan Chalmers
alan.chalmers@bris.ac.uk

Improving SIGGRAPH On-Line Services
Thierry Frey
frey@siggraph.org

International Collegiate Virtual Reality Contest
Akihiko Shirai
shirai@mail.com

IVRC: International Collegiate Virtual Reality Contest
Akhiko Shirai
shirai@mail.com

Khronos BOF
Briana Lorenz-Marrow
briana@goldstandardgroup.com

Linux for Entertainment Birds of a Feather
Mary Quinn
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Molecular Graphics
Michael Pique
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Open GL BOF
Chelsea Palmer
chelsea@sgi.com

OpenGL Performers, Features & Futures
Chelsea Palmer
chelsea@sgi.com

Open Scene Graph
Don Burns
don@andesengineering.com

Open SG BOF
Dirk Reiners
dreiners@iastate.edu

OZONE-Free Presentations: Art, A Life, Archaelogy
Kevin Cain
kevin@pelleas.org

Purdue University Reunion
Jim Sprinkles
jsprink@purdue.edu

Quantum Rendering
Marco Lanzagorta
inzgrt@cmf.nrl.navy.mil

Ringling School of Art and Design Alumni Reception
Terri Arnell
tarnell@siggraph.org

Sharing Ideas in Teaching 3D Animation
Richard LaPidus
lapidus@morainevalley.edu

SPEC/GPC Press Conference
Erin Hatfield
erinh@cramco.com

Stony Brook University for Visual Computing Reunion
Arie Kauffman
ari@cs.sunysb.edu

Taipei ACM SIGGRAPH Reunion
Bing-Yu Chen
robin@ntu.edu.tw

Toyko ACM SIGGRAPH Chapter Party
Yukio Ando
andoh@opengl.com

University of North Carolina at Chapel Hill Reunion
Anselmo Lastra
mail@lastra.net

Visual Effects Society Meeting
Eric Roth
eric@visualeffectssociety.com

VCU School of the Arts Reception
Pamela Turner
ptturner@vcu.edu

Visual Learning in Science and Engineering
Judith Brown
jbrown@siggraph.org

VR Juggler BOF
Aron Bierbaum
aronb@vrac.iastate.edu

Web 3D Consortium
Sandy Ressler
sressler@nist.gov

Women in Animation Meet 'n' Greet
Jan Nagel
jannagel@myexcel.com

YLEM Goals and Strategies
Loren Means
lorenmea@pacbell.net

X3D Tools, Tips, Techniques, and Futures
Leonard Daly
S2005@realism.com

A 14% tax per night is added to all hotel bills in Los Angeles. Room occupancy taxes are subject to change. Early departure fees may apply.

hotels & map

★ **Wilshire Grand Los Angeles**
Headquarters
930 Wilshire Boulevard
Los Angeles, California 90211
+1.213.628.7777
+1.213.612.3989 fax

1 Hilton Checkers Los Angeles
535 South Grand Avenue
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+1.213.626.9906 fax

2 Holiday Inn City Center
1020 South Figueroa Street
Los Angeles, California 90015
+1.213.748.1291
+1.213.748.6028 fax

3 Kawada Hotel
200 South Hill Street
Los Angeles, California 90012
+1.213.621.4455
+1.213.687.4455 fax

4 Los Angeles Marriott Downtown
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Los Angeles, California 90071
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+1.213.613.0291 fax

5 The Mayfair Hotel
1256 West 7th Street
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+1.213.484.2769 fax

6 Millennium Biltmore Hotel
506 South Grand Avenue
Los Angeles, California 90071
+1.213.624.1011
+1.213.612.1545 fax

7 Miyako Hotel Los Angeles
328 East First Street
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+1.213.617.2700 fax

8 New Otani Hotel & Garden
120 South Los Angeles Street
Los Angeles, California 90012
+1.213.629.1200
+1.213.622.0980 fax

9 Omni Los Angeles Hotel at California Plaza
251 South Olive Street
Los Angeles, California 90012
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+1.213.667.3399 fax

10 Quality Inn & Suites Downtown Los Angeles
1901 West Olympic Boulevard
Los Angeles, California 90012
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+1.213.385.5808 fax

11 Radisson Wilshire Plaza
3515 Wilshire Boulevard
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+1.213.386.7379 fax

12 Ramada Inn Los Angeles Downtown
611 South Westlake Avenue
Los Angeles, California 90057
+1.213.483.6363
+1.213.483.0088 fax

13 Sheraton Los Angeles Downtown Hotel
(formerly The Hyatt Regency Los Angeles)
711 South Hope Street
Los Angeles, California 90017
+1.213.683.1234
+1.213.629.3230 fax

14 Ritz Milner Hotel
813 South Flower Street
Los Angeles, California 90017
+1.213.627.6981
+1.213.623.9751 fax

15 Standard Downtown Los Angeles
550 South Flower
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+1.213.892.8686 fax

16 Vagabond Inn Figueroa
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17 Westin Bonaventure Hotel & Suites
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registration and media information

Member Rate

If you are currently an ACM or ACM SIGGRAPH member you are eligible for member discounts. You must provide your current ACM or ACM SIGGRAPH membership number in order to receive the discount, otherwise, you will be charged the non-member rate. Local or regional ACM SIGGRAPH memberships are not eligible for registration discounts.

Student Rate

You must be a full-time student in order to qualify. You must provide the following to qualify for student rates (this applies for those registering in advance as well as at the conference):

- Your 2005 ACM student membership number

Failure to provide valid information will result in you being charged the non-member rate.

Note: Your badge will include your name, organization, city, state, and country as indicated on your registration form.

Registration

South Hall G

Saturday, 30 July	6 – 8 pm
Sunday, 31 July	8 am – 6 pm
Monday, 1 August	8 am – 6 pm
Tuesday, 2 August	8 am – 4 pm
Wednesday, 3 August	8 am – 4 pm
Thursday, 4 August	8 am – 2 pm

Media Headquarters

Room 301

Saturday, 30 July	5 – 7 pm
Sunday, 31 July	8 am – 4 pm
Monday, 1 August	8 am – 5 pm
Tuesday, 2 August	8 am – 5 pm
Wednesday, 3 August	9 am – 5 pm
Thursday, 4 August	9 am – 4 pm

Media Registration

Media representatives must register in the Media Headquarters Office, Room 301. You must submit full and proper media credentials for a media pass. No exceptions will be made.

Media Briefing/ Exhibition Floor Tour

The official SIGGRAPH media briefing provides an update to media on what's new and what's hot at SIGGRAPH 2005. Preview the Computer Animation Festival and receive insight into the SIGGRAPH 2005 presentations and experiences. Gain access to the exhibit floor before it opens to the attendees for a "sneak preview" of the latest products and applications.

Media Briefing
Tuesday, 2 August
8:15 – 8:45 am

Early Exhibition Floor Access
Tuesday, 2 August
9 – 10 am
Exhibit Floor

Exhibitor Media Events

A schedule of various exhibitor media events will be available in the Media Headquarters Office in Room 301 of the Los Angeles Convention Center.

Presentations

- ● Courses
- ● Papers
- ● Panels
- ●○ Sketches
- ●○○ Posters
- ●○ Web Program
- ●○ Educators Program
- ●○○ *Keynote Address/Awards
- ●○ Special Sessions
- ●○○ Special Events
- ●○○ Exhibitor Tech Talks

Experiences

- ●○○ Art Gallery: Threading Time
  Computer Animation Festival
- ● Electronic Theater Ticket - Any Show
- ●○ Electronic Theater Matinée Ticket
- ●○○ Animation Theater
- ●○○ Emerging Technologies
- ●○○ Guerilla Studio
- ● Reception

Services

- ●○○ Birds of a Feather
- ●○○ Get Involved
- ●○○ International Resources
- ●○○ Job Fair
- ●○○ Pathfinders

Documentation

- ● ACM *Transactions on Graphics* (Conference Proceedings special issue)
- ● Full Conference DVD-ROM
- ●○ Electronic Art & Animation Catalog
- ●○ Conference Select CD-ROM

***Conference Select and Exhibits Plus attendees will have access to the Keynote Address via closed circuit TV.**

attendee services

SIGGRAPH 2005 and the Los Angeles Convention Center provide all the support and convenience you need for a successful conference experience.

Accessibility

The convention center is handicap accessible. If you have special needs or requirements, please call Conference Management at: **+1.213.765.4620.**

Airport Shuttle

Super Shuttle is offering SIGGRAPH 2005 attendees a discount to and/or from Los Angeles International Airport, visit www.siggraph.org/s2005 to printout your coupon. Present your coupon to a Super Shuttle representative at the airport. Return reservation should be made at least one day prior to your departure. When you make your return reservations, be sure to mention the coupon to receive the discount.

Audio/Visual Services

+1.213.765.4618

Complete audio/visual services for SIGGRAPH 2005 presenters are available in the **Speaker Prep Room, West Hall A, +1. 213.765.4618.**

Automated Teller Machines (ATMs)

There are several ATMs located throughout the lobbies of the Los Angeles Convention Center.

Baggage Check

South and West Hall Lobbies

Baggage check service is available for briefcases, backpacks, and other small items during conference hours for $2 per bag. For overnight storage the charge is $5 per bag. SIGGRAPH 2005 is not responsible for items provided to Baggage Check.

South Lobby

Sunday, 31 July	8:30 am – 7:30 pm
Monday, 1 August	7:30 am – 6:30 pm
Tuesday, 2 August	7:30 am – 6:30 pm
Wednesday, 3 August	7:30 am – 6:30 pm
Thursday, 4 August	7:30 am – 6:30 pm

West Hall Lobby

Wednesday, 3 August	7:30 am – 6:30 pm
Thursday, 4 August	7:30 am – 6:30 pm

Banks/Currency Exchange

The closest bank and Currency Exchange to the Los Angeles Convention Center is Washington Mutual Bank located at 888 West 7th Street (+1.213.624.1403) and Foreign Currency Express located at 404 South Figueroa (+1.213.624.3693). They are both available for any banking/currency exchange needs you may have during your stay in Los Angeles.

Bookstore

West Hall Lobby

BreakPoint Books offers the latest books and CD-ROMs on computer animation, graphic design, gaming, 3D graphics, modeling, and digital lighting. The bookstore features recent books by SIGGRAPH 2005 speakers and award winners.

Sunday, 31 July	9 am – 7 pm
Monday, 1 August	8 am – 6 pm
Tuesday, 2 August	8 am – 6 pm
Wednesday, 3 August	8 am – 6 pm
Thursday, 4 August	8 am – 6 pm

Note: Bookstore refunds will only be processed during the conference. All bookstore policies are those of BreakPoint Books and not SIGGRAPH 2005.

See the schedule in the bookstore for book signings throughout the week.

Business Center

South Lobby

The LACC Business Center offers computer time rental, fax, services, photocopying, office supplies, phone cards, wireless cards and US stamps.

Saturday	noon – 8 pm
Sunday, 31 July	8 am – 7 pm
Monday, 1 August	8 am – 6 pm
Tuesday, 2 August	8 am – 6 pm
Wednesday, 3 August	8 am – 6 pm
Thursday, 4 August	8 am – 6 pm

Busing

See Shuttle Services.

Conference Management Office

Room 304AB
+1.213.765.4620

If you have questions regarding SIGGRAPH 2005, call or stop by this office anytime during conference hours.

Exhibition Management Office

Room 303AB
+1.213.765.4626

Exhibition Management representatives are available during conference hours to meet with exhibitors and help with plans for exhibiting at SIGGRAPH 2005.

Exhibitor Registration

South Hall G

Open during registration hours. See Registration.

First Aid Office

South Hall (around corner near Pico St. exit) Nurses and paramedics are on duty during conference hours.

Food Services

Restaurants: Compass Café (South Hall) and Galaxy Café (West Hall)
The Los Angeles Convention Center operates several snack stands, food carts, and restaurants throughout the convention center.

Compass Café (South Hall)

Saturday, 30 July	9 am – 3 pm
Sunday, 31 July	8 am – 4 pm
Monday, 1 August	8 am – 6:30 pm
Tuesday, 2 August	8 am – 6:30 pm
Wednesday, 3 August	8 am – 6:30 pm
Thursday, 4 August	8 am – 6:30 pm

Galaxy Café (West Hall)

Sunday, 31 July	8 am – 6 pm
Monday, 1 August	8 am – 6 pm
Tuesday, 2 August	8 am – 6 pm
Wednesday, 3 August	8 am – 6 pm
Thursday, 4 August	8 am – 6 pm

Housing Desk

South Hall G
+1.213.743.6213
Complete information about SIGGRAPH 2005 hotel accommodations. Open during registration hours. See Registration.

Information Desks

South Lobby and West Hall Lobby
Complete information on conference programs and events, the convention center, and what to see and do in Los Angeles.

Saturday, 30 July	2 – 8 pm
Sunday, 31 July	7:30 am – 4 pm
Monday, 1 August	7:30 am – 4 pm
Tuesday, 2 August	7:30 am – 6 pm
Wednesday, 3 August	7:30 am – 6 pm
Thursday, 4 August	7:30 am – 5 pm

International Center

South Lobby
+1.213.743.6202
The SIGGRAPH 2005 International Committee and a multi-lingual staff of student volunteers answer questions, offer suggestions, provide informal translation services, and make connections with international attendees.

Saturday, 30 July	6 – 8 pm
Sunday, 31 July	8 am – 6 pm
Monday, 1 August	8 am – 6 pm
Tuesday, 2 August	8 am – 6 pm
Wednesday, 3 August	8 am – 6 pm
Thursday, 4 August	8 am – 5 pm

Internet Access Kiosks

South Hall G

Wireless Internet Access
SIGGRAPH 2005 provides 802.11b wireless network access in most areas of the Los Angeles Convention Center. To use the wireless network, attendees should have their own wireless (802.11b) cards. Some presentations offer audience participation via wireless.

Please refer to your laptop operating system and client adapter documentation and follow this procedure:

1. Document all existing TCP/IP and wireless configuration information before you make any changes.
2. Configure your laptop to use DHCP.
3. Configure your wireless adapter Network Name (SSID) to be "S2005".
4. Disable encryption on your wireless adapter.

The SIGGRAPH 2005 wireless network provides open, unencrypted communications for conference attendees. The system is not secure and can be monitored by others.

Job Fair

South Hall G

Tuesday, 2 August	10 am – 4 pm
Wednesday, 3 August	Noon – 4 pm

The Art Institutes are once again sponsoring the ACM SIGGRAPH 2005 Job Fair for the leading companies in all related ACM SIGGRAPH fields to discuss employment opportunities with thousands of SIGGRAPH 2005 attendees in a relaxed, informal setting. The Job Fair is open to all SIGGRAPH 2005 attendees at no additional cost.

Job Fair Participants (as of 1 July)

Actvision	Santa Monica, California
Adobe Systems Inc.	San Jose, California
Alias Systems Corp.	Toronto, Canada
AnimationMentor.com	Berkeley, California
Artisan Creative	Los Angeles, California
ATI Technologies	Markham, Ontario, Canada
Autodesk Media & Entertainment	Montréal, Québec, Canada
Creative Heads	El Segundo, California
Crystal Dynamics	Menlo Park, California
Dam Consultants	El Segundo, California
Datascope Recruitment	London
Disney	Burbank, California
Dynamic Animation Systems	Fairfax, Virginia
Electronic Arts	Redwood City, California
Full Sail Real World Education	Winter Park, Florida
greenlightjobs.com	Los Angeles, California
High Moon Studios	Carlsbad, California
High Voltage	Hoffman Estates, Illinois
Intel	Folsom, California
Lucetius Design	West Covina, California
Motion Theory	Venice, California
Mythic Entertainment	Fairfax, Virginia
Neversoft	Culver City, California
Nickelodeon	
Nintendo of America	Redmond, Washington
Papaya Studios	Irvine, California
Reality Check	Los Angeles, California
Savanna College of Art and Design	Savannah, Georgia
School of Creative Media City University of Hong Kong	Kowloon, Hong Kong
Sheridan Institute	Oakville, Ontario, Canada
SCEA, Inc	Foster City, California
Sprite Animation Studios	Los Angeles, California
Stormfront Studios	San Rafael, California
The Art Institutes	Pittsburgh, Pennsylvania
Vicarious Visions	Troy, New York
Vinton Studios	Portland, Oregon
Visuart	Irvine, California
Zoic	Culver City, California

Lost and Found

South Hall G
After the conference, all lost-and-found items will be turned over to the Los Angeles Convention Center security office. To inquire about lost items during and after the conference, call security at +1.213.741.1151, ext. 4605. Lost registration badges are available in Special Assistance: South Hall G.

Merchandise Pickup Center

South Lobby
Your conference documentation (included with registration) must be picked up at the Fulfillment Center. Technical materials and conference documentation will not be shipped, nor will refunds be given for any material that is not picked up at the Merchandise Pickup Center in Hall G.

Saturday, 30 July	6 – 8 pm
Sunday, 31 July	8 am – 6 pm
Monday, 1 August	8 am – 6 pm
Tuesday, 2 August	8 am – 4 pm
Wednesday, 3 August	8 am – 4 pm
Thursday, 4 August	8 am – 2 pm

Message Center

South Lobby

Kiosk where attendees leave and retrieve notes and requests.

Parking

West and South Halls

+1.213.741.1151 ext. 5850

SIGGRAPH 2005 attendees can park at the Los Angeles Convention Center for $10 per day. There are no in/out privileges. The Los Angeles Convention Center parking garages located in the West and South Halls open at 5:30 am and close one hour after the conclusion of the last scheduled SIGGRAPH 2005 function.

Pathfinders

South Lobby

Special assistance for first-time SIGGRAPH conference attendees. Let us help you navigate your way through SIGGRAPH 2005.

Registration

South Hall G

Saturday, 30 July	6 – 8 pm
Sunday, 31 July	8 am – 6 pm
Monday, 1 August	8 am – 6 pm
Tuesday, 2 August	8 am – 4 pm
Wednesday, 3 August	8 am – 4 pm
Thursday, 4 August	8 am – 2 pm

Registration - **Special Assistance Desk**

Assistance with a wide range of problems and concerns, including:

- Credit card problems (validations, errors)
- Lost badges
- Registration corrections and upgrades
- Substitute registration
  (only if authorized on company letterhead)

Restaurant Desks

South Lobby and West Hall Lobby

Concierge services for reservations at Los Angeles restaurants and clubs.

Saturday, 30 July	2 – 8 pm
Sunday, 31 July	7:30 am – 4 pm
Monday, 1 August	7:30 am – 4 pm
Tuesday, 2 August	7:30 am – 6 pm
Wednesday, 3 August	7:30 am – 6 pm
Thursday, 4 August	7:30 am – 5 pm

Shipping Desk

South Hall G

The shipping desk provides next-day air, second-day air, and regular ground shipping services.

Saturday, 30 July	6 – 8 pm
Sunday, 31 July	8 am – 7 pm
Monday, 1 August	8 am – 5 pm
Tuesday, 2 August	8 am – 5 pm
Wednesday, 3 August	8 am – 5 pm
Thursday, 4 August	8 am – 6 pm

Shuttle Service

+1.213.479.1261

SIGGRAPH 2005 provides complimentary shuttle service between most conference hotels, the Los Angeles Convention Center, and to/from the SIGGRAPH 2005 reception. Look for signs and shuttle flyers with specific shuttle details for all events in conference hotel lobbies and the information desk at the LACC. Please note the Holiday Inn Los Angeles City Center is considered the "walk" hotel and will not have shuttle service to/from the convention center.

If you have any shuttle related questions, please contact the shuttle service desk during official shuttle hours. For assistance with handicap service, please call +1.213.479.1261. SIGGRAPH 2005 provides shuttles with wheel chair lifts and tiedowns.

Saturday, 30 July	5 – 8:30 pm
Sunday, 31 July	7:30 am – 8:30 pm
Monday, 1 August	7:30 am – 9:30 pm
Tuesday, 2 August	7:30 am – 9:30 pm
Wednesday, 3 August	7:30 am – 9:45 pm
Thursday, 4 August	7:30 am – 6:30 pm

Hotel shuttle service will pick-up and drop-off attendees at West Hall of the LACC. The shuttle pick-up and drop-off for the Electronic Theater will also be at West Hall of the LACC.

Shuttles for Reception
The Center at Cathedral Plaza,
555 W. Temple Street

Wednesday, 3 August 8 – 10 pm

Shuttles begin transporting from all hotels 30 minutes before the reception start. The last shuttle will depart from The Center at Cathedral Plaza at 10:30 pm. Shuttles will transport attendees staying at the "walk" hotel (Holiday Inn Los Angeles City Center) and the LACC to/from the reception.

Shuttle for Special Session:
The Polar Express
California Science Center IMAX Theater,
700 State Drive

Thursday, 4 August 11:30 am – 1:15 pm

Shuttle service will depart from and return to West Hall at the LACC. Shuttles will begin departing for the IMAX Theater at 10 am. Return service to the convention center will begin immediately following the conclusion of the Special Session at approximately 1:15 pm from the front entrance of the theater. The last shuttle will leave the IMAX Theater at 1:30 pm. Tickets for this Special Session will be provided as you load the shuttle. You MUST have a ticket to get access into the session at the IMAX Theater.

SIGGRAPH 2005 Conference Presentation DVD-Rom sets

South Lobby

A Conference Presentation DVD-Rom is being produced and sold by SOMA Media in cooperation with ACM SIGGRAPH. The DVD-Rom will feature five discs with presentations from the Papers, Courses, Sketches, Web Program, Panels and Special Sessions. The DVD-Roms will include new features such as: searchable interface, live demos, faster loading and larger screen areas for visuals. To order your copy of the SIGGRAPH 2005 Conference Presentation DVD-Rom set stop by the Soma Media Booth located in the South and West Lobbies.

SIGGRAPH Store

South Lobby

+1.213.743.6217

SIGGRAPH Boutique

West Hall Lobby

For casual browsers and serious shoppers. Review and purchase additional technical materials, conference documentation, and gifts (t-shirts, polo shirts, and coffee mugs) for friends, family, and colleagues. SIGGRAPH 2005 merchandise is available on a first-come, first-serve basis in the SIGGRAPH Store (South Lobby) or SIGGRAPH Boutique (West Hall Lobby).

Saturday, 30 July	6 – 8 pm
Note: The Boutique will be open on Sunday.	
Sunday, 31 July	8 am – 6 pm
Monday, 1 August	8 am – 6 pm
Tuesday, 2 August	8 am – 6 pm
Wednesday, 3 August	8 am – 6 pm
Thursday, 4 August	8 am – 6 pm

Speaker Prep Room

West Hall A
+1.213.743.6218

First, go to the contributor registration desk to pick up your registration credentials and conference information. Then go to the Speaker Prep Room to prepare your presentation. Speaker ribbons and badge holders are available only in the Speaker Prep Room. If you're presenting at the conference, you should check in at the Speaker Prep Room at least 24 hours before your presentation.

In the Speaker Prep Room, presenters preview slides and videotapes, sort slides, obtain slide carousels, and arrange for all their audio/visual needs in their presentation rooms.

Saturday, 30 July	Noon – 7 pm
Sunday, 31 July	7 am – 7 pm
Monday, 1 August	7 am – 12:15 pm* and 2 – 7 pm

* Note: Speaker Prep will be closed during the Keynote Address from 12:15 – 2 pm.

Tuesday, 2 August	7 am – 7 pm
Wednesday, 3 August	7 am – 7 pm
Thursday, 4 August	7 am – 2 pm

Special Policies

- Registered attendees under the age of 16 must be accompanied by an adult at all times.
- Children under 16 are not permitted in the Exhibition. Age verification is required.
- No cameras or recording devices are permitted at SIGGRAPH 2005. Abuse of this policy will result in the loss of the individual's registration credentials.

Technical Material Sold After the Conference

Full Conference DVD-ROM
This digital publication contains the electronic version of the technical papers, images, and supplemental material; all of the course and tutorial notes, including supplemental material (movies, source code, HTML presentations); and the permanent record of the Educators Program, Emerging Technologies, Panels, Sketches, Posters, Special Sessions, and Web Program; along with the permanent record of the Art Gallery and Computer Animation Festival.

ACM Transactions on Graphics (Conference Proceedings special issue) – Printed
Contains the SIGGRAPH 2005 technical papers and the ACM SIGGRAPH awards.

Conference Select CD-ROM
This digital publication contains the permanent record of the Art Gallery and Computer Animation Festival and the electronic version of the Educators Program, Emerging Technologies, Panels, Sketches, Posters, Special Sessions, and Web Program. Papers, Panels, and Courses are available only on the Full Conference DVD-ROM.

Electronic Art & Animation Catalog – Printed
Contains the permanent record of images from the Art Gallery and the Computer Animation Festival.

SIGGRAPH 2005 Video Review
Contains animations presented in the Electronic Theater and Animation Theaters. To order these materials after the conference, contact:

ACM Order Department
800.342.6626 (Continental US and Canada)
+1.212.626.0500 (International)
+1.212.944.1318 fax
orders@acm.org

Ticket Sale and Exchange Booth

South Hall G

Electronic Theater Tickets
One ticket is included with each Full Conference and Conference Select registration. Additional tickets cost $50. Every attempt is made to accommodate your requested Electronic Theater show. If you want to exchange your ticket, go to the Ticket Sales and Exchange Booth. Tickets are not available for every show. All Electronic Theater performances contain the same material. Badged attendees may purchase up to two additional Electronic Theater tickets (subject to availability) at On-site Registration beginning at 6 pm Saturday, 30 July. Last-minute tickets are generally available. They will be sold at the door to the Electronic Theater one hour prior to show time. All sales are final.

Reception Tickets
Reception tickets are also available at this counter. The cost is $40 per person. All sales are final.

Telephone Numbers

Art Gallery Office
+1.213.743.6207

Audio/Visual Services
+1.213.765.4618

Conference Management Office
+1.213.765.4620

Emerging Technologies Office
+1.213.743.6211

Exhibition Management Office
+1.213.765.4626

Housing Desk
+1.213.743.6213

International Resources Office
+1.213.743.6202

Media Headquarters
+1.213.765.4628

Los Angeles Convention Center Parking
+1.213.741.1151 ext. 5850

Registration – Special Assistance
+1.213.765.4638

Security Office
+1.213.741.1151 ext. 4605

Shuttle Service
+1.213.479.1261

SIGGRAPH Store
+1.213.743.6217

Speaker Prep Room
+1.213.743.6218

reviewers by program

Art Gallery: Threading Time Art Papers Reviewers
Roy Ascott
Claudia Herbst
Patrick Lichty
Bruce Wands

Art Gallery First-Tier Reviewers
Rick Barry
Joanna Berzowska
Marc Böhlen
Claire F. Doyle
Daniel Durning
Dena Eber
Jeff Mayer
Suzana Milevska
Steve Rittler
Rejane Spitz
Cheryl Stockton
Ruth West
Anita Wetzel
Lina M Yamaguchi

Courses
Matt Adcock
John Anderson
Steve Anderson
Thayer Andrews
Ed Angell
Sampson D. Asare
Mike Bailey
Kavita Bala
Thad Beier
Philippe Bekaert
Kevin Bjorke
David Blythe
Christian-Arved Bohn
Dennis Bouvier
Rob Bredow
Robert Bridson
Judith R. Brown
N.W. Campbell
Warren R. Carithers
Alan Chalmers
Per Christensen
Keith Cok
Alan Commike
Tony DeRose
Mathieu Desbrun
Clark Dodsworth
Hank Driskill
Tom Duff
Fredo Durand
David Ebert
Doug Epps
Bill Feth
Adam Finkelstein
Brian Fisher
Thomas Funkhouser
Michael Garland
Joe Geigel
Margaret Geroch
Reid Gershbein
Indra Geys
Simon Gibson
Andrew Glassner
Craig Gotsman
Susan Gourley
Jason Gregory
Eitan Grinspun
Larry Gritz
Xianfeng Gu
Stefan Gumhold
Igor Guskov
Eric Haines
Mark Hammel
Charles Hansen
Ines Hardtke
Lou Harrison
Wolfgang Heidrich
Barb Helfer
Aaron Hertzmann
Kenneth Hoff
Hugues Hoppe
Kai Hormann
Leo Hourvitz
Donald House
Greg Humphreys
Stephen Hwan
Masa Inakage
Martin Isenburg
Oren Jacob
Doug James
Henrik Wann Jensen
Scott Johnston
Jan Kautz
Kathy Kershaw
Andrei Khodakovsky
Midori Kitagawa
Mach Kobayashi
Leif Kobbelt
Thomas Koninck
Bob Kuehne
Bill La Barge
David Laidlaw
Vali Lalioti
Anselmo Lastra
Michel Leblond
Matthew Lewis
Ming Lin
Dani Lischinski
Tom Lokovic
David Luebke
Katerina Mania
Dinesh Manocha
Patrick Marais
William Mark
Stephen R. Marschner
Jacquelyn Martino
Steve May
Vicky McCann
Michael McCool
Bruce McDiffett
Kyle McKisic
Ann McNamara
Mark Meyer
Andrew Milne
Henry Moreton
Tamara Munzner
Shawn Neely
Martin Nguyen
James O'Brien
Marc Olano
Dinesh Pai
Renato Pajarola
Rick Parent
Valerio Pascucci
Mark Pauly
Hanspeter Pfister
Matt Pharr
Nancy Pollard
Konrad Polthier
Zoran Popović
Jan Prikryl
Guido Quaroni
Ravi Ramamoorthi
Ramesh Raskar
Erik Reinhard
Christophe Renaud
Theresa-Marie Rhyne
Charles Rose
Brian Rosen
Saba Roufchaie
Evelyn Rozanski
Holly Rushmeier
Szymon Rusinkiewicz
Ramy Sadek
Andrea Sanna
Tom Sanocki
Mateu Sbert
Marla Schweppe
Vicki Shreiner
Peter-Pike Sloan
Dena Slothower
Philipp Slusallek
Ryan Smith
Olga Sorkine
Sean Spicer
Neville Spiteri
Oliver Staadt
Jos Stam
Marc Stamminger
George Stantchev
Gordon Stoll
Paul S. Strauss
Ayellet Tal
Gabriel Taubin
Seth Teller
Demetri Terzopoulos
Thomas True
P. Jeffrey Ungar
Michiel van de Panne
Kiril Vidimce
Michael Wahrman
Gregory Ward
Joe Warren
Rüdiger Westermann
Ross Whitaker
Mary Whitton
Brian Windsor
Wayne Wooten
Bing Xu
Ying Zhu
Denis Zorin

Educators Program
Paul Hudson
Lourdes Livingston
Tony Longson
Kate Shaw

Emerging Technologies
Roy Ascott
Mark Bolas
Sheldon Brown
Paul Dietz
Greg Garvey
Diane Gromala
Pat Hanrahan
Ian McDowall
Jacquelyn Ford Morie
Christa Sommerer
Thad Starner
Marcus Thiebaux

Papers
Yeuhi Abe
Sameer Agarwal
Aseem Agarwala
Maneesh Agrawala
Timo Aila
Kurt Akeley
Tomas Akenine-Möller
Ergun Akleman
Irene Albrecht
John Alex
Marc Alexa
Daniel Aliaga
Brett Allen
Pierre Alliez
Ghassan AlRegib
Nina Amenta
John Anderson
Ken Anjyo
Adam Arbree
Okan Arikan
Jim Arvo
Michael Ashikhmin
Ulf Magnus Assarsson
Chris Atkeson
Marco Attene
Ron Azuma
Norman Badler
Jeremy Bailenson
Chandrajit Bajaj
Daniel Baker
Kavita Bala
Thomas Banchoff
DC Banks
David Baraff
Gladimir Baranoski
Jernej Barbic
Alan Barr
Brian Barsky
Ronen Barzel
William Baxter
Philippe Bekaert
Serge Belongie
Alexander Belyaev
Itzhak Benenson
Eric Bennett
Angelo Beraldin
Stephen Berard
Thomas Berleth
Fausto Bernardini
Wes Bethel
Gary Bishop
Ingmar Bitter
Volker Blanz
James Blinn
Bruce Blumberg
Bobby Bodenheimer
Ioana Boier-Martin
Jean-Daniel Boissonnat
Samuel Boivin
Mark Bolas
Mario Botsch
Ronan Boulic
Michael Bove
Doug Bowman
Matthew Brand
David Breen
Chris Bregler
Hector Briceno
Robert Bridson
Eric Brochu
John Bronskill
Pere Brunet
Ian Buck
Christopher Buehler
Juan Buhler
David Burke
Sam Buss
Sharon Calahan
Marie-Paule Cani
Steve Capell
Mark Carlson
John Carmack
Nathan Carr
Edwin Catmull
François Cayre
Frederic Cazals
Jinxiang Chai
Alan Chalmers
Eric Chan
Shing-chow Chan
Mike Chantler
Frederic Chazal
Baoquan Chen
Stephen Chenney
Kwang-Jin Choi
Min Gyu Choi
Hamilton Chong
Per Christensen
Chris Christou
Yiorgos Chrysanthou
Erika Chuang
Yung-Yu Chuang
Paolo Cignoni
Fehmi Cirak
Ken Clarkson
Jonathan Cohen
Michael F. Cohen
Daniel Cohen-Or
David Cohen-Steiner
John Collomosse
Perry Cook
Volker Coors
Georges-Henri Cottet
Ingemar Cox
Jim Cremer
Brian Curless
Cassidy Curtis
Barbara Cutler
Ross Cutler
Kristin Dana
Radoslav Danilak
James Davis
Mark de Berg
Paul Debevec
Doug DeCarlo
Xavier Décoret
Frank Dellaert
Scott Delp
Laurent Demanet
Tony DeRose
Mathieu Desbrun
Oliver Deussen
Olivier Devillers
Tamal Dey
Sim Dietrich
Paul Dietz
Guillermo Diez
H. Quynh Dinh
Jean-Michel Dischler
Yoshinori Dobashi
Michael Doggett
Craig Donner
Walter Donovan
Mira Dontcheva
Julie Dorsey
George Drettakis
Steven Drucker
Mark Duchaineau
Andrew Duchowski
Tom Duff
Florent Duguet
Reynald Dumont
Frédo Durand
Philip Dutré
David Ebert
Alexei Efros
Per Einarsson
Elmar Eisemann
Abbas El Gamal
Gershon Elber
Sharif Elcott
Mark Elendt
Steve Ellis
Jeff Erickson
Kenny Erleben
Thomas Ertl
Irfan Essa
Cass Everitt
Tony Ezzat
Mark Fairchild
Petros Faloutsos
Anthony Fang
Hui Fang
Raanan Fattal
François Faure
Paolo Favaro
Roy Featherstone
Ronald Fedkiw
Steven Feiner
Dieter Fellner
Sidney Fels
Pemith Fernando
James Ferwerda
Adam Finkelstein
Graham Finlayson
Andrew Fitzgibbon
George Fitzmaurice
Eugene Fiume
Shachar Fleishman
Michael Floater
Andrew Forsberg
David Forsyth
Nick Foster
Barry Fowler
Greg Frederickson
Daniel Freedman
Bill Freeman
Doron Friedman
Sarah Frisken
Bernd Fröhlich
Christian Frueh
Henry Fuchs
Jennifer Fung
Thomas Funkhouser
Steve Gabriel
Kelly Gaither
Eric Galin
Andrew Gardner
Rao Garimella
Michael Garland
Joe Geigel
Robert Geist
Reid Gershbein
Sherif Ghali
Djamchid Ghazanfarpour
Abhijeet Ghosh
Andrea Giachetti
Joachim Giesen
Marco Gillies
Andrew Glassner
Michael Gleicher
Enrico Gobbetti
Christophe Godin
Michael Goesele
Tolga Goktekin
S. Burak Gokturk
Jack Goldfeather
Daniel Goldman
Carlos Gonzalez-Ochoa
Amy Gooch
Bruce Gooch
Ben Gorte
Steven Gortler
Craig Gotsman
Naga Govindaraju
Stephane Grabli
Xavier Granier
Ken Greenebaum
Günther Greiner
Cindy Grimm
Sören Grimm
Eitan Grinspun
Larry Gritz
Xianfeng Gu
Brian Guenter
Leonidas Guibas
François Guimbretiere
Stefan Gumhold
Baining Guo
Igor Guskov
Mario Gutierrez
Armann Gylfason
Joerg Haber
John Hable
Martin Hachet
Sunil Hadap
Eric Haines
Michael Halle
Michael Haller
Olaf Hall-Holt
Pat Hanrahan
Tangelder Hans
Charles Hansen
Mark Harris
John Hart
Kazuyuki Hashimoto
Helwig Hauser
Alejo Hausner

Tim Hawkins
Patrick Hebert
Paul Heckbert
Wolfgang Heidrich
Darren Hendler
Carlos Hernandez
Esteban
John Hershberger
Aaron Hertzmann
Lambertus Hesselink
Ken Hinckley
Johannes Hirche
John Hobby
Jessica Hodgins
Michael Hofer
Nicolas Holzschuch
Hugues Hoppe
Kai Hormann
Mike Houston
Alex Hsu
Eugene Hsu
John Hughes
Roger Hughes
Lawrance Ibarria
Takeo Igarashi
Insung Ihm
Masa Inakage
Victoria Interrante
Geoffrey Irving
Martin Isenburg
Charles Jacobs
Doug James
Odest Jenkins
Henrik Wann Jensen
Andrew Johnson
Thouis Jones
Tao Ju
Roy Kalawsky
Marcelo Kallmann
Sing Bing Kang
Craig Kaplan
Michael Kass
Arie Kaufman
Jan Kautz
Michael Kazhdan
Richard Keiser
Alexander Keller
Jarkko Kemppainen
Pankaj Khanna
Andrei Khodakovsky
ByungMoon Kim
Myoung-Jun Kim
Myung-Soo Kim
Tae-Yong Kim
Ron Kimmel
Stefan Kimmerle
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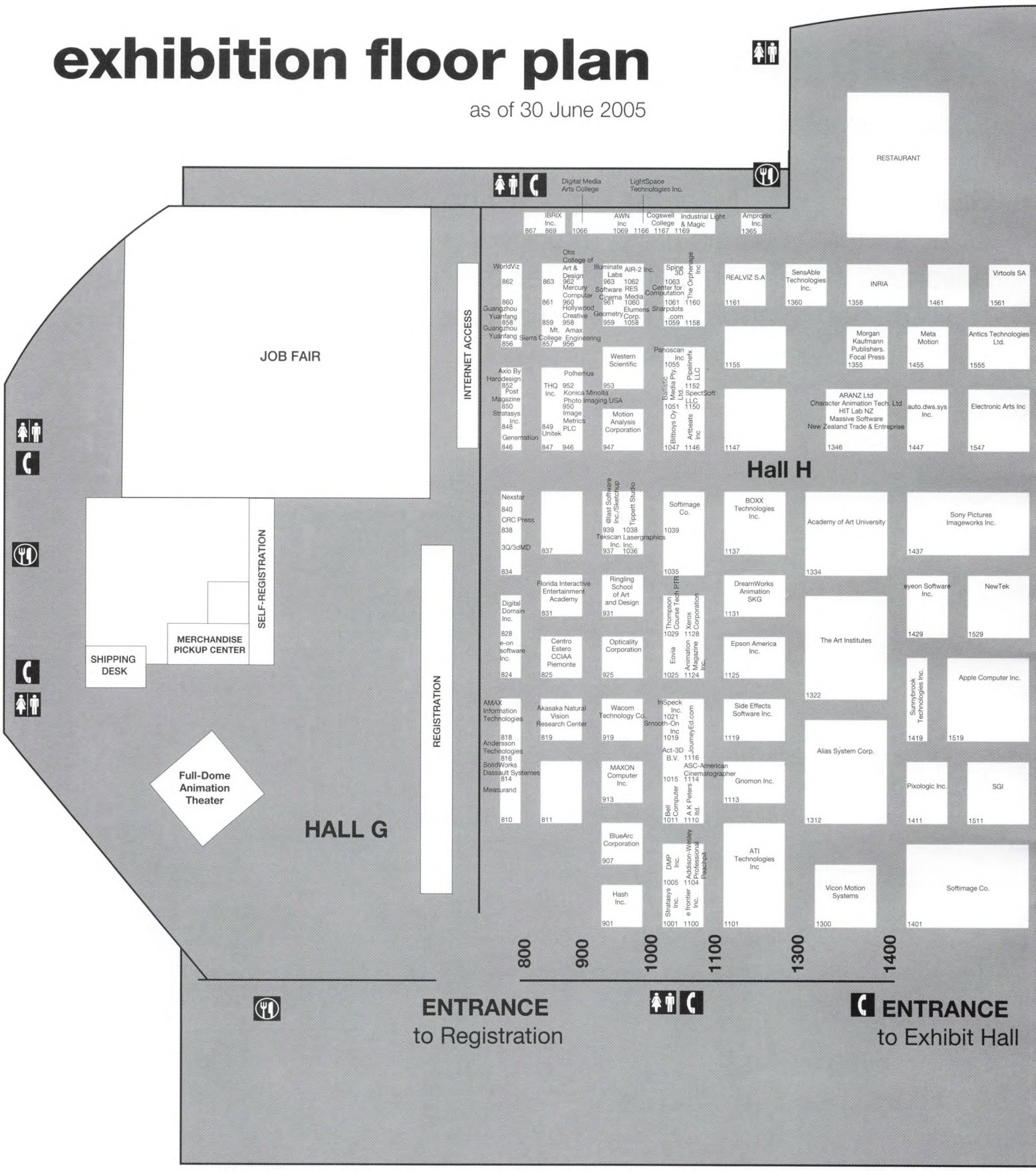

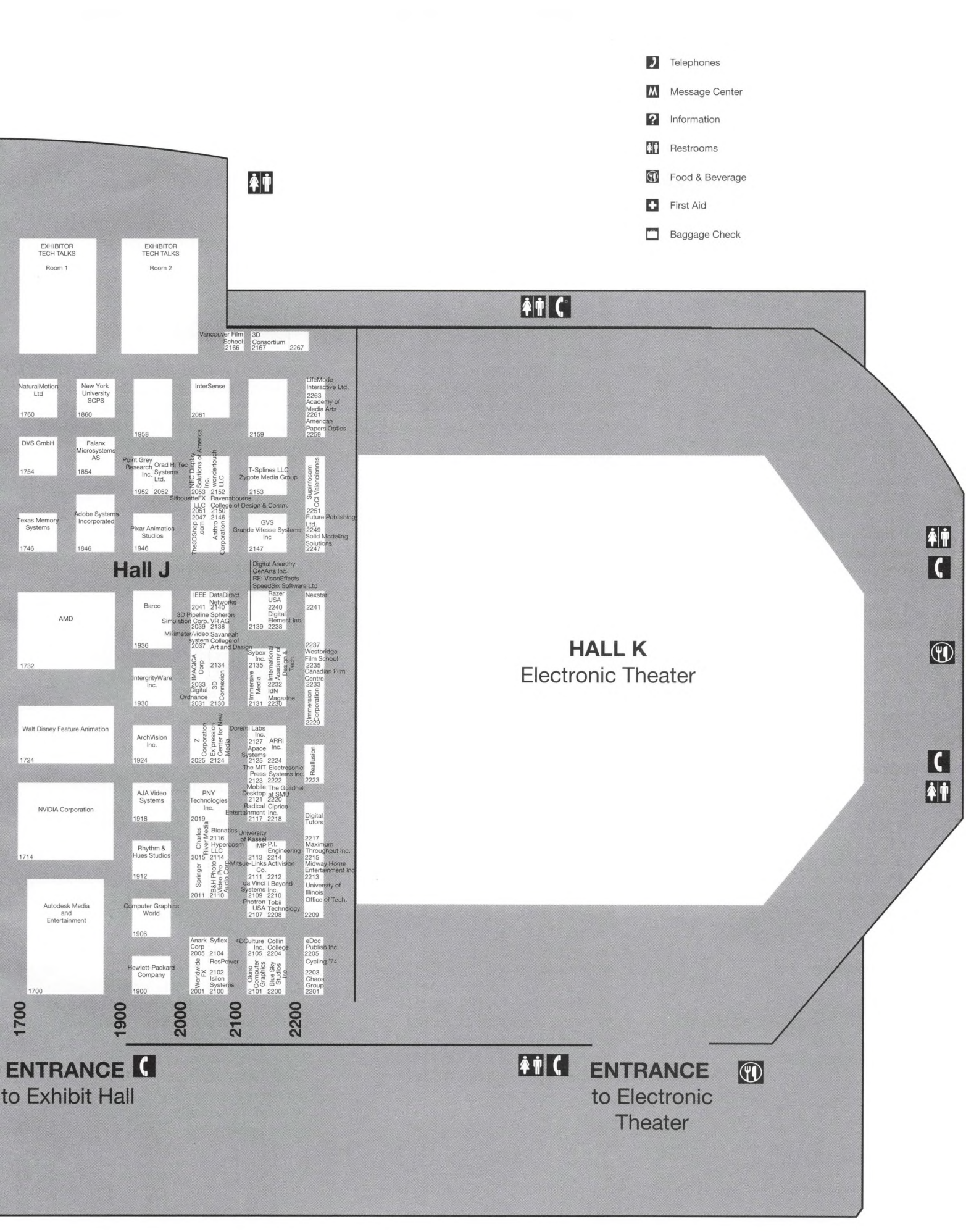
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LifeMode Interactive Ltd. 2263
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IDN Magazine 2230
Immersive Media 2131
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Westbridge Film School 2235
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IMAGICA Corp 2033
3D Connexion 2130
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IntergrityWare Inc. 1930
Walt Disney Feature Animation 1724
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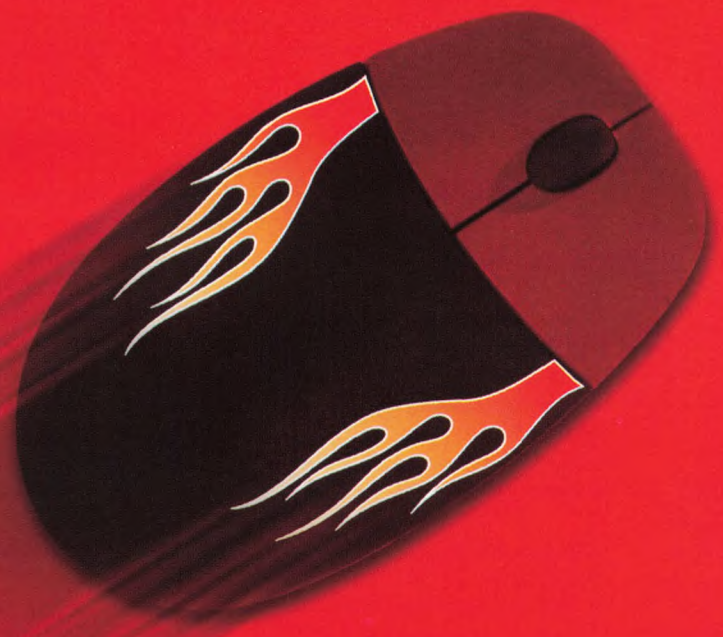

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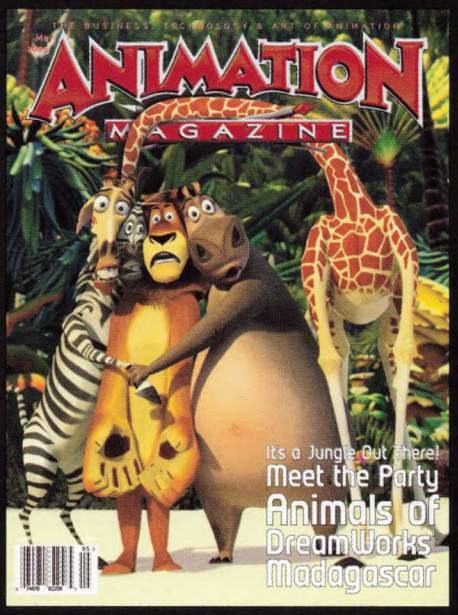

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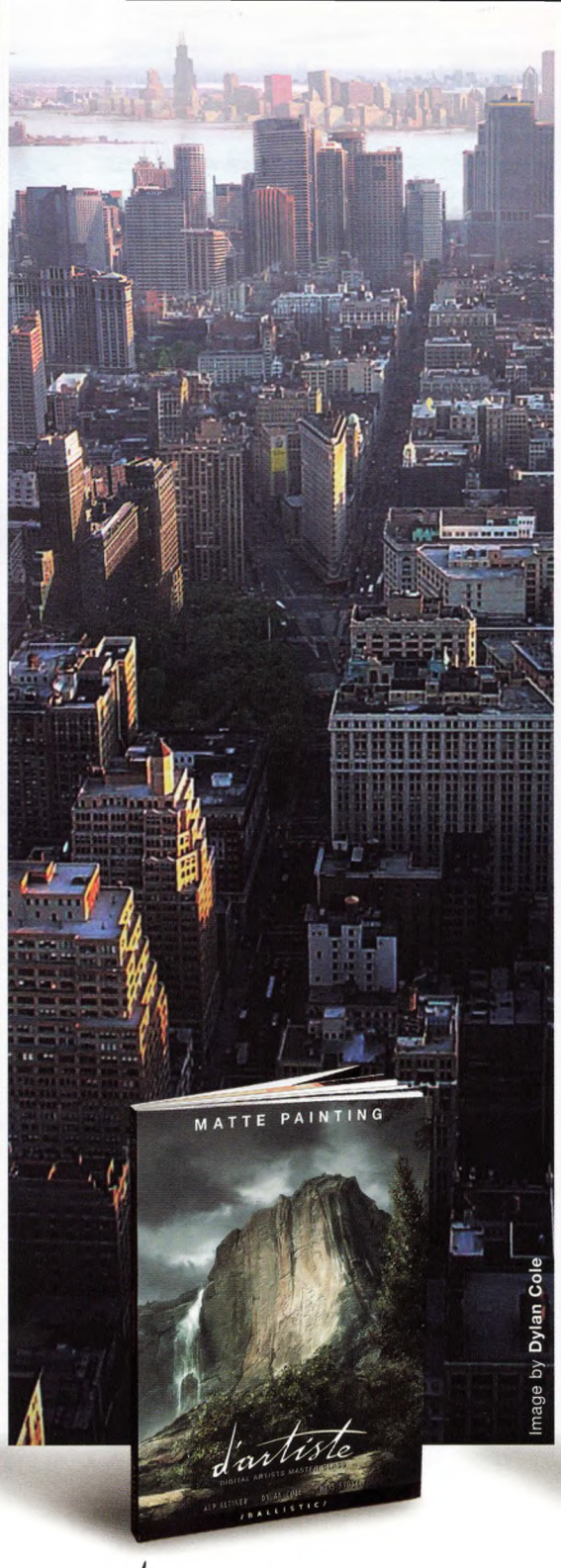

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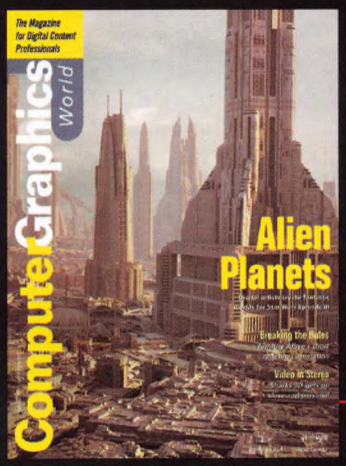

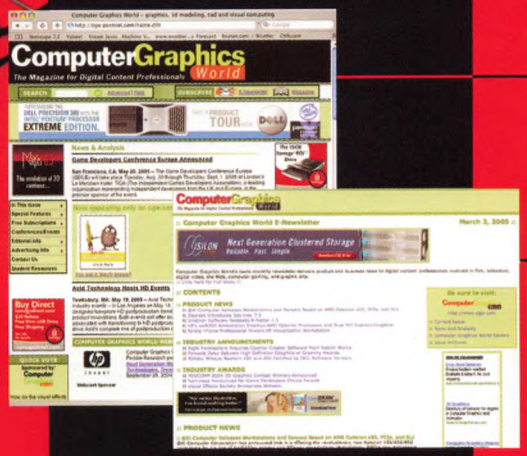

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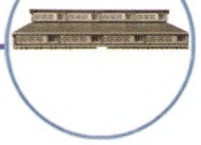

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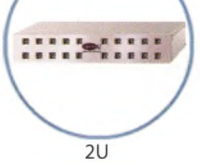

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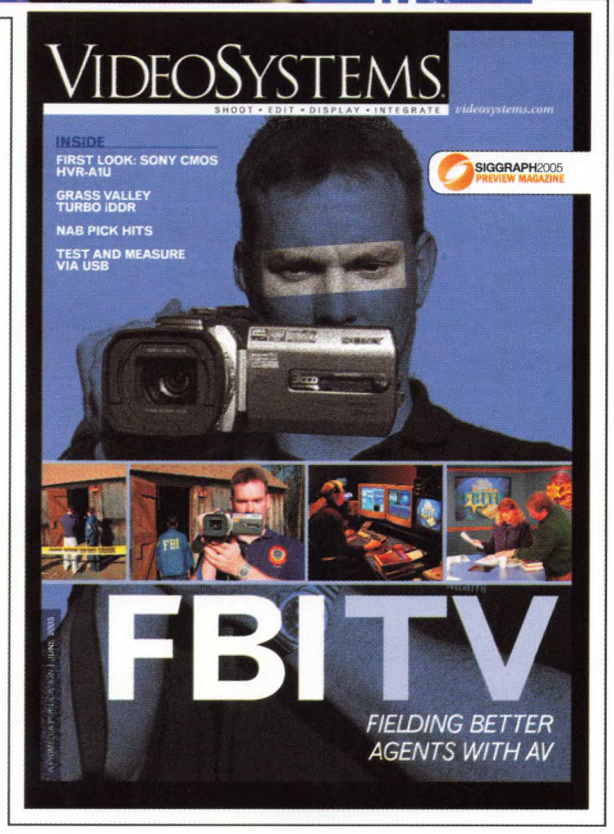

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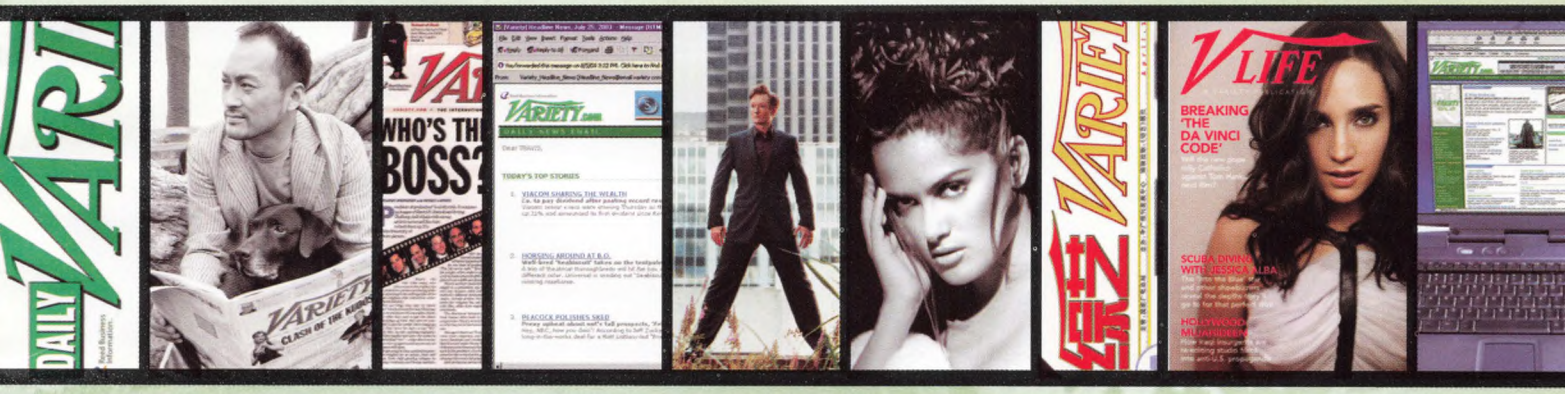

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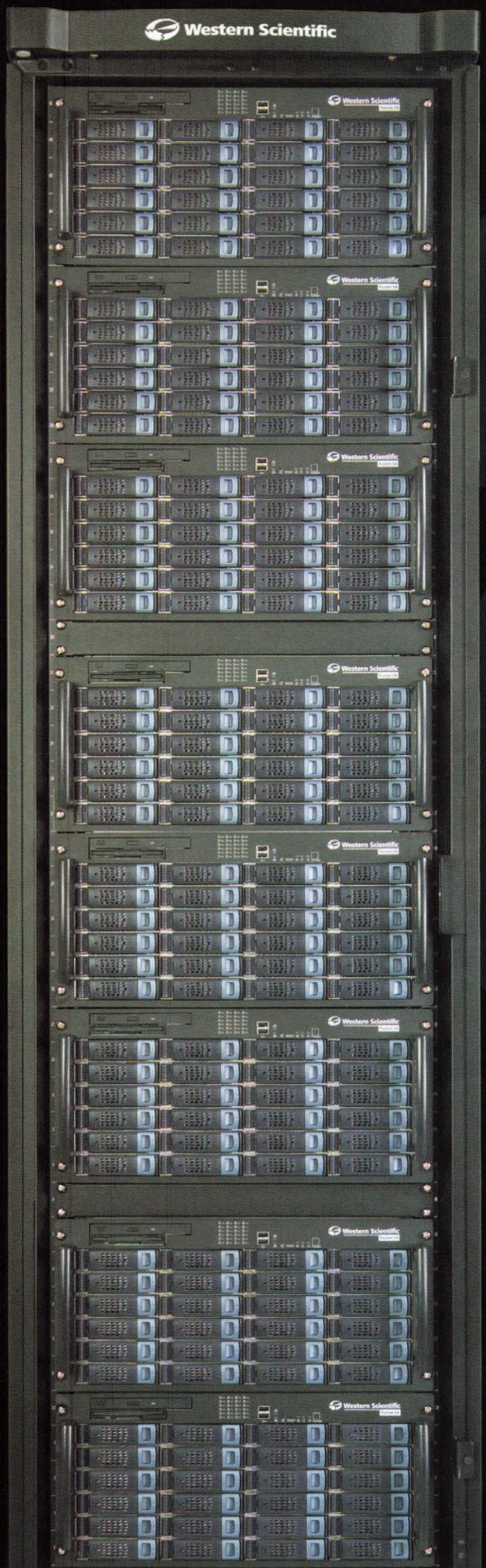

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2125 Apace Systems Corporation
2110 B&H Photo-Video-Pro Audio Corp.
1137 BOXX Technologies, Inc.
2109 da Vinci Systems, LLC
2127 Doremi Labs Inc.
2147 GVS-Grande Vitesse Systems, Inc.
1714 NVIDIA Corporation

Booth

2052 Orad Hi Tec Systems Ltd.
1511 SGI
1039, 1404 Softimage Co.
2235 Westbridge Film School

Head Mounted Displays
2061 InterSense
1455 Meta Motion

High Performance Graphics Processors
1137 BOXX Technologies, Inc.
1005 DMP Inc.
2147 GVS-Grande Vitesse Systems, Inc.
2052 Orad Hi Tec Systems Ltd.
1511 SGI

High Resolution Technologies
2005 Anark Corporation
2125 Apace Systems Corporation
2224 ARRI Inc.
1936 Barco
1137 BOXX Technologies, Inc.
2109 da Vinci Systems, LLC
2147 GVS-Grande Vitesse Systems, Inc.
2061 InterSense
1714 NVIDIA Corporation
1055 Panoscan Inc.
1511 SGI
2138 Spheron VR AG
1419 Sunnybrook Technologies Inc.

Image Based Modeling
834 3Q/3dMD
1015 Act-3D, B.V.
1104 Addison-Wesley Professional/ Peach Pit Press
1846 Adobe Systems Incorporated
816 Andersson Technologies LLC
1924 ArchVision, Inc.
2217 Digital-Tutors
824 e-on software, inc.
2147 GVS-Grande Vitesse Systems, Inc.
2114 Hypercosm, LLC.
2229 Immersion Corporation
1055 Panoscan Inc.
1411 Pixologic, Inc.
1952 Point Grey Research Inc.
1161 REALVIZ S.A.
1511 SGI
1039, 1404 Softimage Co.
2247 Solid Modeling Solutions
2138 Spheron VR AG

Image Management
1846 Adobe Systems Incorporated
2005 Anark Corporation
1924 ArchVision, Inc.
2224 ARRI Inc.
824 e-on software, inc.
2100 Isilon Systems, Inc.

Booth

1152 Pipelinefx LLC
1511 SGI
1039, 1404 Softimage Co.
847 Unitek Information Technologies

Industrial Design
1312 Alias Systems Corp.
2005 Anark Corporation
1924 ArchVision, Inc.
1447 auto.des.sys, Inc.
2217 Digital-Tutors
1005 DMP Inc.
824 e-on software, inc.
1429 eyeon Software Inc.
1900 Hewlett-Packard Company
2114 Hypercosm, LLC.
2229 Immersion Corporation
1116 JourneyEd.com
2101 Okino Computer Graphics, Inc.
847 Unitek Information Technologies

Information Visualization
1015 Act-3D, B.V.
2005 Anark Corporation
1555 Antics Technologies Ltd.
1447 auto.des.sys, Inc.
1936 Barco
2203 Cycling '74
1005 DMP Inc.
824 e-on software, inc.
1429 eyeon Software Inc.
2114 Hypercosm, LLC.
2229 Immersion Corporation
2131 Immersive Media Company
1358 INRIA
1529 NewTek
1152 Pipelinefx LLC
1360 SensAble Technologies, Inc.
1511 SGI
1039, 1404 Softimage Co.
1419 Sunnybrook Technologies Inc.
847 Unitek Information Technologies

Input Devices
2130 3DConnexion
819 Akasaka Natural Vision Research Center
2125 Apace Systems Corporation
2147 GVS-Grande Vitesse Systems, Inc.
2229 Immersion Corporation
2061 InterSense
810 Measurand, Inc.
1455 Meta Motion
2214 P.I. Engineering, Inc.
1952 Point Grey Research Inc.
952 Polhemus
1360 SensAble Technologies, Inc.
2047 The3DShop.com
2208 Tobii Technology AB
847 Unitek Information Technologies
919 Wacom Technology Co.

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Interface Tools
1015 Act-3D, B.V.
1918 AJA Video Systems
2259 American Paper Optics, Inc.
2005 Anark Corporation
2229 Immersion Corporation
2061 InterSense
810 Measurand, Inc.
1455 Meta Motion
847 Unitek Information Technologies

Mapping and Cartography
824 e-on software, inc.

Medical Imaging Software
834 3Q/3dMD
2005 Anark Corporation
1005 DMP Inc.
1429 eyeon Software Inc.
913 MAXON Computer Inc.
947 Motion Analysis Corporation
1360 SensAble Technologies, Inc.
2247 Solid Modeling Solutions
937 Tekscan, Inc.

Mobile Computing
1137 BOXX Technologies, Inc.
1005 DMP Inc.
1900 Hewlett-Packard Company
1714 NVIDIA Corporation
2047 The3DShop.com
847 Unitek Information Technologies

Monitors and Displays
1519 Apple Computer, Inc.
1936 Barco
1011 Bell Computer
2147 GVS-Grande Vitesse Systems, Inc.
1900 Hewlett-Packard Company
2053 NEC Display Solutions of America, Inc.
1511 SGI
1419 Sunnybrook Technologies Inc.
2047 The3DShop.com
847 Unitek Information Technologies
919 Wacom Technology Co.

Motion Capture Equipment
834 3Q/3dMD
2125 Apace Systems Corporation
2147 GVS-Grande Vitesse Systems, Inc.
1900 Hewlett-Packard Company
2229 Immersion Corporation
2131 Immersive Media Company
2061 InterSense
1116 JourneyEd.com
810 Measurand, Inc.
1455 Meta Motion
947 Motion Analysis Corporation
1952 Point Grey Research Inc.
952 Polhemus
847 Unitek Information Technologies

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1300 Vicon Motion Systems

Motion Capture Software

834 3Q/3dMD
1846 Adobe Systems Incorporated
816 Andersson Technologies LLC
1547 Electronic Arts Inc.
1900 Hewlett-Packard Company
946 Image Metrics PLC
2131 Immersive Media Company
1358 INRIA
1116 JourneyEd.com
1455 Meta Motion
947 Motion Analysis Corporation
1952 Point Grey Research Inc.
1161 REALVIZ S.A.
1039, 1404 Softimage Co.
2104 Syflex LLC
849 THQ Inc.
847 Unitek Information Technologies
1300 Vicon Motion Systems

Multimedia Tools and Applications

1015 Act-3D, B.V.
1846 Adobe Systems Incorporated
2005 Anark Corporation
1519 Apple Computer, Inc.
1700 Autodesk Media and Entertainment
2015 Charles River Media
2203 Cycling '74
2217 Digital-Tutors
1005 DMP Inc.
824 e-on software, inc.
1429 eyeon Software Inc.
831 Florida Interactive Entertainment Academy
2114 Hypercosm, LLC.
2229 Immersion Corporation
1358 INRIA
2061 InterSense
1116 JourneyEd.com
1346 New Zealand Trade and Enterprise
2101 Okino Computer Graphics, Inc.
1055 Panoscan Inc.
1152 Pipelinefx LLC
2223 Reallusion
1161 REALVIZ S.A.
1039, 1404 Softimage Co.
1561 Virtools SA
2235 Westbridge Film School

Multimedia Tools and Applications-HW

1015 Act-3D, B.V.
2259 American Paper Optics, Inc.
2005 Anark Corporation
2125 Apace Systems Corporation
1936 Barco
2109 da Vinci Systems, LLC
2147 GVS-Grande Vitesse Systems, Inc.
2229 Immersion Corporation

Booth

2131 Immersive Media Company
2061 InterSense
1511 SGI
847 Unitek Information Technologies

Networking Equipment

818 AMAX Information Technologies
2125 Apace Systems Corporation
1011 Bell Computer
2140 DataDirect Networks Inc.
2147 GVS-Grande Vitesse Systems, Inc.
1900 Hewlett-Packard Company
2215 Maximum Throughput Inc.
2047 The3DShop.com
847 Unitek Information Technologies
953 Western Scientific

Networking Infrastructure

2125 Apace Systems Corporation
1900 Hewlett-Packard Company
847 Unitek Information Technologies
953 Western Scientific

OEM Components

1918 AJA Video Systems
1732 AMD
1011 Bell Computer
1137 BOXX Technologies, Inc.
1005 DMP Inc.
2147 GVS-Grande Vitesse Systems, Inc.
2061 InterSense
947 Motion Analysis Corporation
2214 P.I. Engineering, Inc.
952 Polhemus
937 Tekscan, Inc.
2208 Tobii Technology AB

Paint Systems

1846 Adobe Systems Incorporated
1700 Autodesk Media and Entertainment
1429 eyeon Software Inc.
913 MAXON Computer Inc.
1411 Pixologic, Inc.
1511 SGI
1039, 1404 Softimage Co.
847 Unitek Information Technologies

Printers and Plotters

1900 Hewlett-Packard Company
2047 The3DShop.com
847 Unitek Information Technologies
1128 Xerox Corporation

Projectors

819 Akasaka Natural Vision Research Center
2224 ARRI Inc.
1936 Barco
2047 The3DShop.com
847 Unitek Information Technologies

Booth

Publications

1110 A K Peters, Ltd.
1104 Addison-Wesley Professional/ Peach Pit Press
1124 Animation Magazine Inc.
1114 ASC-American Cinematographer
1051 Ballistic Media Pty. Ltd.
2015 Charles River Media
1906 Computer Graphics World
838 CRC Press, LLC,
1356 Focal Press
1113 Gnomon, Inc.
958 Hollywood Creative Directory
2230 IdN Magazine
2041 IEEE Computer Society
2037 millimeter
2123 The MIT Press
1355 Morgan Kaufmann Publishers
1060 RES Media Group
1059 SharpDots.com
2011 Springer
2135 Sybex, Inc.
1029 Thomson Course Technology PTR
2037 Video Systems
2235 Westbridge Film School

RAID Systems and Storage

818 AMAX Information Technologies
2125 Apace Systems Corporation
1011 Bell Computer
907 BlueArc Corporation
1137 BOXX Technologies, Inc.
2218 Ciprico, Inc.
2109 da Vinci Systems, LLC
2140 DataDirect Networks Inc.
2127 Doremi Labs Inc.
2147 GVS-Grande Vitesse Systems, Inc.
1900 Hewlett-Packard Company
2100 Isilon Systems, Inc.
1511 SGI
1039, 1404 Softimage Co.
1746 Texas Memory Systems
2047 The3DShop.com
847 Unitek Information Technologies
953 Western Scientific

Rendering and Modeling

1015 Act-3D, B.V.
1104 Addison-Wesley Professional/ Peach Pit Press
1846 Adobe Systems Incorporated
1312 Alias Systems Corp.
1555 Antics Technologies Ltd.
2125 Apace Systems Corporation
1519 Apple Computer, Inc.
1924 ArchVision, Inc.
1447 auto.des.sys, Inc.
1700 Autodesk Media and Entertainment
2116 Bionatics
1137 BOXX Technologies, Inc.

Booth

2201 Chaos Group
2217 Digital-Tutors
1005 DMP Inc.
1100 e frontier, Inc.
1547 Electronic Arts Inc.
824 e-on software, inc.
1429 eyeon Software Inc.
831 Florida Interactive Entertainment Academy
846 Genemation
901 Hash, Inc.
1900 Hewlett-Packard Company
2114 Hypercosm, LLC.
2229 Immersion Corporation
1358 INRIA
1021 InSpeck Inc.
1930 IntegrityWare, Inc.
1116 JourneyEd.com
913 MAXON Computer Inc.
1529 NewTek
2101 Okino Computer Graphics, Inc.
1152 Pipelinefx LLC
1411 Pixologic, Inc.
2223 Reallusion
2102 ResPower, Inc.
1360 SensAble Technologies, Inc.
1511 SGI
1039, 1404 Softimage Co.
2247 Solid Modeling Solutions
2138 Spheron VR AG
2104 Syflex LLC
2047 The3DShop.com
847 Unitek Information Technologies
2235 Westbridge Film School
953 Western Scientific

Robotics

2229 Immersion Corporation
2061 InterSense
947 Motion Analysis Corporation
1360 SensAble Technologies, Inc.

Scanners

834 3Q/3dMD
2224 ARRI Inc.
1900 Hewlett-Packard Company
2033 IMAGICA Corp.
2229 Immersion Corporation
1021 InSpeck Inc.
1116 JourneyEd.com
950 Konica Minolta Photo Imaging U.S.A., Inc
952 Polhemus
2047 The3DShop.com
847 Unitek Information Technologies

Scientific Application

819 Akasaka Natural Vision Research Center
2125 Apace Systems Corporation
2116 Bionatics
1137 BOXX Technologies, Inc.

Booth

1005 DMP Inc.
824 e-on software, inc.
2147 GVS-Grande Vitesse Systems, Inc.
2114 Hypercosm, LLC.
2229 Immersion Corporation
1358 INRIA
1116 JourneyEd.com
953 Western Scientific

Scientific Visualization

834 3Q/3dMD
1015 Act-3D, B.V.
1312 Alias Systems Corp.
2005 Anark Corporation
2125 Apace Systems Corporation
1447 auto.des.sys, Inc.
1700 Autodesk Media and Entertainment
2116 Bionatics
1137 BOXX Technologies, Inc.
2203 Cycling '74
1005 DMP Inc.
824 e-on software, inc.
1429 eyeon Software Inc.
846 Genemation
2147 GVS-Grande Vitesse Systems, Inc.
2114 Hypercosm, LLC.
2229 Immersion Corporation
1358 INRIA
1930 IntegrityWare, Inc.
913 MAXON Computer Inc.
1455 Meta Motion
1055 Panoscan Inc.
1360 SensAble Technologies, Inc.
1511 SGI
953 Western Scientific

Simulation

834 3Q/3dMD
1015 Act-3D, B.V.
2005 Anark Corporation
1555 Antics Technologies Ltd.
2125 Apace Systems Corporation
1924 ArchVision, Inc.
1936 Barco
1011 Bell Computer
2116 Bionatics
1137 BOXX Technologies, Inc.
2201 Chaos Group
2217 Digital-Tutors
1005 DMP Inc.
1429 eyeon Software Inc.
2114 Hypercosm, LLC.
2229 Immersion Corporation
2131 Immersive Media Company
1358 INRIA
1116 JourneyEd.com
1455 Meta Motion
2052 Orad Hi Tec Systems Ltd.
1360 SensAble Technologies, Inc.
1511 SGI
1039, 1404 Softimage Co.

Booth

2104 Syflex LLC

Storage Devices; Tape/Disk

2125 Apace Systems Corporation
907 BlueArc Corporation
2218 Ciprico, Inc.
2109 da Vinci Systems, LLC
2140 DataDirect Networks Inc.
2127 Doremi Labs Inc.
2147 GVS-Grande Vitesse Systems, Inc.
1900 Hewlett-Packard Company
2100 Isilon Systems, Inc.
1116 JourneyEd.com
2215 Maximum Throughput Inc.
1746 Texas Memory Systems
2047 The3DShop.com
847 Unitek Information Technologies
953 Western Scientific

Streaming Technology

1846 Adobe Systems Incorporated
2005 Anark Corporation
2125 Apace Systems Corporation
1011 Bell Computer
2100 Isilon Systems, Inc.
1116 JourneyEd.com
2111 Mitsue-Links Co., Ltd.
1529 NewTek
1952 Point Grey Research Inc.
1511 SGI
1746 Texas Memory Systems
2047 The3DShop.com
847 Unitek Information Technologies

Systems Integrators

834 3Q/3dMD
818 AMAX Information Technologies
2125 Apace Systems Corporation
1936 Barco
1011 Bell Computer
1455 Meta Motion
2111 Mitsue-Links Co., Ltd.
2047 The3DShop.com
953 Western Scientific

Terminals, Monitors and Displays

1936 Barco
2147 GVS-Grande Vitesse Systems, Inc.
1900 Hewlett-Packard Company
1511 SGI
1419 Sunnybrook Technologies Inc.
2047 The3DShop.com
847 Unitek Information Technologies

Video Effects Equipment

2125 Apace Systems Corporation
2110 B&H Photo-Video-Pro Audio Corp.
1011 Bell Computer
2109 da Vinci Systems, LLC
1005 DMP Inc.
1429 eyeon Software Inc.

Booth

2147 GVS-Grande Vitesse Systems, Inc.
2131 Immersive Media Company
2061 InterSense
1529 NewTek
2052 Orad Hi Tec Systems Ltd.
1511 SGI
1039, 1404 Softimage Co.
847 Unitek Information Technologies
2235 Westbridge Film School

Video Encoding and Compression

2039 3D Pipeline Simulation Corporation
2125 Apace Systems Corporation
2110 B&H Photo-Video-Pro Audio Corp.
1137 BOXX Technologies, Inc.
2127 Doremi Labs Inc.
1116 JourneyEd.com
2111 Mitsue-Links Co., Ltd.
1529 NewTek
1511 SGI
1039, 1404 Softimage Co.
2047 The3DShop.com
847 Unitek Information Technologies
2235 Westbridge Film School

Video Servers

2125 Apace Systems Corporation
2110 B&H Photo-Video-Pro Audio Corp.
1011 Bell Computer
1137 BOXX Technologies, Inc.
2109 da Vinci Systems, LLC
2127 Doremi Labs Inc.
2147 GVS-Grande Vitesse Systems, Inc.
2052 Orad Hi Tec Systems Ltd.
1511 SGI
2047 The3DShop.com
847 Unitek Information Technologies
953 Western Scientific

Visual Effects Software

1015 Act-3D, B.V.
1104 Addison-Wesley Professional/ Peach Pit Press
1846 Adobe Systems Incorporated
1312 Alias Systems Corp.
816 Andersson Technologies LLC
1555 Antics Technologies Ltd.
2125 Apace Systems Corporation
1519 Apple Computer, Inc.
1146 Artbeats, Inc.
1447 auto.des.sys, Inc.
1700 Autodesk Media and Entertainment
2116 Bionatics
2203 Cycling '74
2217 Digital-Tutors
1005 DMP Inc.
824 e-on software, inc.
1429 eyeon Software Inc.
831 Florida Interactive Entertainment Academy
2139 GenArts, Inc.

Booth

901 Hash, Inc.
1900 Hewlett-Packard Company
946 Image Metrics PLC
2033 IMAGICA Corp.
1116 JourneyEd.com
913 MAXON Computer Inc.
1529 NewTek
2052 Orad Hi Tec Systems Ltd.
1160 The Orphanage Inc.
2107 Photron USA, Inc.
1152 Pipelinefx LLC
1161 REALVIZ S.A.
1511 SGI
1119 Side Effects Software Inc.
1039, 1404 Softimage Co.
1437 Sony Pictures Imageworks Inc.
2139 SpeedSix Software Limited
2104 Syflex LLC
847 Unitek Information Technologies
2235 Westbridge Film School
2152 wondertouch, LLC

VR Software

1015 Act-3D, B.V.
2005 Anark Corporation
1936 Barco
2116 Bionatics
1005 DMP Inc.
2229 Immersion Corporation
1358 INRIA
1455 Meta Motion
947 Motion Analysis Corporation
1161 REALVIZ S.A.
1360 SensAble Technologies, Inc.
1511 SGI
1039, 1404 Softimage Co.
1561 Virtools SA

Web 3D

834 3Q/3dMD
1015 Act-3D, B.V.
1104 Addison-Wesley Professional/ Peach Pit Press
1312 Alias Systems Corp.
2259 American Paper Optics, Inc.
2005 Anark Corporation
1555 Antics Technologies Ltd.
2125 Apace Systems Corporation
1924 ArchVision, Inc.
1700 Autodesk Media and Entertainment
1137 BOXX Technologies, Inc.
2217 Digital-Tutors
1100 e frontier, Inc.
1547 Electronic Arts Inc.
824 e-on software, inc.
1429 eyeon Software Inc.
831 Florida Interactive Entertainment Academy
2114 Hypercosm, LLC.
2229 Immersion Corporation
1021 InSpeck Inc.

Booth

1930 IntegrityWare, Inc.
1116 JourneyEd.com
913 MAXON Computer Inc.
1455 Meta Motion
2111 Mitsue-Links Co., Ltd.
2101 Okino Computer Graphics, Inc.
1055 Panoscan Inc.
1161 REALVIZ S.A.
1039, 1404 Softimage Co.
2247 Solid Modeling Solutions
2047 The3DShop.com
849 THQ Inc.
847 Unitek Information Technologies
1561 Virtools SA
2235 Westbridge Film School

Web Graphics

1015 Act-3D, B.V.
1104 Addison-Wesley Professional/ Peach Pit Press
1846 Adobe Systems Incorporated
1312 Alias Systems Corp.
2005 Anark Corporation
2125 Apace Systems Corporation
1137 BOXX Technologies, Inc.
2217 Digital-Tutors
1547 Electronic Arts Inc.
1429 eyeon Software Inc.
831 Florida Interactive Entertainment Academy
2114 Hypercosm, LLC.
1116 JourneyEd.com
2111 Mitsue-Links Co., Ltd.
2101 Okino Computer Graphics, Inc.
2223 Reallusion
1161 REALVIZ S.A.
1039, 1404 Softimage Co.
2047 The3DShop.com
849 THQ Inc.
847 Unitek Information Technologies

Workstations

818 AMAX Information Technologies
1732 AMD
1011 Bell Computer
1137 BOXX Technologies, Inc.
1906 Computer Graphics World
2147 GVS-Grande Vitesse Systems, Inc.
1900 Hewlett-Packard Company
2052 Orad Hi Tec Systems Ltd.
1511 SGI
2047 The3DShop.com
847 Unitek Information Technologies
953 Western Scientific

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ACM SIGGRAPH

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Chapters of ACM SIGGRAPH exist in 70 cities in 16 countries around the world. They form an international multi-cultural network of people who develop, share, continue, and extend the work and achievements presented at the annual conference. Chapter members include those involved in research, development, education, art, gaming, visualization, and entertainment, just to name a few. Student chapters have been chartered in 10 schools. These groups host activities on their campuses that highlight computer graphics and interactive techniques. For more information about the ACM SIGGRAPH network of chapters, or if you would like to start a Professional or Student Chapter, visit: **chapters.siggraph.org**

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ACM SIGGRAPH awards the prestigious Steven A. Coons award for lifetime achievement, the Computer Graphics Achievement Award for notable achievements, the Outstanding Service Award for extraordinary service to ACM SIGGRAPH by a volunteer, and the Significant New Researcher Award, for new contributors to our field. For a list of past award recipients, visit: **www.siggraph.org/awards**

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SIGGRAPH Video Review

SIGGRAPH Video Review is the world's most widely circulated video-based publication. Over 150 programs document the annual SIGGRAPH Computer Animation Festival, providing an unequaled opportunity to study state-of-the-art computer graphics techniques, theory, and applications. New releases and recent issues available in DVD format. Visit the SIGGRAPH Review booth near the SIGGRAPH 2005 Store in the South Lobby. For information, contact: **svrorders@siggraph.org**

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cooperative agreements

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www.anzgraph.org

AFRIGRAPH
AFRIGRAPH promotes computer graphics, virtual reality, and interactive techniques in Africa. It adapts these technologies to the realities of the African region, builds links between research and industry, encourages international participation of African researchers, and promotes computer graphics and interactive techniques as leading African research and application activities.
www.afrigraph.org/organisation/

China Society of Image and Graphics (CSIG)
China Society of Image and Graphics is an academic society of scholars and engineers engaged in basic research, software and hardware development, or their applications in imaging and graphics. CSIG promotes research and development in theory and high technology, and advances popularization and applications of computer graphics.
www.jig.com.cn

Computer Graphics Arts Society (CG-ARTS)
The Computer Graphics Arts Society, officially recognized by the Japanese government in 1992, is a publicly funded body dedicated to promoting Japanese computer graphics education. It is also dedicated to developing a distinctive Japanese media arts culture in the 21st century by extending support to media-arts-related activities and artists.
www.cgarts.or.jp/

Digital Content Association of Japan (DCAj)
As digital content changes society and business, DCAj is promoting production, distribution, and use of high-quality digital content that will lead today's networked society.
www.dcaj.or.jp/

Eurographics
The European Association for Computer Graphics is a professional association that assists members with their work and careers in computer graphics and interactive digital media. Eurographics has members worldwide and maintains close links with developments in the USA, Japan, and other countries, but inviting speakers from those countries to participate in Eurographics events and by sending representatives to other events.

ACM SIGGRAPH has an affiliation agreement with Eurographics that entitles members who join both organizations to receive a discounted membership rate.
www.eg.org/

Imagina
Imagina, the 24th European Digital Content Creation Festival, will be held at the Grimaldi Forum in Monte Carlo, 1-3 February 2006. Imagina focuses on the major challenges of the digital imaging industry. International experts provide insight into the state of the art and consider prospects in the main research areas of the imaging industry.
www.imagina.mc

International Game Developers Association (IGDA)
The International Game Developers Association is a non-profit association established by game developers to foster creation of a worldwide game development community. The IGDA's mission is to build a community of game developers that leverages the expertise of its members for the betterment of the industry and the development of the art form.
www.igda.org
info@idga.org

International Visual Literacy Association (IVLA)
The International Visual Literacy Association is a not-for-profit association of educators, artists, and researchers dedicated to the principles of visual literacy. It was formed for the purpose of providing education, instruction, and training in modes of visual communication and their application through the concept of visual literacy to individuals, groups, organizations, and the general public.
www.ivla.org/

Nordic Interactive
Nordic Interactive focuses on initiating and stimulating research, development, and education in interactive digital technology in the Nordic countries (Denmark, Norway, Finland, Sweden). The organization facilitates collaboration among businesses, research, development, and education communities to create links among planned and existing projects, programs, and activities.
www.nordicinteractive.org
secr@nordicinteractive.org

SEAGRAPH
SEAGRAPH is a society headquartered in Singapore and is intended to bring together computer graphics professionals and enthusiasts in Southeast Asia, to help promote the technology in the region. The technology includes rendering techniques, graphical/geometric data compression, gaming, VR, general computer graphic techniques, and so forth.
www.seagraph.org

Swedish Computer Graphics Society (SIGRAD)
SIGRAD constitutes a meeting place for academic researchers and students, and professionals in industry with an interest in computer graphics and its applications. SIGRAD organizes an annual national conference on computer graphics as well as several workshops on various computer graphics themes.
www.sigrad.org

acknowledgements

Art Gallery

Academy of Media Arts
Advanced Micro Devices, Inc.
The American Museum of the Moving Image
Apple Computer, Inc.
ATI Technologies Inc.
ATOA - Artists Talk on Art
Bowling Green State University
British Council
Carnegie Mellon University
Charles Morrow Associates, Inc.
Concordia University
CTX Technology
Edgeworx
Epson, Inc.
Futurefarmers
Goldsmiths College
Harvard University
Intelligent Agent
Kavli Institute for Theoretical Physics
at University of California Santa Barbara
Mechanism Digital, Inc.
Media Art and Technology, University of California,
Santa Barbara
Musashino Art University
New York Institute of Technology
New York University
Parsons School of Design, Department
of Design and Technology
Pratt Institute, Office of the Provost
Pratt Institute, Office of the Dean of Fine Arts
Pratt Institute, Computer Graphics and Interactive
Media Department
Purdue University
Quinnipiac University
School of Visual Arts
Texas A&M University, Interface Ecology Lab
The Kitchen
Tokyo Museum of Photography
Turbulence
University at Buffalo
University of Hawaii at Hilo, Humanities Division
University of Maine-New Media
University of Massachusetts-Dartmouth
University of New Mexico
University of Plymouth-Planetary Collegum
University of Southern California, School of Cinema-
Television, Interactive Media Division
University of Texas at Dallas
Wacom Technology Corporation
William Paterson University
Womens Studio Workshop
WPS1.org

Computer Animation Festival

Academy of Art University
Advanced Micro Devices, Inc.
Apple Computer, Inc.
Cabaret Chocolates
Christie Digital
CTX Technology
Ex'pression College for Digital Arts
Industrial Light & Magic
J.Walt Adamczyk
LodeStar Astronomy Center
NVIDIA Corporation
Panasonic
Penguin Flight Dynamics
Pixar Animation Studios
Rough House Editorial
Sky-Skan
Snader and Associates
University of New Mexico
Visionary Forces, Inc.
Wild Brain

Courses

The Art Institute of California - San Diego
California Institute of Technology
Hewlett-Packard Company
NVIDIA Corporation
Pixar Animation Studios
Rochester Institute of Technology
Silicon Graphics, Inc.

Cyber Fashion Show

5th Dimension Technologies
Adidas
Alps Electric Corporation
AMF Korsets
Anissë Designs
Aoyama Morikawa Laboratory
Applied Effects
Arts Queensland
ArtSway
Australia Arts Council
Banff New Media Institute
BioControl Systems
Burning Man Nation
Central Saint Martins College of Art & Design
Charmed Technology
CLUTCH
Conselho Nacional de Desenvolvimento
Cientfico e Tecnológico
Core Research for Evolutional Science and Technology
of Japan Science and Technology Agency
CuteCircuit
Cyberoptix
Electroboutique
eMagin Corporation
Enlighted Designs
Fundação de Amparo à Pesquisa do Estado
de São Paulo
FOSSIL
Galatea Productions
Greg Passmore Photography
Heritage Canada
Institute of Advanced Media Arts and Sciences
Institute of Arts, Universidade Estadual de Campinas
Interaction Design Ivrea
Jennifer Berry
Kaos Software
Keio University
Kobe University
Ludica
MAC Makeup
Massachusetts Institute of Technology Media Lab
MicroStone Corporation
Mikids Design Studio
mintymonkey
Mutaytor
MuTech Corp
New Media Research Networks
NTT Micro Integration Laboratories
Nyx
Oakley, Inc.
Pacific Neotek
PAN
Penn State Altoona
Psi-hoops
Psycho Girlfriend
Psymbiote Project
Ratstar Labs
Robochrist
See-Throo
Sensory Engineering
Shimadzu Corporation
Simon Fraser University
SintheteX Fashions
Skydeas: Seams
SMack! NYC
SmartInternet Technology CRC
Sony CSL
Soul in the Machine
Stephen F. Austin State University
Stephen Hues
Strange Attractors
Suzanne Bernel Photography
Teijin Corporation
Terpin Communications
The Advanced Institute of Wearable Environmental
Information Networks
The SMARTlab Centre, Central St. Martins
College of Art & Design
The University of Tokyo
Tsukamoto Laboratory
Tyler School of Art, Temple University
Ube Pallet Leasing Corporation
University of California, Irvine
University of California, Riverside
Wicked Talent
Yamatake Corporation
Z Media

Educators Program

Advanced Micro Devices, Inc.
CTX Technology

Emerging Technologies

Advanced Micro Devices, Inc.
CTX Technology
JVC Professional
National Center for Supercomputing Applications,
University of Illinois
QuVIS, Inc.

Emerging Technologies - Access Grid

inSORS Integrated Communications, Inc.
Internet2 Commons
ItaP, Purdue University
JVC Professional
National Center for Supercomputing Applications, University of Illinois
Purdue University
Stewart FilmScreen

GraphicsNet

Advanced Micro Devices, Inc.
Apple Computer, Inc.
Associated Technologies & Data Recovery
Cisco Systems, Inc.
Cromwell International
CTX Technology
Darkstar Technologies
Farrotech Computers
Fluke Networks, Inc.
Lee County School District
Purdue University INAC/NCN
Reality Pixels, Inc.
Sun Microsystems, Inc.

Guerilla Studio

3D Compression Technologies Inc
3Dvfx.net
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Advanced Micro Devices, Inc.
Alias Systems Corp.
Amigos de los Rios
Apple Computer, Inc.
Arizona State University
Autodesk, Inc.
Auto.des.sys, Inc.
Bauhaus Inc.
John Brock
Cakewalk
Caligari Corporation
Celia Pearce & Friends
ColorByte Software
Cool Neon
Corel Corporation
Crytek GmbH
CTX Technology
Cycling '74
Daniel Smith Inc.
Tara DeMarco
Digital Atelier
Digital Domain, Inc.
Dimension 3D Printing
e frontier America, Inc.
Edirol Corporation
Epson, Inc.
Fakespace Systems, Inc.
Four Chambers Studio
GarageGames, Inc.
Gibson
The Gnomon Workshop, Inc.
Helen Golden
Golden Artist Colors, Inc.
Bob Gould
GretagMacbeth AG
Groveland Software Labs, Inc.
Hahnemühle FineArt
Howe Stream Productions
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Images by Nutty
ImagiNail
inkAID
Institute for Studies in the Arts, Arizona State University
Integrated Color Solutions, Inc.
Intel Corporation
InterSense
kathybeal.com
Knowledge Adventure
Kreysler and Associates
LimeLite Media
Lightspeed Design, Inc.
Linden Lab
LizardTech, Inc.
Lyn Bishop
Ludica
Luxology
M Ragsdale Wright Studios
Materialise
Magnetic Eagle Productions
MAXON Computer, Inc.
Monterey Bay Aquarium Research Institute
Motion Graphix
NewTek
NVIDIA Corporation
Otis College of Art + Design
Parker & Associates
Peak Media
Penn State Altoona
PhaseSpace
Pixologic, Inc.
Portland State University
PRISM at Arizona State University
Psymbiote Project
Raindrop Geomagic, Inc.
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Red River Paper
Rigel Instruments, Ltd.
Right Hemisphere
Robert McNeel & Associates
SensAble Technologies, Inc.
Shades of Paper
SintheteX Fashions
Softimage Co.
Sony Electronics
Sony Pictures Imageworks
Stratasys, Inc.
Synthetik Software, Inc.
Toonboom Animation, Inc.
Tyler School of Art, Temple University
Universal Laser Systems, Inc.
University of California, San Diego
University of Southern California
ViewSonic Corporation
Kimberly Voigt
Emily L. Young
Wacom Technology Corporation
Way Cool Nails
X-Rite
Z Corporation

International Resources

Sandro Alberti, fen-om.com
Advanced Micro Devices, Inc.
CTX Technology
Media Innovations
Pontifícia Universidade Católica do Rio de Janeiro
UT Research Institute, The University of Tokyo

Panels

NVIDIA Corporation
The Gnomon Workshop, Inc.

Papers

Eidgenössische Technische Hochschule Zürich
Microsoft Corporation
Mitsubishi Electric Research Laboratories (MERL)
NVIDIA Corporation
Pixar Animation Studios

Pathfinders

Middle Tennessee State University
North Carolina State University

Sketches

NVIDIA Corporation

Special Sessions

Sony Pictures Imageworks
The Gnomon Workshop, Inc.

Student Volunteers

Alias Systems Corp.
Alien Skin Software, LLC.
Alienware Corp.
The Art Institutes
Advanced Micro Devices, Inc.
Anark Corporation
Animation Magazine
Autodesk, Inc.
Auto.des.sys, Inc.
Bauhaus Inc.
Ballistic Media
Boxx Technologies
Blue Sky Studios/20th Century Fox Animation
Caligari Corporation
Digital-Tutors
DreamWorks LLC
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Electronic Arts Inc.
Extensis, Inc.
Eyeon Software Inc.
The Gnomon Workshop, Inc.
Hash, Inc.
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NewTek
NVIDIA Corporation
O'Reilly Media, Inc.
PalmSource, Inc.
Pixar Animation Studios
Pixologic
PNY Technologies
Purdue University
Right Hemisphere
Rhythm & Hues Studios
Softimage Co.
Sony Pictures Imageworks
Sybex Publishing
Turbo Squid, Inc.
Wacom Technology Corporation
The Walt Disney Company
John Wiley & Sons, Inc.

Web Program

Amazon.com
New York University
Purdue University

General

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Alienware
CTX Technology
Intel Corporation
Macworld Magazine
NVIDIA Corporation
Purdue University
Purdue University College of Technology at New Albany
Purdue University College of Technology at South Bend
Purdue University College of Technology at West Lafayette
The Art Institutes
The Scooter Store

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In the next 12 months, there's only one opportunity to experience revolutionary computer graphics and interactive techniques: SIGGRAPH 2006 in Boston.

interact with the world's leading experts, as they present advanced theory and practical applications. see the year's finest international achievements in scientific visualization, digital art, animation, and visual effects. interface with SIGGRAPH Pioneers and emerging achievers. exchange ideas, insights, and inspiration with people who share your goals and aspirations.

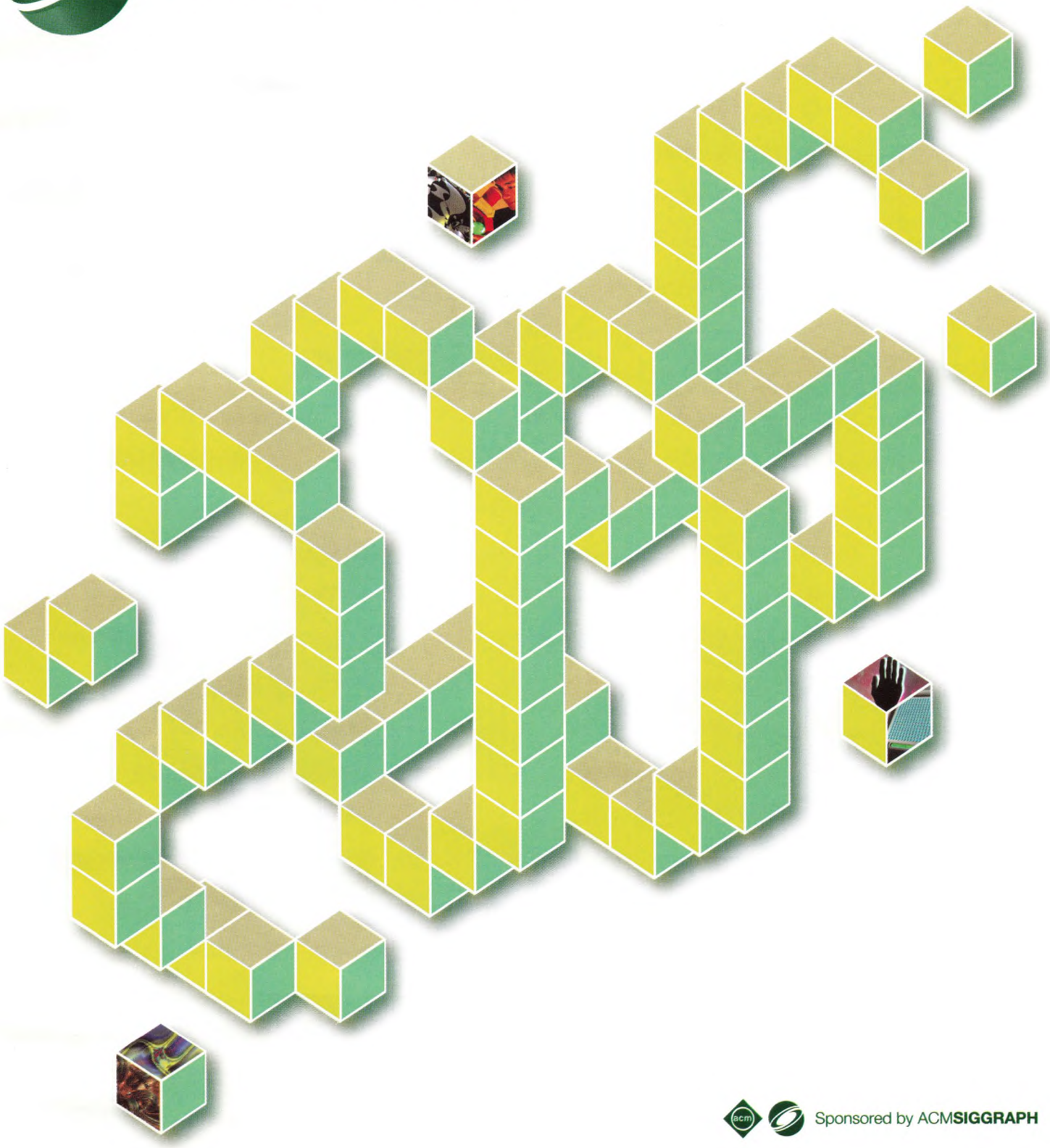
On 4 August, you'll be energized and prepared for another year of action in research, development, creativity, and production.

www.siggraph.org/s2006

The 33rd International Conference on Computer Graphics and Interactive Techniques

Conference 30 July - 3 August 2006 Exhibition 1 - 3 August 2006 Boston Convention & Exhibition Center Boston, Massachusetts USA

SIGGRAPH2006



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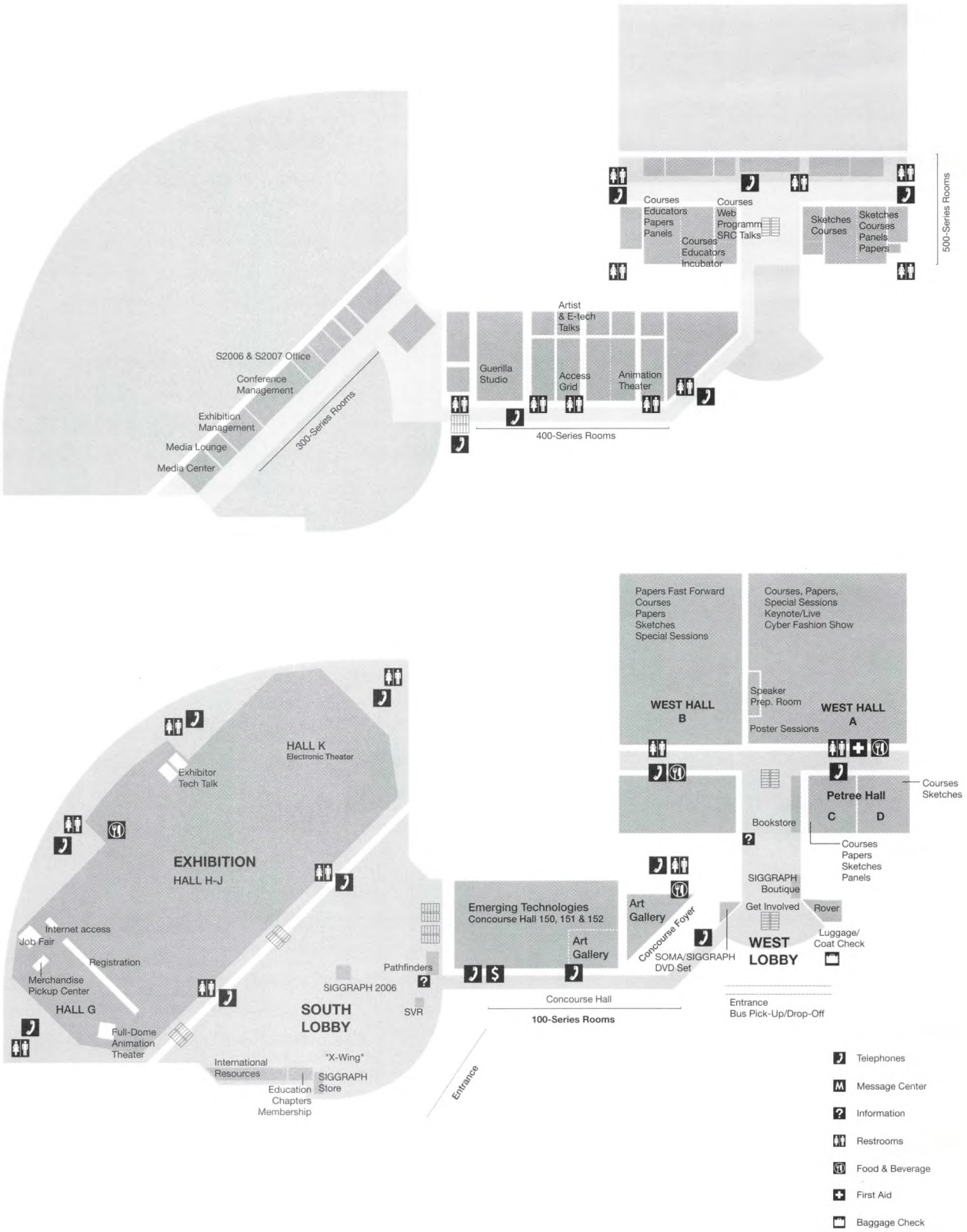

ACM Student Research Competition

Tuesday, 2 August, 3:45 – 5:30 pm
Room 501AB

Sponsored by Microsoft Research, the ACM Student Research Competition is an internationally recognized opportunity for undergraduate and graduate researchers to:

- **Share research results**
- **Exchange ideas and gain new insights**
- **Meet and talk with academic and industry luminaries**
- **Understand the possible, practical applications of their research**
- **Perfect their communications skills**

Finalists will be selected to present a talk on Tuesday, 2 August, 3:45 – 5:30 pm at SIGGRAPH 2005.
For more detailed information: www.siggraph.org/s2005

Call for Volunteers

ACM SIGGRAPH relies heavily on volunteers to plan and produce the premier international conference on computer graphics and interactive techniques. Volunteer opportunities for this vibrant event include: future conference chairs, SIGGRAPH 2006 sub-committee members. SIGGRAPH 2007 program chairs, and additional on-site volunteers for most years. Explore how you can contribute your ideas, energy, and expertise at: www.siggraph.org/volunteering

Co-Located Events

The annual SIGGRAPH conference is expanding the number and breadth of co-located workshops and small conferences. Three events are co-located with SIGGRAPH 2005:

Association of Medical Illustrators 60th Annual Conference Workshops: 28 July - 29 July 2005
Conference: 30 July - 1 August 2005
California Lutheran University
Los Angeles, California

The Association of Medical Illustrators (AMI) exists to advance right and left brain collaboration in producing visual media that effectively communicates bioscientific concepts. The AMI conference fosters and celebrates this synergy of science and artistry that brings the magic of understanding, and our 2005 program taps LA creative resources that fuel life, business, and art.

For more information and registration: www.ami.org/events/events.php

ACM SIGGRAPH/Eurographics Symposium on Computer Animation
29-31 July 2005
Hyatt Regency Hotel
Los Angeles, California

The Symposium on Computer Animation (SCA) is a premier forum for disseminating the latest research results in computer animation. SCA provides an opportunity for computer animation researchers to interact, share new results, show live demonstrations of their work, and discuss emerging research directions for the field.

For more information and registration: www.cs.ucr.edu/rgl/sca

SIGGRAPH/Eurographics Graphics Hardware 2005
30 – 31 July 2005
Wilshire Grand Hotel
Los Angeles, California

Graphics Hardware is a highly visible, established international forum for exchanging experience and knowledge related to computer graphics hardware. The event, held annually since 1986, offers a unique perspective on graphics hardware by combining discussions and constructive critique of innovative concepts as well as product-level designs. It is an inclusive forum for the entire graphics hardware community and brings together researchers, engineers, and architects. The program features two days of paper and industry presentations

For more information and registration: www.graphicshardware.org/

Inquiries about co-locating events with the annual SIGGRAPH conference should be directed to:

Barbara Helfer
ACM SIGGRAPH Vice President
colocated@siggraph.org

Future Conference Dates

SIGGRAPH 2006
30 July - 3 August 2006
Boston, Massachusetts

SIGGRAPH 2007
5 - 9 August 2007
San Diego, California